COMPUTER INFO-GALLERY

VOLUME - 7

(2018-19)

Students' Assignments as IT Encyclopedia

PREFACE

This book is intended to make the New-Comers (Students) of 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 the IT terminologies and concepts. Already 6 Volumes has been launched during 2012-2018.

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 the task without copying others' content. Then, I thought why it shouldn't be combined together in the form of a book, which will help other students also. That is how this book got emerged. This is the 7th Volume for the academic year 2018-19 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

(Dr.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	S.SARAN	01	01
02	R.AKALYA	02	03
03	S.MALLIKARJUN	03	05
04	S.CHRIST OLIVER LLOYD	04	07
05	K.S.VASANTHA KUMAR	05	09

UNDER THE GUIDANCE OF : Ms.S.VIDHYA and Ms.K.GOMATHY

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

S.NO.	NAME	TOPIC NO.	PAGE NO.
06	E.GOWTHAM	06	11
07	S.LOGANANTH	07	13
08	AKSHITA DAYMA	08	15
09	C.PRASANTH	09	17
10	S.PREETHA	10	19

UNDER THE GUIDANCE OF : Ms.M.GEETHA

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

S.NO.	NAME	TOPIC NO.	PAGE NO.
11	P.K.SAKTHI AGATHIYA	11	21
12	V.VIMAL AOHITNAN	12	23
13	R.PRIYANKA	13	25
14	S.BOOMIKA	14	27
15	V.VINITHA	15	29

UNDER THE GUIDANCE OF : Ms.R.PUSHPALATHA

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

UNDER THE GUIDANCE OF : Dr.T.VELUMANI

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

UNDER THE GUIDANCE OF : Mr.S.SUGANESH

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

UNDER THE GUIDANCE OF : Ms.P.THENMOZHI

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

S.NO.	NAME	TOPIC NO.	PAGE NO.
31	V.C.HARIPRIYA	31	61
32	B.MONISHA	32	63
33	N.RUCHI BOHRA	33	65
34	P.PRAVEEN KUMAR	34	67
35	S.PRASATH	35	69

UNDER THE GUIDANCE OF : Mr.S.SIVARAJA

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

S.NO.	NAME	TOPIC NO.	PAGE NO.
36	R.SOUNDHAR	36	71
37	J.POOJA	37	73
38	D.GOBIKA	38	75
39	D.NIVETHA	39	77
40	A.NAVEEN KUMAR	40	79

UNDER THE GUIDANCE OF : Ms.R.SAVEETHA

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

S.NO.	NAME	TOPIC NO.	PAGE NO.
41	K.SHAFEERA	41	81
42	G.RAKESH	42	83
43	K.ANANOH	43	85
44	B.SUMITHA	44	87
45	S.ALAGUSUDHAN	45	89

UNDER THE GUIDANCE OF : Mr.D.GOPINATH

STUDENT VOLUNTEERS: 1. Mr. S. CHRIST OLIVER LLOYD – I B.Sc (CS) –'A'

2. Mr. S. K. RAKHA GOKHUL – I B.Sc (CS) –'A'

01. ACROBAT READER

Adobe Acrobat:

Adobe Acrobat is a family of application software and Web services developed by Adobe Inc. It is to view, create, manipulate, print and manage files in Portable Document Format (PDF).

The family comprises Acrobat Reader (formerly Reader), Acrobat (formerly Exchange) and Acrobat.com. The basic Acrobat Reader, available for several desktop and mobile platforms. It is freeware. It supports viewing, printing and annotating of PDF files. The commercial proprietary Acrobat, available for MicrosoftWindows and macOS only, can also create, edit, convert, digitally sign, encrypt, export and publish PDF files. Acrobat.com complements the family with a variety of enterprise content management and file hosting services.

History:

Adobe Acrobat came to being in 1993 and had to compete with other products and proprietary formats that aimed to create digital documents:

- Common Ground from No Hands Software Inc.
- Envoy from WordPerfect Corporation
- Folio Views from NextPage
- Replica from Farallon Computing
- WorldView from Interleaf
- DjVu from AT&T Laboratories

Old logos of Acrobat apps and services:

Adobe has renamed the Acrobat products several times, in addition to merging, splitting and discontinuing them. Initially, the offered products were called Acrobat Reader, Acrobat Exchange and Acrobat Distiller. "Acrobat Exchange" soon became "Acrobat". Over time, "Acrobat Reader" became "Reader". Between versions 3 and 5, Acrobat did not have several editions. In 1999, the Acrobat.com service came to being and introduced several web services whose names started with "Acrobat".

Eventually, "Acrobat.com" was downgraded from the name of the family of services, to that of one those service.

By 1 April 2015, the Acrobat family consisted of:

- Acrobat XI Pro (for Windows and macOS)
- Acrobat XI Standard (for Windows only)
- Reader XI (for Windows, macOS, Android and iOS)
- FormsCentral (web service with desktop client)
- EchoSign (web service)
- Acrobat.com (web service)
- PDF Pack (web service)
- Send (web service).

Security:

A comprehensive list of security bulletins for most Adobe products and related versions is published on their Security bulletins and advisory pages and in other related venues. In particular, the detailed history of security updates for all versions of Adobe Acrobat has been made public. From Version 3.02 onwards, Acrobat Reader has included support for JavaScript. This functionality allows a PDF document creator to include code which executes when the document is read.

02. ACTION SCRIPT

ActionScript is an object oriented programming language originally developed by Macromedia Inc. It is used primarily for the development of websites and software targeting the Adobe Flash Player platform, used on Web pages in the form of embedded SWF files. ActionScript3 is also used with Adobe AIR system for the development of desktop and mobile applications. The language itself is open-source in that its specification is offered free of charge and both an open source compiler and open source virtual machine are available. ActionScript is also used with Scale form GFx for the development of 3D video game user interfaces and HUDs.

Overview of Action Script:

ActionScript was initially designed for controlling simple 2D vector animations made in Adobe Flash. Initially focused on animation, early versions of Flash content offered few interactivity features and thus had very limited scripting capability. Later versions added functionality allowing for the creation of Web-based games and rich Internet applications with streaming media (such as video and audio). Today, ActionScript is suitable for mobile development through Adobe AIR, use in some database applications, and in basic robotics, as with the Make Controller Kit. Flash MX 2004 introduced ActionScript 2.0, a scripting language more suited to the development of Flash applications. It is often possible to save time by scripting something rather than animating it, which usually also enables a higher level of flexibility when editing.

Since the arrival of the Flash Player 9 alpha (in 2006) a newer version of ActionScript has been released, ActionScript 3.0. This version of the language is intended to be compiled and run on a version of the ActionScript Virtual Machine that has been itself completely re-written from the ground up (dubbed AVM2). Because of this, code written in ActionScript 3.0 is generally targeted for Flash Player 9 and higher and will not work in previous versions. At the same time, ActionScript 3.0 executes up to 10 times faster than legacy ActionScript code due to the Just-In-Time compiler enhancements.

Flash libraries can be used with the XML capabilities of the browser to render rich content in the browser. This technology is known as Asynchronous Flash and XML, much like AJAX.

Adobe offers its Flex product line to meet the demand for Rich Internet Applications built on the Flash runtime, with behaviors and programming done in ActionScript. ActionScript 3.0 forms the foundation of the Flex 2 API.

History:

Action Script started as an object-oriented language for Macromedia's Flash authoring tool, now developed by Adobe Systems as Adobe Flash. The first three versions of the Flash authoring tool provided limited interactivity features. Early Flash developers could attach a simple command, called an "action", to a button or a frame. The set of actions was basic navigation controls, with commands such as "play", "stop", "getURL", and "gotoAndPlay".

With the release of Flash 4 in 1999, this simple set of actions became a small scripting language. New capabilities introduced for Flash 4 included variables, expressions, operators, if statements, and loops. Although referred to internally as "ActionScript", the Flash 4 user manual and marketing documents continued to use the term "actions" to describe this set of commands.

Code protection:

In opposition to the decompilers, ActionScript obfu scators have been introduced, which transform code into a form that breaks decompiler output while preserving the functionality and structure of the program. Higher-quality obfuscators implement lexical transformations such as identifier renaming, control flow transformation, and data abstraction transformation which collectively make it harder for decompilers to generate output likely to be useful to a human.

03. ACTIVE MOVIE

ActiveMovie was the immediate ancestor of Windows Media Player 6.x, and was a streaming media technology now known as DirectShow, developed by Microsoft to replace Video for Windows. ActiveMovie allows users to view media streams, whether distributed via the Internet, an intranet or CD-ROMs.

Originally announced in March 1996, the first version was released in May 1996 bundled with the beta version of Internet Explorer 3.0. In ActiveMovie an option was added to the Start Menu to launch the ActiveMovie Control. This allowed users to play multimedia files and thus was a rudimentary media player.

In March 1997, Microsoft announced that ActiveMovie was going to become part of the DirectX set of technologies, and by July it was being referred to as DirectShow.

Control icon from the Start Menu upon installation. Microsoft provided instructions for reinstalling the icon on its website.

DirectShow:

Logo of the DirectX Media SDK – the first time DirectShow was distributed under its current name.

DirectShow (sometimes abbreviated as DS or DShow), codename Quartz, is a multimedia framework and API produced by Microsoft for software developers to perform various operations with media files or streams. It is the replacement for Microsoft's earlier Video for Windows technology. Based on the Microsoft Windows Component Object Model (COM) framework, DirectShow provides a common interface for media across various programming languages, and is an extensible, filter-based framework that can render or record media files on demand at the request of the user or developer. The DirectShow development tools and documentation were originally distributed as part of the DirectX SDK. Currently, they are distributed as part of the Windows SDK (formerly known as the Platform SDK).

Microsoft plans to completely replace DirectShow gradually with Media Foundation in future Windows versions. One reason cited by Microsoft is to provide much more robust support for content protection systems. Microsoft's MSFT Becky Weiss also confirms that you'll notice that working with the Media Foundation requires you to work at a slightly lower level than working with DirectShow would have. And there are still DirectShow features that aren't (yet) in Media Foundation".

04. ADA

Ada is a structured, statically typed, imperative, and object-oriented high-level computer programming language, extended from Pascal and other languages. It has built-in language support for design-by-contract, extremely strong typing, explicit concurrency, tasks, synchronous message passing, protected objects, and non-determinism. Ada improves code safety and maintainability by using the compiler to find errors in favor of runtime errors. Ada is an international standard; the current version (known as Ada 2012) is defined by ISO/IEC 8652:2012.

It was designed by:

- MIL-STD-1815/Ada 83: Jean Ichbiah
- Ada 95: Tucker Taft
- Ada 2005: Tucker Taft
- Ada 2012: Tucker Taft

Ada is an ALGOL-like programming language featuring control structures with reserved words such as if, then, else, while, for, and so on. However, Ada also has many data structuring facilities and other abstractions which were not included in the original ALGOL 60, such as type definitions, records, pointers, enumerations. Such constructs were in part inherited from or inspired by Pascal.

Features:

Features of Ada include strong typing, modularity mechanisms has run-time checking, parallel processing, exception handling, and generics. Ada 95 added support for object-oriented programming, including dynamic dispatch. Ada is designed for development of very large software systems.

Ada packages can be compiled separately. Ada package specifications can also be compiled separately without the implementation to check for consistency.

History:

In the 1970s, the US Department of Defense (DoD) was concerned by the number of different programming languages being used for its embedded computer system projects, many of which were obsolete or hardware-dependent, and none of which supported safe modular programming. In 1975, a working group, the High Order Language Working Group (HOLWG), was formed with the intent to reduce this number by finding or creating a programming language generally suitable for the department's and the UK Ministry of Defense requirements.

After many iterations beginning with an original Straw man proposal the eventual programming language was named Ada. The total number of high-level programming languages in use for such projects fell from over 450 in 1983 to 37 by 1996.

Ada attracted much attention from the programming community as a whole during its early days. Its backers and others predicted that it might become a dominant language for general purpose programming and not just defense-related work. Early Ada compilers struggled to implement the large, complex language and both compile-time and run-time performance tended to be slow and tools primitive. Compiler vendors expended most of their efforts in passing the massive, language-conformance-testing, government-required "ACVC" validation suite that was required in another novel feature of the Ada language effort.

An example program (Hello, world!") in Ada:

```
procedure Hello
isbegin
Put_Line ("Hello, world!");
end Hello;
```

Note:

This program can be compiled by using the freely available open source compiler GNAT, by executing (gnatmake hello.adb)

05. ADAPTIVE SERVER ENTERPRISE (ASE)

Adaptive Server Enterprise is originally known as Sybase SQL Server, and also commonly known as Sybase DB or Sybase ASE, is a relational model database server product for businesses developed by Sybase Corporation which became part of SAP AG. ASE is predominantly used on the Unix platform, but is also available for Microsoft Windows.

Structure:

A single standalone installation of ASE typically comprises one "dataserver" and one corresponding "backup server". In multi server installation many dataservers can share one backup server. A dataserver consists of system databases and user databases. Minimum system databases that are mandatory for normal working of dataserver are 'master', 'tempdb', 'model', 'sybsystemdb' and 'sybsystemprocs'. 'Master' database holds critical system related information that includes, logins, passwords, and dataserver configuration parameters. 'Tempdb' is used for storage of data that are required for intermediate processing of queries, and temporary data. 'Model' is used as a template for creating new databases. 'Sybsystemprocs' consists of system supplied stored procedures that queries system tables and manipulates data in them.

Editions:

SAP also has a developer edition that can be used for free to develop against. It only allows 1 engine and 25 connections. There is an express edition which is limited to 1 server engine, 2 Gb of memory and 5 Gb of disk space per server. This edition is free for pOn January 27, 2010 Sybase release ASE 15.5. It included support for In-Memory and Relaxed-Durability Databases, Distributed transaction management in the shared-disk cluster, faster compression for backups as well as Backup Server Support for the IBM® Tivoli® Storage Manager. Deferred Name Resolution for User-Defined Stored Procedures, FIPS 140-2 Login Password Encryption, Incremental Data Transfer, bigdatetime and bigtime Datatypes and tempdb groups were also added.roduction purposes.

History:

Originally for Unix platforms in 1987, Sybase Corporation's primary relational database management system product was initially marketed under the name Sybase SQL Server. In 1988, SQL Server for OS/2 was co-developed for the PC by Sybase, Microsoft, and Ashton-Tate. Ashton-Tate divested its interest and Microsoft became the lead partner after porting SQL Server to Windows NT. Microsoft and Sybase sold and supported the product through version 4.2.1.

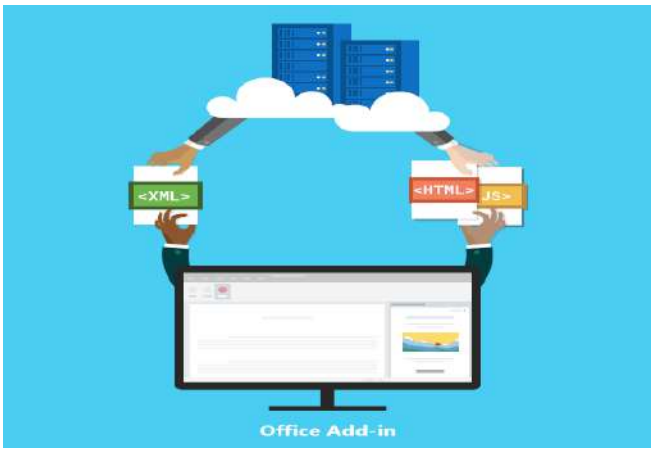
In 1993, the co-development licensing agreement between Microsoft and Sybase ended, and the companies parted ways while continuing to develop their respective versions of SQL Server. Sybase released Sybase SQL Server 10.0, which was part of the System 10 product family, which also included Back-up Server, Open Client/Server APIs, SQL Monitor, SA Companion and OmniSQL Gateway.

Starting with version 11.5 released in 1996, Sybase moved to differentiate its product from Microsoft SQL Server by renaming it to Adaptive Server Enterprise.Sybase 11.5 added Asynchronous prefetch, case expression in sql, the optimizer can use a descending index to avoid the need for a worktable and a sort. The Logical Process Manager was added to allow prioritization by assigning execution attributes and engine affinity.

06. ADD-INS

Introduction:

Add-ins provide optional commands and features for Microsoft Excel. By default, add-ins are not immediately available in Excel, so you must first install and activate these add-ins so that you can use them. Are you looking for information about Office Add-ins based on HTML, CSS, and JS? If you are, see Get an Office Add-in for Excel.



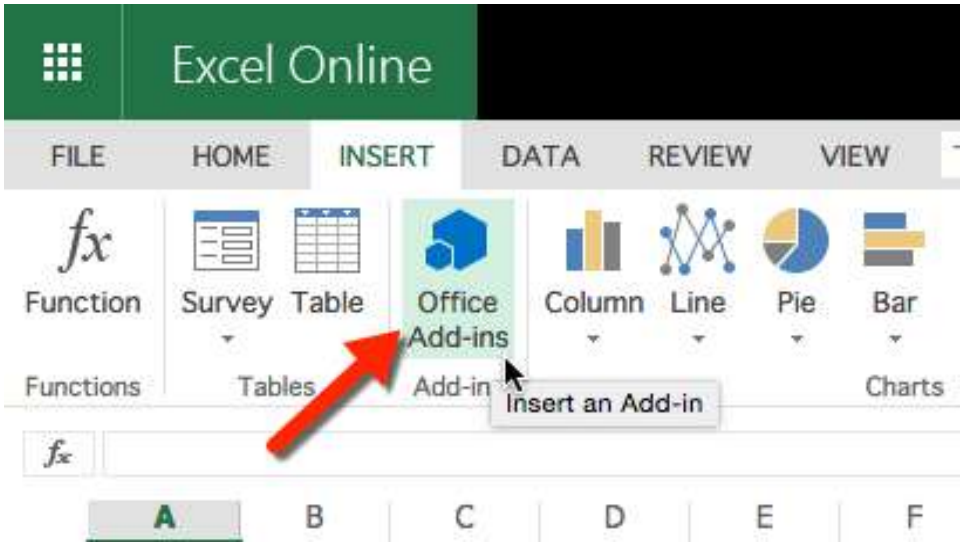
About add-ins:

Some add-ins are built in to Excel, such as Solver and the Analysis Tool Pak. Other add-ins are available from the Download Center and must first be downloaded and installed. Finally, there are add-ins that are created by third parties, such as a programmer in your organization or a software solution provider. These can be Component Object Model (COM)add-ins, Visual Basic for Applications (VBA)add-ins, and DLL add-ins. These add-ins must also be installed to use them.

