COMPUTER INFO-GALLERY

VOLUME - 5

(2016-17)

Students' Assignments as IT Encyclopedia

PREFACE

This book is intended to make the new-comers (students) to the Department of Computer Science (UG), who does not have the ideas regarding the basics of the Computer and its terminologies. It can also help the students from computer backdrop, to make a review regarding IT terminologies and concepts. Already 4 Volumes has been launched during 2012-16.

The thought of publishing this book arises as a sparkle to make the Student's Assignments, in an organized manner. I had an idea that, if the topics given to the students to prepare their Assignments are non-repetitive, then they may do it without copying others' content. Then, I thought why not we club it together in the form of a book, which will help other students also. That is how this book got emerged. This is 5th Volume for the academic year 2016-17 with some other useful contents to make the students very well equipped in the foundation level especially for the students who come into the area of Autonomous.

The copy of this book will be maintained in the Department Library and also the e-content of this has been posted in our college website. I hereby deliver my heartfelt thanks to the most honorable Correspondent Sir, the respected Principal Sir, and the beloved H.O.D. (CS) Prof .P.Ramesh sir, who gave me the freedom, to conduct an activity of this kind. I thank my colleagues and my senior faculty members who have given me a moral support. I also thank my dear students for their co-operation. I hereby assure that the Department of Computer Science (UG) will always find ways for the betterment of the students.

Thanking You,

INFO- GALLERY IN-CHARGE

(R.Sundar Raj)

INDEX

BEST WISHES

To all your present and future innovations for the betterment of our students and the Institution……

H.O.D **Principal** **Correspondent**

Assignment Contributions

Class : I B.Sc (CS) - 'A'

S.NO	NAME	TOPIC NO.	PAGE NO.
01	T. PAVITHRA	01	01
02	S. PRASATH	02	03
03	S. ASHIQ MOHAMED	03	05
04	K. A. SREYA	04	07
05	K. JABA ROSE	05	09

UNDER THE GUIDANCE OF: Mr. T. VELUMANI

Class : I B.Sc (CS) - 'B'

S.NO	NAME	TOPIC NO.	PAGE NO.
06	R. SOUNDHAR	06	11
07	P. EZHILARASI	07	13
08	P. KAVIYA	08	15
09	M. D. NANDHINI	09	17
10	N. NANDHINI	10	19

UNDER THE GUIDANCE OF: Mr. S. SIVARAJA

Class : I B.Sc (CS) - 'C'

S.NO	NAME	TOPIC NO.	PAGE NO.
11	M. DHANASHEKARAN	11	21
12	S. ALAGUSUDHAN	12	23
13	K. SHAFEERA	13	25
14	G. SANMATHI	14	27
15	S. KEERTHANA	15	29

UNDER THE GUIDANCE OF: Mr. A. R. KARTHEKEYAN

Class : II B.Sc (CS) - 'A'

S.NO	NAME	TOPIC NO.	PAGE NO.
16	S. VINOTHAN	16	31
17	B. M. ANANDHI	17	33
18	A. JEEVANANTHAM	18	35
19	P. PRIYA	19	37
20	E. HARIHARAN	20	39

UNDER THE GUIDANCE OF : Ms. K. GOMATHY

Class : II B.Sc (CS) - 'B'

S.NO	NAME	TOPIC NO.	PAGE NO.
21	V. LOGESHWARAN	21	41
22	A. PRABHU	22	43
23	M. NIZAR AHAMED	23	45
24	B. M. SRIGURUPRASAATH	24	47
25	A. KARTHIKA	25	49

UNDER THE GUIDANCE OF : Ms. P. THENMOZHI

Class : II B.Sc (CS) - 'C'

S.NO	NAME	TOPIC NO.	PAGE NO.
26	S. ANGUKARTHIKEYAN	26	51
27	G. HAMALY SRI	27	53
28	J. BALAJI	28	55
29	P. SURESH KUMAR	29	57
30	B.R. CHAITHRA	30	59

UNDER THE GUIDANCE OF : Ms. R. SAVEETHA

Class : III B.Sc (CS) - 'A'

S.NO	NAME	TOPIC NO.	PAGE NO.
31	P. HARIHARAN	31	61
32	J. SURYA	32	63
33	S.P. SANJAY KARAN	33	65
34	B. ROSHINI	34	67
35	R. RESHMA	35	69

UNDER THE GUIDANCE OF: Ms. S. GOWTHAMI

Class : III B.Sc (CS) - 'B'

S.NO	NAME	TOPIC NO.	PAGE NO.
36	R. MYTHILI	36	71
37	S. CHANDRA PRIYADHARSHINI	37	73
38	L. VIJAYA PRIYA	38	75
39	K. LOGESHWARA RAO	39	77
40	M. KARTHIKEYAN	40	79

UNDER THE GUIDANCE OF: Ms. R. PUSHPALATHA

Class : III B.Sc (CS) - 'C'

S.NO	NAME	TOPIC NO.	PAGE NO.
41	K. INDHU	41	81
42	N. MEENAPRIYA	42	83
43	R. KIRUTHIGA	43	85
44	V. SINDHU	44	87
45	B. ANUSUYA DEVI	45	89

UNDER THE GUIDANCE OF: Mr. D. GOPINATH

01. ACTIVE MATRIX IN COMPUTER

Introduction

Active matrix is a type of addressing scheme used in flat panel displays. In this method of switching individual elements (pixels), each pixel is attached to a transistor and capacitor actively maintaining the pixel state while other pixels are being addressed in contrast with the older passive matrix technology in which each pixel must maintain its state passively, without being driven by circuitry. The active matrix technology was invented by Bernard J. Lechner at RCA and first demonstrated as a feasible device using thin-film transistors (TFTs) by T. Peter Brody. Given an m × n matrix, the number of connectors needed to address the display is m + n (just like in passive matrix technology). Each pixel is attached to a switch-device, which actively maintains the pixel state while other pixels are being addressed, also preventing crosstalk from inadvertently changing the state of an unaddressed pixel. The most common switching devices use TFTs i.e. a FET based on either the cheaper non-crystalline thin-film silicon (a-Si), polycrystalline silicon (poly-Si), or cd Semiconductor material.

Advantages of active matrix

The common type of display technology used in all modern LCD and OLED computer, TV and mobile device screens. Active matrix is sharper and has more contrast than less expensive passive matrix screens. Active matrix does not suffer from the "submarining" effect, in which the cursor disappears when moved rapidly.

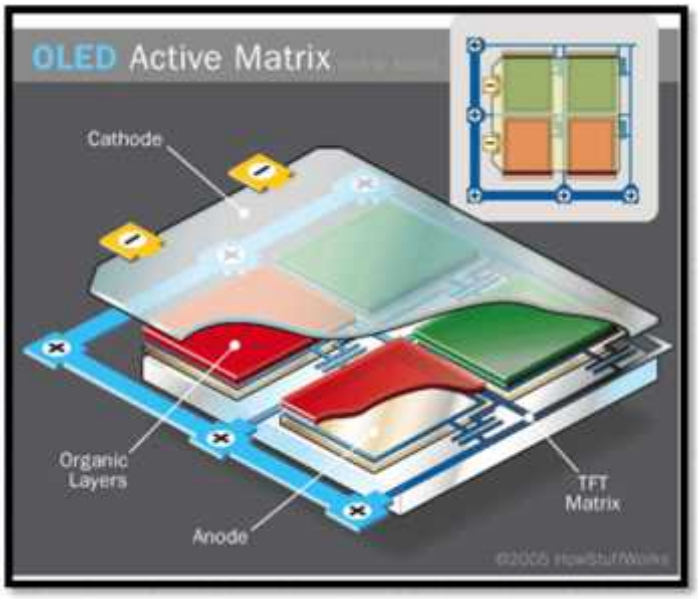
Disadvantage of active matrix

While active-matrix displays do have a crisp picture because each pixel has its own transistor, they consume more power when running off of a battery. Also, because of the number of transistors, there is more of an opportunity for dead pixels.

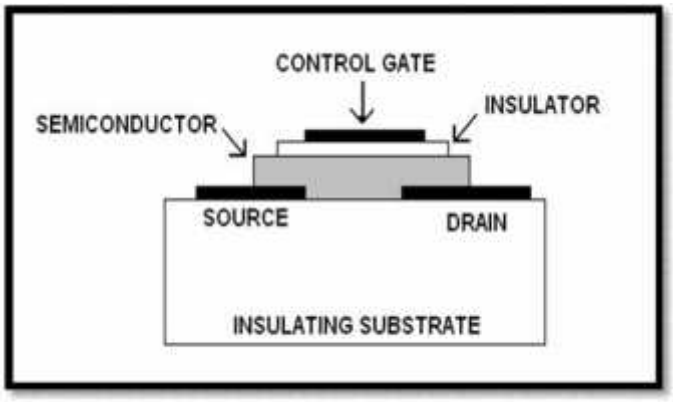
The active-matrix may have disadvantages like any technology. However, is still recommended by most over the dual-scan technology.

Liquid Crystal Display

An active-matrix liquid-crystal display(AMLCD) is a type of flat panel display, the only viable technology for high-resolution TVs, computer monitors, notebook computers, tablet computers and with an LCD screen, due to low weight, very good image quality, wide color gamut.



TFF devices:



Lecomber proposed a TFT using amorphous hydrogenated silicon (Si:H) as the active layer material. Amorphous hydrogenated silicon was preferred over the pure amorphous silicon due to the fact that it can be doped with both donors and acceptors forming n-type and p-type TFT devices. Thin-film, formed with a-Si:H, have no grain boundaries and it was the most cost-effective technology.

02. ACTIVEX CONTROL

Introduction

An ActiveX control is a component program object that can be re-used by many application programs within a computer or among computers in a network. The technology for creating ActiveX controls is part of Microsoft's overall ActiveX set of technologies, chief of which is the Component Object Model (COM). ActiveX controls can be downloaded as small programs or animations for Web pages. In general, ActiveX controls replace the earlier OCX (Object Linking and Embedding custom controls). An ActiveX control is roughly equivalent in concept and implementation to the Java applet.

Microsoft introduced ActiveX in 1996. In principle, ActiveX is not dependent on Microsoft Windows operating systems, but in practice most ActiveX controls only run on Windows. Most also require the client to be running on anx86-based computer because ActiveX controls contain compiled code. ActiveX is still supported as of Windows10, through Internet Explorer 11, while ActiveX is not supported in their default web browser Microsoft Edge (that has a different incompatible extension system).

ActiveX controls

Formerly Object Linking and Embedding, ActiveX is one of the major technologies used in component-based software engineering. Compared with JavaBeans, ActiveX supports more programming languages, but JavaBeans supports more platforms. ActiveX is supported in many rapid application development technologies, such as Active Template Library, Delphi, JavaBeans, Microsoft Foundation Class Library, Qt, Visual Basic, Windows Forms and wx Widgets, to enable application developers to embed ActiveX controls into their products.

Applications of ActiveX controls

Many Microsoft Windows applications including many of those from Microsoft itself, such as Internet Explorer, Microsoft Office, Microsoft Visual Studio, and Windows Media Player use ActiveX controls to build their feature set and also encapsulate their own functionality as ActiveX controls which can then be embedded into other applications. Internet Explorer also allows the embedding of ActiveX controls in web pages.

History

Faced with the complexity of OLE 2.0 and with poor support for COM in MFC, Microsoft simplified the specification and rebranded the technology as ActiveX in 1996. Even after simplification, users still required controls to implement about six core interfaces. In response to this complexity, Microsoft produced wizards, ATL base classes, macros and C++ language extensions to make it simpler to write controls. Starting with Internet Explorer 3.0 (1996), Microsoft added support to host ActiveX controls within HTML content. If the browser encountered a page specifying an ActiveX control via an OBJECT tag, it would automatically download and install the control with little or no user intervention. And security risks (especially given the lack of user intervention). Microsoft subsequently introduced security measures to make browsing including ActiveX safer.

Example

Digital signing of installation packages (Cabinet files and executable). Controls must explicitly declare themselves safe for scripting. Increasingly stringent default security settings.

03. ADD-ONS

Definition

An add-on is a hardware unit that can be added to a computer to increase its capabilities or a program utility that enhances a primary program. Less frequently, some manufacturers and software developers use the term add-in. Examples of add-ons for a computer include cards for sound, graphics acceleration, modem capabilities, and memory. Software add-ons are common for games, word processors, and accounting programs.

Types of add-ons

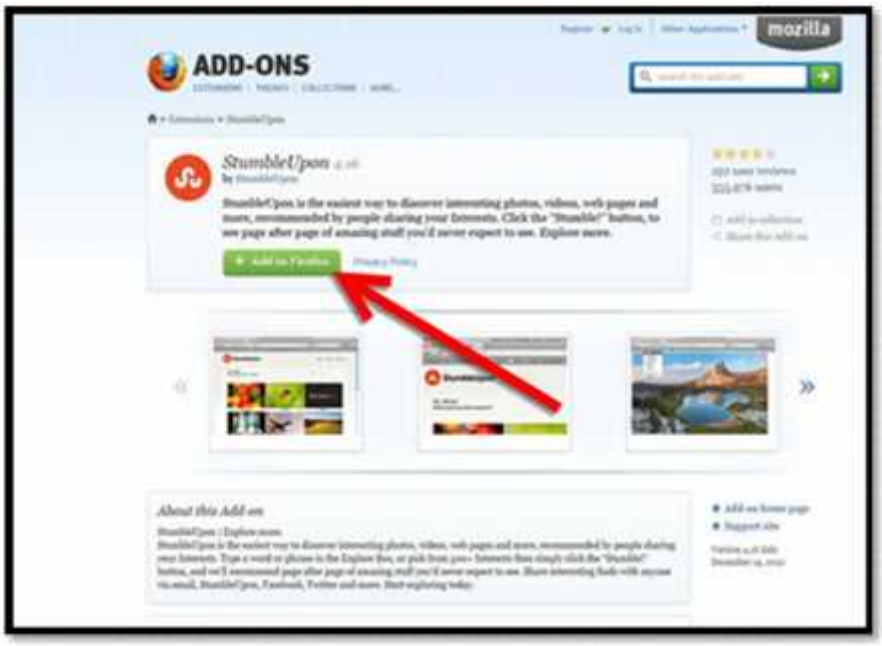
Extensions:

Modify the behavior of existing features or add new features. The feature could be something in the user interface or a functional feature that manifests itself when a certain action is performed. Themes are examples of extensions that primarily concern themselves with the user interface. Search engines definitions are examples of functional extensions.

Themes:

Formerly known as "Personas". Strictly modify certain elements of the user interface. Their most prominently featured change is the background image that they add to tool bars, menu bars and status bars of the main application window. They may change the text and background colour as well.

Example:



Plug-ins:

Render web contents that the program cannot natively render. For example, Adobe Flash Player is such a plug-in; it renders embedded Adobe Flash contents in web pages. The framework that enables creation of Mozilla plug-ins is called NPAPI. Mozilla plug-ins are being phased out; Mozilla plans to discontinue most plug-ins in Fire Fox.

Benefits of add-ons

- **Changing times require evolving capabilities**.

  As the Market evolves, traders and investors are increasingly employing sophisticated software to assist them in their investments.

- **New versions and features upgrades are free**.

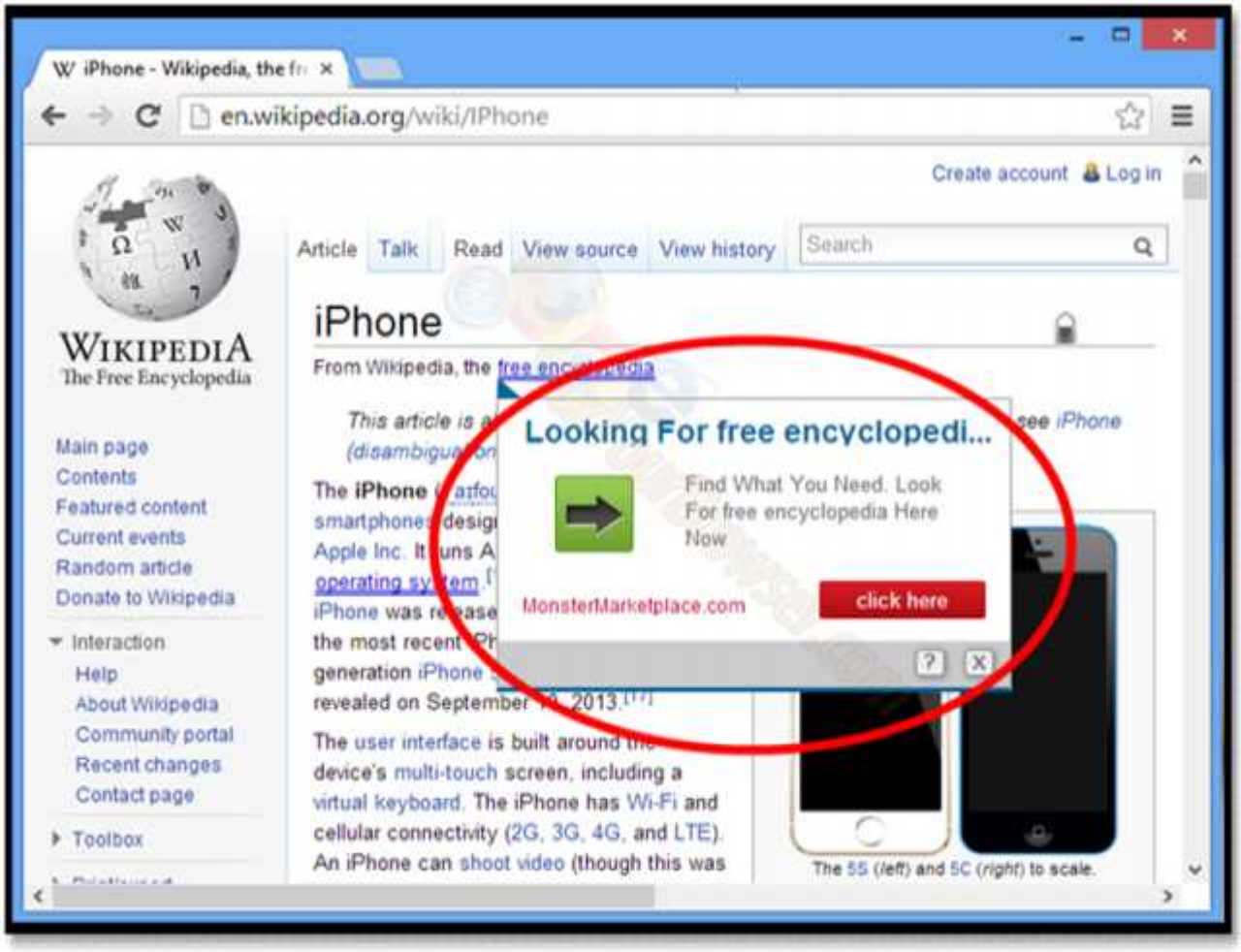
  Since you are on a subscription plan, we will keep on adding new features, introducing enhancements or releasing fixes related to the module for free to you for the entire duration of your subscription period.