Most add-ins can be categorized into three different types:

- **Excel add-ins:** These typically include Excel add-in (.xlam), Excel 97-2003 add-in (.xla), or DLL add-in (.xll) files or they are automation add-ins. Some Excel add-ins, such as Solver and the Analysis Tool Pak, may be available after you install Excel or Microsoft Office. Typically, you only need to activate these add-ins to use them.

- **Downloadable add-ins:** Additional add-ins for Excel can be downloaded and installed from downloads at Office.com.
- **Custom add-ins:** Developers and solution providers usually design custom Component Object Model (COM) add-ins, automation add-ins, VBA add-ins, and XLL add-ins. These must be installed for you to use them.After you have installed or activated an add-in, the add-in and its commands may be available in one of the following locations.
- **Data tab:** After you install and activate the Analysis Tool Pak and Solver add-ins, the Data Analysis and Solver commands are available in the Analysis group.
- **Formulas tab:** After you install and activate the Euro Currency Tools, the Euro Conversion and Euro Formatting commands are displayed in the Solutions group.
- **Add - Ins tab:** Other add-ins may be added to the Add-Ins tab. This tab is added to the ribbon when you install and activate the first add-in that is shown in the Add-Ins tab. If you don't see the Add-Ins tab, you should exit and then restart Excel.



Add or remove an Excel add-in:

1.Click the File tab, click Options, and then click the Add-Ins category.
2.In the Manage box, click Excel Add-ins, and then click Go. The Add-Ins dialog box appears.
3.In the Add-Ins available box, select the check box next to the add-in that you want to activate, and then click OK.

07. AFK GAMING

Introduction:

Away from keyboard (AFK)is a colloquialization used in many online communities such as chat rooms and gaming environments to denote the fact that a player has stepped away from their device, and will be unreachable until they return".

It is often encountered in servers and multiplayer games, and can be observed when a player's avatar is standing idle, without any input from the player. Such players are often removed from the server as to reduce server lag. Minecraft servers, for instance, will remove AFK players automatically. In gaming, AFK players are sometimes punished not only by being kicked from the server, but also by having his/her credit score reduced. If his/her credit score is lower than the required minimum score to play in certain modes such as ranked play, he/she will be banned in that game mode.

This is done to prevent players from being AFK in competitive matches where server speed can hinder performance drastically. "Downsides to online connections include increased difficulty detecting cheating compared to physical events, and greater network latency, which can negatively impact players' performance, especially at high levels of competition".

Definition:

"Away from keyboard" (AFK)is a type of chat lingo that shows a user is stepping away from a hardware device. AFK Gaming is a technique used typically by MMORPG gamers, but also can be theoretically used by any other game genre.

AFK gamers use software, either in the form of a bot or a games built-in macro system, to continuously do a repetitive task for them, over and over. It also gives the player a significant competitive edge against the other players.

Techopedia explains Away From Keyboard (AFK):

In a concentrated internet chat, "AFK" can mean anything, from having to wrangle kids or look out the window to monitor a back yard, to times when users have to leave the room entirely. This term was extremely useful in traditional settings, where people were chatting to each other on computers continually, back and forth, and wanted to know why there might be a lack of immediate response.

With today's more loosely set up systems, "AFK" is not used as much. On smart phone texting, which has become the prevailing method of digital chat, there is the idea that a sender takes his or her chances, realizing that there is a good chance the individual is distracted or unable to answer a message at any given time.

In some ways, the wait indicators on smart phone chat systems (such as small bubbles to indicate a user is typing)do provide clues to whether someone is away from the keyboard or not. In email, there is no use of a designation like "AFK" because it is assumed that someone will monitor their inbox at some time in the future.

However, some people who look at how technology is used today have commented that perhaps use of an indicator like AFK could be used to indicate whether or not someone is available to see a message.

Away From Keyboard: Taking Gaming Offline:

As video games continue to captivate kids around the world, Scholastic AFK or "Away From Keyboard"books aim to harness that gaming passion, and convert it into a literacy tool.

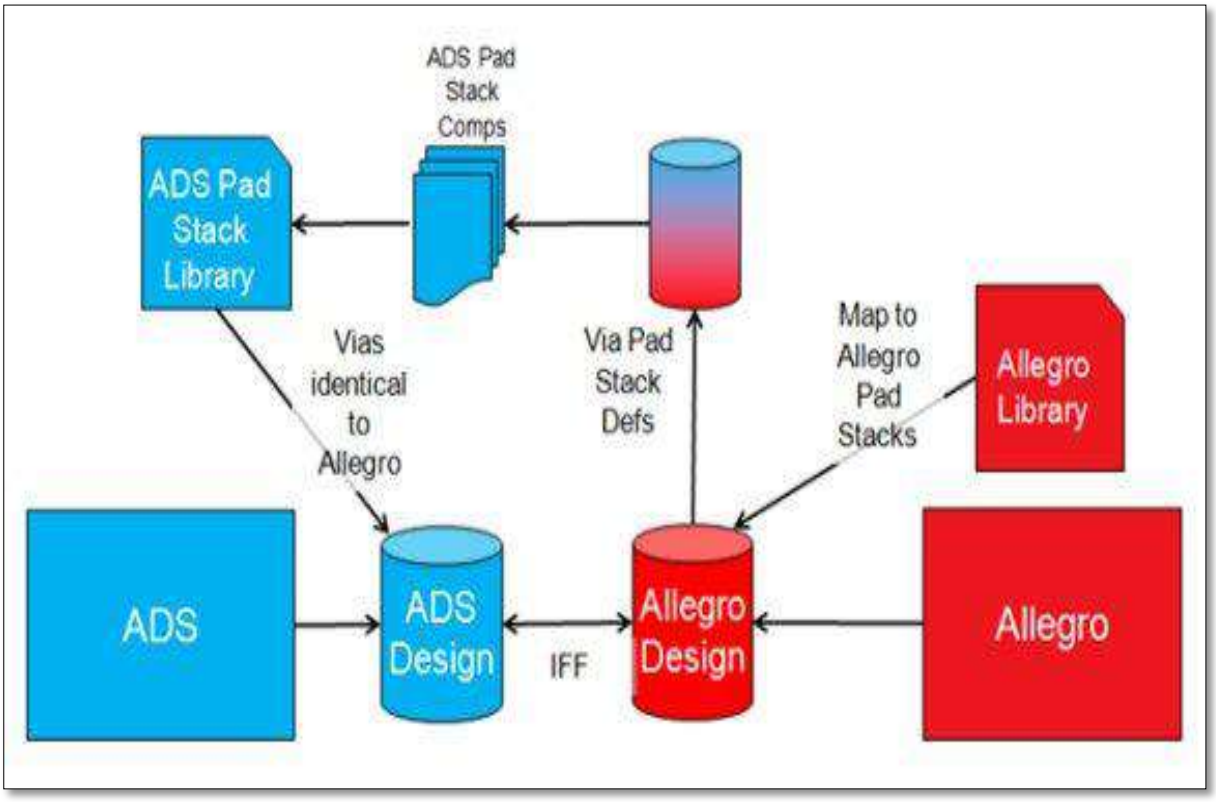
They tell us about what they love about gaming as well as some of the many benefits these books provide to growing readers: they encourage time away from screen, while also supporting reading and literacy by keeping fans engaged in the worlds they love.

08. ALLEGRO LIBRARY

Introduction:

Allegro is a cross-platform library mainly aimed at video game and multimedia programming. It handles common, low-level tasks such as creating windows, accepting user input, loading data, drawing images, playing sounds. and generally abstracting away the underlying platform. However, Allegro is not a game engine: we are free to design and structure our program as we like.

Allegro is a software library for video game development. The functionality of the library includes support for basic 2D graphics, image manipulation, text output, audio output, MIDI music, input and timers, as well as additional routines for fixed-point and floating-point matrix arithmetic, Unicode strings, file system access, file manipulation, data files, and 3D graphics.



The library is written in the C programming language and designed to be used with C, C++, or Objective-C, with bindings available for Python, Lua, Scheme, D, Go, and other languages. Allegro comes with extensive documentation and many examples.

Allegro supports Windows, Mac OS, Unix like systems, Android, and iOS, abstracting their Application Programming Interfaces (APIs) into one portable interface. Previous versions up to 4.4 supported Windows, macOS, DOS, BeOS, and various Unix-like systems with (or without) the X Window System. There is also an independent port of Allegro on Amigo OS 4 and Morph OS.Released under the terms of the z lib license, Allegro is free and open source software.

Allegro provides the following graphic functions:

Vector drawing:

- Pixels, lines, rectangles, triangles, circles, ellipses, arcs, Bezier curves
- Shape fill, with or without pattern
- Polygons: flat, Gouraud, textured (3D) and translucent

Sprites:

- Masked, compressed and compiled sprites
- Blitting, rotation, stretching, reduction, alpha blending, Gouraud shading
- Native support for BMP, LBM, PCX and TGA files (others supported with library extensions)

Color palettes:

- Color palette manipulation (reading, writing, conversion)
- Conversion of color formats RGB <-> HSV

Text:

- Support for different encodings and conversion, default is UTF-8
- Bitmap fonts (masking, coloring, alignment)

Misc:

- Draw directly on the screen or on any-size memory bitmaps
- Hardware scrolling and triple buffering (where available), Mode-X split screen
- Animation functions for FLI/FLC format.

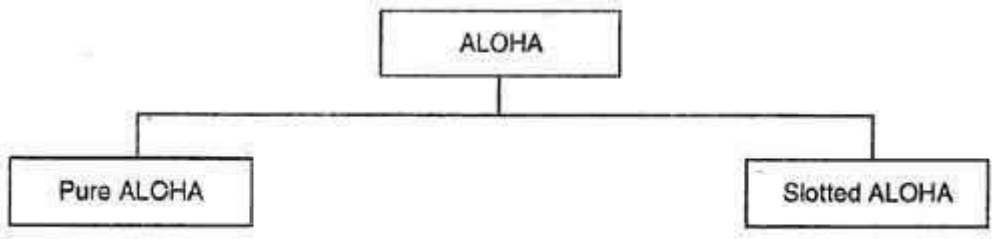
09. ALOHA

Introduction:

Aloha is a system for coordinating and arbitrating access to a shared communication Networks channel. It was developed in the 1970s by Norman Abramson and his colleagues at the University of Hawaii.ALOHA stands for Advocates of Linux Open-source Hawaii Association.

Aloha also called the Aloha method refers to a simple communications scheme in which each source (transmitter) in a network sends data whenever there is a frame to send. This protocol was developed for the use of satellite communication systems in the Pacific.

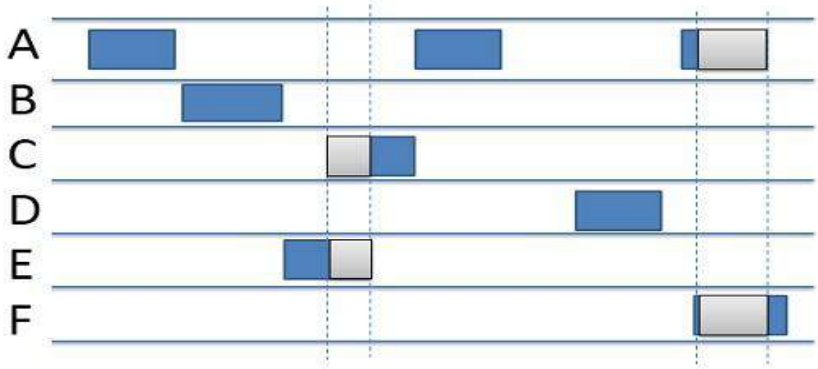
Types of Aloha:



Types of ALOHA

Pure Aloha:

The Pure ALOHA just allows every station to transmit the data whenever they have the data to be sent. When every station transmits the data without checking whether the channel is free or not there is always the possibility of the collision of data frames. If the acknowledgment arrived for the received frame, then it is ok or else if the two frames collide (Overlap), they are damaged.



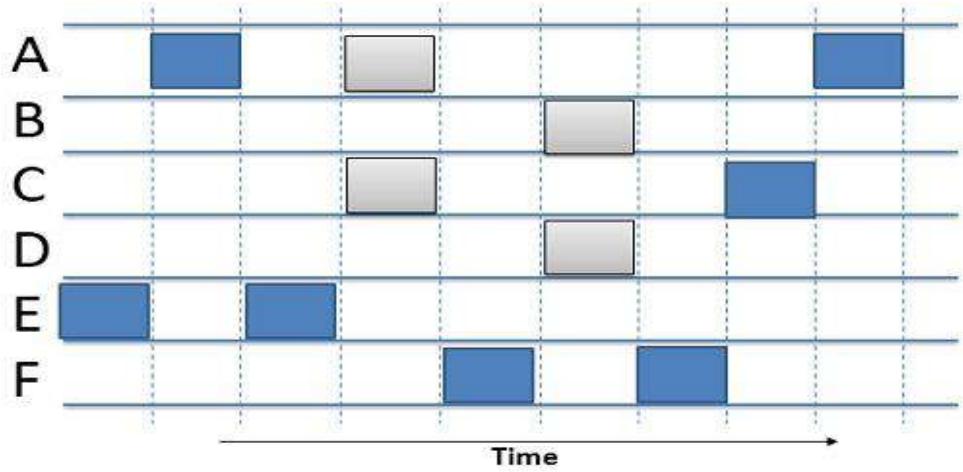
Pure ALOHA

If a frame is damaged, then the stations wait for a random amount of type and retransmit the frame till it transmits successfully. The waiting time of each station must be random and it must not be same just to avoid the collision of the frames again and again. The throughput of the Pure ALOHA is maximized when the frames are of uniform length. The formula to calculate the throughput of the pure ALOHA is S-=G*e^-2G, the throughput is maximum when G=1/2 which is 18% of the total transmitted data frames.

Slotted Aloha:

Roberts introduced an another method to improve the capacity of the Pure ALOHA which is called Slotted ALOHA. He proposed to divide the time into discrete intervals called time slots. Each time slot corresponds to the length of the frame.

In contrast to the Pure ALOHA, Slotted ALOHA does not allow to transmit the data whenever the station has the data to be send. The Slotted ALOHA makes the station to wait till the next time slot begins and allow each data frame to be transmitted in the new time slot.



Slotted ALOHA

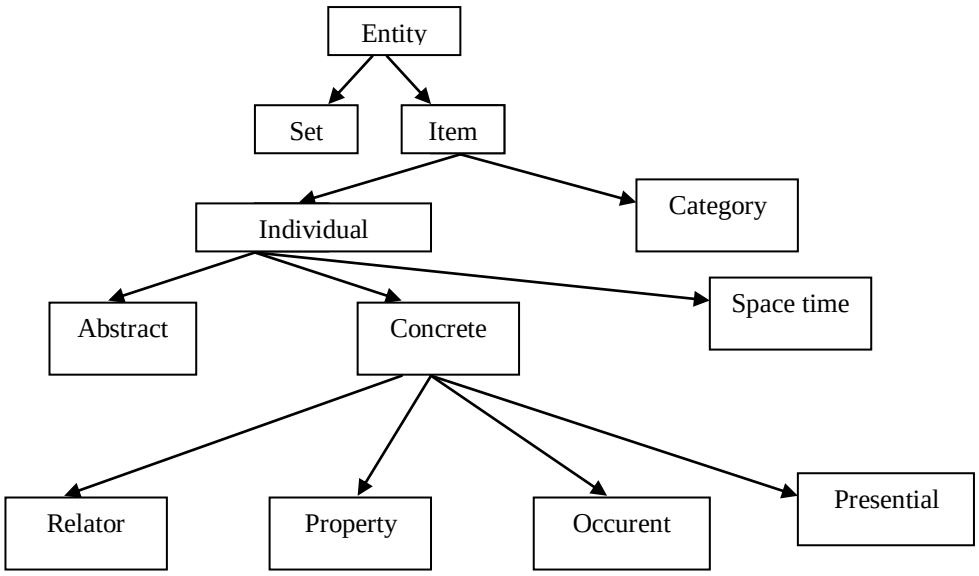
Synchronization can be achieved in Slotted ALOHA with the help of a special station that emits a pip at the beginning of every time slot as a clock does. The formula to calculate the throughput of the Slotted ALOHA is S=G*e^-G, the throughput is maximum when G=1 which is 37% of the total transmitted data frames. In Slotted ALOHA, 37% of the time slot is empty, 37% successes and 26% collision.

10. ARTIFICIAL INTELLIGENCE

Introduction:

Artificial intelligence sometimes called machine intelligence is intelligence demonstrated by machines in contrast to the natural intelligence displayed by humans and other animals. The field was founder on the claim that human intelligence can be so precisely described that a machine can be made to stimulate it. It often revolves around the use of algorithms.

Knowledge representation:



Computational intelligence and soft computing:

Interest in neural networks and "connectionism" was revived by David Rumdlhart and others in the middle of the 1980s. Artificial neural networks are an example of soft computing they are solutions to problems which cannot be solved with complete logical certainty and where an approximate solution is often sufficient. Other soft computing approaches to AI include fuzzy systems, evolutionary computation and many statistical tools.

Programming language for artificial intelligence:

- IPL - perform dynamic memory allocation, data types
- Lisp - Lambda calculus (Linked lists)
- Julia - machine learning, using native or non-native libraries

Applications:

- Health care, Automotive, Finance and Economics.
- Video Games, Military, Audit.

Examples:

- Autonomous Vehicles (drones and self-driving cars)
- Medical diagnosis
- Creating art (poetry)
- Playing games (Chess or Go)
- Online assistants (such as Siri).

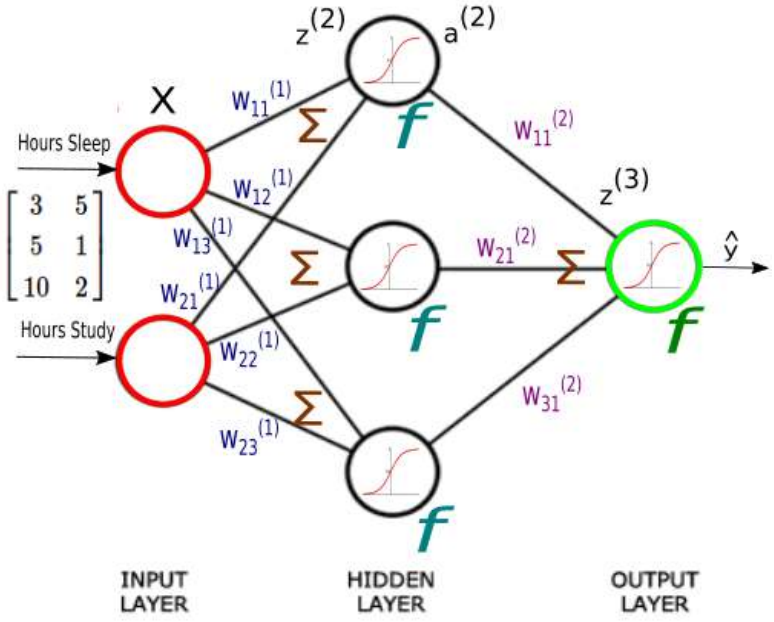
Problems:

The overall research goal of artificial intelligence is to create technology that allows computers and machines to function in an intelligent manner. The general problem of stimulating (or creating) intelligence has been broken down into sub-problems. These consist of particular traits or capabilities that researchers expect an intelligent system to display.

11. ARTIFICIAL NEURAL NETWORKS

Introduction:

In Information Technology (IT), a neural network is a system of hardware and/or software patterned after the operation of neurons in the human brain. Neural networks also called artificial neural networks are a variety of deep learning technology, which also falls under the umbrella of artificial intelligence, or AI. The ability to learn, memorize and still generalize prompted research in algorithmic modelling of biological neural systems. While successes have been achieved in modelling biological neural systems, there are still no solutions to the complex problem of modelling intuition, consciousness and emotion- which form integral parts of human intelligence states by Alan Turing, 1950.Human brain has the ability to perform tasks such as pattern recognition, perception and motor control much faster than any computer.



Different NN types:

- Single-layer NNs, such as the Hopfield network.
- Multilayer feed forward NNs, for example standard back propagation, functional link and product unit networks.
- Temporal NNs, such as the Elman and Jordan simple recurrent networks as well as time – delay neural networks.

- Self-organizing NNs, such as the Kohonen self-organizing feature maps and the learning vector quantizer.
- Combined feed forward and self-organizing NNs such as the radial basis function networks.

The ANN applications:

- Classification, the aim is to predict the class of an input vector.
- Pattern matching, the aim is to produce a pattern best associated with a given input vector.
- Pattern complication, the aim is to complete the missing parts of a given input vector.
- Control, an appropriate action is suggest based on given an input vectors.
- Optimization, the aim is to find the optimal vales of parameters in an optimization problem.
- Data mining, with the aim of discovering hidden patterns from data.
- Function approximation/times series modelling, the aim is to learn the functional relationships between input and desired output vectors.

ANN architectures:

Neural networks are known to be universal functions approximators. Various architectures are available to approximate any non-linear function. Different architectures allow for generation of functions of different complexity and power.

- Feed forward networks
- Feedback networks
- Lateral networks

Learning methods:

Artificial neural networks is computed through the optimized weight values. The method by which the optimized weight values are attained id called learning. Learning methods:

- Supervised learning
- Unsupervised learning
- Reinforced learning.

12. AVIONICS SOFTWARE

Avionics:

Avionics are the electronics systems used on aircraft, artificial satellites and spacecraft. Avionic system include communication, navigation, the display and management of multiple systems, and the hundreds of the systems that are fitted to the aircraft to perform individual functions. These can be as simple as a searchlight for as complicated as the tactical system for an airborne early warning platform. The term avionics is a portmanteau of the words aviation an electronics.

Avionics Software:

The main difference between avionic software and conventional embedded software is that the development process is required by law and is optimized for safety. It is claimed that the process described below is only slightly slower and more costly (perhaps 15 percent) than the normal ad hoc processes used for commercial software. Since most software fails because of mistakes, eliminating the mistakes at the earliest possible step is also a relatively inexpensive and reliable way to produce software. In some projects however, mistakes in the specifications may not be detected until deployment.

Development process:

The main difference between avionics software and other embedded systems is that the actual standards are often far more detailed and rigorous than commercial standards, usually described by documents with hundreds of pages. It is usually runs on a real time operating system.

Since the process is legally required, most processes have documents or software to trace requirements from numbered paragraphs in the specifications and designs to exact pieces of code, with exact tests for each, and a box on the final certification checklist. This is specifically to prove conformance to the legally mandated standard.

Integration testing:

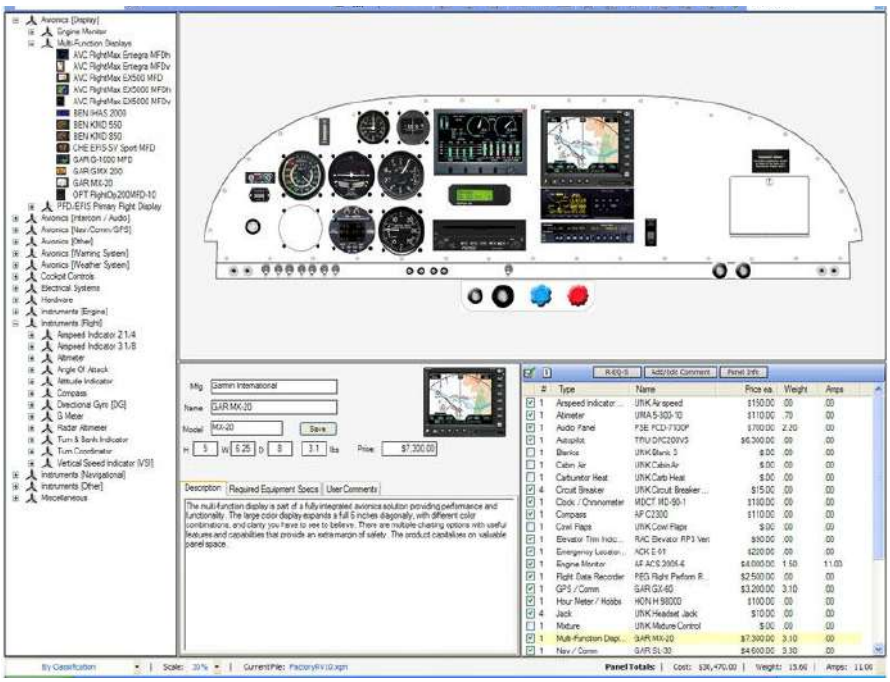
As pieces of code become available, they are added to a skeleton of code, and tested in place to make sure each interface works.

Usually the built-in-tests of the electronics should be finished first, to begin burn-in and radio emissions tests of the electronics.Next, the most valuable features of the software are integrated. It is very convenient for the integrators to have a way to run small selected pieces of code, perhaps from a simple menu system.

Some program managers try to arrange this integration process so that after some minimal level of function is achieved, the system becomes deliverable at any following date, with increasing numbers of features as time passes.

Unit testing:

Unit test code is written to exercise every instruction of the code at least once to get 100% code coverage. A "coverage" tool is often used to verify that every instruction is executed, and then the test coverage is documented as well, for legal reasons.



This test is among the most powerful. It forces detailed review of the program logic, and detects most coding, compiler and some design errors. Some organizations write the unit tests before writing the code, using the software design as a module specification. The unit test code is executed, and all the problems are fixed.

13. B2EVOLUTION

What is B2evolution?

B2 evolution is a Content Management System (CMS) written in PHP and backed by a MySQL database and aimed at making it easy to build and maintain websites for sharing information and collaborating with your community.B2 evolution is a free open-source software that you can download and run on the web-hosting service of your choice.

Use of B2evolution:

B2 evolution is a tool that allows you to build your own website. This range from just a home page to a full featured site with multiple blogs, forums for your user community and structured content.

It allows you to send newsletters to your user community and members can send private messages to each other. Contrary to other website or blog building solutions, with b2evolution everything is under your control and yours only. And it's 100% free and open source.

Organize all your contents into a complete website:

B2 evolution is a very versatile Content Management System (CMS) designed to organize all kinds of contents: simple web pages, blog posts, photos, videos, downloadable files (PDF, ZIP), manuals, forums and more. Your content can be then combined and organized into a complete website. B2evolution lets you start as small as you want and grow as big as you need.

Customizable look & feel:

B2evolution will present your content using a system of skins, containers and widgets. The sidebar may contain any number of widgets related or not to the main content, such as a list of categories, recent posts or even ads.

The menu may be entirely you need. Once you have decided on the general layout of your content blocks, it is possible to change the look & feel of your website by customizing the existing skins or using different skins entirely. You can also build custom skins of your own.

Marketing Features:

B2 evolution also includes goal tracking and server-side analytics.

B2 evolution can send email newsletters to your members. B2 evolution can send email newsletters to your members. Actually, it can even send targeted email to subsets of your user base through its complete campaign management interface.

Main features:

It is known primarily for its multi-blog capabilities, b2evolution also includes "all the features of traditional blog tool like file & photo management, advanced skinning, multiple domain support, detailed user permissions, and w3c standards compliance. The software will run on IIS using FastCGI, but database servers other than MySQL and MariaDB are not supported. It also supports numerous third-party plugins. Others features include community-wide spam filters, in which many b2evolution sites aggregate.

It includes automatic redirection of renamed articles and insertion of canonical link tags, URL shortening, localization into a dozen language packs, and a fully exposed API for plugin developers to add new functionalities.B2 evolution's code is factored into the blog application itself and aframework called EvoCore. EvoCore can be used on its own to build non-blog web applications.

14. BERKELEY SOFTWARE DESIGN

Berkeley Software Design, Inc(BSDI):

A company that sells BSD/OS, a commercial version of Berkeley Standard Distribution Unix, networking, and Internet technologies originally developed by the Computer Systems Research Group (CSRG). Leading CSRG Computer Scientists founded BSDI in 1991. BSDI's BSD/OS represents over 20 years of development by the world wide BSD technical community.

BSD technology is known worldwide for its powerful, flexible and portable architecture and advanced development environments. BSDI designs, develops, markets and supports the BSD/OS operating system, Internet server software for IBMPCs, and other products. BSDI planned to release an Internet gateway product for Novell IPX Networks in 1995.

Berkeley Software Design Inc. (BSDI or later BSDi) was a corruption which developed, sold licenses for, and supported BSD/OS (originally known as BSD/386), a commercially and partially proprietary variant of the BSD Unix operating system for PC compatible computer systems. The name was chosen for its similarity to "Berkeley Software Distribution" the source of its primary product. BSDI was founded by Rick Adams and the members of the computer systems research groups (CSRG) at the University of California, Berkeley, including Keith Bostic, KrikMcKusick, Mike Karels, Bill Jolitz and Donn Seeley. Jolitz, Seeley and Trent Hein were working for Rick Adam's UNUET at the time became BSID'S first employees when the company began operations in 1991.

In December 1991 USENIX secretary and Former Head of the Software at Convex Computers, Rob Kolstad from university of Illinois, was hired and would and take over company operations.BSD/386 was released in January 1992. The full system, including source code retailed at $995, which was more affordable then the equivalent source code license for the rival Unix System v from AT&T (which cost more than $20,000 in the late 1982s.) Under Rob kolstad direction, the company decided to pursue internet infrastructure as their primary customer audience. In the mid-1990s the top- 10 websites in the world were almost using BSD/386 as their BSD source codebase.

Berkeley Software Design:

Berkeley Software Design was a corporation which developed, sold license for, and supported BDS/OS, a commercial and partially propriety variant of the BSD Unix operating system for PC compatible computer systems.

Short for Berkeley Software Design, Inc., BSDI is a commercial supplier of internet and networking software based on the BSD (Berkeley) version of UNIX. In addition to providing a commercial version of the BSD operating system, BSDI also develops internet server and gateway products.

BSDI:

BSDI is the manufacture of the networking components and the producer of the internet and networking software designed for Berkeley versions of UNIX. BSDI was founded in 1991.

15. BETA TEST

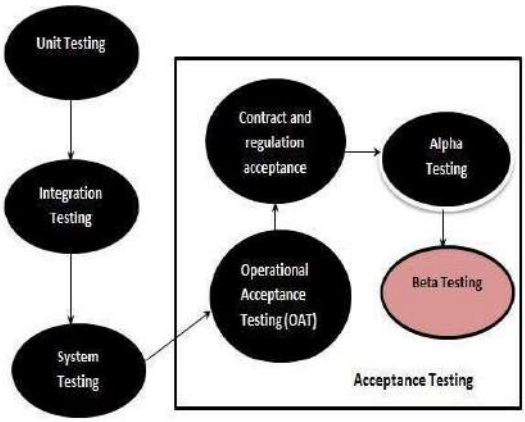
Introduction:

A beta test is the second phase of software testing in which a sampling of the intended audience tries the product out. Beta is the second letter of the Greek alphabet.

Beta testing also known as user testing takes place at the end users site by the end users to validate the usability, functionality, compatibility, and reliability testing.

Beta testing - in SDLC:

The following diagram explains the fitment of Beta testing in the software development life cycle:



Beta testing dependencies:

There are number of factors that depend on the success of beta testing:

- Test Cost
- Number of Test Participants
- Shipping.

Features of beta testing:

The following are the features of beta testing:

- The test takes place at the site of the user
- Black box technique is normally used
- It only needs a few weeks of execution
- It checks for security and reliability.

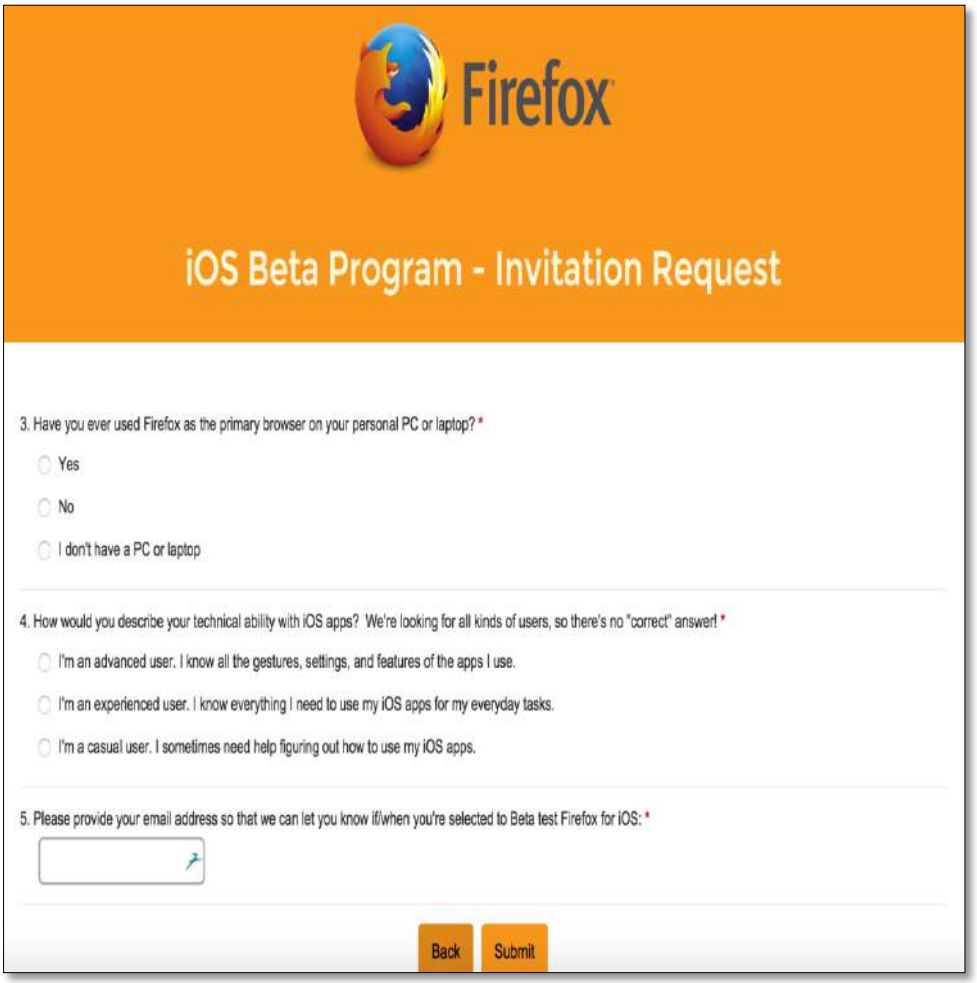
Advantages of beta testing:

Beta testing has numerous advantages and they are listed below:

- The actual users are given the opportunity to test the application before it is released to the general public.
- Customers can install and test the application as well as provide you feedbacks.

Disadvantages of beta testing:

- Exercising control over the testing is difficult since it is not done under lab environment but in real environment.
- It is difficult to find the correct testers and manage their participation.



Beta testing is the final test carried out by the end users in real environment. The feedback gathered from it serves as the basis for improving the future versions of the application.

16. BI SOFTWARE

Business intelligence software:

Business intelligence software is a type of application software designed to retrieve, analyze, transform and report data for business intelligence. The applications generally read data that has been previously stored, often - though not necessarily - in a data warehouse or data mart. Business Intelligence software plays a key role in the strategic planning process of the corporation.

Definition:

According to Forrester Research, business intelligence is "a set of methodologies, processes, architectures, and technologies that transform raw data into meaningful and useful information used to enable more effective strategic, tactical, and operational insights and decision-making."

Types:

The key general categories of business intelligence applications are:

- ❖ Spreadsheets

- ❖ Reporting and querying software
- ❖ Online analytical processing (OLAP)
- ❖ Digital dashboards
- ❖ Data mining

Development of business intelligence software:

The first comprehensive business intelligence systems were developed by IBM and Siebel (currently acquired by Oracle) in the period between 1970 and 1990. At the same time, small developer teams were emerging with attractive ideas, and pushing out some of the products companies still use.

Cloud-hosted business intelligence software:

In the years after 2000, business intelligence software producers became interested in producing universally applicable BI systems which don't require expensive installation, and could hence be considered by smaller and midmarket businesses. Cloud-hosted data analytics made it possible for companies to categorize and process large volumes of data, which is how we can currently speak of unlimited visualization, and intelligent decision making.

Data:

Business operations can generate a very large amount of information in the form of e-mails, memos, notes from call-centers, news, user groups, chats, reports, web-pages, presentations, image-files, video-files, and marketing material. According to Merrill Lynch, more than 85% of all business information exists in these forms; a company might only use such a document a single time. Because of the way it is produced and stored, this information is either unstructured or semi-structured.