04. ADWARE

Definition

Adware is the form of software that downloads or displays unwanted ads when a user in online, collects marketing data and other information without the user's knowledge or redirects search requests to certain advertising websites. Adware that does not notify the user and attains his or her consent is regarded as malicious**.**

Adware is the name given to programs that are designed to display advertisements on your computer, redirect your search requests to advertising websites, and collect marketing-type data. For example, the types of websites that you visit so that customized adverts can be displayed



Removal of adware

There can be many reasons why they suspect that an Adware program – that has been detected by Kaspersky's antivirus engine – may be a threat. For example, if they didn't consent to the installation of the program and don't know where the program came from, nor if they've read a description of the program on Kaspersky's website and now have concerns over its safety. In such cases, Kaspersky's antivirus software will help to get rid of the Adware.

How Do You Get Adware on the user's Computer?

Normally download adware without knowing about it, since no one usually wants to see advertisements whenever they run a program. Then how does adware get on the user's computer? Adware often piggybacks on other program downloads that do they want. For example, a lot of free software (freeware) programs have adware associated with them.

Examples

Some examples of freeware that may contain adware are:

- Advanced search engines
- Instant news and weather updates
- Computer games
- Peer-to-peer (P2P) file sharing programs
- Fun mouse pointers, desktop themes and backgrounds
- Emoticons and smileys used in email
- Applications that say they will improve the efficiency of your computer.

For cases where Adware programs are detected, but it confident that these are programs that you have consented to, you may decide that the programs are not harming your devices or data. Kaspersky products let you disable the option to detect these programs or let you add specific programs to a list of exceptions so that the antivirus engine will not flag this Adware as malicious.

05. ALERT BOX AND MESSAGES

Alert box

An alert dialog box is a special dialog box that is displayed in a graphical user interface when something unexpected occurred that requires immediate user action. The typical alert dialog provides information in a separate box to the user, after which the user can only respond in one way by closing it. Closing an alert dialog will provide access to the original window, which is not available while the alert dialog is presented.

Usage

- **Error -** informs the user than an operation could not continue or complete due to some insurmountable error.
- **Warning -** alerts that the current course of action could be in some way dangerous or detrimental, often offering the option of not proceeding.
- **Info-** presents a general notification about a recent event.

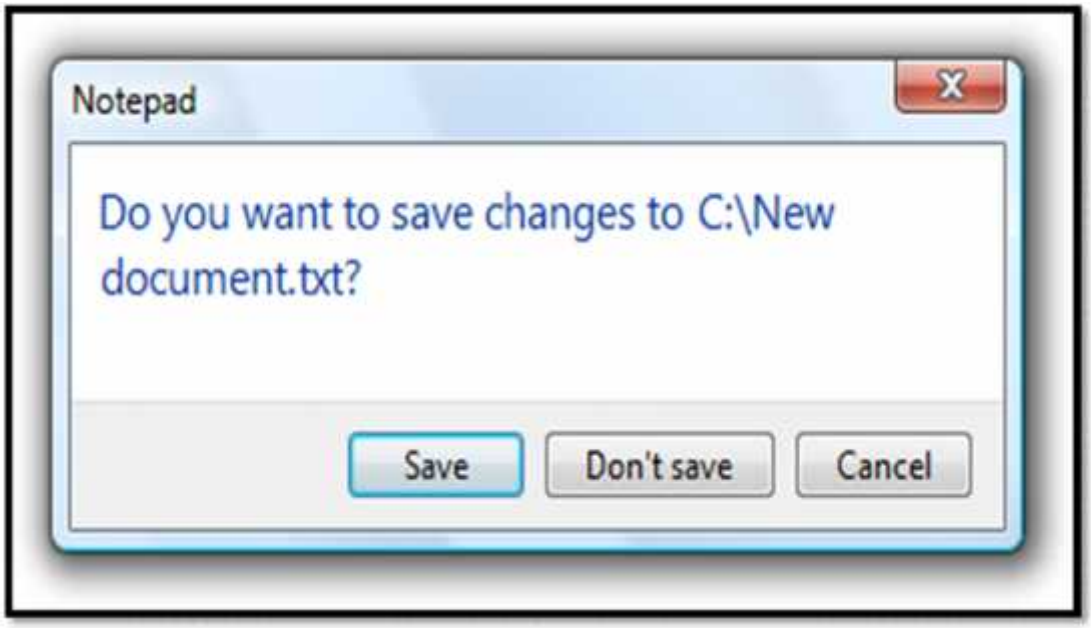
Warning and question alerts typically offer two opposite options to close the dialog ("Allow/Deny", "OK/Cancel", "Yes/No") with the implicit assumption that one will proceed with the paused process that triggered the dialog, and the other one will interrupt the process without action. A good practice in interface design often included In Human Interface Guidelines, is to label each option with the precise effect that it will have on the process.

Alert boxes act as a safeguard for users, preventing us from doing things we wish we hadn't. Perhaps the most common alert box is the one that pops up when user try to close a document without saving it. User mostly likely see an alert box with the message, "Save changes to this document before closing?" user can select "Don't Save," to discard the changes, "Save," to save the changes before closing the document, or "Cancel," to cancel closing the document and continue working on it.

Most alert boxes include the standard alert icon a triangle with an exclamation point in the middle to get your attention. However, not all alert boxes have multiple options, such as "Cancel" and "OK."

Displaying Message

A message box is a predefined dialog box that displays application related information to the user. Message boxes are also used to request information from the user.

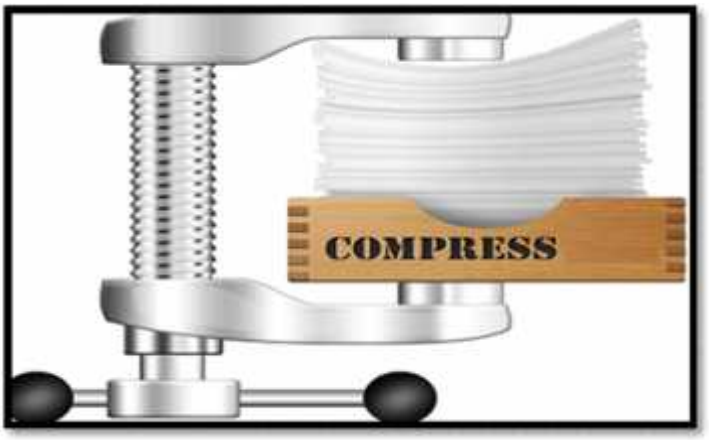


They can also use a message box to ask a user a question. The user answers by clicking one of several buttons that you specify to display by using the Message Box Button enumeration.

06. ARCHIE PROGRAM

File compression

The main objective of this File Compression project is to design compression software which significantly reduces the size of a file so that it can be easily shared over mail even in slow internet speed. This software works in the same way as the Winrar, which are popular compression tools. Each byte of the file will be compressed and takes quite LESS memory on the disk.



File compression is a process of "packaging" a file (or files) to use less disk space. compression works by minimizing redundancy in a file's code. Compression software allows to take many files and compress them into one file, which is smaller than the combined size of the originals. File compression is commonly used when sending a file from one computer to another over a connection that has limited bandwidth, the compression basically makes the file smaller and, therefore, the sending of the file is faster.

- The type of compression is called lossless compression, because it lets you to recreate the original file exactly. All lossless compression is based on the idea of breaking a file into a "smaller" form for transmission or storage and then putting it back together on the other end so it can be used again.

Example of WinRaR

WinRAR is a powerful archive manager. It can backup the user data and reduce size of email attachments, decompress RAR, ZIP and other files downloaded from Internet and create new archives in RAR and ZIP file format.

The advantages of file compression

Compressing files is the processes of making them smaller in terms of the number of bytes of data that they contain. Compression can be described as lossless, where the compressed file is exactly the same as the original file, when it is uncompressed or lossy, where data that is not needed in the file is stripped out and is no longer available.

The zip convention uses lossless compression when a folder is converted to a zip folder. All Zip programs are lossless. Data representing sound that is beyond the range of human hearing is removed from the file during the conversion process. File compression is a data compression method in which the logical size of a file is reduced to save disk space for easier and faster transmission over a network or the Internet. File compression is also known as file zipping.

When to use file compression?

File compression in this release is designed to be used only for compressing cold data or write-once objects and files. Compressing other types of data can result in performance degradation. File compression uses the z lib data compression library and favors saving space over speed.

07. CARTRIDGE DRIVE

A ROM cartridge or cart is a removable enclosure containing ROM designed to be connected to a consumer electronic device such as a computer, video game console and electronic musical instruments. ROM cartridges can be used to load software such as video games. Cartridges had battery-backed static random-access memory, allowing a user to save data.

ROM cartridges allows the user to rapidly load and access programs and data without the expense of a floppy drive, which was an expensive peripheral during the home computer era, and without using slow, sequential, and often unreliable Compact Cassette Tape. As disk drives became more common and software expanded beyond the practical limits of ROM size, cartridge slots disappeared from later game consoles and personal computers. Cartridges are still used with handheld gaming consoles such as the Nintendo DS, Nintendo 3DS, and the upcoming tablet -like hybrid video game console Nintendo Switch.

Electronic musical instruments usage

Besides their prominent usage on video game consoles, ROM cartridges have also been used on a small number of electronic musical instruments, particularly electronic keyboards. These keyboards use specialized cards known as Music Cartridges, a ROM cartridge simply containing MIDI data to be played on the keyboard as MIDI sequence or song data. This technology, however, quickly become obsolete and extremely rare after the advent of floppy disk drive in later models.

Design

ROM cartridges can carry software, hardware expansion as well. The Super FX coprocessor chip in some Super NES game packs. Cartridge designed by Code masters which incorporated two additional gamepad ports. This allowed players to have up to four gamepads connected to the console without the need for an additional multi-controller adapter. The ROM cartridge slot principle in various mobile devices and it is a high density low-cost flash flash chip.

Personal computers may allow the user to boot and install an operating system off a USB flash drive instead of CD ROM or floppy disks. Digital cameras with flash drive slots allow users to rapidly exchange cards when full, and allow rapid transfer of pictures to a computer or printer.

Advantages and disadvantages

Storing software on ROM cartridges has a number of advantages over other methods of storage like floppy disks and optical media. As the ROM cartridge is memory mapped into the system's normal address space, software stored in the ROM can be read like normal memory; since the system does not have to transfer data from slower media, it allows for nearly instant load time and code execution. Software run directly from ROM typically uses less RAM, leaving memory free for other processes. While the standard size of optical media dictates a minimum size for devices which can read disks, cartridges can be manufactured in different sizes, allowing for smaller devices like handheld game systems.

ROM cartridges typically have less capacity than other media. ROM cartridges are typically more expensive to manufacture than discs, and storage space available on a cartridge is less than that of an optical disc. Techniques such as bank switching were used to add more capacity to a cartridge. Due to its widespread usage for video gaming, ROM cartridges were often colloquially referred to as a game cartridge.

Software manufacturers began sacrificing the quick load time of ROM cartridges for the greater capacity and lower cost of optical media. Another source of pressure of releasing a cartridge video game inevitably came with the risk of producing thousands of unsold cartridges.

08. CHATLINE

Chat line services make it possible for people to communicate with one another by telephone call. However, recent chat lines are like CB radio in which a number of people both listen and speak together.

Chatlines are most popular in the United States and Canada as an alternative to online dating. Some of the most popular chatlines include QuestChat, Livelinks and Fonochat. Both male and female callers dial in and through a common access number. As soon as a caller is connected into the system, user prompted to record his name and a brief greeting described and what the user is looking for Profanity and unwanted references are typically not allowed, the chatline moderator's job is to listen and approve every greeting that is recorded. Once the greeting is recorded, the caller is allowed into the live chat area (or live connector).

The live connector is where live callers are introduced to other callers greetings, one by one. The caller has the option to listen only to local callers, or to everyone who is live on the system. As soon as a greeting is played, the caller is prompted to press 1 to connect live with that person, 2 to send her a recorded message or 3 to skip this person and listen to the next person's greeting. Some systems allow you to block a caller by pressing 8 or report a caller to the moderators by pressing 9 (or some other key depending on the system).

Chatlines free trail

Most chatlines offer male callers a 30 to 60 minute free trial. In an attempt to keep their lines busy, some chatline including Livelinks, RedHot and QuestChat give female callers unlimited access to their system.

Private mailboxes

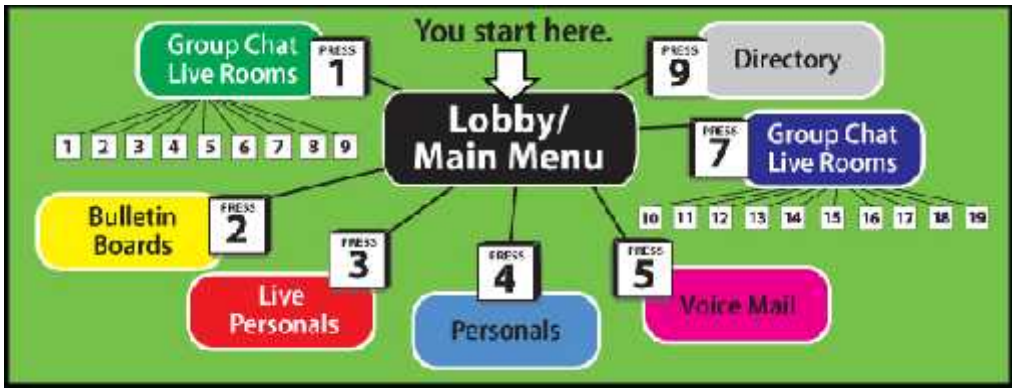
Some chatlines offer its members a persistent mailbox they can use to receive messages from users even when they are offline. A live caller is given the option hear other member's mailboxes, where they can leave a recorded message to be retrieved by the mailbox owner next time he connects to the system.

Chatline numbers

ChatLines free trail number: +712–432–3632

IndiaPhoneChat call: (218) 895-3232

When calling from India, the number is: 001-218-895-3232



Popular chatline Numbers

LIVELINKS	855 993 0584
QUESTCHAT	866 736 4100
FONOCHAT	855 972 4661
REDHOT	844 903 1829
NIGHTLINE	866 736 4500
CHATLINEUS	816 533 2000
VIBELINE	855 993 0253
AFFAIRHUB	801 409 1444
HARDLINE	877 574 5566
GUYSPY	855 993 5560
LIVECHAT	509 876 5777
AXXESS	877 600 2323
LAVALIFE	800 410 3535
TANGO	800 498 1288

09. CONFUSION MATRIX IN COMPUTER

In the field of machine learning and specifically the problem of statistical classification, a confusion matrix, also known as an error matrix,[4] is a specific table layout that allows visualization of the performance of an algorithm, typically a supervised learning one (in unsupervised learning it is usually called a matching matrix). Each column of the matrix represents the instances in a predicted class while each row represents the instances in an actual class (or vice versa).[2] The name stems from the fact that it makes it easy to see if the system is confusing two classes (i.e. commonly mislabeling one as another).

It is a special kind of contingency table, with two dimensions ("actual" and "predicted"), and identical sets of "classes" in both dimensions (each combination of dimension and class is a variable in the contingency table).

Example

		Predicted		
		Cat	**Dog**	**Rabbit**
Actual class	**Cat**	5	3	0
	Dog	2	3	1
	Rabbit	0	2	11

If a classification system has been trained to distinguish between cats, dogs and rabbits, a confusion matrix will summarize the results of testing the algorithm for further inspection. By assuming a sample of 27 animals 8 cats, 6 dogs, and 13 rabbits, the confusion matrix is derived.

Simple guide to confusion matrix terminology

A confusion matrix is a table that is often used to describe the performance of a classification model (or "classifier") on a set of test data for which the true values are known.

The user wanted to create a "quick reference guide" for confusion matrix terminology because the user couldn't find an existing resource that suited my requirements: compact in presentation, using numbers instead of arbitrary variables, and explained both in terms of formulas and sentences.