17. BITCOMET

Basic introduction:

BitComet (Originally named Simple BT client from versions 0.11 to 0.37) is a cross-protocol BitComet, HTTP and FTP client written in C++ Microsoft windows and available in 52 different languages. The first public release was version 0.28.

Features:

The BitComet program is a Multi-threaded multi-protocol hybrid download manager and BitTorrent peer-to-peer(P2P) file sharing application. It supports simultaneous download tasks. It can draw parts of files from many sources in Client-server protocols.

BitComet allows users to share their torrent files. BitTorrent users through the torrent sharing features named as "Torrent Share" in previous versions and renamed to "Torrent Exchange" since 1.17.

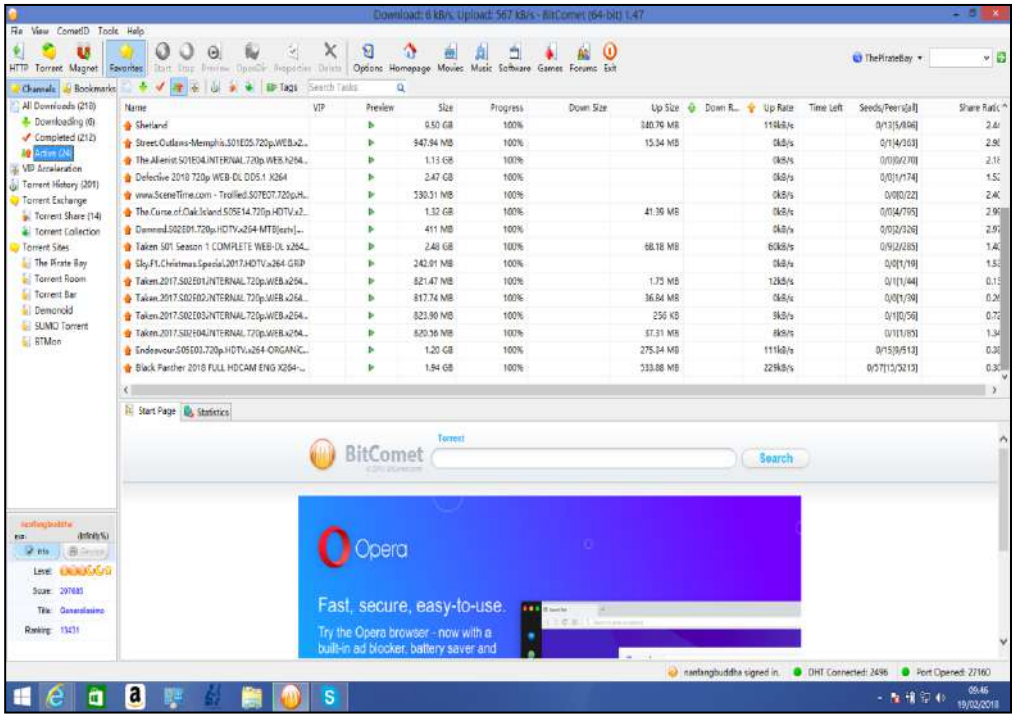
In February 2011, BitComet launched anonymous downloading features, downloads will be handled by BitComet VIP servers and real IP address of the user will be hidden. BitComet chief feature include an embedded Internet Explorer window to let users search for torrents. Along with the features typical of contemporary BitTorrent clients, it supports UPnP gateway configuration, bandwidth scheduling , Webseeding ,selecting only certain files for download inside a torrent package ,NAT traversal ,Peer Exchange ,Initial seeding and support for Magnet Links.

Information of BitComet:

Developer(s)	: BitComet Development Group (China)
Initial Release	: August 6, 2003; 15 years ago
Stable Release	: 1.51 (June 12, 2018; 6 months ago)
Written In	: C++
Operating System	: Windows 2000 and later
Available In	: 52 Languages

Type : Bit Torrent client

License : Adware



Torrent File Format:

According to the official Bit Torrent specification, ” All strings in a torrent file that contain text must be UTF-8 encoded” .BitComet torrent format now conforms to the standard. It has started with March 2010.As of April 2008 File Hippo will no longer be updating BitComet .As they have copied the File Hippo site text ,files ,images and update checker and are passing it off as original work .We recommend you use a different more reputable torrent client such as u torrent .BitComet version prior to 1.20 encoded the files names and paths using the Windows Chinese or Japanese code page and stored a UTF-8 version in a non-standard attribute. BitComet torrent format now conforms to the standard.

Search engine:

The search site is google.atcomet.com

It was the most popular common site of the search engine for BitComet. BitComet was the predefined torrent file format downloader.

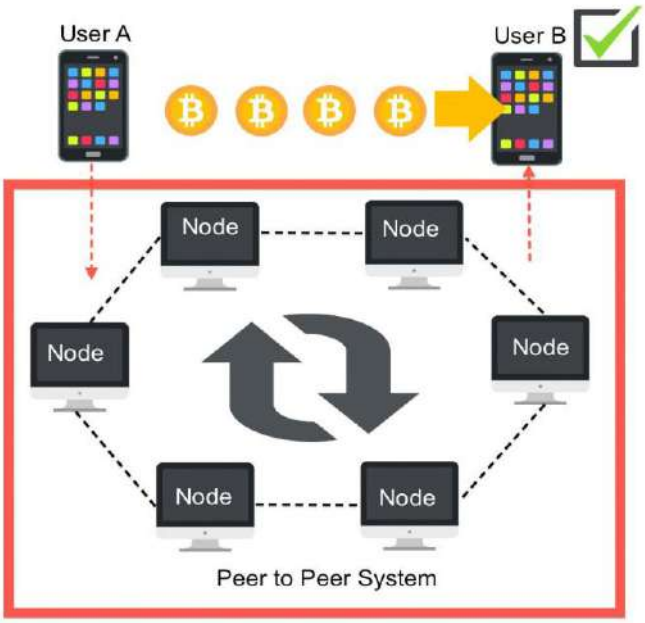
18. BITCOIN

Definition:

A type of digital currency in which encryption techniques are used to regulate the generation of units of currency and verify the transfer of funds, operating independently of a central bank

Mechanism of Bitcoin:

Bitcoin is a peer-to-peer electronic payment system. It allows payment online without operating through a financial institution. A node refers to any computer that is running the Bitcoin client software and cooperating in the peer-to-peer network by broadcasting transactions. The P2P version allows each node to operate as both a client and a server at the same time.



Transactions:

An electronic coin is considered as a chain of digital signatures. An owner does a transaction by transferring an amount of his bitcoins to another user. The transactions are saved in this following way.

- We calculate the hash of the previous transaction of the coin and the public key of the next owner.
- The owner of the coin signs the output of the hash with his private key

Mycelium:

Mycelium is the most popular Bitcoin wallet on Android. The company Mycelium was founded in 2008, it is a Bitcoin company with 35 employees located in Europe, Asia, and America and it offers mobile wallets for iPhone and Android.

Price:

The price of a Bitcoin, like the price of everything, is mostly determined by the demands of costumers and the supplies. When the demands for Bitcoins are high, the price increases, but when the use and the demands drop, naturally the price also falls.

Fees:

- The first transaction in every block is a special transaction, it is a reward for the creator of the block, this motivates the nodes to support the network and provides a way to initially distribute Bitcoins into circulation (since there is no central authority to issue them).
- The transaction fees: The user must pay an insignificant fee for each transaction. Standard fees = 0,0001 BTC [4]
- You would think that because there no need to physically print bills or mine the coins that there could be an infinite number of Bitcoins in existence however that would devalue the currency and render it worthless. there are exactly 21,000,000 coins
- Mining Bitcoins is a term actually means you're using a computer program to solve mathematical problems to verify various transactions around the world Bitcoin miners then get paid a certain number of Bitcoins for solving those problems

19. BACKUS NAUR FORM

Backus Naur Form:

Backus–Naur form or Backus normal form (BNF) is a notation technique for context-free grammars, often used to describe the syntax of languages used in computing, such as computer programming languages, document formats, instruction sets and communication protocols. They are applied wherever exact descriptions of languages are needed for instance, in official language specifications, in manuals, and in textbooks on programming language theory.

Introduction:

A BNF specification is a set of derivation rules, written as

<symbol> ::= __expression__

where <symbol> is a non terminal , and the __expression__ consists of one or more sequences of symbols; more sequences are separated by the vertical bar "|", indicating a choice, the whole being a possible substitution for the symbol on the left. Symbols that never appear on a left side are terminals. On the other hand, symbols that appear on a left side are non-terminals and are always enclosed between the pair <>.

Syntax:

The Backus - Naur Form is a way of defining. It consists of a set of terminal symbols

- a set of non-terminal symbols
- a set of production rules of the form

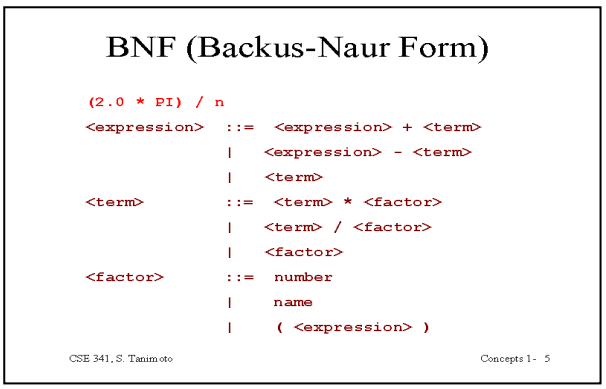


Table of symbols:

The following represents a proposed ISO/IEC 14977 standard symbol of BNF

Usage	Notation
definition	=
concatenation	,
termination	;
alternation	|
optional	[...]
repetition	{ ... }
grouping	(...)
terminal string	" ... "
terminal string	' ... '
comment	(* ... *)
special sequence	? ... ?
exception	-

Advantages over BNF:

Any grammar defined in EBNF can also be represented in BNF, though representations in the latter are generally lengthier. E.g., options and repetitions cannot be directly expressed in BNF and require the use of an intermediate rule or alternative production defined to be either nothing or the optional production for option.

Some softwares using BNF:

- Coco/R, compiler generator accepting an attributed grammar in EBNF
- DMS Software Reengineering Toolkit, program analysis and transformation system for arbitrary languages
- GOLD BNF parser
- GNU bison, GNU version of yacc
- RPA BNF parser. Online (PHP) demo parsing: JavaScript, XML
- XACT X4MR System, a rule-based expert system for programming language translation
- XPL Analyzer, a tool which accepts simplified BNF for a language and produces a parser for that language in XPL; it may be integrated into the supplied SKELETON program, with which the language may be debugged.

20. BRUTE FORCE PROGRAMMING

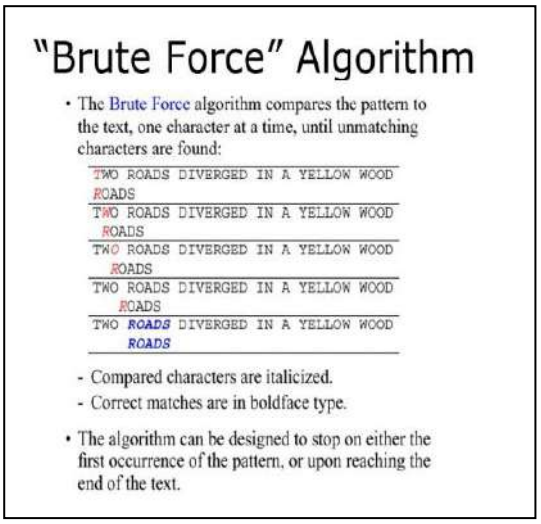
Introduction:

In computer science, brute-force search or exhaustive search, also known as generate and test, is a very general problem-solving technique and algorithmic paradigm that consists of systematically enumerating all possible candidates for the solution and checking whether each candidate satisfies the problem's statement.

A brute-force algorithm to find the divisors of a natural number n would enumerate all integers from 1 to n, and check whether each of them divides n without remainder. A brute-force approach for the eight queens puzzle would examine all possible arrangements of 8 pieces on the 64-square chessboard, and, for each arrangement, check whether each (queen) piece can attack any other.

Explanation:

This is the case, for example, in critical applications where any errors in the algorithm would have very serious consequences; or when using a computer to prove a mathematical theorem. Brute-force search is also useful as a baseline method when benchmarking other algorithms or metaheuristics. Indeed, brute-force search can be viewed as the simplest metaheuristic. Brute force search should not be confused with backtracking, where large sets of solutions can be discarded without being explicitly enumerated.



Basic Algorithm:

In order to apply brute-force search to a specific class of problems, one must implement four procedures, first, next, valid, and output. These procedures should take as a parameter the data P for the particular instance of the problem that is to be solved, and should do the following:

1.first (P): generate a first candidate solution for P.
2.next (P, c): generate the next candidate for P after the current one c.
3.valid (P, c): check whether candidate c is a solution for P.
4.output (P, c): use the solution c of P as appropriate to the application.

The next procedure must also tell when there are no more candidates for the instance P, after the current one c. A convenient way to do that is to return a "null candidate", some conventional data value Λ that is distinct from any real candidate. Likewise the first procedure should return Λ if there are no candidates at all for the instance P. The brute-force method is then expressed by the algorithm

$c \leftarrow first(P)$

while $c \neq \Lambda$ do

if valid (P,c) then output (P, c)

$c \leftarrow next(P,c)$

end while

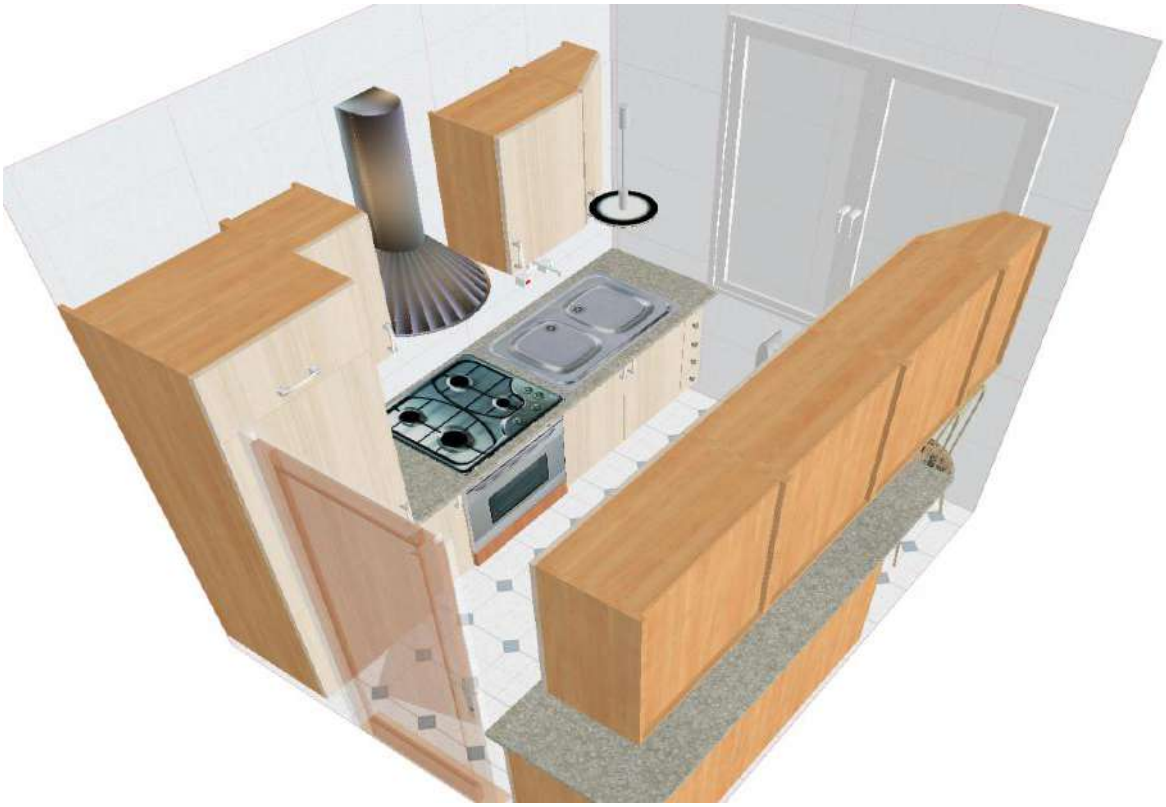
The algorithm is easily modified to stop after finding the first solution, or a specified number of solutions; or after testing a specified number of candidates, or after spending a given amount of CPU time.

Combinatorilol Explosion:

The main disadvantage of the brute-force method is that, for many real-world problems, the number of natural candidates is prohibitively large. For instance, if we look for the divisors of a number as described above, the number of candidates tested will be the given number n. So if n has sixteen decimal digits, say, the search will require executing at least 10^{15} computer instructions, which will take several days on a typical PC.

21. COMPUTER-AIDED ARCHITECTURAL DESIGN (CAAD)

Computer-aided architectural design (CAAD) software programs are the repository of accurate and comprehensive records of buildings and are used by architects and architectural companies.



The first program was installed back in the 1960s, to help architects save time instead of drawing their blueprints. Computer-aided design also known as CAD was originally the type of program that architects used, but since CAD couldn't offer all the tools that architects needed to complete a project, CAAD developed as a distinct class of software.

Overview:

All CAD and CAAD systems employ a database with geometric and other properties of objects; they all have some kind of graphic user interface to manipulate a visual representation rather than the database; and they are all more or less concerned with assembling designs from standard and non-standard pieces. Currently, the main distinction which causes one to speak of CAAD rather than CAD lies in the domain knowledge (architecture-specific objects, techniques, data, and process support) embedded in the system.

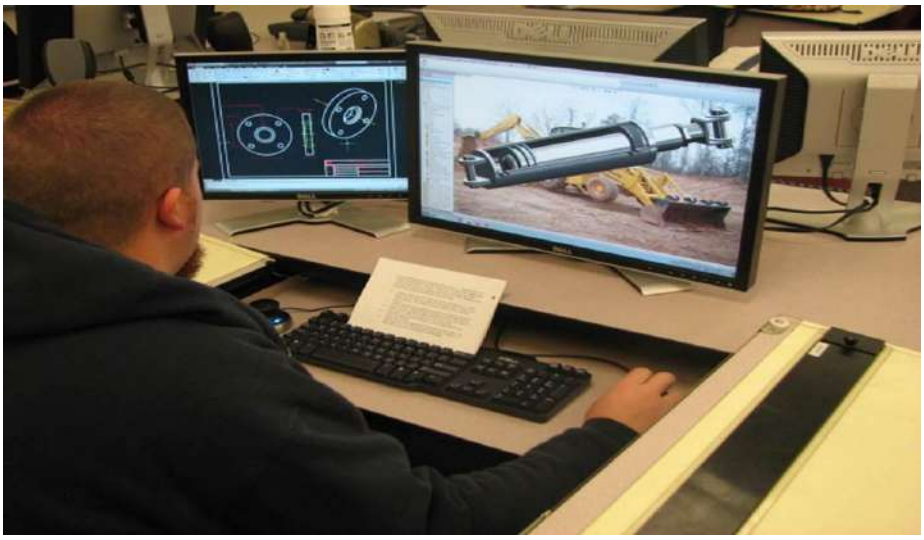
Three-dimensional objects:

CAAD has two types of structures in its program. The first system is surface structure which provides a graphics medium to represent three-dimensional objects using two-dimensional representations. Also algorithms that allow the generation of patterns and their analysis using programmed criteria, and data banks that store information about the problem at hand and the standards and regulations that applies to it. The second system is deep structure which means that the operations performed by the computer have natural limitations. Computer hardware and machine languages that are supported by these make it easy to perform arithmetical operations quickly and accurately.

Advantages:

Another advantage to CAAD is the two way mapping of activities and functionalities. The two instances of mapping are indicated to be between the surface structures (TM1) and the deep structures (TM2). These mappings are abstractions that are introduced in order to discuss the process of design and deployment of CAAD systems. In designing the systems the system developers usually consider TM1. Here a one-to-one mapping is the typical statement, which is to develop a computer based functionality that maps as closely as possible into a corresponding manual design activity, for example, drafting of stairs, checking spatial conflict between building systems, and generating perspectives from orthogonal views.

22. COMPUTER AIDED DESIGN AND DRAFTING (CADD)



Overview:

Certificate programs in computer-aided drafting and design (CADD) explore drafting techniques used in the engineering and architecture industries. Learn about the courses, jobs, and continuing education associated with these programs.

Students in CADD certificate programs learn to use computer software to create designs, manage data, and analyse plans. They develop drafting skills in areas such as electronics, structures, and fluid power. Most CADD certificate programs take less than a year to complete and have no education prerequisites beyond a high school diploma or its equivalent.

Certificate:

CADD certificate programs may include some general education courses in communications, composition and mathematics. Most courses, though, focus on teaching students skills in CADD and related topics.

Course topics may include:

- Blueprint reading
- Dimensioning
- Schematics
- Modelling
- Residential drafting

Popular career options:

Graduates of CADD certificate programs are prepared to work in fields that involve drafting work. CADD professionals may work as:

- Civil drafters
- Mechanical drafters
- Architectural drafters

What is AUTOCAD?

AutoCAD is a computer-aided drafting software program used to create blueprints for buildings, bridges, and computer chips, among other things. AutoCAD is used by drafters and other professionals. It is a 2-D and 3-D computer-aided drafting software application used in architecture, construction, and manufacturing to assist in the preparation of blueprints and other engineering plans. Professionals who use AutoCAD are often referred to as drafters.

AUTOCAD features:

- Storage and Accessibility
- 3D View
- Revisions and Modifications
- Quality Assurance and Control
- Speed
- Accuracy.

Role in industries:

Once the student has gained a basic understand of AUTOCAD software, they can learn how it can be applied in the Drafting projects. CADD professionals can also quickly come up with a finished set of drawings that includes planning, profile cross-sections, topographic maps and subdivisions. CADD will prepare students to make use of CAD in Building Information Modelling (BIM) for enhancing Engineering Designs and Construction Documentation.

Entry level salary Up to Rs:-2 Lakhs per annum (in India).

23. CALL BY VALUE

Parameter passing:

Standard mechanisms

- Call by value
- Call by reference

Other methods

- Call by value-result
- Call by name, result

Call by value:

Call by value is the parameter passing mode where the actual parameter is copied into the formal parameter at the point of function invocation. In call by value mechanism, the called function creates a new set of variables in stack and copies the values of the arguments into them.

Calling mechanism:

Arguments are evaluated for their values. Local variables created for each parameter. Values resulting from arguments copied to new parameter variables. When function call ends, parameter variables are discarded. During function execution, value of parameters may diverge from argument values (function does not affect arguments).

Call by value source code:

```
void swap(int x, int y)

{

int z;

z=x;

x=y;

y=z;

printf("Swapped values are a=%d and b=%d" ,x, y);
```

```
}
int main(int argc,char*argv[])
{
int a=7,b=4;
printf("Original values are a=%d and b=%d ,a, b);
swap(a,b);
printf("The values after swap are a=%d and b=%d", a, b);
}
```

Output:

Original Values are a = 7 and b = 4

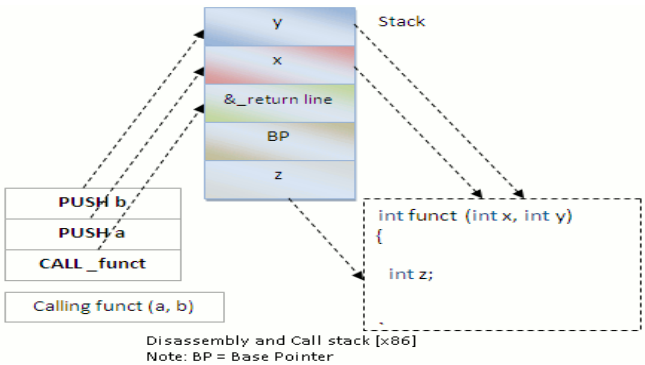
Swapped values are a = 4 and b = 7

The values after swap are a = 7 and b = 4

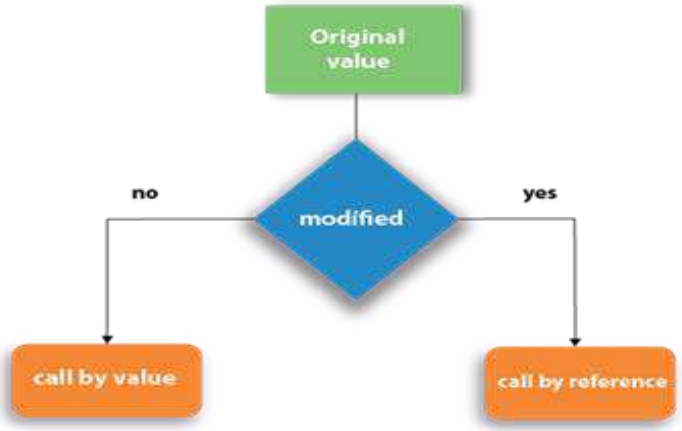
Flow diagram:

Here is the flow diagram describing disassembly steps, call stack and argument variables. Calling swap (a, b) can be split into some assembly steps like-

1. push value of b
2. push value of a
3. save return address
4. call function.



24. CALL BY REFERENCE



Call by reference:

The call by reference method of passing arguments to a function copies the address of an argument into the formal parameter. Inside the function, the address is used to access the actual argument used in the call. It means the changes made to the parameter affect the passed argument.

To pass a value by reference, argument pointers are passed to the functions just like any other value. So accordingly you need to declare the function parameters as pointer types as in the following function **swap()**, which exchanges the values of the two integer variables pointed to, by their arguments.

Example:

```
#include <stdio.h>

/* function declaration */

void swap(int *x, int *y);

 int main () {

  /* local variable definition */

   int a = 100;
```

```
int b = 200;
printf("Before swap, value of a : %d\n", a );
printf("Before swap, value of b : %d\n", b );
  /* calling a function to swap the values.
      * &a indicates pointer to a i.e. Address of variable a and
      * &b indicates pointer to b i.e. Address of variable b.
   */  swap(&a, &b);
printf("After swap, value of a : %d\n", a );
printf("After swap, value of b : %d\n", b );
 return 0;
}
```

Output:

Before swap, value of a :100

Before swap, value of b :200

After swap, value of a :200

After swap, value of b :100

It shows that the change has reflected outside the function as well, unlike call by value where the changes do not reflect outside the function.

Memory allocation:

The operation performed on formal parameters affects the value of actual parameters because all the operations performed on the value stored in the address of actual parameters.

The memory allocation is similar for both formal parameters and actual parameters. All the operations in the function are performed on the value stored at the address of the actual parameters, and the modified value gets stored at the same address.

25. CEDEGA

If you have ever used the Linux platform for playing Windows games, you are obviously familiar with Wine. This is the tool that became one of the earliest to have made it possible for gamers to enjoy their favourite Windows games on Linux.

Archive of games that performed well on cedega:

After the development of Wine, came Cedega, which was released by Transgaming Technologies as a means of replacing Wine.

But, the two tools were existing parallel to each other and were both accessible despite the development of Cedega. By the time Cedega was released, Wine had evolved into versions that were far better than its initial version. On the other hand, Cedega had taken up the old version of Wine, even though it was more advanced in a number of ways. It is for this reason that it was referred to as WineX when it was first released

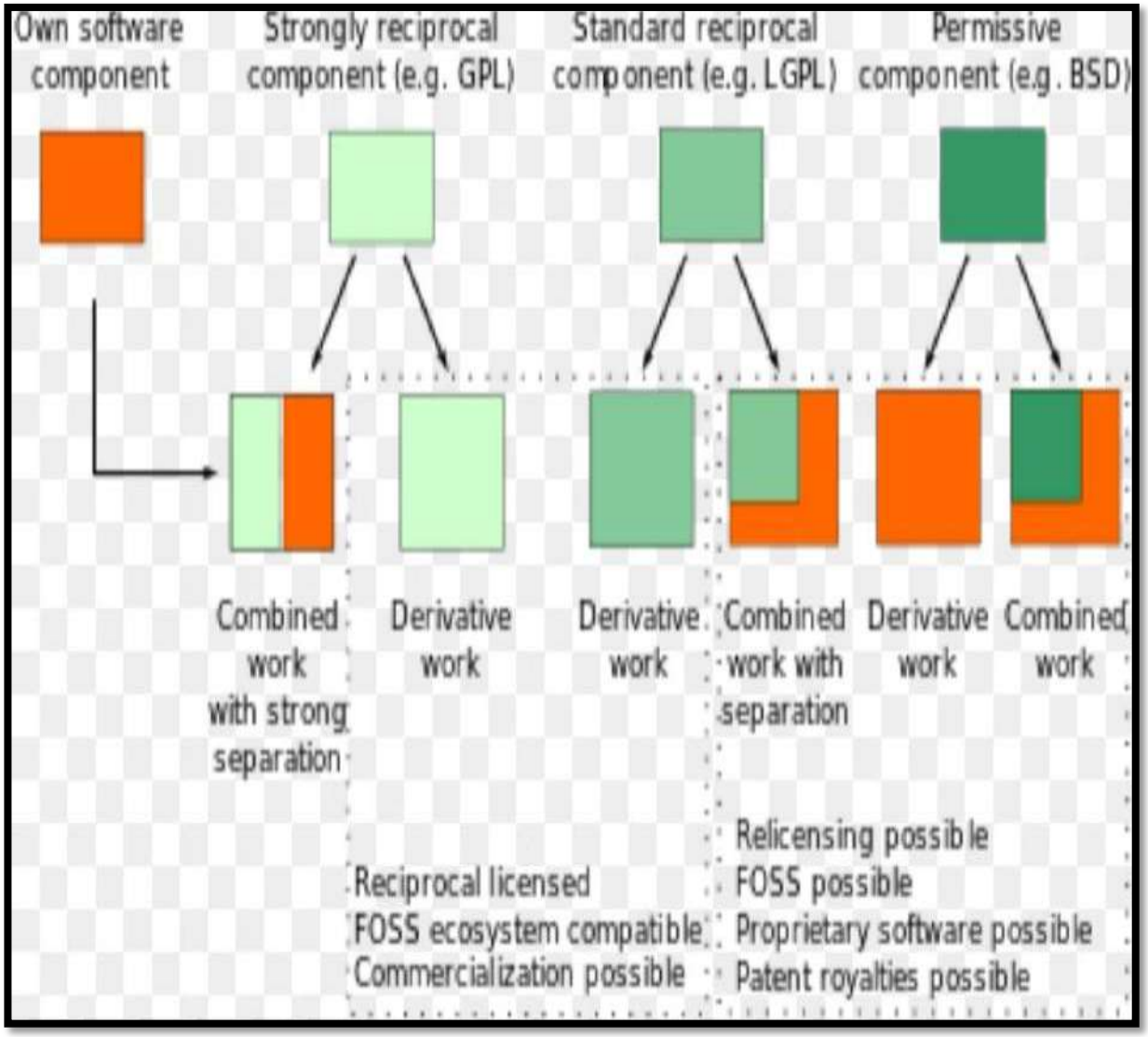
Cedega (formerly known as WineX) was the proprietary fork by TransGaming Technologies of Wine, from the last version of Wine under the X11 license before switching to GNU LGPL. It was designed specifically for running games created for Microsoft Windows under Linux. As such, its primary focus was implementing the DirectX API. WineX was renamed to Cedega on the release of version 4.0 on June 22, 2004.

TransGaming:

TransGaming Inc. decided to change its business focus from technology and gaming to real estate financing.

In August 2016 its last remaining gaming division, GameTree TV, together with its subsidiaries and offices in Tel Aviv and Kiev, were sold to TransGaming Interactive UK Limited, a subsidiary of General Media Ventures based in the United Kingdom.

This company now carries on the GameTree TV business under the TransGaming name



License compatibility

Cedega:

Developer(s): TransGamingTechnolgies

Stable release: 7.3 / June 2, 2009; 9 years ago

Operating system: Linux

Type: Compatibility layer License

Cedega Gaming Service was retired on February 28, 2011. TransGaming announced that development would continue under the GameTree Linux Developer Program.

26. CONTROL FLOW GRAPH (CFG)

Definition:

A control flow graph in computer science is a representation, using graph notation, of all paths that might be traversed through a program during its execution. The control flow graph is due to Frances E. Allen, who notes that Reese T. Prosser used Boolean connectivity matrices for flow analysis before.

In a control flow graph each node in the graph represents a basic block, i.e. a straight-line piece of code without any jumps or jump targets, jump targets start a block, and jumps end a block. Directed edges are used to represent jumps in control flow. There are, in most presentations, two specially designated blocks: the entry blocks, through which control enters into the flow graph, and the exit block, through which all control flow leaves.

Reachability:

Reachability is a graph property useful in optimization.

If a sub graph is not connected from the sub graph containing the entry block, that sub graph is unreachable during any execution, and so is unreachable code, under normal conditions it can be safely removed.

If the exit block is unreachable from the entry block, an infinite loop may exist. Not all infinite loops are detectable, see Halting problem. A halting order may also exist there.

Special edges:

A back edge is an edge that points to a block, nor the only edge entering its destination block. These edges must be split: a new block must be created in the middle of the edge without affecting any other edges.

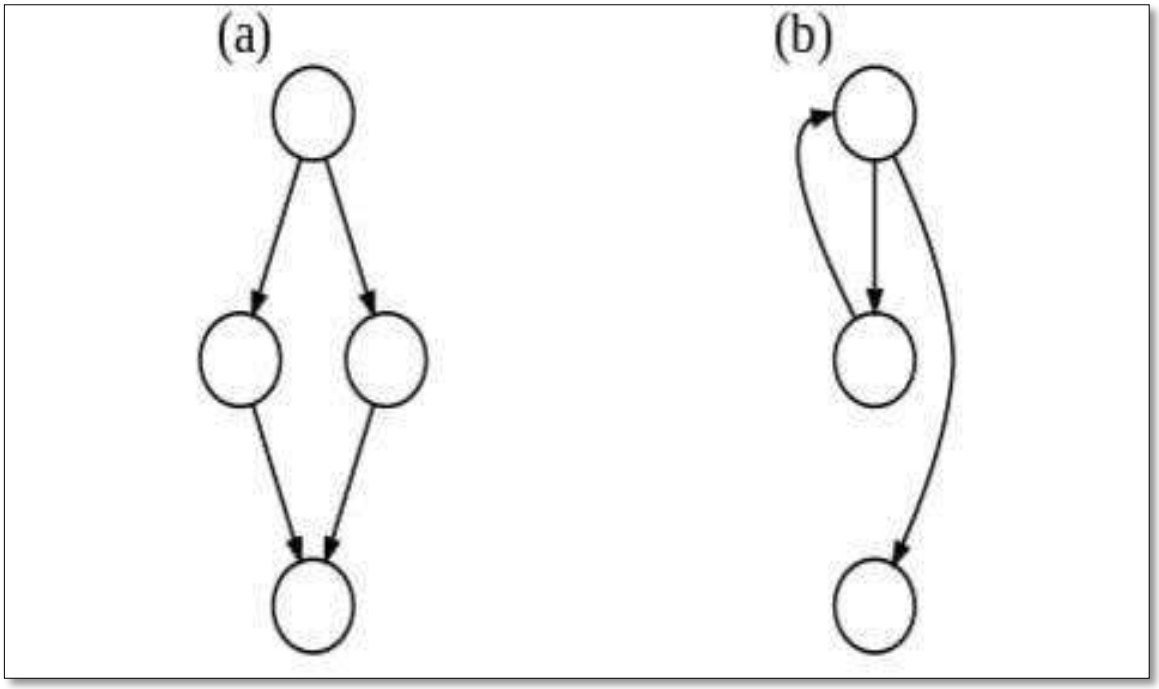
An abnormal edge is an edge whose destination is unknown. Exception handling constructs can produce them. These edges tend to inhibit optimization.

Loop connectedness:

The loop connectedness of a CFG is defined with respect to a given depth first search tree (DFST) of the CFG.

This DFST should be rooted at the start node and cover every node of the CFG. Edges in the CFG which run from a node to one of its DFST ancestors (including itself) are called back edges.

The loop connectedness is the largest number of back edges found in any cycle-free path of CFG. In a reducible CFG, the loop connectedness is independent of the DFST chosen.



The CFG is essential to many compiles optimization and static analysis tools. A Control Flow Graph (CFG) in computer science is a representation, using graph notation, of all paths that might be traversed through a program during its execution.

The control flow graph is due to Frances E. Allen who notes that Rees T. Prosser used Boolean connectivity matrices for flow analysis before.