Let's start with an example confusion matrix for a binary classifier (though it can easily be extended to the case of more than two classes):

n=165	Predicted: NO	Predicted: YES
Actual: NO	50	10
Actual: YES	5	100

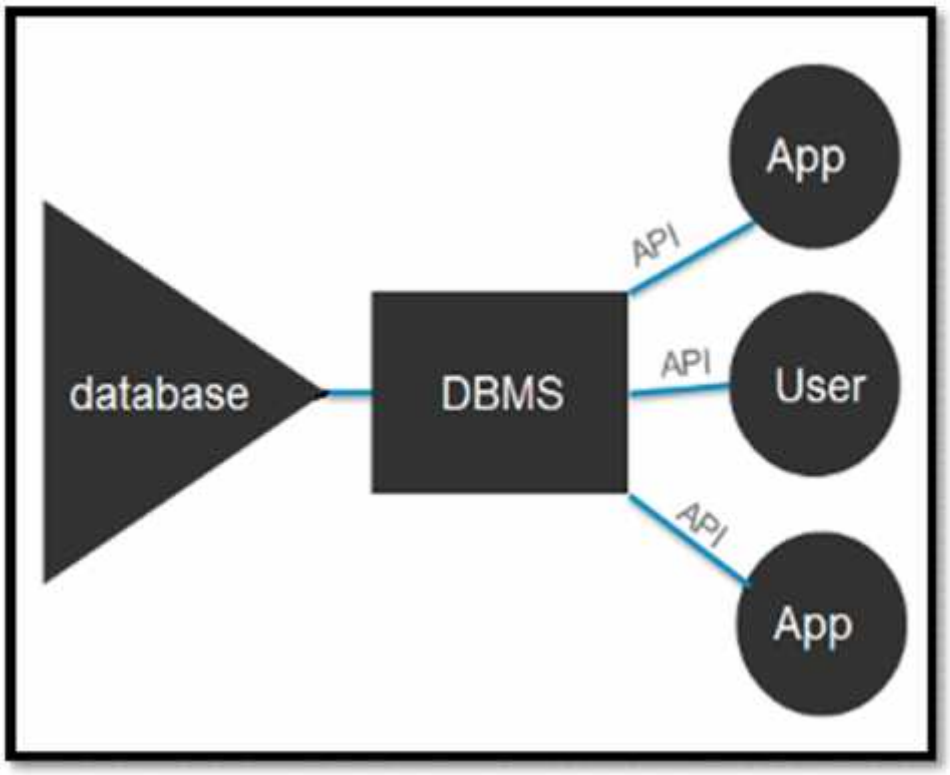
What can we learn from this matrix?

- There are two possible predicted classes: "yes" and "no". If we were predicting the presence of a disease, for example, "yes" would mean they have the disease, and "no" would mean they don't have the disease.
- The classifier made a total of 165 predictions (e.g., 165 patients were being tested for the presence of that disease).
- Out of those 165 cases, the classifier predicted "yes" 110 times, and "no" 55 times.
- In reality, 105 patients in the sample have the disease, and 60 patients do not.

10. DATABASE MANAGEMENT SYSTEM (DBMS)

Definition

A DBMS makes it possible for end users to create, read, update and delete data in a database. The DBMS essentially serves as an interface between the database and end users or application programs, ensuring that data is consistently organized and remains easily accessible.



The DBMS can offer both logical and physical data independence. That means it can protect users and applications from needing to know where data is stored or having to be concerned about changes to the physical structure of data (storage and hardware).

As long as programs use the application programming interface (API) for the database that is provided by the DBMS, developers won't have to modify programs just because changes have been made to the database.

With relational DBMSs (RDBMSs), this API is SQL, a standard programming language for defining, protecting and accessing data in a RDBMS.

DBMS formats

The information from a database can be presented in a variety of formats. Most DBMSs include a report writer program *t*hat enables you to output data in the form of a report. Many DBMSs also include a graphics component that enables you to output information in the form of graphs and charts.

Advantages of a DBMS

Using a DBMS to store and manage data comes with advantages, but also overhead. One of the biggest advantages of using a DBMS is that it lets end users and application programmers access and use the same data while managing data integrity.

Techopedia explains Database Management System (DBMS)

A Database is the back-end of an application. A DBMS receives instruction from a database administrator (DBA) and accordingly instructs the system to make the necessary changes. These commands can be to load, retrieve or modify existing data from the system. There are four main types of database organization:

- **Relational Database:** Data is organized as logically independent tables. Relationships among tables are shown through shared data.
- **Flat Database:** Data is organized in a single kind of record with a fixed number of fields. This database type encounters more errors due to the repetitive nature of data.
- **Object Oriented Database:** Data is organized with similarity to object oriented programming concepts. An object consists of data and methods, while classes group objects having similar data and methods.
- **Hierarchical Database:** Data is organized with hierarchical relationships. It becomes a complex network if the one-to-many relationship is violated.

11. DEBIAN

Debian is a Unix-like computer operating system that is composed entirely of free software, most of which is under the GNU General Public License and packaged by a group of individuals participating in the Debian Project. The Debian Project was first announced in 1993 by Ian Murdock, Debian 0.01 was released on September 15, 1993, and the first stable release was made in 1996.

The Debian stable release branch is one of the most popular for personal computers and network servers, and has been used as a base for several other distributions. The project's work is carried out over the Internet by a team of volunteers guided by the Debian Project Leader and three foundational documents the Debian Social Contract, the Debian Constitution, and the Debian Free Software Guidelines. New distributions are updated continually, and the next candidate is released after a time-based freeze.

As one of the earliest Linux distributions, it was decided that Debian was to be developed openly and freely distributed in the spirit of the GNU Project. This decision drew the attention and support of the Free Software Foundation, which sponsored th1e project for one year from November 1994 to November 1995.

Features

Debian has access to online repositories that contain over 50,000 software packages making it one of the largest software compilations. Debian officially contains only free software, but non-free software can be downloaded from the Debian repositories and installed. Debian includes popular free programs such as LibreOffice, Firefox web browser, Evolution mail, K3b disc burner, VLC media player, GIMP image editor, and Evince document viewer.

Example of Debian

History

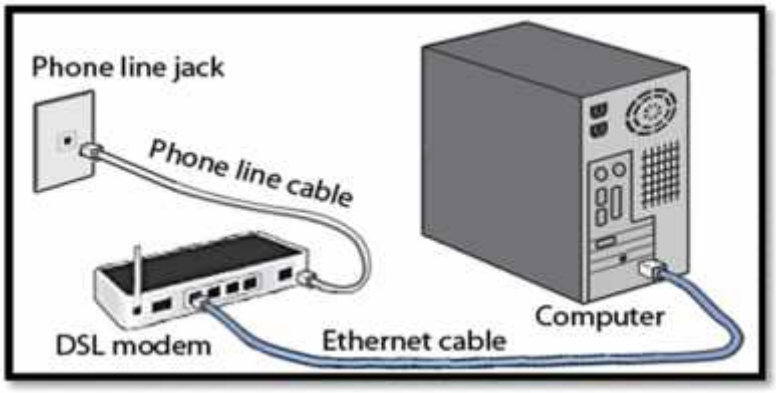
Debian was first announced on August 16, 1993, by Ian Murdock, who initially called the system "the Debian Linux Release". The word "Debian" was formed as a combination of the first name of his then-girlfriend Debra Lynn and his own first name. Before Debian's release, the Softlanding Linux System (SLS) had been a popular Linux distribution and the basis for Slackware. The perceived poor maintenance and prevalence of bugs in SLS motivated Murdock to launch a new distribution.

Debian 0.01, released on September 15, 1993, was the first of several internal releases. Version 0.90 was the first public release, providing support through mailing lists hosted at Pixar. In it he called for the creation of a distribution to be maintained openly, in the spirit of Linux and GNU.

Debian 6.0 (Squeeze) was released in February 2011, introduced Debian GNU/kFreeBSD as a technology preview, featured a dependency-based boot system, and moved problematic firmware to the non-free area. Debian 7.0 (Wheezy) was released in May 2013, featuring multiarch support and Debian 8.0 (Jessie) was released in April 2015, using system as the new init system. At present, Debian is still in development and new packages are uploaded to unstable every day.

12. DIGITAL SUBSCRIBER LINE (DSL)

Digital subscriber line is a family of technologies that are used to transmit digital data over telephone lines. In telecommunications marketing, the term DSL is widely understood to mean asymmetric digital subscriber line (ADSL), the most commonly installed DSL technology, for Internet access DSL service can be delivered simultaneously with wired telephone service on the same telephone line. This is possible because DSL uses higher frequency bands for data. On the customer premises, a DSL filter on each non-DSL outlet blocks any high-frequency interference to enable simultaneous use of the voice and DSL services.



History

- For a long time it was thought that it was not possible to operate a conventional phone-line beyond low-speed limits (typically under 9600 bit/s). In the 1950s, ordinary twisted-pair telephone-cable often carried four megahertz (MHz) television signals between studios, suggesting that such lines would allow transmitting many megabits per second.
- The 1980s saw the development of techniques for broadband communications that allowed the limit to be greatly extended. A patent was filed in 1979 for the use of existing telephone wires for both telephones and data terminals that were connected to a remote computer via a digital data carrier system. Joseph W. Lechleider's contribution to DSL was his insight that an asymmetric arrangement offered more than double the bandwidth capacity of symmetric DSL.

- Consumer-oriented ADSL was designed to operate on existing lines already conditioned for Basic Rate Interface ISDN services, which itself is a digital circuit switching service (non-IP), though most incumbent local exchange carriers (ILECs) provision Rate-Adaptive Digital Subscriber Line (RADSL) to work on virtually any available copper pair facility, whether conditioned for BRI or not. Engineers developed high speed DSL facilities such as High bit rate Digital Subscriber Line (HDSL) and Symmetric Digital Subscriber Line (SDSL) to provision traditional Digital Signal 1 (DS1) services over standard copper pair facilities

Older ADSL standards delivered 8 Mbit/s to the customer over about 2 km (1.2 mi) of unshielded twisted-pair copper wire. Until the late 1990s, the cost of digital signal processors for DSL was prohibitive. All types of DSL employ highly complex digital signal processing algorithms to overcome the inherent limitations of the existing twisted pair wires.

Operation

Telephones are connected to the telephone exchange via a local loop which is a physical pair of wires. The local loop was originally intended mostly for the transmission of speech, encompassing an audio frequency range of 300 to 3400 hertz. It is converted from analog to digital operation, the idea of being able to pass data through the local loop took hold, ultimately leading to DSL.

13. DIGITAL VISUAL INTERFACE (DVI)

Digital Visual Interface (DVI) is a video display interface developed by the Digital Display Working Group (DDWG). The digital interface is used to connect a video source, such as a video display controller, to a display device, such as a computer monitor. It was developed with the intention of creating an industry standard for the transfer of digital video content.

The interface is designed to transmit uncompressed digital video and can be configured to support multiple modes such as DVI-A (analog only), DVI-D (digital only) or DVI-I (digital and analog). Featuring support for analog connections, the DVI specification is compatible with the VGA interface. This compatibility, along with other advantages, led to its widespread acceptance over competing digital display standards Plug and Display (P&D) and Digital Flat Panel (DFP). Although DVI is predominantly associated with computers, it is sometimes used in other consumer electronics such as television sets and DVD players.

Technical overview

DVI's digital video transmission format is based on panel Link, a serial format developed by Silicon Image that utilizes a high-speed serial link called transition minimized differential signalling (TMDS).Like modern analog VGA connectors, the DVI connector includes pins for the display data channel (DDC).A newer version of DDC called DDC2 allows the graphics adapter to read the monitor's extended display identification data (EDID). If a display supports both analog and digital signals in one DVI-I input, each input method can host a distinct EDID. Since the DDC can only support one EDID, there can be a problem if both the digital and analog inputs in the DVI-I port detect activity. It is up to the display to choose which EDID to send.

DVI

When a source and display are connected, the source first queries the display's capabilities by reading the monitor EDID block over an I²C link. The EDID block contains the display's identification, colour characteristics (such as gamma level), and table of supported video modes. The table can designate a preferred mode or native resolution. Each mode is a set of CRT timing values that define the duration and frequency of the horizontal/vertical sync, the positioning of the active display area, the horizontal resolution, vertical resolution, and refresh rate.

Digital data encoding

One of the purposes of DVI stream encoding is to provide a DC-balanced output link that reduces decoding errors. This goal is achieved by using 10-bit symbols for 8-bit or less characters and using the extra bits for the DC balancing.

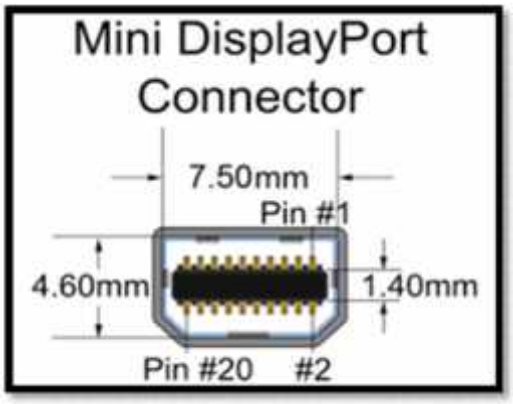
Like other ways of transmitting video, there are two different regions: the active region, where pixel data is sent, and the control region, where synchronization signals are sent. The active region is encoded using transition-minimized differential signalling, where the control region is encoded with a fixed 8b/10b encoding. As the two schemes yield different 10-bit symbols, a receiver can fully differentiate between active and control regions.

When DVI was designed, most computer monitors were still of the cathode ray tube type that require analog video synchronization signals. The timing of the digital synchronization signals matches the equivalent analog ones, making the process of transforming DVI to and from an analog signal a process that does not require extra (high-speed) memory, expensive at the time. HDCP is an extra layer that transforms the 10-bit symbols before sending through the link.

14. DISPLAY PORT

Display Port is a digital display interface developed by the Video Electronics Standards Association (VESA). The interface is primarily used to connect a video source to a display device such as a computer monitor, though it can also be used to carry audio, USB, and other forms of data.

VESA designed it to replace VGA, DVI, and FPD-Link. DisplayPort is backwards compatible with VGA, DVI and HDMI through the use of passive and active adapters.

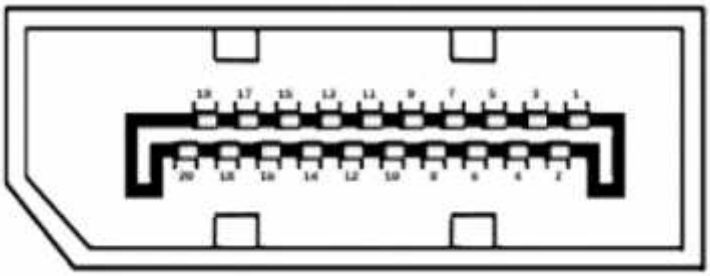


Overview

Display Port is the first display interface to rely on packetized data transmission, a form of digital communication found in technologies including Ethernet, USB, and PCI Express. It allows both internal and external display connections and, unlike legacy standards where differential pairs are fixed to transmitting a clock signal with each output, the Display Port protocol is based on small data packets known as micro packets, which can embed the clock signal within the data stream, allowing higher resolutions with fewer pins.

The use of data packets also allows Display Port to be extensible, meaning additional features can be added over time without significant changes to the physical interface itself. Display Port can be used to transmit audio and video simultaneously. The video signal path can have six to sixteen bits per color channel, and the audio path can have up to eight channels of 24-bit 192 kHz uncompressed PCM audio or can encapsulate compressed audio formats in the audio stream.

Example



Versions

Version 1.0 to 1.1:

The first version, 1.0, was approved by VESA on 3 May 2006. Version 1.1a was ratified on 2 April 2007. DisplayPort 1.0 allows a maximum of 8.64 Gbit/s data rate over a 2-meter cable. DisplayPort 1.1 also allows devices to implement alternative link layers such as fibre optic, allowing a much longer reach between source and display without signal degradation, although alternative implementations are not standardized.

Version 1.2:

DisplayPort version 1.2 was approved on 22 December 2009. The most significant improvement of the new version is the doubling of the effective bandwidth to 17.28 Gbit/s in High Bit Rate 2 (HBR2) mode, which allows increased resolutions, higher refresh rates, and greater colour depth.

Version 1.3:

DisplayPort version 1.3 was approved on 15 September 2014.This standard increases overall transmission bandwidth to 32.4 Gbit/s with the new HBR3 mode featuring 8.1 Gbit/s per lane (up from 5.4 Gbit/s with HBR2 in version 1.2), for a total data throughput of 25.92 Gbit/s after factoring in 8b/10b encoding overhead.

Version 1.4:

DisplayPort version 1.4 was published March 1, 2016. No new transmission modes are defined, so HBR3 (32.4 Gbit/s) as introduced in version 1.3 still remains as the highest available mode. DisplayPort 1.4 adds support for Display Stream Compression 1.2 (DSC), Forward Error Correction, HDR10 extension defined in CTA-861.3, the Rec.