Dominator:

A block M dominates a block N if every path from the entry that reaches block N has to pass through block M. The entry block dominates all blocks.

In the reverse direction, block M post dominates block N if every path from N to the exit has to pass through block M. The exit block post dominates all blocks.

27. CITADEL SOFTWARE

About citadel software:

We analyze global markets with discipline and focus, and employ a range of strategies in an effort to deliver market-leading investment returns to our capital partners. We empower the most talented minds in finance with an unparalleled combination of deep fundamental research, predictive analytics, and leading-edge technology to identify and capture new opportunities. Our world-class global team brings together the art of investing with the science of finance to help our capital partners achieve their financial goals.

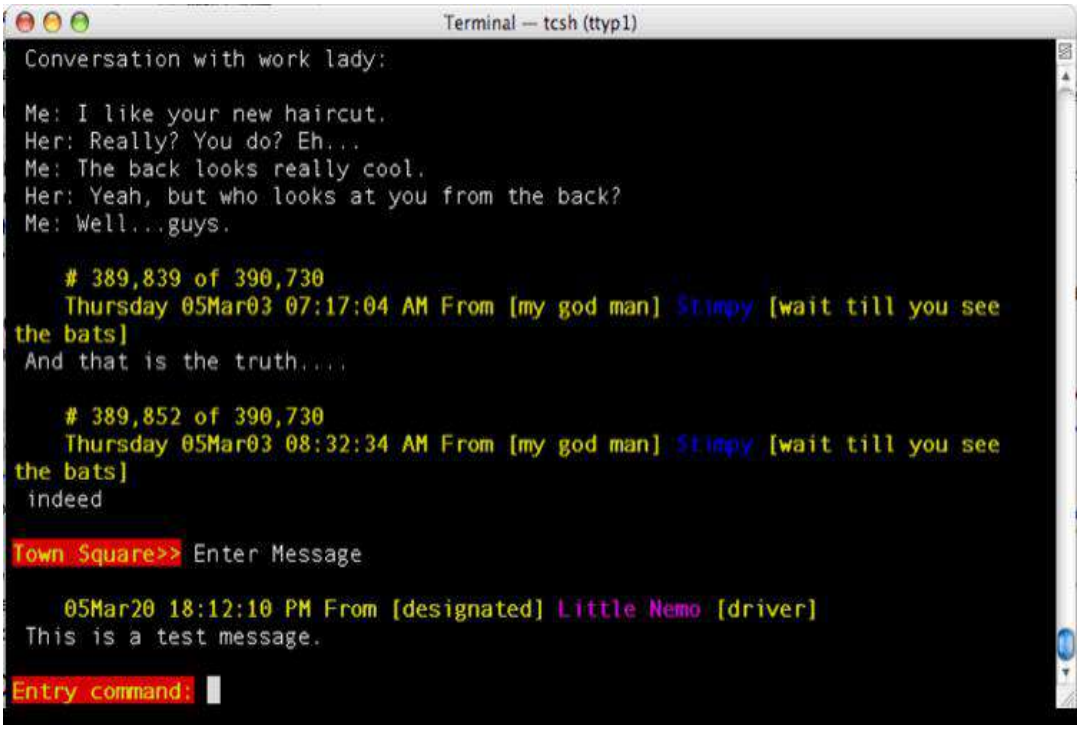
Content:

Citadel is the name of a bulletin board system (BBS) computer program, and of the genre of programs it inspired. Citadels were notable for their room-based structure and relatively heavy emphasis on messages and conversation as opposed to gaming and files. The first Citadel came online in 1980 with a single 300 baud modem; eventually many versions of the software, both clones and those descended from the original code base (but all usually called "Citadels"), became popular among BBS callers and sysops, particularly in areas such as the Pacific Northwest, Northern California and Upper Midwest of the United States, where development of the software was ongoing. Citadel BBS were most popular in the late 1980s and early 1990s, but when the Internet became more accessible for online communication, Citadels began to decline.

The citadel user interface:

The utilization of a natural metaphor, the concept of rooms devoted to topics, marked Citadel's main advancement over previous BBS packages in the area of organization. Messages are associated with rooms, to which the user moves in order to participate in discussions; similarly, a room could optionally give access to the underlying file system, permitting the organization of available files in an organic manner. Most installations permitted any user to create a room, resulting in a dynamic ebb and flow closer to true conversation than most other BBS packages achieved. Certain versions of Citadel extend the metaphor of rooms with “hallways” and/or “floors,” organizing groups of rooms according to system requirement.

By contrast, previous bulletin board software emphasized the availability of files, with a single uncoupled message area that could only be read linearly, forward or backward.



History:

Citadel was originally written for the CP/M operating system in 1981 by Jeff Prothero, known to the nascent Citadel world as Cynbe ru Taren (CrT). Unlike most BASIC-based BBS programs of the time, it was written in a fairly standard dialect of C known as BDS C, a compiler written and distributed by Leor Zolman and its 6 month lifetime achieved immediate success.

Version 2 debuted on David Mitchell's ICS BBS, Prothero's involvement with the project ended following a conflict centered around a user called "sugar bunny". He released the source to the public domain and it became available as a download from various systems as well as through the C Users Group.

Other citadel implementation:

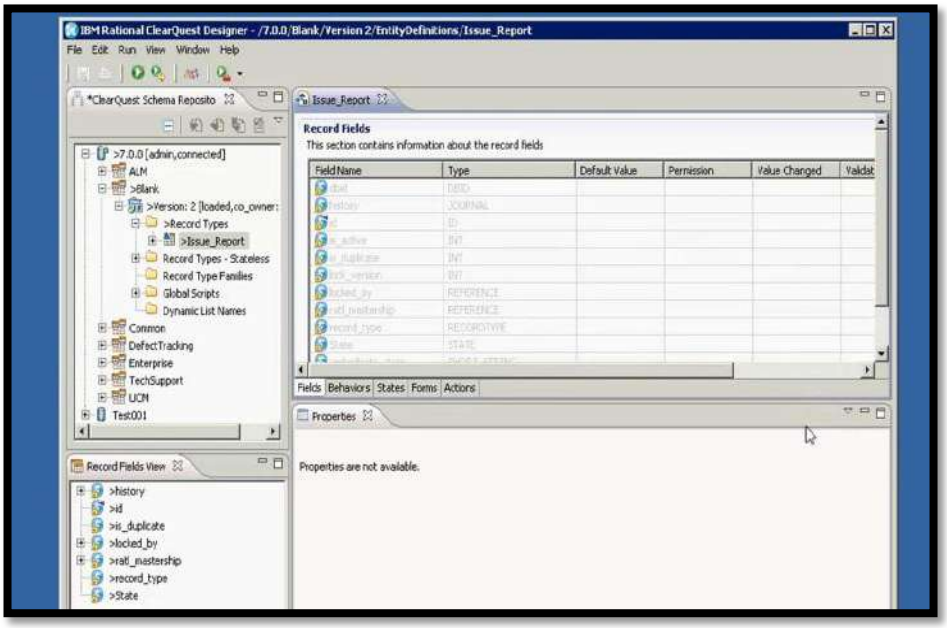
Implementations that share the familiar Citadel user interface, but are not derived from the original Citadel code base, are also common. They have ranged from vanity projects such as a Citadel-like control program to control the serial port of an advanced graphing calculator, to full-blown efforts to modernize the Citadel interface with modern protocols.

28. CLEARQUEST SOFTWARE

ClearQuest is an enterprise level workflow automation tool from the Rational Software division of IBM. Commonly, ClearQuest is configured as a bug tracking system, but it can be configured to act as a CRM tool or to track a complex manufacturing process. It can also implement these functions together.IBM provides a number of predefined "schemas" for common tasks such as software defect tracking which can themselves be further customized if required.

Overview:

ClearQuest is a client-server application although note that technically there is no ClearQuest "backend". Rather, the ClearQuest clients utilize an existing database server. Traditionally ClearQuest has comprised a fat client and a number of databases existing on a backend RDBMS server to store all captured data. Charts and complex queries must still be constructed on the Windows client, even if they can be used on the other clients.



Apart from the standard ClearQuest user client, a design tool called ClearQuest Designer is also provided.The ClearQuest Desi-gner is currently only available for Microsoft Windows.

Hook:

A hook is an arbitrary piece of code that can be configured to be executed when a particular event occurs. There are two main types of hooks: Field Hooks and Action Hooks and ClearQuest breaks these down further to allow very fine-grained control over when hook code is run.

Record Type:

Definition of an individual entity. A Record Type encapsulates one or mo re fields and is analogous to a database table. Record Types can be either "Statel ess" or "State-based" with the latter being able to transition between a defined set of states. For example, a "Defect" Record Type used to record software bugs may move between states such as "New", "open", "Assigned", "Fixed", "Rejecte d", "Reopened", "Deferred" and "closed".

Schema:

A Schema in ClearQuest terminology encapsulates a single workflow incl uding information on states, actions, data structures and hooks. Schemas are ver sioned in ClearQuest and all versions are stored in a Schema Repository.

Schema Repository:

A database containing one or more Schemas. The schemas are actually stored as SQL within the tables of the Schema Repository database itself.

Test Database:

A database used by administrators to test changes to a production system without impacting the live system. Each Test Database is associated with a vers ion of a Schema.

User Database:

A database containing the data entered and queried by users. Each User Database is associated with a version of a Schema.

Administration:

Aside from the ClearQuest Designer, ClearQuest also provides a full API to allow programmatic access to ClearQuest. Like the hook code, this API is vi a Perl on Unix and Linux and either Perl or VBScript on Windows.

Integration:

ClearQuest is designed to be used with other Rational Software testing to ols, such as IBM Rational Performance Tester, IBM Rational Functional Tester and IBM Rational Manual Tester.

29.COCOMO

Introduction:

Constructive Cost Model, a method for evaluating or estimating the cost of the software development. This model is developed by Barry W.Boehm in 1970. It is a regression model based on number of Lines Of Code. It is used as a process reliably predicting the various parameters associated with making a project such as size, effort, cost, time and quality. It offers some advantages to its users:

- COCOMO estimates are more objective and repeatable than estimates made by methods relying on propriety models
- COCOMO can be calibrated to reflect your software development environment, and to produce more accurate estimates.

The most fundamental calculation in the COCOMO model is the use of the Effort Equation to estimate the number of Person-Months required to develop a project.

History:

It is developed in the year 1970 by Barry W.Boehm and published as a model for estimating effort, cost, and schedule for software projects. In 1995,COCOMO II was developed and published in 2000.COCOMO consist of a hierarchy of three detailed and accurate forms. The Basic COCOMO is good for quick ,early ,rough order of magnitude estimates of software costs. Intermediate COCOMO takes the Cost Drivers into account and Detailed COCOMO accounts for the influence of individual project phases.

COCOMO modes:

Organic mode:

Development projects are uncomplicated and involve small experienced teams.

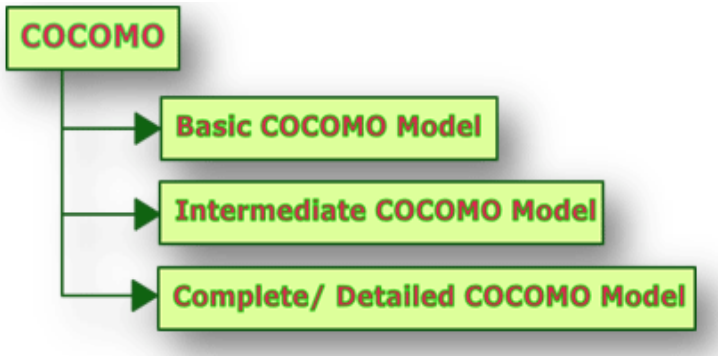
Semi-detached mode:

Development projects are more complicated than organic mode and involve teams of people with mixed level of experience.

Embedded mode: Development projects must fit rigid set of requirements because the software is to be embedded in a strongly joined complex of hardware , software, regulations and operating process.

Types of Models:

COCOMO consists of a hierarchy of three increasingly detailed and accurate forms. Any of the three forms can be adopted according to the requirements. There are three types of COCOMO model:



1.Basic COCOMO model

Basic COCOMO computes software development effort as a function of program size. Program size is expressed in estimated thousands of source of code .Basic COCOMO is good for quick estimate of software costs. However it does not account for differences in hardware constraints, personnel quality and experiences, use of modern tools and techniques and so on.

The basic COCOMO equations take the form

Effort Applied (E) = $a_b(KLOC)^{b}_{b}$ [man-months]

2.Intermediate COCOMO model:

Intermediate COCOMO computes software development effort as function of program size and a set of "cost drivers" that includes subjective assessment of product, hardware, personnel and project attributes. This extension considers a set of four "cost drivers".

The Intermediate Cocomo formula now takes the form:

$E=a_i(KLoC)^{(b}_{i})(EAF)$

3.Detailed COCOMO model:

Detailed COCOMO incorporates all characteristics of the intermediate version with an assessment of the cost drivers impact on each step of the software engineering process.

30. CODEWARRIOR

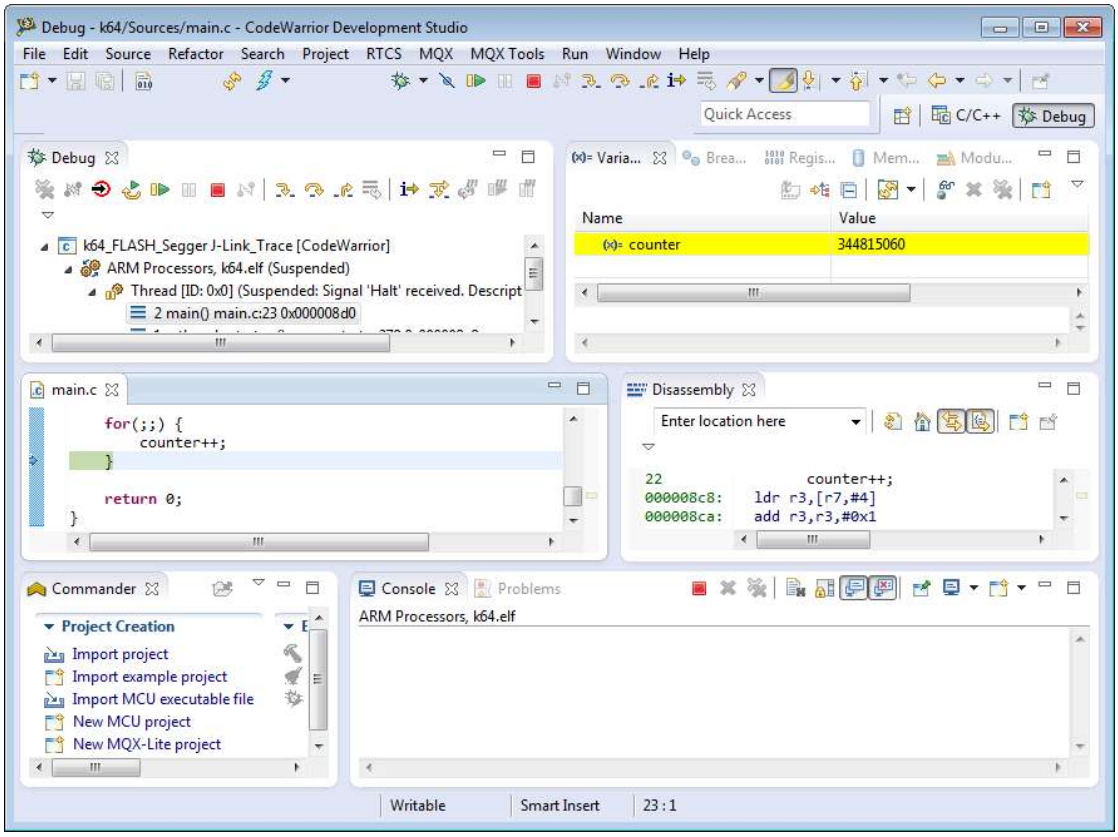
About Codewarrior:

CodeWarrior is an integrated development environment (IDE) published by NXP Semiconductors for editing, compiling, and debugging software for several microcontrollers and microprocessors.

Codewarrior's advantages in Mac:

During Apple's transition to the PPC, CodeWarrior quickly became the de facto standard development system for the Mac, rapidly displacing Symantec's THINK C and Apple's own Macintosh Programmer's Workshop. The purchase of NeXT in 1996 led to a decline in Code Warrior's relevance as Mac programming moved to the NeXT platform's own device.

Originally a single integrated product, now known as the "Classic IDE", the IDE was later replaced with Eclipse IDE. The current versions are 6.3 of the Classic IDE, and 11.0 for the Eclipse IDE. Languages supported are C, C++, and assembly language.



History:

CodeWarrior was originally developed by Metrowerks based on a C compiler and environment for the Motorola 68K, developed by Andreas Hommel and acquired by Metrowerks.

CodeWarrior was a key factor in the success of Apple's transition of its machine architecture from 68K processors to PowerPC because it provided a complete, solid PowerPC compiler when the competition (Apple's MPW tools and Symantec C++) was mostly incomplete.

CodeWarrior for Mac would be discontinued after the next release, CodeWarrior Pro 10. Although Metrowerks did not detail their reasons, the demand for CodeWarrior had presumably fallen during the time Apple began distributing Xcode (its own software development kit for OS X) for free.

Origin of the name:

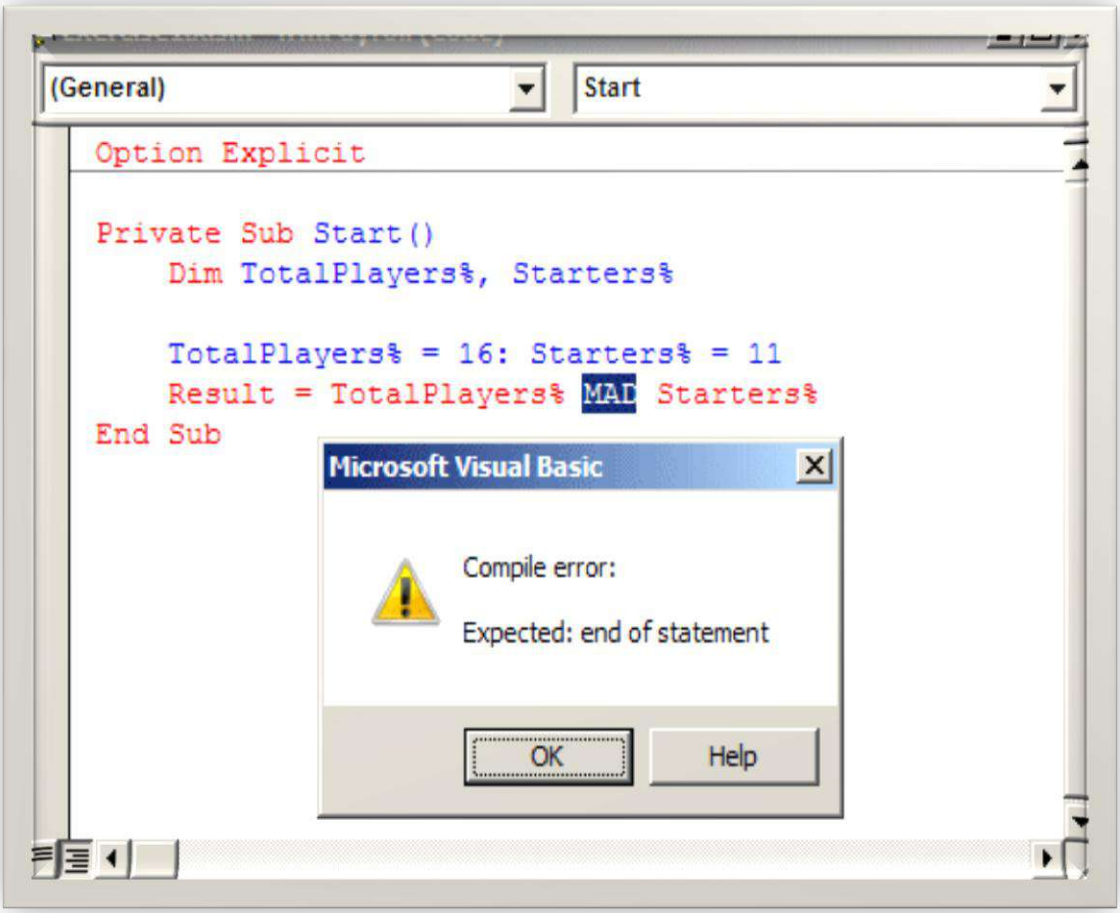
CodeWarrior CD packaging was very much in the tradition of the Apple developer CDs, featuring slogans such as "Blood, Sweat, and Code" and "Veni, Vidi, Codi" in prominent lettering. Competing products such as Symantec's THINK C were more conventionally marketed.

One of these, volume 9, was titled "Code Warrior", referring to the movie Mad Max 2: The Road Warrior. Later Apple dropped the whimsical titling in favor of a more sober "Developer CD series". Coincidentally the Metrowerks founder, Greg Galanos, an Australian, was also inspired by the movie and proposed the CodeWarrior name. Metrowerks subsequently used the name for their new developer product.

31. COMPILER BUG

The most experienced developers have run into some compiler bugs. However, as mentioned above, their incidence is far lower than other problems. Compilers tend to be extremely reliable when the following conditions are met.

- The compiler is heavily used
- The optimization options chosen are heavily used
- The code being compiled "looks like" most other code.

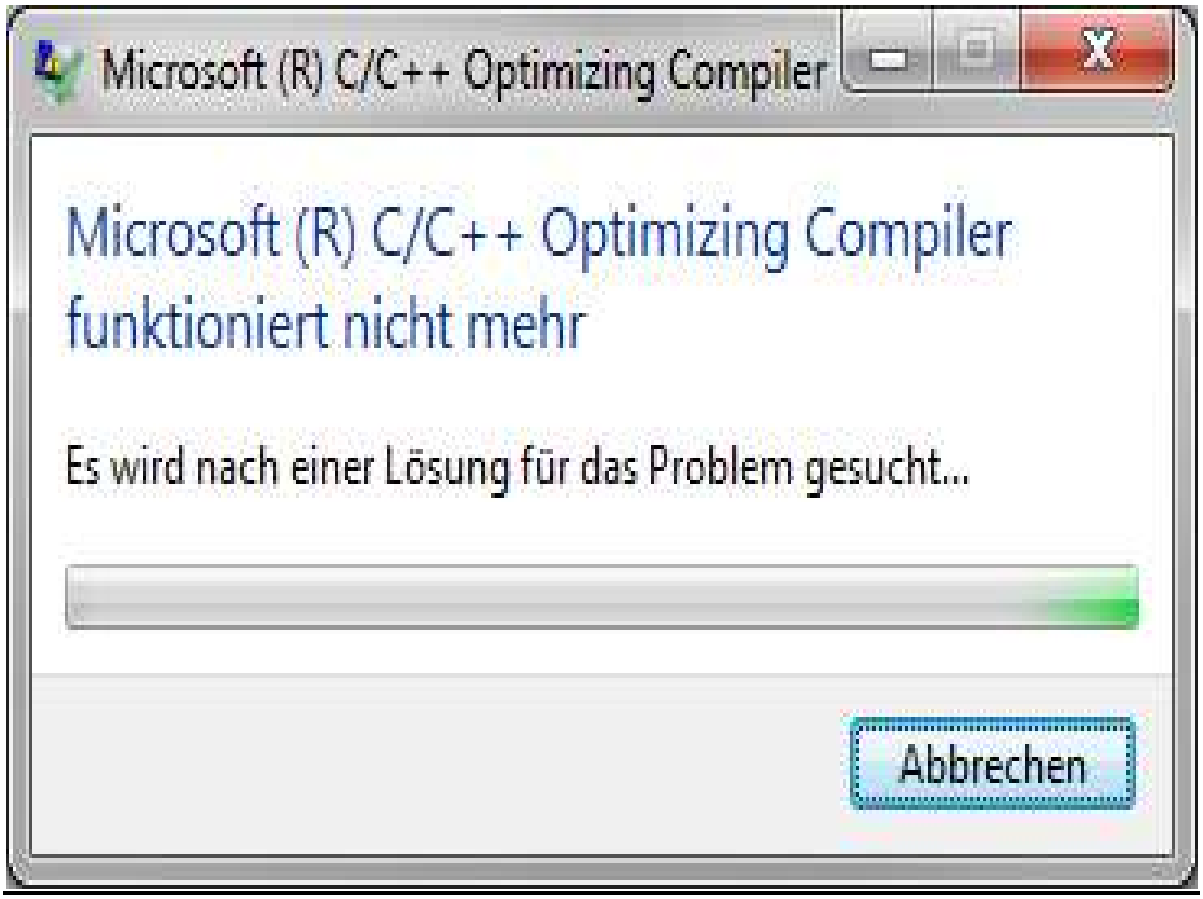


Compiler bugs where the wrong code is emitted at all optimization levels are relatively uncommon, as are bugs when optimizations are disabled. However, both happen. In general, bugs can be expected to be more common as the optimizer is asked to be more aggressive.

If any of the conditions above is not met, the incidence of compiler bugs can go up dramatically.

Consider these situations:

- We are using a cross-compiler for a new, obsolete, or unpopular embedded processor
- We are using strange combinations of optimization flags
- We are compiling machine-generated c code or otherwise straying outside the compiler's comfort zone



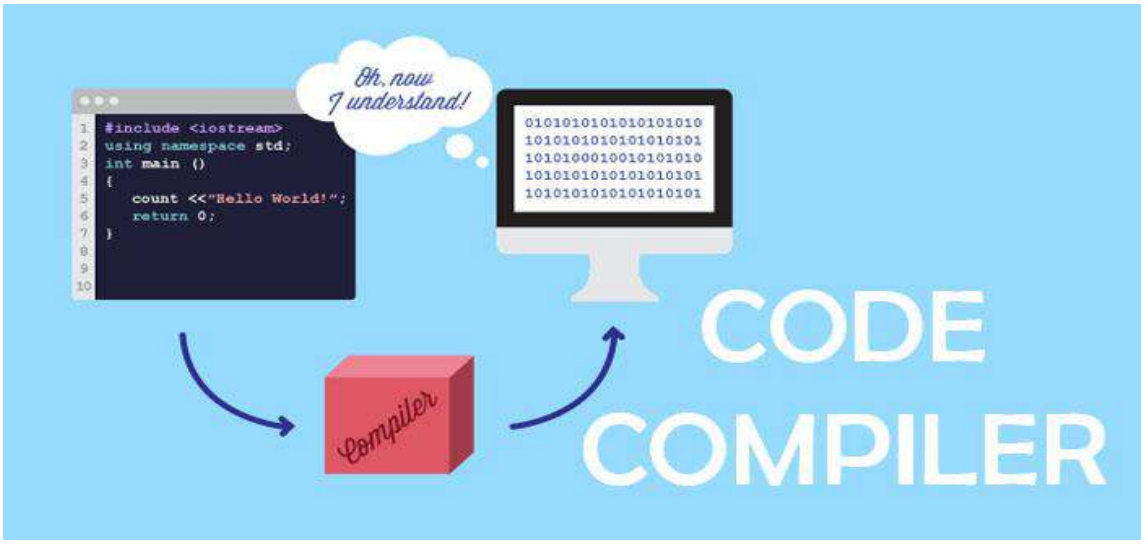
Reporting a Bug:

Once we're sure we've found a compiler bug, we should try to find out if it's a known bug or not. Making matters worse, there is a substantial gray zone of behaviors not covered by the C standard but that are expected of real compilers.

This includes the behavior of extensions such as inline assembly and attributes. Arguments about bugs in these extensions can be frustrating for everyone. OS code and embedded systems tend to live in this gray zone a lot.

32. COMPILER-COMPILER

A compiler-compiler or compiler generator is a programming tool that creates a parser, interpreter or compiler from some form of formal description of a programming language and machine. The input may be a text file containing the grammar written in BNF or EBNF that defines the syntax of a programming language, and whose generated output is some source code of the parser for the programming language, although other definitions exist. Usually, the resulting source code will have to be extended upon before a complete compiler emerges.



A metacompiler is a software development tool used chiefly in the construction of compilers, translators and interpreters for other programming languages. The input to a metacompiler is a computer program written in a specialized programming metalanguage designed chiefly for the purpose of constructing compilers. The language of the compiler produced is called the object language. The minimal input producing a compiler is a metaprogramming specifying the object language grammar and semantic transformations into an object program.

Variant

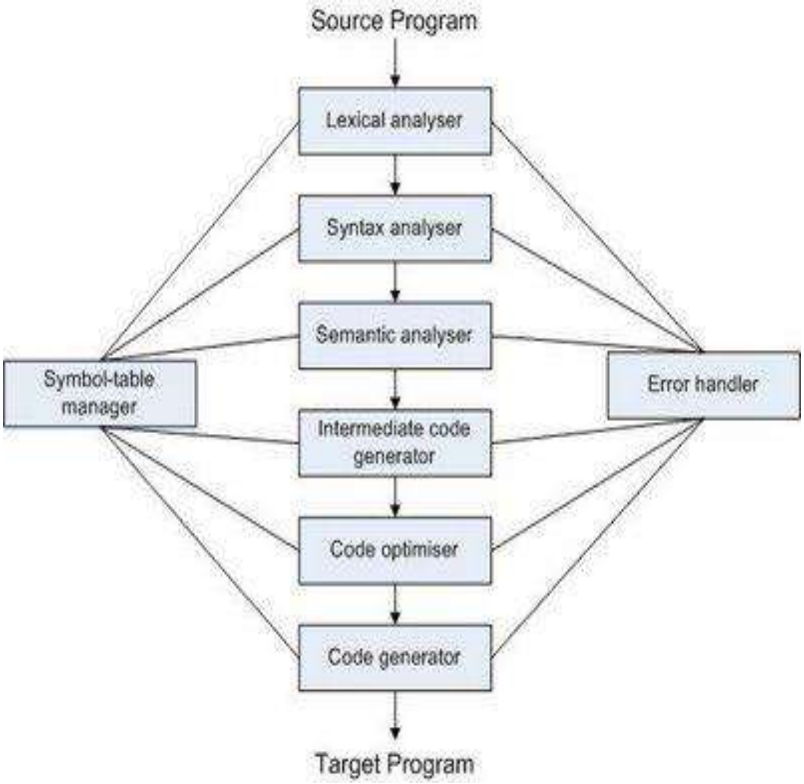
Typical parser generator associates executable code with each of the rules of the grammar that should be executed when these rules are applied by the parser.

These pieces of code are sometimes referred to as semantic action routines since they define the semantics of the syntactic structure that is analyzed by the parser.

Depending upon the type of parser that should be generated, these routines may construct a parse tree (or abstract syntax tree), or generate executable code directly. One of the earliest (1964), surprisingly powerful, versions of compiler-compilers is META II, which accepted an analytical grammar with output facilities that produces stack machine code, and is able to compile itself and other languages.

Meta compilers

Metacompilers reduce the task of writing compilers by automating the aspects that are the same regardless of the object language. This makes possible the design of domain-specific language which are appropriate to the specification of a particular problem.



A metacompiler reduces the cost of producing translators for such domain-specific object languages to a point where it becomes economically feasible to include in the solution of a problem a domain-specific language design.

33. COPYRIGHT INFRINGEMENT

Copyright infringement (colloquially referred to as piracy) is the use of works protected by copyright law without permission, infringing certain exclusive rights granted to the copyright holder, such as the right to reproduce, distribute, display or perform the protected work, or to make derivative rights. The copyright holder is typically the work's creator, or a publisher or other business to whom copyright has been assigned.

Copyright holders routinely invoke legal and technological measures to prevent and penalize copyright infringement. Copyright infringement disputes are usually resolved through direct negotiation, a notice and take down process, or litigation in civil court.

Theft

Copyright holders frequently refer to copyright infringement as theft. In copyright law, infringement does not refer to theft of physical objects that take away the owner's possession, but an instance where a person exercises one of the exclusive rights of the copyright holder without authorization. Courts have distinguished between copyright infringement and theft.

The court said that in the case of copyright infringement, the province guaranteed to the copyright holder by copyright law certain exclusive rights is invaded, but no control, physical or otherwise, is taken over the copyright, nor is the copyright holder wholly deprived of using the copyrighted work or exercising the exclusive rights held. A 1979 East German court ruling found that software was "neither a scientific work nor a creative achievement" and ineligible for copyright protection, legalizing software copying in the country.

Freebooting

The term "freebooting" has been used to describe the unauthorized copying of online media, particularly videos, onto websites such as Facebook, YouTube or Twitter. The word itself had already been in use since the 16th century, referring to pirates, and meant "looting" or "plundering". Haran advocated the term in an attempt to find a phrase more emotive than "copyright infringement", yet more appropriate than "theft". The phrase was also the title of the episode the phrase was coined on. An alternative proposed by co-host CGP Grey is view jacking.

Developing world

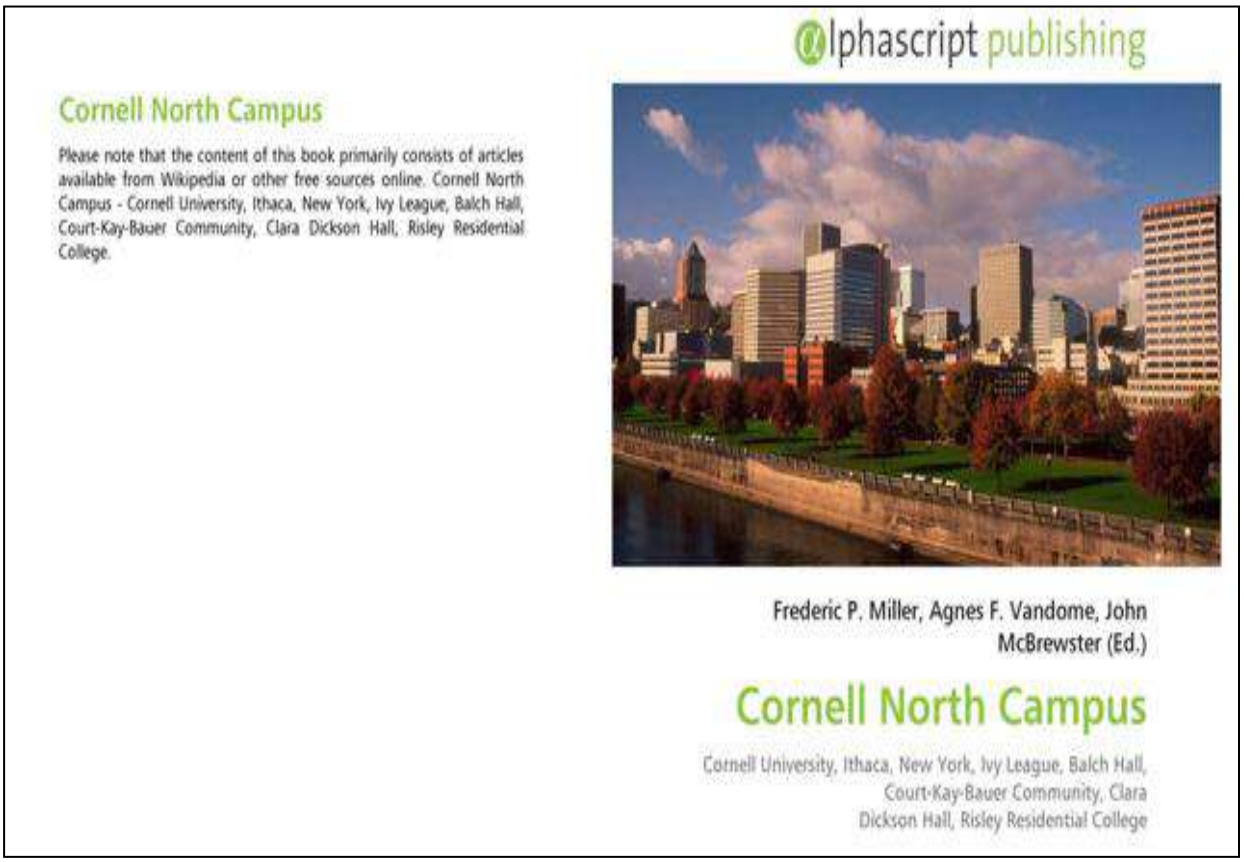
In Media Piracy Emerging Economics, the first independent international comparative study of media piracy with centre on Brazil, India, Russia, South Africa, Mexico, Turkey and Bolivia, "high prices for media goods, low incomes, and cheap digital technologies" are the chief factors that lead to the global spread of media piracy, especially in emerging markets.