15. DYNAMIC RANDOM ACCESS MEMORY (DRAM)

History

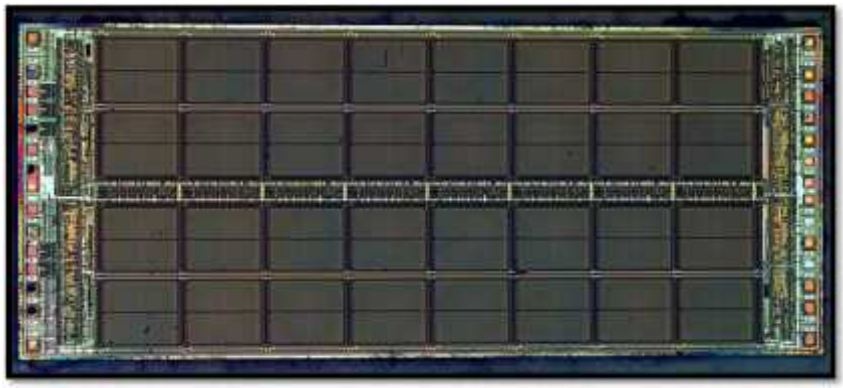
The cryptanalytic machine code-named "Aquarius" used at Bletchley Park during World War II incorporated a hard-wired dynamic memory. Paper tape was read and the characters on it "were remembered in a dynamic store. The store used a large bank of capacitors, which were either charged or not, a charged capacitor representing cross and an uncharged capacitor dot. Since the charge gradually leaked away, a periodic pulse was applied to top up those still charged (hence the term 'dynamic')". In 1964, Arnold Farber and Eugene Schlig, working for IBM, created a hard-wired memory cell, using a transistor gate and tunnel diode latch. They replaced the latch with two transistors and two resistors, a configuration that became known as the Farber-Schlig cell.

In 1965, Benjamin Agusta and his team at IBM created a 16-bit silicon memory chip based on the Farber-Schlig cell, with 80 transistors, 64 resistors, and 4 diodes. In 1966, DRAM was invented by Dr.Robert Dennard at the IBM Thomas J. Watson Research Center. He was granted U.S. patent number 3,387,286 in 1968. Capacitors had been used for earlier memory schemes such as the drum of the Atanasoff–Berry Computer, the Williams tube and the Selectron tube.The first DRAM with multiplexed row and column address lines was the Mostek MK4096 4 Kbit DRAM designed by Robert Proebsting and introduced in 1973. This addressing scheme uses the same address pins to receive the low half and the high half of the address of the memory cell being referenced, switching between the two halves on alternating bus cycles.

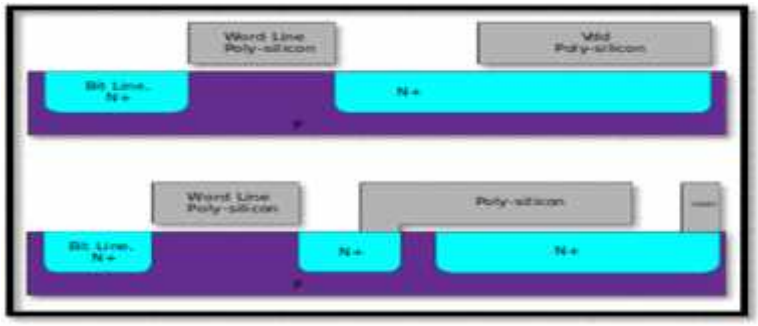
DRAM

Dynamic random-access memory (DRAM) is a type of random-access memory that stores each bit of data in a separate capacitor within an integrated circuit. The capacitor can be either charged or discharged; these two states are taken to represent the two values of a bit, conventionally called 0 and 1.Since even "non-conducting" transistors always leak a small amount, the capacitors will slowly discharge, and the information eventually fades unless the capacitor charge is refreshed periodically.

Because of this refresh requirement, it is a dynamic memory as opposed to static random-access memory (SRAM) and other static types of memory. Unlike flash memory, DRAM is volatile memory (vs. non-volatile memory), since it loses its data quickly when power is removed. However, DRAM does exhibit limited data remanence.



Example



DRAM Vs SRAM

DRAM is widely used in digital electronics where low-cost and high-capacity memory is required. One of the largest applications for DRAM is the main memory (colloquially called the "RAM") in modern computers; and as the main memories of components used in these computers such as graphics cards (where the "main memory" is called the graphics memory).

In contrast, SRAM, which is faster and more expensive than DRAM, is typically used where speed is of greater concern than cost, such as the cache memories in processors. The advantage of DRAM is its structural simplicity: only one transistor and a capacitor are required per bit, compared to four or six transistors in SRAM.

16. FAX

Definition

A fax (short for facsimile and sometimes called tele-copying) is the telephonic transmission of scanned-in printed material (text or images), usually to a telephone number associated with a printer or other output device. The original document is scanned with a fax machine, which treats the contents (text or images) as a single fixed graphic image, converting it into a bitmap. In this digital form, the information is transmitted as electrical signals through the telephone system. The receiving fax machine reconverts the coded image and prints a paper copy of the document.

Almost all modems manufactured today are capable of sending and receiving fax data. Fax/modem software generates fax signals directly from disk files or the screen. However, if the document requires editing, it must be converted into ASCII text by an OCR (optical character recognition) program, or it must be retyped manually into the computer.

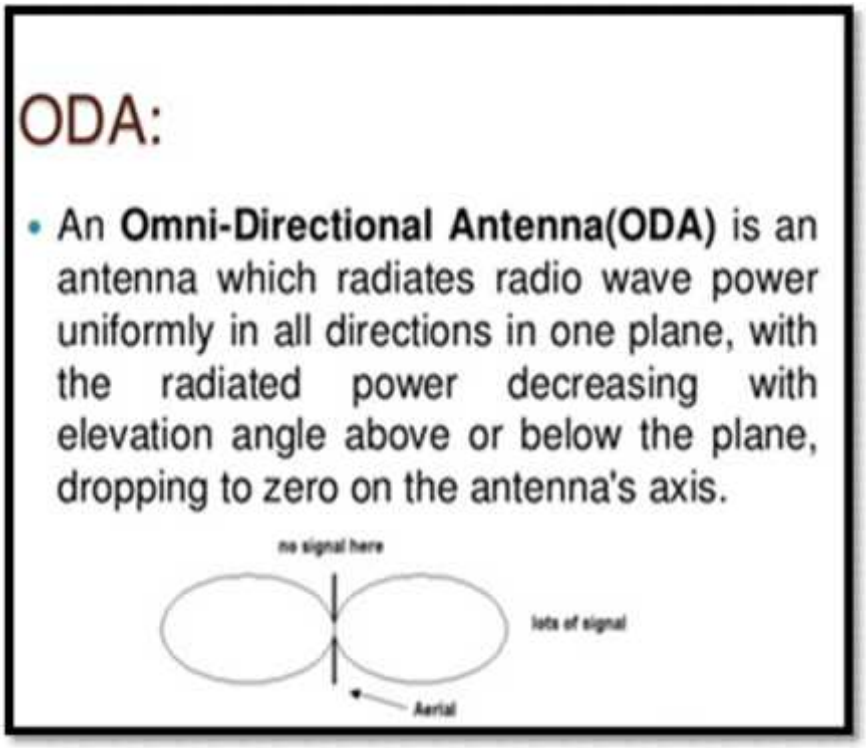
A more efficient method of sending documents that require modification is through the e-mail system. E-mail files are already ASCII text so they can be edited immediately in any text editor or word processing program. The Internet now provides a new and cheaper way to send faxes in some cases. A number of free and commercial companies provide arrangements for using the Internet rather than the public telephone system for most or part of the path to the fax point.

Computer network

In information technology, a computer network, also called a data network, is a series of points, or nodes, interconnected by communication paths for the purpose of transmitting, receiving and exchanging data, voice and video traffic. Network devices including switches and routers use a variety of protocols and algorithms to exchange information and to transport data to its intended endpoint.

Every endpoint (sometimes called a host) in a network has a unique identifier, often an IP address or a Media Access Control address, that is used to indicate the source or destination of the transmission. Endpoints can include servers, personal computers, phones and many types of network hardware.

Omni-directional antenna



An Omni-directional antenna is a wireless transmitting or receiving antenna that radiates or intercepts radio-frequency (RF) electromagnetic fields equally well in all horizontal directions in a flat, two-dimensional (2D) geometric plane. Omni-directional antennas are used in most consumer RF wireless devices, including cellular telephone sets and wireless routers.

In theory, a vertically oriented, straight conductor such as a dipole antenna measuring no more than 1/2 wavelength from end-to-end always exhibits Omni-directional properties in a horizontal (azimuth) plane. Multiple collinear (in-line) vertical dipoles also exhibit Omni-directional behavior in the azimuth plane.

Wavelength

A wavelength is a measure of distance between two identical peaks (high points) or troughs (low points) in a wave a repeating pattern of travelling energy like light or sound.

17. FINGER IN UNIX

In, finger is a program you can use to find information about computer users. It usually lists the login name, the full name, and possibly other details about the user you are fingering. These details may include the office location and phone number (if known), login time, idle time, time mail was last read, and the user's plan and project files. The information listed varies, and you may not be able to get any information from some sites.

In some cases, you may be able to use the finger command to verify an address or find more information for someone at another institution about whom you already have some information. The finger command is available on most Unix systems. It differs from the who is command, which you can use simply to find the email address of someone at another institution.

To use finger, at your Unix prompt, enter:

finger username@node.domain

Replace node. Domain with the appropriate machine and domain address, and username with the name of the person or the person's username, for example:

finger dvader@mentor.cc.purdue.edu

You will get output similar to the following:

[mentor.cc.purdue.edu]
Login name: dvader **In real life: Darth Vader**
Directory: /home/mentor/d/dvader **Shell: /bin/csh**
Last login Tue Jul 17 15:21 on ttyQ7 from expert.cc.purdue.edu
Unread mail since Wed Jul 18 13:00:54 2001

Some sites use a period (.) instead of an underscore (_) in the full name (for example, Darth.Vader), or require an extra period to specify middle initials (Darth.E.Vader).

Finger command

- -l Force long output format.
- -s Force short output format.
- -h Suppress printing of the .project file in a long format printout.
- -p Suppress printing of the. plan file in a long format printout.
- The term "finger" had, in the 1970s, a connotation of "is a snitch". This made "finger" a good reminder/mnemonic to the semantic of the UNIX finger command.

For more information about finger and who is, at your Unix prompt, enter one of the following:

- man finger
- man who is

FINGER USER INFORMATION PROTOCOL

Finger displays the user's login name, real name, terminal name and write status (as a ''*'' after the terminal name if write permission is denied), idle time, login time, office location and office phone number.

-l- Produces a multi-line format displaying all of the information described for the **-s** option as well as the user's home directory, home phone number, login shell, mail status, and the contents of the files ".plan", ".project", ".pgpkey" and ".forward" from the user's home directory.

-p- Prevents the **-l** option of finger from displaying the contents of the ".plan", ".project" and ".pgpkey" files.

-m- Prevent matching of user names. User is usually a login name; however, matching will also be done on the users' real names, unless the **-m** option is supplied. All name matching performed by finger is case insensitive.

The finger command shows information about a user account such as the name of the user, when the account was last accessed, and where the account is located.

18. FLIP-FLOPS

History

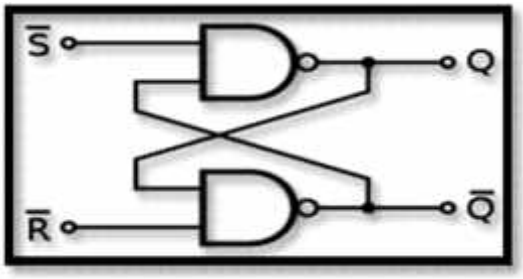
The first electronic flip-flop was invented in 1918 by the British physicists and it was initially called the Eccles–Jordan trigger circuit and consisted of two active elements. Early flip-flops were known variously as trigger circuits or.

According to P. L. Lindley, an engineer at the US, the flip-flop types detailed below (SR, D, T, JK) were first discussed in a 1954 course on computer design by Montgomery Phister, and then appeared in his book Logical Design of Digital Computers.

Flip-Flop Types

Flip-flops can be divided into common types: the SR ("set-reset"), D ("data" or "delay"), T ("toggle"), and JK types are the common ones. The behavior of a particular type can be described by what is termed the characteristic equation.

SR NAND latch



Simple set-reset latches

An animation of a SR latch, constructed from a pair of cross-coupled. Red and black mean logical '1' and '0', respectively. When using static gates as building blocks, the most fundamental latch is the simple *SR* latch, where S and R stand for set and reset. It can be constructed from a pair of cross-coupled .The stored bit is present on the output marked Q.

An SR latch

This is an alternate model of the simple SR latch which is built with set and reset now become active low signals, denoted S and R respectively. Otherwise, operation is identical to that of the SR latch. Historically, SR-latches have been predominant despite the notational inconvenience of inputs.

SR AND-OR latch

The latch is currently in hold mode (no change).

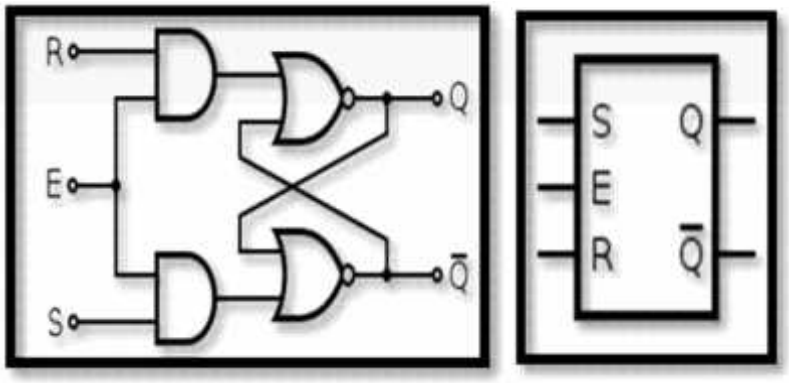
JK latch

The JK latch is much less frequently used than the JK flip-flop.

Gated latches and conditional transparency

Latches are designed to be transparent. That is, input signal changes cause immediate changes in output. However, by following a transparent-high latch with a transparent-low (or opaque-high) latch, a master–slave flip-flop is implemented.

Gated SR latch



A synchronous SR latch (sometimes clocked SR flip-flop) can be made by adding a second level of NAND gates to the inverted SR latch (or a second level of AND gates to the direct SR latch).

The extra NAND gates further invert the inputs so the simple SR latch becomes a gated SR latch (and a simple SR latch would transform into a gated SR latch with inverted enable).

19. HOTMAIL

Introduction of Hotmail

Hotmail was launched in 1996 and was the first free web-based email service. Founded by Sabeer Bhatia and Jack Smith in, and headquartered in. It was originally spelled Hotmail, putting emphasis on the "HTML" in the name. When Hotmail first launched, the free accounts offered features such as filter and enhanced virus scanning and storage up to 250-MB.

Outlook.com

Outlook.com is a web-based suite of webmail, contacts, tasks and calendaring services from Microsoft. Microsoft acquired Hotmail in 1997 for an estimated $400 million and launched it as MSN Hotmail, later rebranded to Windows Live Hotmail as part of the suite of products. Microsoft released the final version of Hotmail in October 2011, available in 36 languages. It was replaced by Outlook.com in 2013.

MSN Hotmail

Hotmail was sold to in December 1997 for a reported $400 million, and it joined the group of services. Hotmail quickly gained in popularity as it was for different markets around the globe, and became the world's largest webmail service. Hotmail originally ran on a mixture of a FreeBSD and solaris operating system.

Security issues

In 2001, the Hotmail service was compromised again by computer hackers who discovered that anyone could log in to their Hotmail account and then pull messages from any other Hotmail account by crafting a URL with the second account's username and a valid message number.

Competition

In 2004, announced its own mail service, Featuring greater storage space, speed, and interface flexibility, this new competitor spurred a wave of innovation

in webmail. The main industry heavyweights Hotmail and introduced upgraded versions of their email services with greater speed, security, and advanced features.

Windows live Hotmail

The Hotmail brand was planned to be phased-out when Microsoft announced that the new mail system would be called Windows Live Mail. Development of the beta was finished in April 2007, Windows Live Hotmail was released to new registrations on May 7, 2007, as the 260 million MSN Hotmail accounts worldwide gained access to the new system.

Windows Live Hotmail was awarded's Editor's Choice Award in February 2007, March 2007, and February 2011. As a result of user feedback, Hotmail was updated so that scrolling works for users who have the reading pane turned off.

Windows Live Hotmail was released to new registrations on May 7, 2007, as the 260 million MSN Hotmail accounts worldwide gained access to the new system.

The old MSN Hotmail interface was accessible only by users who registered before the Windows Live Hotmail release date and had not chosen to update to the new service. The roll-out to all existing users was completed in October 2007.

Support for Firefox in the upgraded Windows Live Hotmail took a few months to complete. By 2009, support for Google Chrome was still incomplete, prompting the Chrome developers to temporarily ship a browser that employed user agent spoofing when making requests to the Windows Live site.

20. INTEGRATED SERVICES DIGITAL NETWORK (ISDN)

Introduction

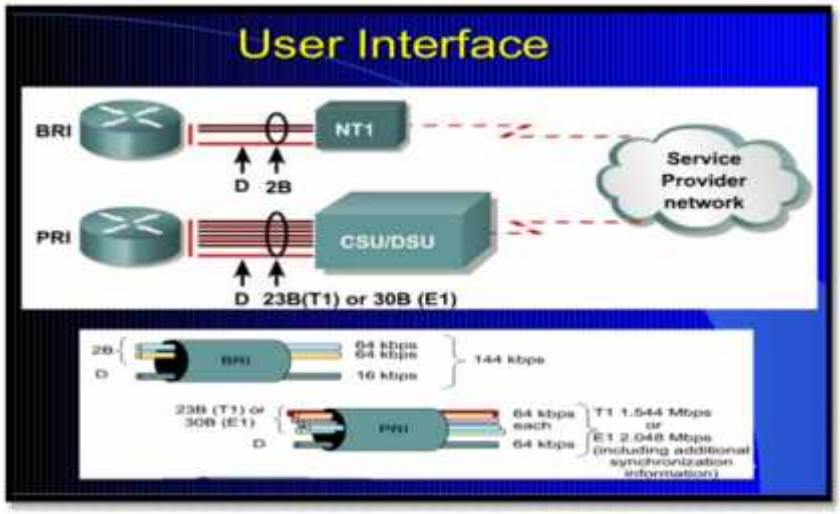
Integrated Services for Digital Network (ISDN) is a set of communication standards for simultaneous digital transmission of voice, video, data, and other network services over the traditional circuits of the public switched telephone network. It was first defined in 1988 in the CCITT red book.

ISDN Devices

ISDN Services

- **Bearer Services:** Bearer services provide the means to transfer (voice, data and video) between users without the network manipulating the content of that information. They can be provided using circuit-switched, packet-switched, frame-switched, or cell-switched networks.
- **Teleservices:** In teleservices, the network may change or process the contents of the data. These services correspond to layers 4-7 of the OSI model. Teleservices include telephony, teletex, telefax, videotex, telex and teleconferencing.
- **Supplementary Service:** Supplementary services are those services that provide additional functionality to the bearer services and teleservices.

ISDN interfaces



Basic Rate Interface (BRI, 2B+D, 2B1D) or Basic Rate Access is an Integrated Services Digital Network (ISDN) configuration intended primarily for use in subscriber lines similar to those that have long been used for voice-grade telephone service. The Primary Rate Interface (PRI) is a telecommunications interface standard used on an Integrated Services Digital Network (ISDN) for carrying multiple DS0 voice and data transmissions between the network and a user.

ISDN Protocols

The ISDN protocols are signalling protocols that govern the exchange of data on the D channel. The two ISDN signalling protocols make up a layered protocol stack, with the Link Access Protocol for the D Channel providing Layer 2 data-link services and the Q.931 protocol providing higher-layer services.

ISDN Advantages

ISDN network lines are able to switch manifold devices on the single line such as faxes, computers, cash registers credit cards readers, and many other devices. The basic advantage of ISDN is to facilitate the user with multiple digital channels.This network can be the public ISDN, or an office-based digital PABX (an ISPBX). An ISPBX needs to be connected to the public ISDN. A user's call request might be modified by any of the intervening networ

21. INTERNET OF THINGS (IoT)

What is Internet of Things?

The Internet's Impact on Our Thinking An exploration of the consequential implications on our cognitive thought process Brent Meyers AP Literature Ms. Craff Period 3 Research Question: As the internet becomes increasingly intertwined within our daily lifestyles as a society, what are the consequential insinuations of this increased dependence and the effects to our intelligence as a whole?

The internet to assist us with the informational demands of our current modernized lifestyle. The internet essentially provides us with an outlet for research, an opportunity to delve deeper into topics for further information, and to essentially infinitely expand the information available to us. As the internet becomes increasingly intertwined within our daily lifestyles, we must ask, what the consequences of our increased dependence are.

The internet affecting our intelligence as a collective society. Although access to the internet has allowed society to augment knowledge and increase productivity, it is hindering our ability to analyze topics, deliberate, and as a whole, critically think. As the internet continues to become further intertwined within our

daily lifestyles, it is negatively shaping the way we are processing and interpreting information.

About Internet of Things

- Essentially, the way we are currently using the internet is reducing our desire to be inquisitive, think, comprehend, and ultimately retain information. There is no doubt that the internet has considerable benefits to our society.
- It predominantly supplies us with a vast spectrum of information imperative to our innovative lifestyles, giving us the freedom of quickly looking up information and having answers for solutions.
- We commonly use the internet to improve our own productivity, explore our interests, and ultimately increase our potential to explore and innovate**.**
- This internet definitely plays a major role in our society and impacts over "1.8 billion users worldwide" according to statistics published by the Wall Street Journal (Shirky).
- Despite these benefits, proven trends indicate that with our customary reliance on the internet every day, our originality and higher order thinking is diminishing. As a society, our critical thinking as a generation is declining in comparison to that of past generations.
- The internet readily available to almost everyone, we can easily find solutions to questions online and take information that the internet supplies rather than analyzing topics and critically thinking on our own.
- Nicholas Carr, a prominent evaluator of the internet and its impact, believes our reliance on researching others opinions and ideas on the internet is jeopardizing our originality and higher order thinking.
- "Evolving from cultivators of personal knowledge into hunters and gathers in the electronic forest. Dazzled by the Net's treasures, we are blind to the damage we may be doing to our intellectual lives and even our culture" (Carr).
- Carr illustrates that the internet is giving rise to a systematic trend of fact finding and reporting. We are becoming too apt to share what others think rather than personally developing and formulating our own unique ideas.

22. INTERNET PROTOCOL (IP)

The Internet Protocol (IP) is the principal communications protocol in the Internet protocol suite for relaying datagram's across network boundaries. Its routing function enables internetworking, and essentially establishes the Internet.

IP has the task of delivering packets from the source host to the destination host solely based on the IP addresses in the packet headers. For this purpose, IP defines packet structures that encapsulate the data to be delivered. It also defines addressing methods that are used to label the datagram with source and destination information.

Historically, IP was the connectionless datagram service in the original Transmission Control Program introduced by Vint Cerf and Bob Kahn in 1974; the other being the connection-oriented Transmission Control Protocol (TCP). The Internet protocol suite is therefore often referred to as TCP/IP.

The first major version of IP, Internet Protocol Version 4 (IPv4), is the dominant protocol of the Internet. Its successor is Internet Protocol Version 6 (IPv6).

Contents

Function:

- Datagram construction
- IP addressing and routing

The Internet Protocol is responsible for addressing hosts and for routing datagram's (packets) from a source host to a destination host across one or more IP networks.

For this purpose, the Internet Protocol defines the format of packets and provides an addressing system that has two functions: Identifying hosts and providing a logical location service.

- **Datagram Construction**

Sample encapsulation of application data from UDP to a Link protocol frame. Each datagram has two components: a header and a payload. The IP header is tagged with the source IP address, the destination IP address, and other meta-data needed to route and deliver the datagram.

The payload is the data that is transported. This method of nesting the data payload in a packet with a header is called encapsulation.

- **IP addressing and routing**

IP addressing entails the assignment of IP addresses and associated parameters to host interfaces. The address space is divided into networks and sub networks, involving the designation of network or routing prefixes.

IP routing is performed by all hosts, as well as routers, whose main function is to transport packets across network boundaries.

23. INTERNET SERVICE PROVIDER (ISP)

What does ISP mean?

ISP literally means Internet service provider or provider. It is a service (most of the time paid for) which allows you to connect to the Internet.

Why use an ISP?

Unless the user have a specialized line (other than a telephone line), he/she cannot connect directly to the internet using the telephone line. Indeed, the telephone line was not designed for this:

- It was originally designed to transport "voice", i.e. a frequency modulation in the range of the voice tone
- Telephone servers only know how to start a conversation from a telephone number
- Unless you resort to a special service, generally it is not possible to have communication between more than two points...

So, the internet service provider is an intermediary (connected to the internet by specialized lines) which gives the access to the Internet, using a number which enter using the modem, and which enables a connection to be established.

However, this address is not fixed because at the time of the next connection the service provider gives the user one of its free addresses (therefore different because depending on its capacity, it may have several hundreds of thousands.

How does the ISP connect the user to the Internet?

When the user are connected to the Internet through the service provider, communication between the user and the ISP is established using a simple protocol: PPP (Point to Point Protocol), a protocol making it possible for two remote computers to communicate without having an IP address. In fact the user's computer does not have an IP address.

However an IP address is necessary to be able to go onto the Internet because the protocol used on the Internet is the TCP/IP protocol which makes it possible for a very large number of computers which are located by these addresses to communicate.

So, communication between the user and the service provider is established according to the PPP protocol which is characterized by:

- A telephone call
- Initialization of communication
- Verification of the user name (login or user Id)
- Verification of the password

Once the users are "connected", the internet service provider lends an IP address which the users keep for the whole duration that they are connected to the internet.

The user's connection is therefore a proxy connection because it is the service provider who sends all the requests the user make and the service provider who receives all the pages that the request and who returns them to the user.

It is for these reasons for example that when they have Internet access via an ISP, they must pick up the email on each connection because generally it is the service provider that receives the email (it is stored on one of its servers).

- **Coverage:** Number which is charged as a local call wherever the users are calling from
- **Price:** This depends on the ISP and the type of package chosen. Some ISPs now offer free access.

24. INTRANET

What is an Intranet?

An internal website that helps employees gets stuff done. That's it. It's what an intranet is in simple, everyday language. It's also what you can say to explain an intranet to most employees (or to your retired uncle when he asks what you're doing for work these days).

An intranet wears many hats inside an organization. It's a website, communications channel and collaboration platform. It helps people work better by combining the best features of wikis, blogs, document and content management systems. An intranet makes it easy for everyone inside an organization to contribute, not just a select few.

While the thought of a distributed author model may seem daunting (How do the user stay in control of what's out there?) the benefits can far outweigh the drawbacks.

Empowering employees with a voice and the freedom to share ideas with their colleagues can be a positive step forward to a culture of collaboration that embraces our tech-savvy age.

Understanding internets, intranets & extranets

So what's the difference? While the internet connects many people to many websites, an intranet is a website that connects people inside an organization. Then, there's the extranet site, which connects people inside an organization with external parties, like partners, clients and vendors, to encourage collaboration and make it easier to share information.

What gets done on an intranet?

James Robertson, perhaps the world's foremost authority on intranets, says that today's intranet has five purposes:

- Content (e.g. policy documents)
- Communication (e.g. corporate news)
- Activity (e.g. expense form)
- Collaboration (e.g. project wiki)
- Culture (e.g. noon-hour jogging club)

James also points out that the modern intranet is now much more than a place to store static corporate content it's becoming a key tool for organizational success. The five-purpose model can help frame your overall vision, define your intranet strategy and come up with a plan to engage your audience. It's like writing an outline before you tackle that 20-page report.

Intranets

- **Then and now:** When intranets first came on the digital scene, they were basically just used to store company-wide data and broadcast information from a central location. They were not exactly built to collaborate. Since then intranets have evolved into a much more valuable tool for employees and organizations. What's the reason behind this evolution, you ask? When the concept of Web 2.0 was popularized in 2004, it represented a huge shift in the way digital information was managed. Now, the way people live and work is drastically different. Social technology is as much a part of our everyday routines as our morning java (they actually go nicely together).

25. JAVA SCRIPT

What is JavaScript?

JavaScript (often shortened to JS) is a lightweight, interpreted, object-oriented language with first-class functions, and is best known as the scripting language for Web pages, but it's used in many non-browser environments as well. It is a prototype-based, multi-paradigm scripting language that is dynamic, and supports object-oriented, imperative, and functional programming styles.

Contrary to popular misconception, JavaScript is not "Interpreted Java". In a nutshell, JavaScript is a dynamic scripting language supporting prototype based object construction. The basic syntax is intentionally similar to both Java and C++ to reduce the number of new concepts required to learn the language. Language constructs, such as if statements, for and while loops, and switch and try ... Catch blocks function the same as in these languages (or nearly so.)

JavaScript runs on the client side of the web, which can be used to design program how the web pages behave on the occurrence of an event. JavaScript is an easy to learn and also powerful scripting language, widely used for controlling web page behavior.

JavaScript can function as both a procedural and an object oriented language. Objects are created programmatically in JavaScript, by attaching methods and properties to otherwise empty objects at run time, as opposed to the syntactic class definitions common in compiled languages like C++ and Java.

Once an object has been constructed it can be used as a blueprint (or prototype) for creating similar objects.

JavaScript's dynamic capabilities include runtime object construction, variable parameter lists, function variables, dynamic script creation object introspection (via for ... In), and source code recovery (JavaScript programs can decompile function bodies back into their source text).

For a more in depth discussion of JavaScript programming follow the JavaScript resources links below.

What JavaScript implementations are available?

The Mozilla project provides two JavaScript implementations. The first ever JavaScript was created by Brendan Each at Netscape, and has since been updated to conform to ECMA-262 Edition 5 and later versions. This engine, code named spider monkey, is implemented in C/C++. The Rhino engine, created primarily by Norris Boyd (also at Netscape) is a JavaScript implementation written in Java. Like spider monkey, Rhino is ECMA-262 Edition 5 compliant. Several major runtime optimizations such as trace monkey (Firefox 3.5), jäger monkey (Firefox 4) and ion monkey were added to the spider monkey JavaScript engine over time. Work is always ongoing to improve JavaScript execution performance.

26. NETIQUETTE ON THE INTERNET

Introduction

Netiquette is etiquette on the Internet. Since the Internet changes rapidly, its netiquette does too, but it's still usually based on the Golden Rule. The need for a sense of netiquette arises mostly when sending or distributing -mail, posting on Use net groups, or chatting.

The current social standards for online communication, the techniques are used for inclusion. They are influenced by group association. Netiquette is the combination of the terms.

The term has two parts.

- Ethics is the etiquette.
- Manners are the form.

Ethics are the biggest parts of social interaction because community standards determine appropriate behavior. Manners represent the fact that we rely on the medium. Together these generate effective communication.

- Computer Ethics
- Manners
- Effective Communication

Recognition comes from following group standards. The more standards followed and groups were in or contacts we have the more influential the engagement. Manners are categorical techniques required to send and receive messages. Using the basics and applying the influence of our friends to our contact is good etiquette.

Those who create high traffic content are influencers.

Do	**Don't**
– Think before you go too far.	– Do cyber bullying.
– Check yourself.	– Make friends with haters.
– Accept things that you're sure it's safe.	– Hack other accounts.
– Accept people that you know.	– Be a hater.
– Limit our time.	– Spam.
– Put priorities.	– Accept stranger.
– Click with your conscience HD clear.	– Fooled by tempting e-mail.
– Download safely with no fear.	– Use inappropriate symbols.

Rules

- When typing never write in all capital letters. People don't like it when we shout at them in person. And they sure don't like when we shout at them on the net.
- Use proper quotes and always use the whole quote. Don't take quotes out of context and don't be selective about which part of the quote we want to use.
- Be patient with internet newbie's. Know that they are just learning like us did once upon a time.
- Avoid overuse of emoticons. They really lose their cuteness when overused and tend to irritate people.

Example of good netiquette

Include context. When commenting on a message thread it is good netiquette to include a relevant quote from the original message to give context to the user's comment.

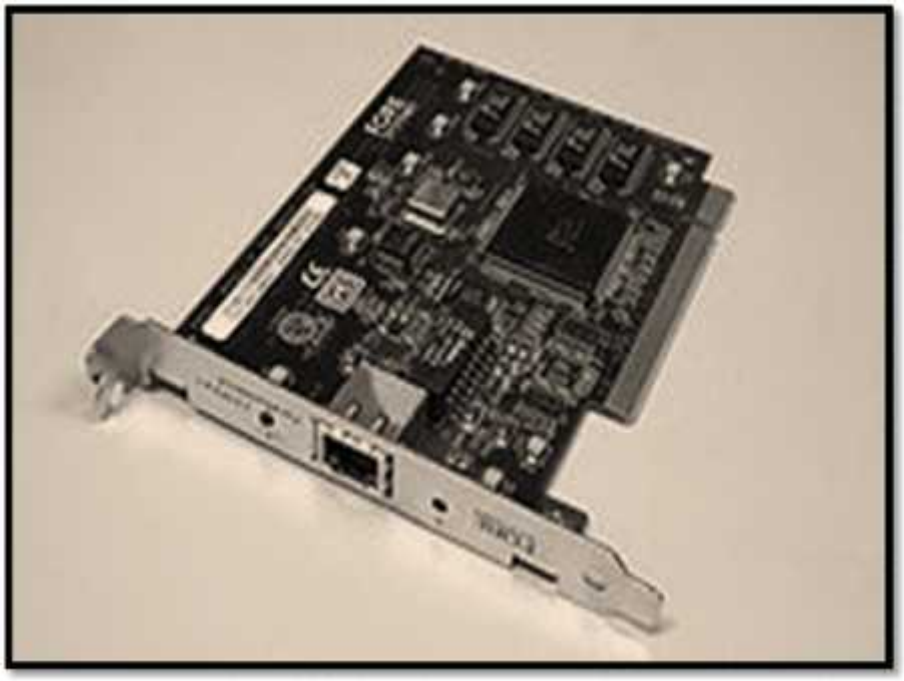
Example of bad netiquette

Don't type in all caps, it may not give an impressive look.

27. NETWORK INTERFACE CARD (NIC)

Introduction

- A network interface controller (NIC, also known as a Network Interface Card, network adapter, LAN adapter or physical network interface and by similar terms) is a computer hardware component that connects a computer to a computer network.
- Early network interface controllers were commonly implemented on expansion cards that plugged into a computer bus.
- Modern network interface controllers offer advanced features such as interrupt and DMA interfaces.



Purpose

The network controller implements the electronic circuitry required to communicate using a specific physical layer and data link layer standard such as Ethernet, Fiber Channel, Wi-Fi or Token Ring.

Implementation

The NIC may use one or more of the following techniques to indicate the availability of packets to transfer:

- Polling is where the CPU examines the status of the peripheral under program control.
- Interrupt-driven I/O is where the peripheral alerts the CPU that it is ready to transfer data
- Programmed input/output is where the CPU moves the data to or from the NIC to memory.
- Direct memory access (DMA) is where some other device other than the CPU assumes control of the system bus to move data to or from the NIC to memory.

Performance and advanced functionality

The hardware-based distribution of the interrupts, described above, is referred to as receive-side scaling (RSS). Purely software implementations also exist, such as the receive packet steering (RPS) and receive flow steering (RFS).

Further performance improvements can be achieved by routing the interrupt requests to the CPUs/cores executing the applications which are actually the ultimate destinations for network packets that generated the interrupts.

Types of NIC Cards

- Jumper Configurable NIC Cards
- Software Configurable NIC Cards
- Plug-and-Play Configurable NIC Cards

28. ORACLE

Introduction

Larry Ellison co-founded Oracle Corporation in 1977 with Bob Miner and Ed Oates under the name Software Development Laboratories (SDL). He heard about the IBM System R database from an article in the IBM Research Journal provided by Oates. In 1995, Oracle Systems Corporation changed its name to Oracle Corporation**,** officially named Oracle, but sometimes referred to as Oracle Corporation, the name of the holding company.

Product Services

Oracle designs, manufactures, and sells both software and hardware products, as well as offers services complementing them (such as financing, training, consulting, and hosting services). Many of the products have been added to Oracle's portfolio through acquisitions.

Technology Timeline

- 1979: Offers the first commercial SQL RDBMS.
- 1986: Offers a client-server DBMS.
- 1987: Introduces UNIX-based Oracle applications.
- 1988: Introduces PL/SQL.
- 1999: Offers its first DBMS with XML support.
- 2002: Offers the first database to pass 15 industry standard security evaluations.
- 2005: Releases its first free database, Oracle Database 10*g* Express Edition (XE).
- 2013: Begins use of Oracle 12c which is capable of providing cloud services with Oracle Database.

Oracle Secure Enterprise Search

Oracle Secure Enterprise Search (SES), Oracle's enterprise-search offering, gives users the ability to search for content across multiple locations, including websites, XML files, file servers, content management systems, and enterprise resource planning systems, customer relationship management systems, business intelligence systems, and databases.

Development Software

- Oracle Designer - a CASE tool which integrates with Oracle Developer Suite
- Oracle Developer – which consists of Oracle Forms, Oracle Discoverer and Oracle Reports
- Oracle J Developer, a freeware IDE
- Net Beans, a Java-based software-development platform
- Oracle Application Express
- Oracle SQL Developer, an integrated development environment for working with SQL-based databases
- Open Java Development Kit
- Oracle Corporation develops and supports two operating systems: Oracle Solaris and Oracle Linux.

Oracle cloud

- Software as a Service
  - ✓ Enterprise applications: SCM, EPM, HCM, ERP and CX offerings
- Platform as a Service
  - ✓ Platform services on which to build and deploy applications or extend applications: database, Java application server, mobile, business analytics, big data, Internet of Things, etc.
  - ✓ Oracle Cloud Platform.

29. PENTIUM

Introduction

Pentium is a brand used for a series of x86-compatible microprocessors produced by Intel since 1993. In its current form, Pentium processors are considered entry-level products that Intel rates as "two stars", meaning that they are above the low-end Atom and Celeron series but below the faster Core i3, i5 and i7 lines as well as the high-end Xeon processors.

The current Pentium processors have only the name in common with the early ones, and are in fact based on the Intel Core architecture, typically implemented by lowering the clock frequency and disabling some features, such as hyper-threading, virtualization and, partly, L3 cache.

Overview

- The original Pentium branded CPUs were expected to be named 586 or i586, to follow the naming convention of previous generations (286, i386, i486).
- Following Intel's previous series of 8086, 80186, 80286, 80386, and 80486 microprocessors, the company's first P5-based microprocessor was released as the original Intel Pentium on March 22, 1993.
- Due to its success, the Pentium brand would continue through several generations of high-end processors.

Pentium-branded processors

- P5 micro architecture.
- P6 micro architecture.
- Net burst micro architecture.
- Pentium M micro architecture.
- Core micro architecture.
- Nehalem micro architecture.
- Sandy Bridge micro architecture.
- Ivy Bridge micro architecture.
- Has well micro architecture.

Pentium compatible Intel processors

- Celeron, a low-end version.
- Core, the mainstream version including Core 2 and Core i7, now placed above Pentium.
- Xeon, a high-end version used in servers and workstations.
- A100 (discontinued) an ultra-mobile version of Pentium M.
- EP80579, A system-on-a-chip based on Pentium M.
- Atom, current ultra-mobile processors.
- Xeon Phi, a high-end version used in servers and workstations. (Processor/Profile/Coprocessor)

Advantages

Advantages of the Intel Pentium 4 include more bandwidth, better graphics, and better streaming media. Disadvantages include the high cost, frequent over-heating, and slower overall performance.

30. PERL

Introduction

Perl is a family of high-level, general-purpose, interpreted, dynamic programming languages. The languages in this family include Perl 5 and Perl 6. Though Perl is not officially an acronym, there are various acronyms in use, the best-known being "Practical Extraction and Reporting Language "Perl was originally developed by Larry Wall in 1987 as a general-purpose Unix scripting language to make report processing easier.

History

- Perl 1.0 released in December 18, 1987.
- Perl 2, released in 1988.
- Perl 3, released in 1989, added support for binary data streams.
- Perl 4, 4.036 in 1993.
- Initial design of Perl 5 continued into 1994. The perl5-porters mailing list was established in May 1994
- Perl 5.6 was released on March 22, 2000.
- The next version became 5.5.640, with plans for development and stable versions.

Camel symbol

- The Camel symbol used by O'Reilly Media.
- This image of a camel has become an unofficial symbol of Perl as well as a general hacker emblem.
- O'Reilly owns the image as a trademark

Onion symbol

- The onion logo used by The Perl Foundation
- The symbol is a visual pun on pearl onion.

Overview

1	Features	Perl takes features from shell programming. Variables are marked with leading sigils.
2	Design	Perl was designed so that computer programmers could write programs more quickly and easily.
3	Applications	Perl has chiefly been used to write CGI scripts, glue language, made portable across Windows, (GUIs) may be developed using Perl.
4	Implementation	Perl is implemented as a core interpreter.
5	Availability	Distributions are available for most operating systems.

Database interfaces

- Perl's text-handling capabilities can be used for generating SQL queries; arrays, hashes, and automatic memory management.
- In Perl 5, database interfaces are implemented by Perl DBI modules.

Example code

In older versions of Perl, one would write the Hello World program as:

```
print "Hello World!\n";
```

Criticism

Perl has been referred to as "line noise" by some programmers who claim its syntax makes it a write-only language.

31. PHP

Introduction

PHP stands for Hypertext Preprocessor. PHP is an HTML-embedded, server-side scripting language designed for web development. It is also used as a general purpose programming language. It was created by Rasmus Lerdorf in 1994 and appeared in the market in 1995. Much of its syntax is borrowed from C, C++, and Java. PHP codes are simply mixed with HTML codes and can be used in combination with various web frameworks.

The main goal of PHP is to allow web developer to create dynamically generated pages quickly. A PHP file consists of texts, HTML tags and scripts with a file extension of .php, .php3, or .phtml. You can create a login page, design a form, and create forums, dynamic and static websites and many more with PHP.

What is PHP?

PHP is a open source, interpreted and object-oriented scripting language i.e. executed at server side. It is used to develop web applications (an application i.e. executed at server side and generates dynamic page).

PHP function

PHP function is a piece of code that can be reused many times. It can take input as argument list and return value. There are thousands of built-in functions in PHP. In PHP, we can define Conditional function**,** and Function within Function and Recursive function also.

PHP Features

- ✓ **Performance**: Script written in PHP executes much faster than those scripts written in other languages such as JSP & ASP.
- ✓ **Open Source Software**: PHP source code is freed available on the web, you can develop all the version of PHP according to your requirement without paying any cost.
- ✓ **Platform Independent**: PHP are available for WINDOWS, MAC, and LINUX& UNIX operating system. A PHP application developed in one OS can be easily executed in other OS also.
- ✓ **Compatibility**: PHP is compatible with almost all local servers used today like Apache, IIS etc.
- ✓ **Embedded**: PHP code can be easily embedded within HTML tags and script.
- ✓ **Database**: PHP supports various databases like MySQL, Oracle, Sybase, Solid, Postgre SQL, Informix etc.

Advantages of PHP

- ✓ **Free of Cost**: PHP is open source and all its components are free to use and distribute.
- ✓ **Platform independent**: PHP is platform independent and can be run on all major operating systems.
- ✓ **Compatible with almost all servers**: PHP is compatible with almost all servers used today.
- ✓ **Secure**: PHP has multiple layers of security to prevent threats and other malicious attacks.
- ✓ **Easy to learn**: PHP has a very easy and understandable syntax. Its codes are **based** on C, C++ and embedded with HTML so it is very easy to learn for a programmer.

32. PING

Definition

Ping is a computer network administration software utility used to test the reach ability of a host on an Internet Protocol (IP) network. It measures the round-trip time for messages sent from the originating host to a destination computer that are echoed back to the source.

History

The ping utility was written by Mike Muss in December 1983 as a tool to troubleshoot problems in an IP network. He was inspired by a remark by David Mills on using ICMP echo packets for IP network diagnosis and measurements.

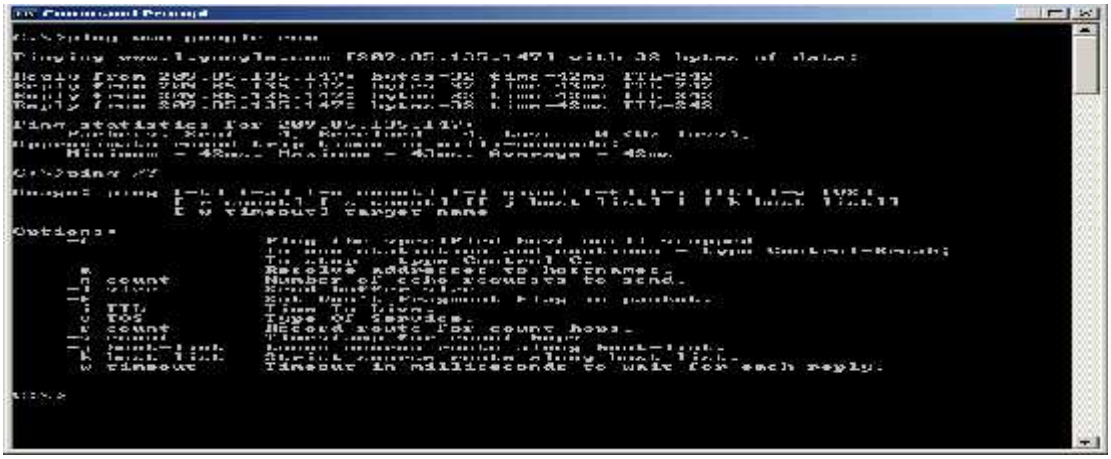
Sample ping test $ Ping -c 5 www.example.com

PING www.example.com (93.184.216.119): 56 data bytes
64 bytes from 93.184.216.119: icmp_seq=0 ttl=56 time=11.632 ms
64 bytes from 93.184.216.119: icmp_seq=1 ttl=56 time=11.726 ms
64 bytes from 93.184.216.119: icmp_seq=2 ttl=56 time=10.683 ms
64 bytes from 93.184.216.119: icmp_seq=3 ttl=56 time=9.674 ms
64 bytes from 93.184.216.119: icmp_seq=4 ttl=56 time=11.127 ms
5 packets transmitted, 5 packets received, 0.0% packet loss
Round-trip min/avg/max/stddev = 9.674/10.968/11.726/0.748 ms

Error Indications

In cases of no response from the target host, most implementations of ping display nothing, or periodically print notifications about timing out. Possible ping outputs indicating a problem include the following:

- H, !N or !P – host, network or protocol unreachable
- S – source route failed
- T – return time millisecond or 1/4 meters-second (normally in telephone meters per and in traffic control mille per second)
- F – fragmentation needed
- U or !W – destination network/host unknown
- I – source1 host is isolated
- A – communication with destination network administratively prohibited
- Z – communication with destination host administratively prohibited
- Q – for this To the destination network is unreachable
- X – communication administratively prohibited
- V – host precedence violation
- C – precedence cutoff in effect



Security consideration

The flood ping option exists in many implementations, sending requests as fast as possible in an attempt to determine the response of the network under high-load conditions.

That option is restricted to users having administrative privileges, but may be used in denial-of-service attacks to induce a ping flood, in which the attacker attempts to overwhelm the victim with ICMP echo requests.

33. PRIVACY POLICIES IN COMPUTER SERVICE

Definition

Privacy policy describes the information and privacy practices for all In-House Computer Services, LLC (herein after referred to as ICS) services. This privacy policy describes how ICS will collect and use your information. When the user provides an ICS technician with your personal information, you consent to the information practices described in this policy.

To assist the user with reading through our privacy policy, we have provided questions and answers below that the user may find helpful in understanding our privacy practices

When does ICS collect information from me?

While taking advantage of services available from ICS, you may be asked to provide personal information. For example, you may be asked to provide personal information when you schedule an appointment for services at the user's home or office, bring in your product for service, purchase products, contact ICS with a question or concern, participate in a promotion or survey and/or participate in other activities with ICS.

How is the information used?

ICS uses the information you provide in order to fulfil requests for services or information provide customer services; administer promotions or surveys offer new products or services; improve the effectiveness of ICSHELPSYOU.COM, marketing endeavours and offers; conduct research and analysis send marketing communications or perform other business activities.

Does ICS share my personal information with others?

ICS does not sell or rent your personal information to third parties. ICS may need to share the personal information with certain third parties such as our service providers and other representatives for limited purposes.

For example, ICS may share personal information with third parties to perform services such as sending ICS marketing communications, servicing products, conducting research, analysis or administering surveys, sending regular mail and email on behalf of ICS, processing credit card payments, data storage and hosting services.

Security

Whether the users are using ICSHELPSYOU.COM, having services performed remotely or at your location ICS has security measures place and take reasonable precautions to protect against the loss, misuse and unauthorized access of the user's personal information under ICS' abilities.

It includes personal information and also provides in order to complete a purchase. ICS cannot ensure or warrant the security of any information you transmit by email, and the user do so at your own risk.

Remote access

ICS offers remote access service to assist in diagnosing and resolving system issues. This process allows ICS technicians to remotely access the user's computer to determine the problem and either repair it or provide advice on what options are available to fix the issue.

34. PYTHON

Python is an interpreter, object-oriented programming language similar to PERL that has gained popularity because of its clear syntax and readability. Python is said to be relatively easy to learn and portable, meaning its statements can be interpreted in a number of operating systems, including UNIX-based systems, Mac OS, MS-DOS, OS/2, and various versions of Microsoft Windows 98.

The source code is freely available and open for modification and reuse. Python has a significant number of users.

A general description of Python

Python is a high-level general purpose programming language:

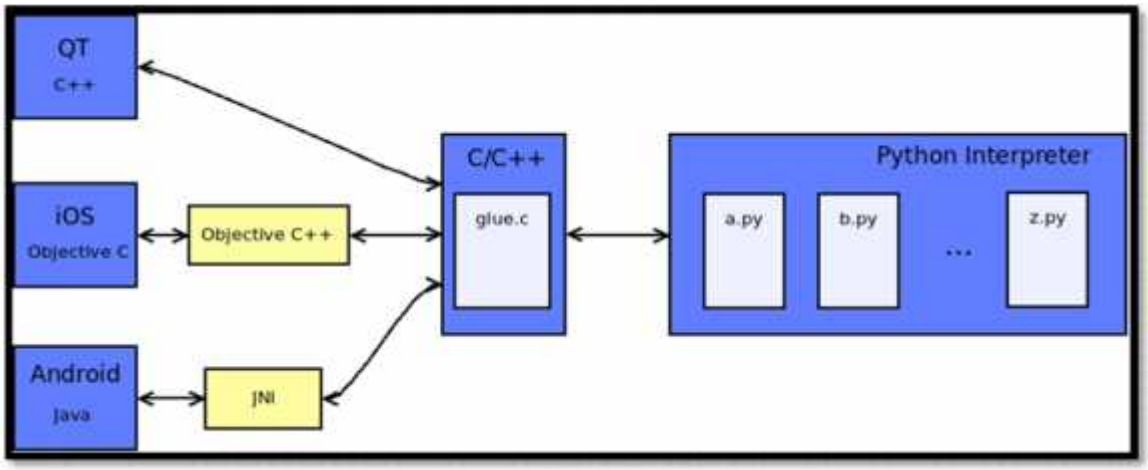
- Because code is automatically compiled to byte code and executed, Python is suitable for use as a scripting language, Web application implementation language, etc.
- Because Python can be extended in C and C++, Python can provide the speed needed for even compute intensive tasks.
- Because of its strong structuring constructs (nested code blocks, functions, classes, modules, and packages) and its consistent use of objects and object-oriented programming, Python enables us to write clear, logical applications for small and large tasks.

Benefits of using Python

- Elimination of human error
- Versatility: Can run in Arc Toolbox
- Increased productivity; Scheduled tasks clean syntax (for allocation of blocks to use derogations);
- normal distribution has a lot of useful modules (including the module for developing GUI);

Important features of Python

- Built in high level data types: strings, lists, dictionaries.
- The usual control structures: if, if else, while, plus a powerful collection iterate.
- Multiple levels of organizational structure: functions, classes, modules, and packages. These assist in organizing code. An excellent and large example is the Python standard library.
- Compile on the fly to byte code Source code is compiled to byte code without a separate compile step. Source code modules can also be "precompiled" to byte code files.
- Object oriented Python provides a consistent way to use objects: everything is an object. And, in Python it is easy to implement new object types Extensions in C and C++ Extension modules and extension types can be written by hand. There are also tools that help with this, for example, SWIG, sip, Pyrex.



Disadvantages

- Python like many other interpreted languages that do not apply, for example, JIT-compilers have a common drawback -the relatively low rate of program implementation.
- The lack of static typing and some other reasons do not allow you to implement a Python function overloading mechanism at compile time.

35. RELATIONAL DATABASE MANAGEMENT SYSTEM (RDBMS)

Definition

RDBMS stands for Relational Database Management System. RDBMS data is structured in database tables, fields and records. Each RDBMS table consists of database table rows. Each database table row consists of one or more database table field.

RDBMS store the data into collection of tables, which might be related by common fields (database table columns). RDBMS also provide relational operators to manipulate the data stored into the database tables. Most RDBMS use SQL as database query language.

Introduction to SQL

SQL (Structured Query Language) is a database computer language designed for managing data in relational database management systems (RDBMS).

SQL Statement

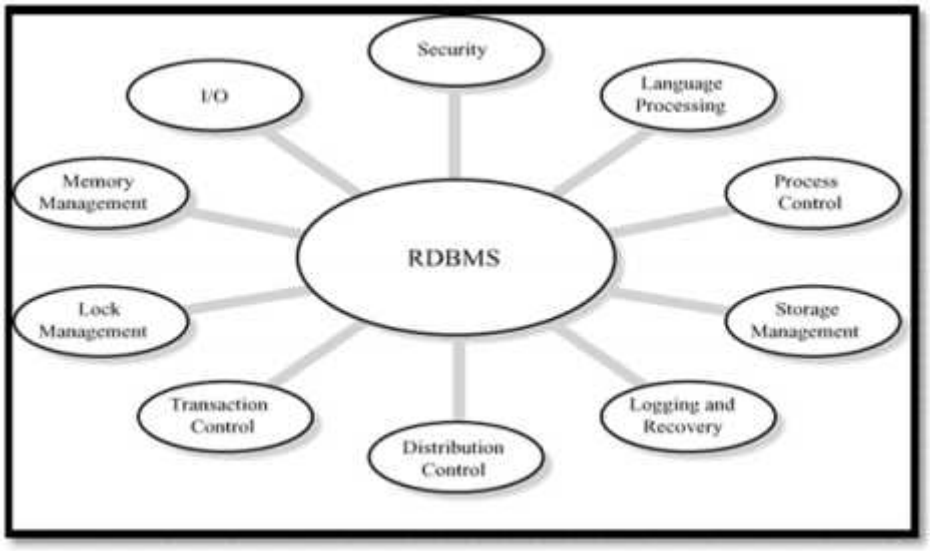
Operation	SQL	Description
Create	INSERT INTO	inserts new data into a database
Read (Retrieve)	SELECT	extracts data from a database
Update	UPDATE	updates data in a database
Delete (Destroy)	DELETE	deletes data from a database

Different from a normal dbms

1. DBMS stores data as files whereas RDBMS stores data in a tabular arrangement.
2. RDBMS allows for normalization of data.
3. RDBMS maintains a relation between the data stored in its tables. A normal DBMS does not provide any such link. It blankly stores data is its files.

RDBMS technology

- Client/Server Databases
  Oracle, Sybase, MySQL, SQLServer
- Personal Databases
  MS Access



The advantages of RDBMS

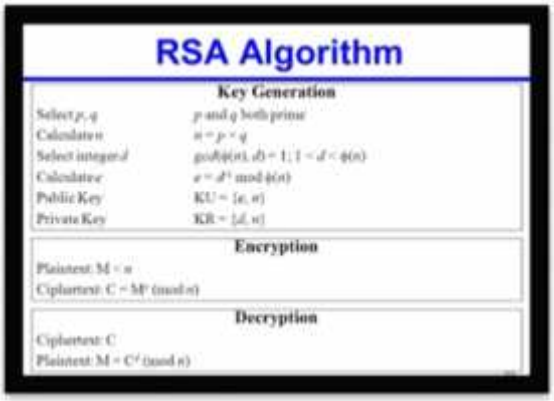
- Data Structure
- Multi-User Access
- Privileges
- Network Access
- Speed
- Maintenance
- Language

Disadvantages of RDBMS

- Cost of execution
- Complex Multi-Media data
- Structure limits
- Isolated databases

36. RSA ALGORITHM

RSA is an algorithm used by modern computers to encrypt and decrypt messages. It is an asymmetric cryptographic algorithm. Asymmetric means that there are two different keys. This is also called public key cryptography, because one of them can be given to everyone. The other key must be kept private. It is based on the fact that finding the factors of an integer is hard (the factoring problem). RSA stands for Ron Rivest, Adi Shamir and Leonard Adleman, who first publicly described it in 1978. A user of RSA creates and then publishes the product of two large prime numbers, along with an auxiliary value, as their public key. The prime factors must be kept secret. Anyone can use the public key to encrypt a message, but with currently published methods, if the public key is large enough, only someone with knowledge of the prime factors can feasibly decode the message.



- **Public-key encryption**

This idea omits the need for a \courier" to deliver keys to recipients over another secure channel before transmitting the originally-intended message. In RSA, encryption keys are public, while the decryption keys are not, so only the person with the correct decryption key can decipher an encrypted message. Everyone has their own encryption and decryption keys. The keys must be made in such a way that the decryption key may not be easily deduced from the public encryption key.

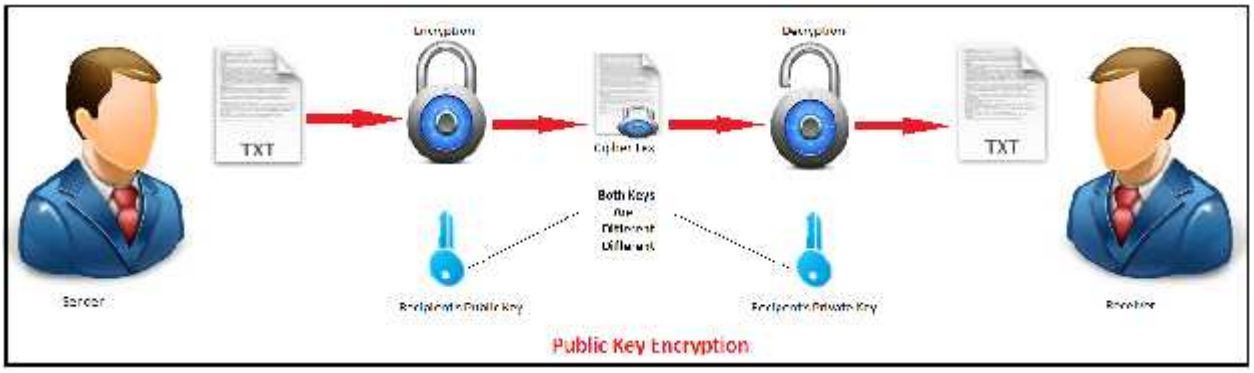
- **Digital signatures**

The receiver may need to verify that a transmitted message actually originated from the sender (signature), and didn't just come from there (authentication).

Description of Digital Signature

This is done using the sender's decryption key, and the signature can later be varied by anyone, using the corresponding public encryption key. Signatures therefore cannot be forged. Also, no signer can later deny having signed the message. This is not only useful for electronic mail, but for other electronic transactions and transmissions, such as fund transfers. The security of the RSA algorithm has so far been validated, since no known attempts to break it have yet been successful, mostly due to the difficulty of factoring large numbers n = pq, where p and q are large prime numbers.

Public-key cryptosystems



Each user has their own encryption and decryption procedures, E and D, with the former in the publicly and the latter kept secret. These procedures are related to the keys, which, in RSA specifically, are sets of two special numbers. We of course start out with the message itself, symbolized by M, which is to be encrypted".

Signatures

For complete assurance that the message originated form a sender, and was not just sent through him by a third party who may have used the same encryption key (that of the receiver), we need a digital signature to come with the message. This has obvious implications of importance in real-life applications. Bob wants to send a private message to Alice. To sign the document, we pull a clever little trick, all assuming that the RSA algorithm is quick and reliable, mostly due to property.

37. SHAREWARE

Shareware is a type of proprietary software which is initially provided free of charge to users, who are allowed and encouraged to make and share copies of the program. Shareware is often offered as a download from an Internet website or as a compact disc included with a magazine. Shareware is available on all major personal computer platforms.

The term shareware is used in contrast to open-source software, in which the source code is available for anyone to inspect and alter; and freeware, which is software distributed at no cost to the user but without source code being made available

Types of shareware

- **Adware:** Adware, short for "advertising-supported software", is any software package which automatically renders advertisements in order to generate revenue for its author. On Microsoft Windows, shareware is often packaged with adware.
- **Demoware:** Demoware is a demonstration version of software. There are generally two types Demoware that which is crippled, and that which has a trial period.
- **Crippleware:** In software, Crippleware means that vital features of the program such as printing or the ability to save files are disabled until the user buys the software. The distinction between Freemium and Crippleware is that an unlicensed Freemium program has useful functionality, while Crippleware demonstrates its' potential but is not in itself useful.

- **Trialware:** Trialware is software with a built-in time limit. The user can try out the fully featured program until the trial period is up, and then most Trialware reverts to a reduced-functionality (Freemium, Nagware, or Crippleware) or non-functional mode, unless the user pays the license fee and receives a registration code to unlock the program.

  Trialware has become the norm for online Software as a Service (SaaS).

- **Donationware:** Donationware is a licensing model that supplies fully operational unrestricted software to the user and requests an optional donation be paid to the programmer or a third-party beneficiary (usually a non-profit).

  The amount of the donation may also be stipulated by the author, or it may be left to the discretion of the user, based on individual perceptions of the software's value. Since Donationware comes fully operational (i.e. not Crippleware) with payment optional, it is a type of freeware.

- **Nagware:** Nagware (also known as Begware, Annoyware or a Nagscreen) is a pejorative term for shareware that persistently reminds the user to purchase a license.

  It usually does this by popping up a message when the user starts the program, or intermittently while the user is using the application.

  These messages can appear as windows obscuring part of the screen, or as message boxes that can quickly be closed. Some Nagware keeps the message up for a certain time period, forcing the user to wait to continue to use the program.

  Some titles display a dialog box with payment information and a message that paying will remove the notice, which is usually displayed either upon startup or after an interval while the application is running.

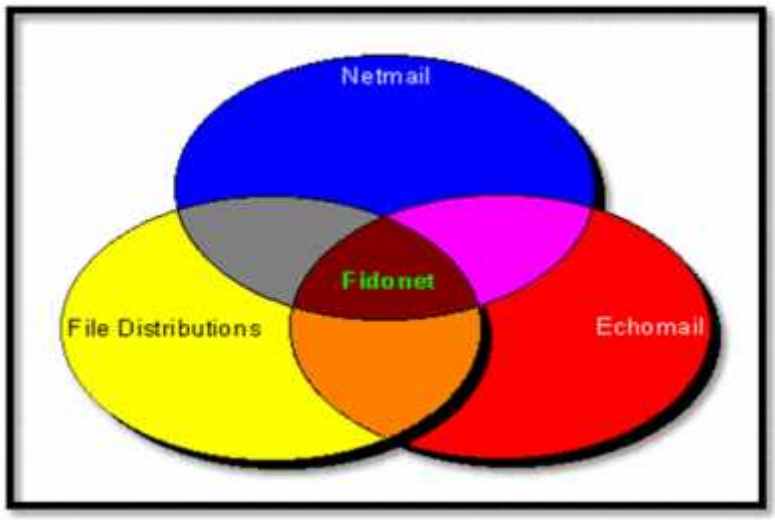
38. SIGNATURE IN MAIL

An email signature is a block of text appended to the end of an email message often containing the sender's name, address, phone number, disclaimer or other contact information. "Traditional" internet cultural .sig practices assume the use of mono spaced ASCII text because they pre-date MIME and the use of HTML in email. In this tradition, it is common practice for a signature block to consist of one or more lines containing some brief information on the author of the message such as phone number and email address, URLs for sites owned or favoured by the author - but also often a quotation (occasionally automatically generated by such tools as fortune), or an ASCII art picture. Among some groups of people it has been common to include self-classification codes.

Gmail as well, Internet forums

Business e-mails may also be some signature block elements mandated by local laws:

- Germany requires companies to disclose their company name, registration number, place of registration etc. in email signatures, in any business-related emails.
- Ireland's Director of Corporate Enforcement requires all limited companies operating websites to disclose such information in their emails.
- The UK's Ecommerce Regulations require this information in all emails from limited companies as well.



On web forums, the rules are often less strict on how a signature block is formatted, as Web browsers typically are not operated within the same constraints as text interface applications. Users will typically define their signature as part of their profile. Depending on the board's capabilities, signatures may range from a simple line or two of text to an elaborately-constructed HTML piece. Images are often allowed as well, including dynamically updated images usually hosted remotely and modified by a server-side script. In some cases avatars or hackergotchis take over some of the role of signatures.

Fidonet

With FidoNet, echomail and netmail software would often add an origin line at the end of a message. This would indicate the FidoNet address and name of the originating system (not the user). The user posting the message would generally not have any control over the origin line. However, single-line taglines, added under user control, would often contain a humorous or witty saying. Multi-line user signature blocks were rare. Most email clients, including Mozilla Thunderbird, the built-in mail tool of the web browser Opera, Microsoft Outlook and Outlook Express, and Eudora, can be configured to automatically append an email signature with each new message.

Most email servers can be configured to append email signatures to all out go in Email signatures in business.

39. SURGE PROTECTOR

A surge protector (or surge suppressor or surge diverter) is an appliance or device designed to protect electrical devices from voltage spikes. A surge protector attempts to limit the voltage supplied to an electric device by either blocking or shorting to ground any unwanted voltages above a safe threshold. This article primarily discusses specifications and components relevant to the type of protector that diverts (shorts) a voltage spike to ground; however, there is some coverage of other methods.

The terms surge protection device (SPD) and transient voltage surge suppressor (TVSS) are used to describe electrical devices typically installed in power distribution panels, process control systems, communications systems, and other heavy-duty industrial systems, for the purpose of protecting against electrical surges and spikes, including those caused by lightning. Scaled-down versions of these devices are sometimes installed in residential service entrance electrical panels, to protect equipment in a household from similar hazards.

Important specifications

These are some of the most prominently featured specifications which define a surge protector for AC mains, as well as for some data communications protection applications.

Joules Rating

This number defines how much energy an MOV-based surge protector can theoretically absorb in a single event, without failure. Counter-intuitively, a lower number may indicate longer life expectancy if the device can divert more energy elsewhere and thus absorb less energy. In other words, a protective device offering a lower clamping voltage while diverting the same surge current will cause more of the surge energy to be dissipated elsewhere in that current's path. Better protectors exceed peak ratings of 1000 joules and 40,000 amperes.

It is often claimed that a lower joule rating is undersized protection, since the total energy in harmful spikes can be significantly larger than this. However, if properly installed, for every joule absorbed by a protector, another 4 to 30 joules may be dissipated harmlessly into ground. An MOV-based protector (described below) with a higher let-through voltage can receive a higher joule rating, even though it lets more surge energy through to the device to be protected.

Response Time

Surge protectors don't operate instantaneously; a slight delay exists. The longer the response time, the longer the connected equipment will be exposed to the surge. However, surges don't happen instantly either. Surges usually take around a few microseconds to reach their peak voltage, and a surge protector with a nanosecond response time would kick in fast enough to suppress the most damaging portion of the spike.

40. SWING LIBRARY

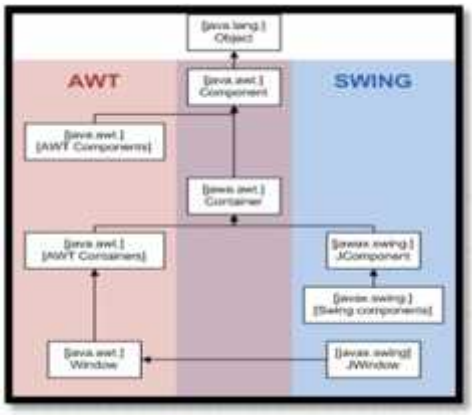
Swing is a GUI widget toolkit for Java. It is part of Oracle's Java Foundation Classes (JFC) – an API for providing a graphical user interface (GUI) for Java programs.

Swing was developed to provide a more sophisticated set of GUI components than the earlier Abstract Window Toolkit (AWT). Swing provides a native look and feel that emulates the look and feel of several platforms, and also supports a pluggable look and feel that allows applications to have a look and feel unrelated to the underlying platform. It has more powerful and flexible components than AWT. In addition to familiar components such as buttons, check boxes and labels, Swing provides several advanced components such as tabbed panel, scroll panes, trees, tables, and lists.

Architecture

Swing is a platform-independent, Model-View-Controller GUI framework for Java, which follows a single-threaded programming model. Additionally, this framework provides a layer of abstraction between the code structure and graphic presentation of a Swing-based GUI.

- **Relationship to AWT:**



- **Foundations:**

Swing is platform-independent because it is completely written in Java. Complete documentation for all Swing classes can be found in the Java API Guide for Version 6 or the Java Platform Standard Edition 8 API Specification for Version 8.

The Abstract of AWT

The Abstract Window Toolkit (AWT) has provided platform-independent APIs for user interface components. In AWT, each component is rendered and controlled by a native peer component specific to the underlying windowing system. By contrast, Swing components are often described as lightweight because they do not require allocation of native resources in the operating system's windowing toolkit. The AWT components are referred to as heavyweight components.

Difference between AWT and Swing

There are many differences between java.awt and swing that are given below.

No.	Java AWT	Java Swing
1)	AWT components are **platform-dependent**.	Java swing components are **platform-independent**.
2)	AWT components are **heavyweight**.	Swing components are **lightweight**.
3)	AWT **doesn't support pluggable look and feel**.	Swing **supports pluggable look and feel**.
4)	AWT provides **less components** than Swing.	Swing provides **more powerful components** such as tables, lists, scrollpanes, colorchooser, tabbedpane etc.
5)	AWT **doesn't follows MVC**(Model View Controller) where model represents data, view represents presentation and controller acts as an interface between model and view.	Swing **follows MVC**.

Relationship to SWT:

The Standard Widget Toolkit (SWT) is a competing toolkit originally developed by IBM and now maintained by the Eclipse community. SWT's implementation has more in common with the heavyweight components of AWT.

This confers benefits such as more accurate fidelity with the underlying native windowing toolkit, at the cost of an increased exposure to the native platform in the programming model. There has been significant debate and speculation about the performance of SWT versus Swing; some hinted that SWT's heavy dependence on JNI would make it slower when the GUI component and Java need to communicate data, but faster at rendering when the data model has been loaded into the GUI, but this has not been confirmed either way.

41. TRANSMISSION CONTROL PROTOCOL (TCP)

The most common transport layer protocol is used on Ethernet and the Internet. It was developed by DARPA. TCP is the connection-oriented built on top of Internet protocol (IP) and is nearly always seen in the combination TCP/IP (TCP over IP). It adds reliable communication and flow-control and provides full-duplex, process-to-process connections. TCP is defined in STD 7 and RFC 793.

TCP header

0 0	0 1	0 2	0 3	0 4	0 5	0 6	0 7	0 8	0 9	1 0	1 1	1 2	1 3	1 4	1 5	1 6	1 7	1 8	1 9	2 0	2 1	2 2	2 3	2 4	2 5	2 6	2 7	2 8	2 9	3 0	3 1
Source Port																Destination Port															
Sequence Number																															
Acknowledgment Number																															
Data Offset				Reserved				ECN			Control Bits					Window															
Checksum																				Urgent Pointer											
Options and padding :::																															
Data :::																															

Source Port: 16 bits.

Destination Port: 16 bits.

Sequence Number: 32 bits.

The sequence number of the first data byte in this segment. If the SYN bit is set, the sequence number is the initial sequence number and the first data byte is initial sequence number + 1.

Acknowledgment Number: 32 bits.

If the ACK bit is set, this field contains the value of the next sequence number the sender of the segment is expecting to receive. Once a connection is established this is always sent.

Data Offset: 4 bits.

Reserved: 3 bits.
N, NS, Nonce Sum: 1 bit.

Added in RFC 3540. This is an optional field added to ECN intended to protect against accidental or malicious concealment of marked packets from the TCP sender.

Control Bits: 6 bits.

U, URG: 1 bit.
Urgent pointer valid flag.

Window: 16 bits, unsigned.

Checksum: 16 bits.

This is computed as the 16-bit one's complement of the one's complement sum of a pseudo header of information from the IP header, the TCP header, and the data, padded as needed with zero bytes at the end to make a multiple of two bytes. The pseudo header contains the following fields:

00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Source IP address																															
Destination IP address																															
0								IP Protocol								Total length															

Urgent Pointer: 16 bits, unsigned.

If the URG bit is set, this field points to the sequence number of the last byte in a sequence of urgent data.

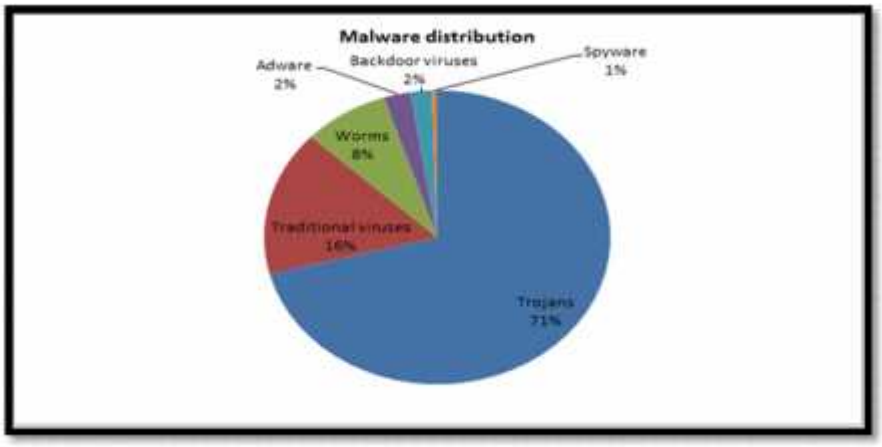
Options: 0 to 40 bytes.

Options occupy space at the end of the TCP header. All options are included in the checksum. An option may begin on any byte boundary. The TCP header must be padded with zeros to make the header length a multiple of 32 bits.

42. TROJAN HORSE

Definition

A Trojan horse is a destructive program that masquerades as a benign application. Unlike viruses, Trojan horses do not replicate themselves but they can be just as destructive. One of the most insidious types of Trojan horse is a program that claims to rid a computer of viruses but instead introduces viruses into the system.



The main types of Trojan Horses

Remote Access Trojans:

Abbreviated as RATs, a Remote Access Trojan is designed to provide the attacker with complete control of the victim's system. Attackers usually hide these Trojan horses in games and other small programs that unsuspecting users then execute on their PCs.

Data Sending Trojans:

This type of Trojan horses is designed to provide the attacker with sensitive data such as passwords, credit card information, log files, e-mail address or IM contact lists. These Trojans can look for specific pre-defined data, or they install a key logger and send all recorded keystrokes back to the attacker.

Destructive Trojans:

This Trojan horse is designed to destroy and delete files, and it’s more like a virus than any other Trojan. It can often go undetected by antivirus software.

Proxy Trojans:

This kind of Trojan horses is designed to use the victim's computer as a proxy server. This lets the attacker do anything from your computer, including credit card fraud and other illegal activities and even use your system to launch malicious attacks against other networks.

FTP Trojans:

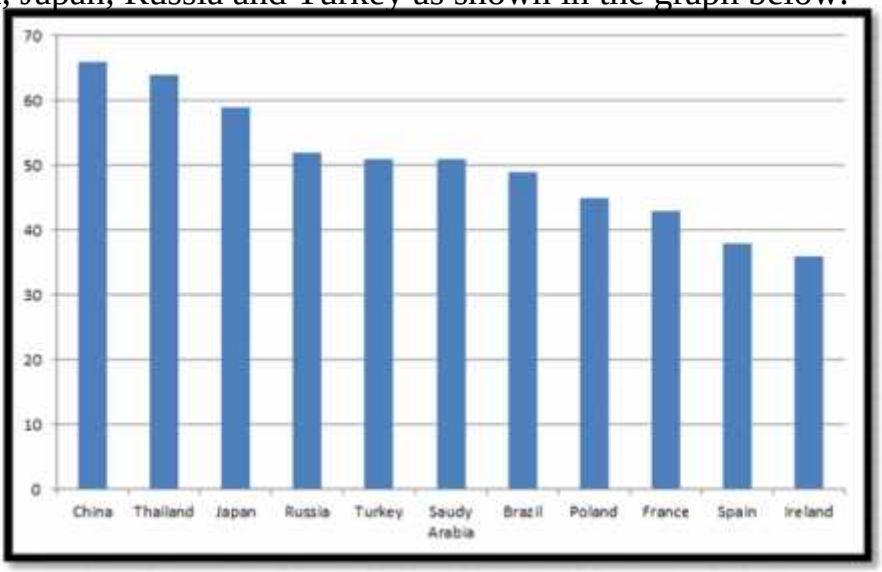
This Trojan horse opens port 21 (the port for FTP transfer) and lets the attacker connect to your computer using File Transfer Protocol (FTP).

Security software disabler Trojans:

This nasty Trojan horse stops or kills computer security software such as antivirus programs or firewalls without the user knowing. It's usually combined with another type of Trojan as a "payload".

Trojans trends:

Country reports show that China still holds the first place with infection rates of approximately 65% of which more than 75% are Trojans, closely followed by Thailand, Japan, Russia and Turkey as shown in the graph below.



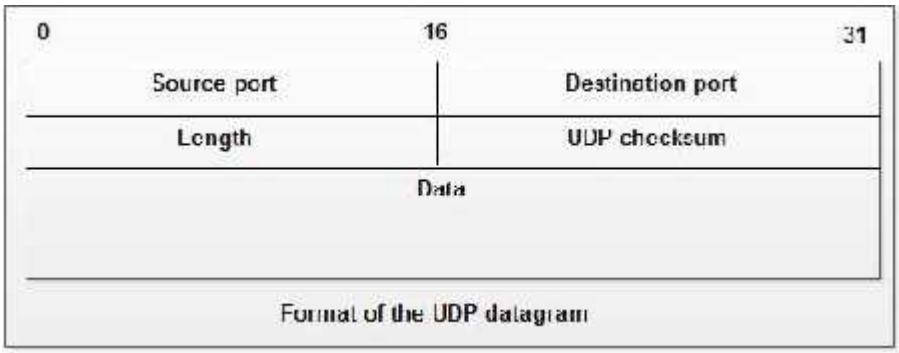
Trojans are known as the most widely spread infection type across computer systems accounting for approximately 70% of all detected malware, followed by traditional viruses and worms.

43. USER DATAGRAM PROTOCOL (UDP)

UDP (User Datagram Protocol) is a simple OSI transport layer protocol for client/server network applications based on Internet Protocol (IP). UDP is the main alternative to TCP and one of the oldest network protocols in existence, introduced in 1980.

UDP is often used in video conferencing applications or computer games specially tuned for real-time performance. To achieve higher performance, the protocol allows individual packets to be dropped (with no retries) and UDP packets to be received in a different order than they were sent as dictated by the application.

UDP header



Format of the UDP datagram

Following is a brief description of each field:

Source Port: This is the port number of the application that is originating the user data.

Destination Port: This is the port number pertaining to the destination application.

Length: This field describes the total length of the UDP datagram, including both data and header Information.

UDP Checksum: Integrity checking is optional under UDP. If turned on, both ends of the communications channel use this field for data integrity checks.

Ports: UDP applications use datagram sockets to establish host-to-host communications. Sockets bind the application to service ports that functions as the endpoints of data transmission.

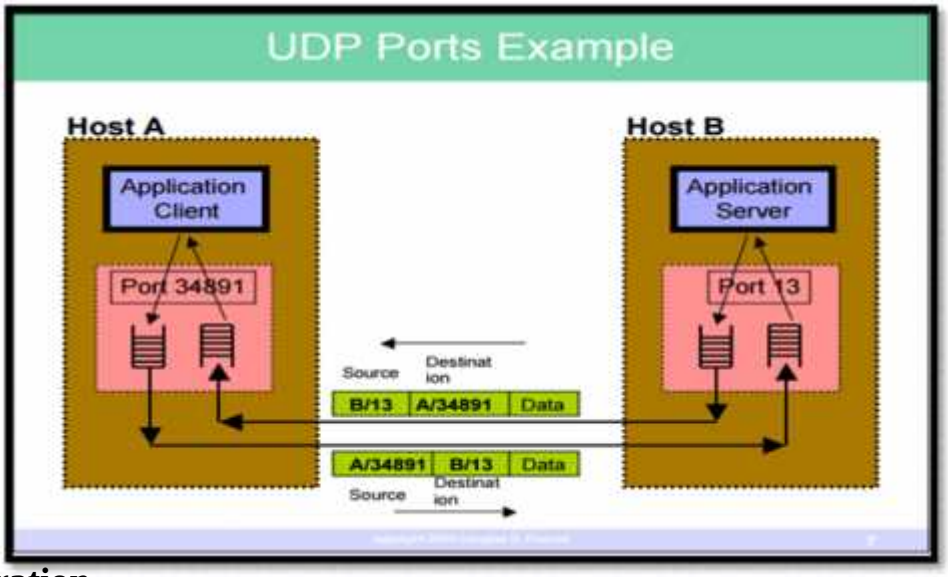
A port is a software structure that is identified by the port number, a 16 bit integer value, allowing for port numbers between 0 and 65,535.

Port 0 is reserved, but is able to be used if the sending process does not expect messages in response.

Ports 1 through 1023 (hexadecimal 0x3FF) are named "well-known" ports and on Unix-like operating systems, binding to one of these ports requires super user (root) access.

Ports 1024 through 49,151 (0xBFFF) are registered ports.

Ports 49,152 through 65,535 (0xFFFF) are used as temporary ports usually by clients when communicating to servers.



UDP Operation

Connectionless:

Independent user data grams, even if from same source socket to same destination socket. No streaming is supported. Data must be small enough to fit in one user datagram.

No flow or error control:

If checksum fail, destination silently drops the datagram. Source gets no idea whether the user datagram has arrived.

44. UTILITY SOFTWARE

Utility software is system software designed to help analyze, configure, optimize or maintain a computer. It is a type of system software, used to support the computer infrastructure by contrast with, application software which is aimed at directly performing tasks that benefit ordinary users.

Utility software helps to manage, maintain and control computer resources. Operating systems typically contain the necessary tools for this, but separate utility programs can provide improved functionality.

Types of utilities:

- **Anti-virus** utilites scan for computer virues.
- **Archivers** output a stream or a single file when provided with a directory or a set of files.
- **Backup software** makes copies of all information stored on a disk and restores either the entire disk.
- **Clipboard managers** expand the clipboard functionality of an operating system.
- **Cryptographic** utilities encrypt and decrypt streams and files.
- **Data compression** utilities output a shorter stream or a smaller file when provided with a stream or file.
- **Disk checkers** scan an operating hard drive and check for logical (file system) or physical errors.

- **Disk cleaners** find files that are unnecessary to computer operation, or take up considerable amounts of space.
- **Disk compression** utilities transparently compress/uncompress the contents of a disk, increasing the capacity of the disk.
- **Disk defragmenters** detect computer files whose contents are scattered across several locations on the hard disk, and move the fragments to one location to increase efficiency.
- **Hex editors** directly modify the text or data of a file. These files could be data or an actual program.
- **Memory testers** check for memory failures.
- **Registry cleaners** clean and optimize the Windows Registry by removing old registry keys that are no longer in use.
- **System monitors** monitor resources and performance in a computer system.
- **System profilers** provide detailed information about the software installed and hardware attached to the computer.

Backup software helps in the creation of a backup of the files on our computer. Most computer systems use a hard disk drive for storage. Backup software helps us copy the most important files to another storage device, such as an external hard disk. We can also make an exact copy of our hard disk.

Increasingly, backup software uses cloud storage to create backups. This typically means we pay a fee to use the storage space of a third party and use their backup software to manage which files are going to be backed up. Disk tools include a range of different tools to manage hard disk drives and other storage devices. This includes utilities to scan the hard disks for any potential problems. Disk tools are important because a failure of a hard disk drive can have disastrous consequences.

45. VIDEO GRAPHICS ARRAY (VGA)

Introduction of VGA

VGA, which stands for video graphics array, is currently the most popular standard for PC screen display equipment. Technically, a VGA is a type of video adapter. IBM developed the VGA for its PS/2 line of computers, but loads of other manufacturers make VGA add-in boards (that plug into a slot in the PC) and VGA chips(sometimes it placed in motherboard).

A VGA monitor is a monitor that works with a VGA adapter. A VGA monitor requires an interface card and a cable. The user need to know how much memory is on the card. The user may want to add more memory, especially if the plan is to create and use complex graphic or photographic images.

VGA cable

The Video Graphics Array cables (VGA) has been used for a long time now. These cables are formerly exclusive for IBM computers but as time goes by many computer producers adopted with this kind of technology. VGA cables are capable of transmitting data from one device to another specifically from a computer to monitor. Though there are other cables available in the market like the HDMI, still most offices and households prefer VGA cables.

VGA connector

The VGA connector is used for display devices and is used to connect a computer to a monitor, projector, or TV.

Features/Specification

- 256 kB Video RAM (The very first cards could be ordered with 64 kB or 128 kB of RAM, at the cost of losing some or all high-resolution 16-color modes)
- 16-color and 256-color palette display modes
- 262,144-color global palette (6 bits, and therefore 64 possible levels, for each of the red, green, and blue channels via the RAMDAC)
- Selectable 25.175 MHz or 28.322 MHz master pixel clock
- Usual line rate fixed at 31.469 kHz
- Maximum of 800 horizontal pixels
- Maximum of 600 lines
- Refresh rates at up to 70 Hz
- Vertical blank interrupt (Not all clone cards support this)
- Planar mode: up to 16 colours (4-bit planes)
- Packed-pixel mode: 256 colours (Mode 13h)
- No hardware sprites
- No Bitter, but supports very fast data transfers via "VGA latch" registers.
- Split screen support
- 0.7 V peak-to-peak
- 5-ohm double-terminated impedance (18.7 mA – 13 mA).

We express our sincere Gratitude for all those who have helped us, for the successful launch of this book, which is one of the Best Practices of the Department ....