According to the same study, even though digital piracy inflicts additional costs on the production side of media, it also offers the main access to media goods in developing countries. The strong trade-offs that favour using digital piracy in developing economies dictate the current neglected law enforcements toward digital piracy.

34. CORNELL COMPILER (CORC)

CORC is an experimental computing language that was developed at Cornell University to serve the needs of a large and increasing group of computer users whose demands are both limited and intermittent. These are the laymen of the computing world, who chose to become as little concerned as possible in the computing process and mechanics, but who would like to benefit from the computational ability that is now commonplace. At a university most of the faculty and student users would fall into this category. In recognition of the current significance of the computer in every area of business, science and engineering there is increasing faculty interest in introducing some use of modern computation into the students' academic experience if this can be done without placing too great a burden on an already hard-pressed curriculum.

Cornell has made groundbreaking achievements in distributed computing systems, information retrieval, computational theory, trustworthy computing, artificial intelligence, social networking, and computer graphics.



The research areas are

- Artificial intelligence
- Graphics
- Programming languages
- Scientific computing
- Security

Artificial intelligence:

The Cornell CS department has developed one of the leading AI groupsin the world, as can be seen by our record of awards, press mentions, and other recognition. our relatively small size makes for a collaborative and cooperative environment within which a broad set of research groups flourish.

Programming language:

Programming Languages is a lively area at Cornell with eight faculties and over a dozen Ph.D. students.Cornell researchers have also contributed to language implementation, program analysis and optimization, domain-specific languages, and software engineering.

Scientific computing:

Scientists and engineers rely more than ever on computer modeling and simulation to guide their experimental and design work.The infrastructure that supports this activity depends critically on the development of new numerical algorithms that are reliable.

Security:

The nation security and economy rely on infrastructures for communication, finance, energy distribution and transportation to all increasingly dependent on networked information systems.

When these networked information systems perform badly or do not work at all, they put life, liberty and property at risk. Cornell has one of the largest and most visible groups of security researchers found anywhere.

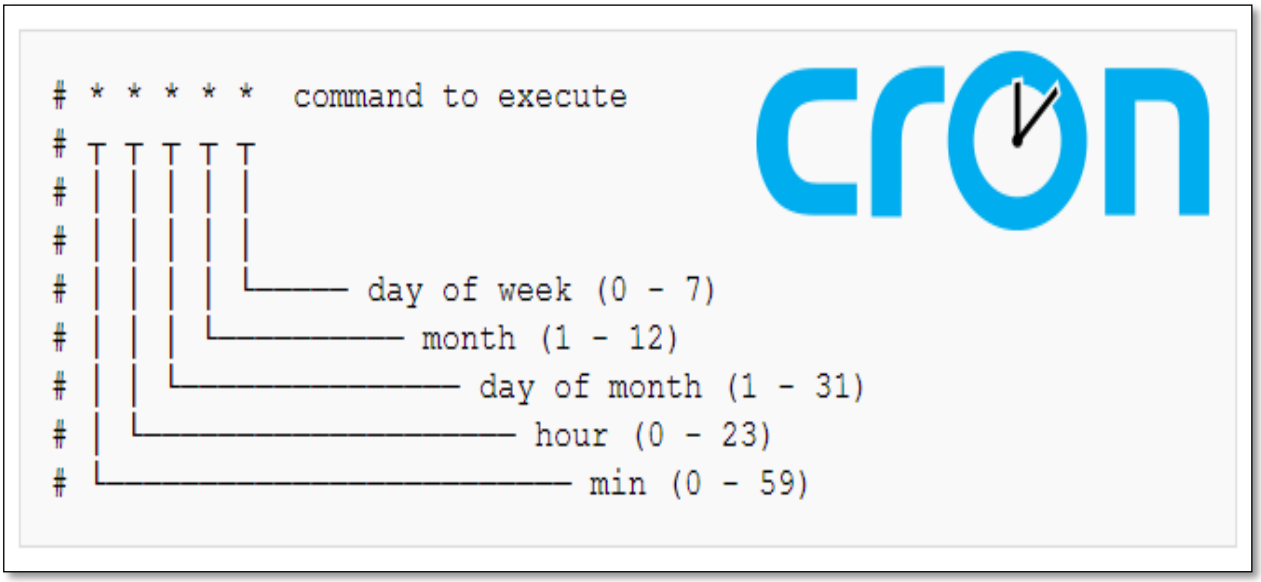
35. CRON-UNIX APLICATION

Introduction:

The software utility cron is a time-based job scheduler in Unix computer operating systems. People who set up and maintain software environments use cron to schedule jobs to run periodically at fixed times, dates, or intervals. It typically automates system maintenance or administration though its general-purpose nature makes it useful for things like downloading files from the Internet and downloading email at regular intervals.

Crontab:

Cron is driven by a crontab cron tablefile, a configuration file that specifies shell commands to run periodically on a given schedule. The crontab files are stored where the lists of jobs and other instructions to the cron daemon are kept. Users can have their own individual crontab files and often there is a system-wide crontab file that only system administrators can edit.



These two files play an important role:

- **cron.allow** - If this file exists, it must contain your username for you to use cron jobs.
- **cron.deny** - If the cron.allow file does not exist but the cron.deny file does exist then, to use cron jobs, you must not be listed in the cron.deny file.

Unix- Application:

Unix- was developed using a high-level programming language C instead of platform-specific assembly language, enabling its portability across multiple computer platforms.Unix-also was developed as a self -contained software system, comprising the operating system, development environment, utilities, documentation, and modifiable source code.

Components:

- Kernel - The kernel is the master control program of the operating system, handling memory management, system calls, and other low-level functions common to most programs, and providing drivers for controlling hardware.

- Shell - The shell is an interactive program that provides an interface between the user and the kernel. The shell interprets commands entered by the user or supplied by a shell script, and passes them to the kernel for execution.
- Shells available for use on Unix and Unix-like systems include the Bourne shell, the Bourne-again shell, the C shell, the Z shell.

For example:

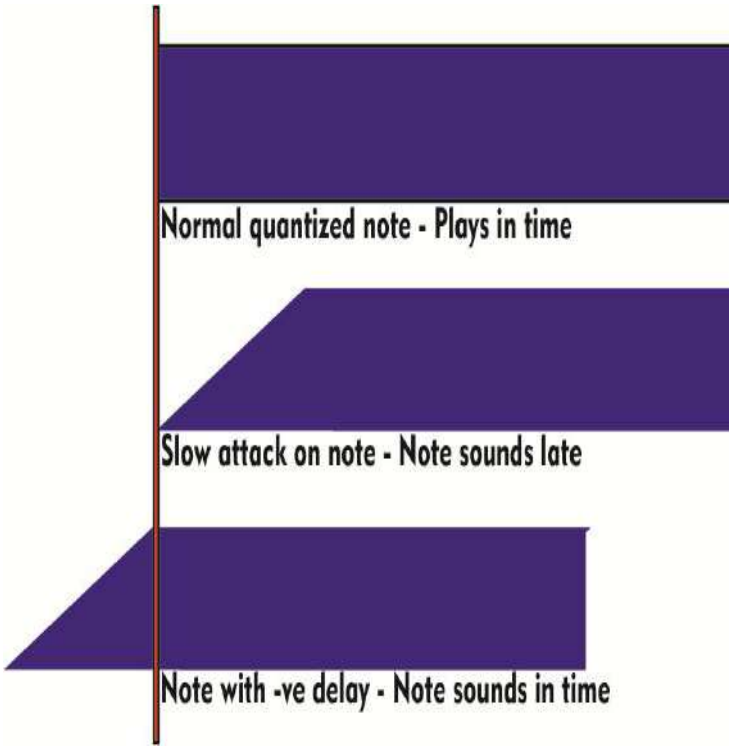
At IU, a network-attached storage device is used to provide GPFS file system for the research computing systems.

36. CUBASE

Cubase definition:

Cubase is a digital audio workstation (DAW) developed by Steinberg for music and MIDI recording, arranging and editing. The first version, which was originally only a MIDI sequencer and ran on the Atari ST computer, was released in 1989. Cut-down versions of Cubase are included with almost all Yamaha audio and MIDI hardware, as well as hardware from other manufacturers.

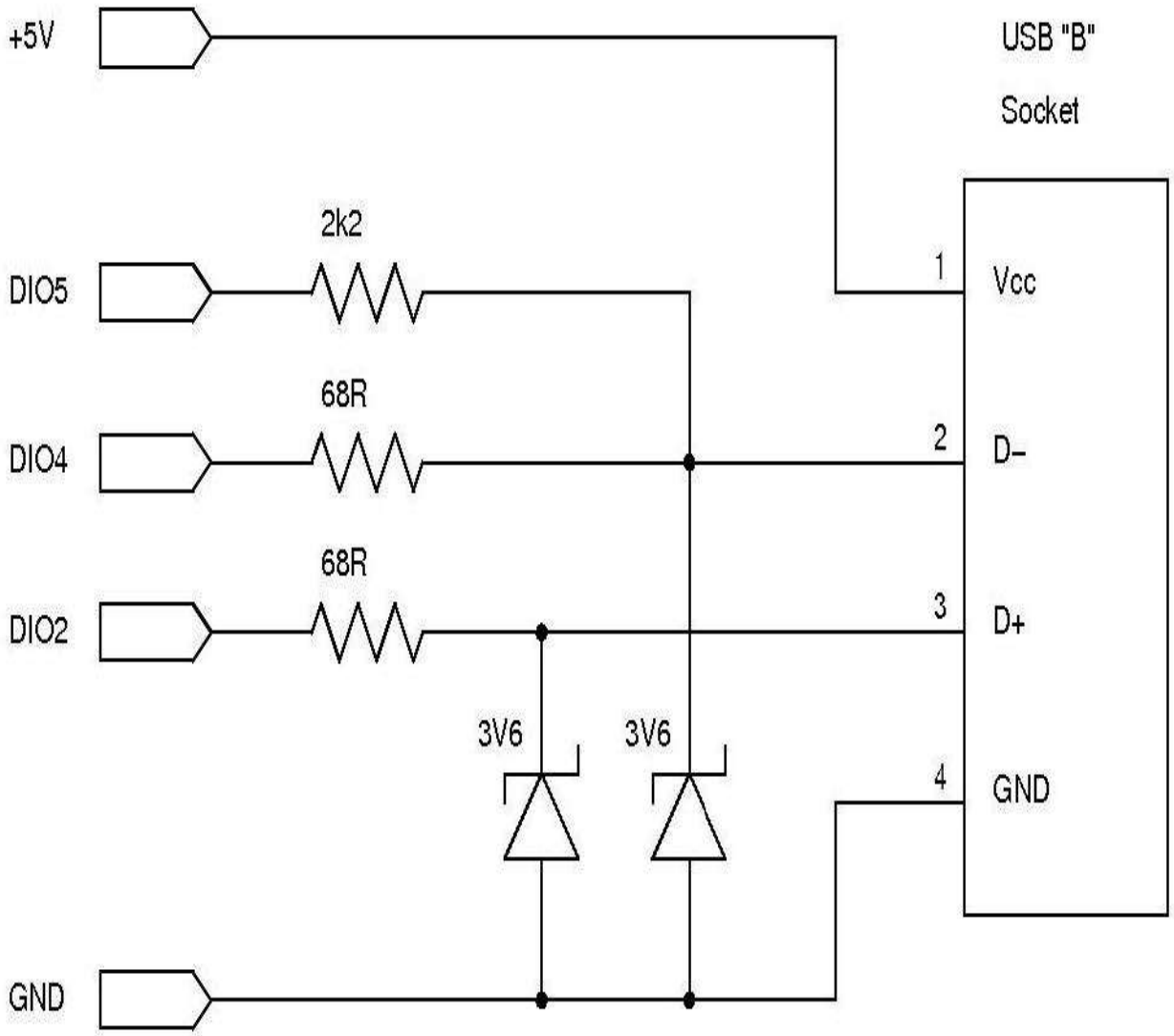
Delay compensation:



To avoid Cubase to add latency when you play a VST instrument in real-time or record live audio, you can activate Constrain Delay Compensation. This minimizes the latency effects of the delay compensation, while maintaining the sound of the mix as far as possible.

Cubase LE:

Building on the same core technologies found in Steinberg's Cubase Pro advanced music production system, Cubase LE is a special compact version that provides all the basic tools for recording, editing and mixing everything from the initial idea to the final masterpiece.



Advantages of Cubase:

Cubase is a popular DAW that is primarily MIDI and plug-in instrument based (known as VSTi's) and is a good choice for composers who want to use lots of synthesizers and samples in their music. It also does a fine job of recording audio tracks. Cubase's primary competitors are Apple Logic, Ableton Live, and Pro Tools.

Cubase 10:

Cubase 10 delivers many impressive new features in a remarkably powerful software package. It includes many new tools to enhance your creativity and speed your workflow. The perfect entry ticket into the world of computer-based music production, Cubase LE offers powerful, yet easy-to-use software tools for a large range of music styles.

37. DIGITAL ASSET MANAGEMENT SYSTEM

Digital Asset Management System (DAM):

Digital asset management is a business process for organizing, storing and retrieving rich media and managing digital rights and permission. Rich media assets include photos, music, videos, animations, podcasts and other multimedia content.

DAM involves the creation of archive, the development of infrastructure to preserve and manage digital assets and a search functionality that allows end users to identify, locate and retrieve an asset. At its simplest, a DAM is a set of database records.

What is a digital asset?

The asset being managed is stored in a digital format and is detailed by its metadata. The metadata can describe the asset content, the means of encoding, ownership, and rights of access.

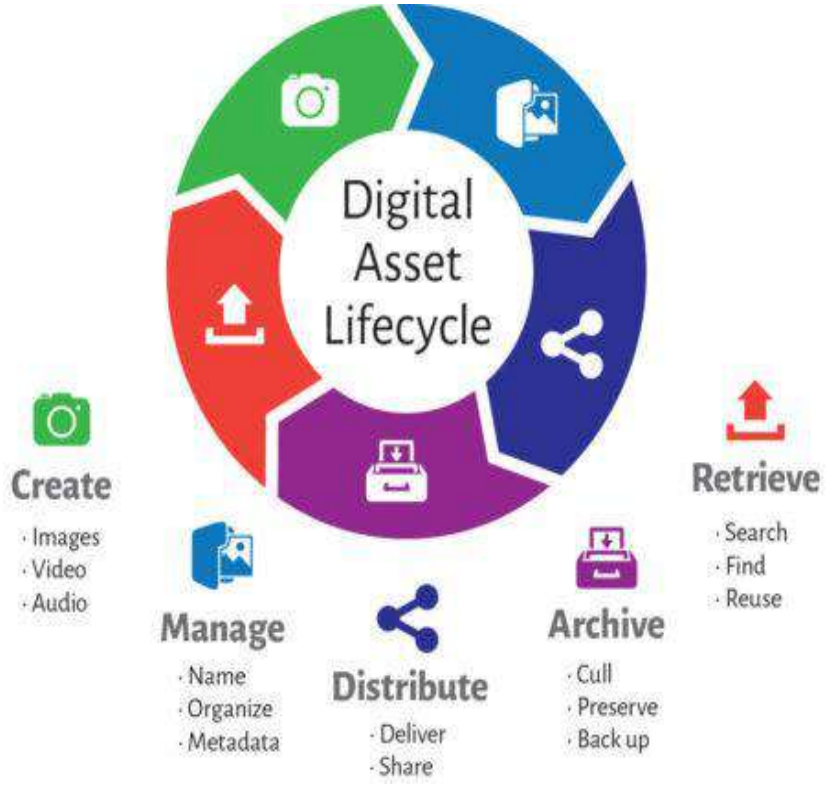
Types of digital asset management:

There are several broad categories of digital asset management. Brand asset management systems have content that is mostly marketing-related, such as logos.

Library asset management systems focus on storage and retrieval of infrequently changing media assets, such as photo archiving. Production asset management system manages assets as they are being created for digital media production, such as video games.

DAM Software:

While digital media management software tools were once used exclusively by publishing and media companies, they are increasingly being incorporated into content management systems and are of particular interest to retail sales companies that have customer-facing websites.



Benefits of DAM software:

Some benefits of DAM software are that it allows access to digital media anytime, anywhere. It also includes fast implementation, easy integration, and is intuitive.

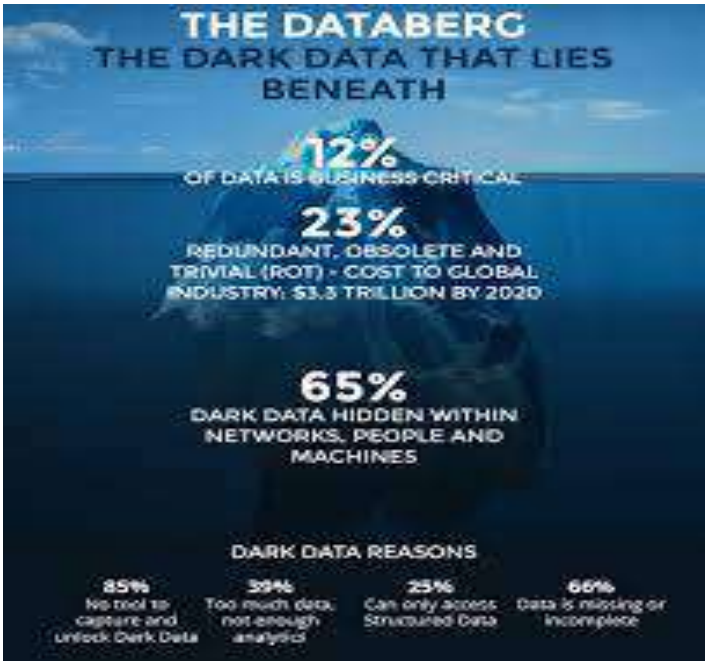
38. DARK DATA

Dark data is data which is acquired through various computer network operations but not used in any manner to derive insights or for decision making. The ability of an organization to collect data can exceed the throughput at which it can analyse the data. In some cases the organization may not even be aware that the data is being collected.IBM estimates that roughly 90 percent of data generated by sensors and analog-to-digital conversions never get used.

It is an information assets that an organization collects process and stores in the course of its regular business activity, but generally fails to use for another purpose.

According IDC, 90% of unstructured data are never analyzed. Such data is known as dark data. Dark data is digital information that is not being used.

Many times the organization leave the data dark for practical reasons. The data may be dirty and by the time it can be scrubbed, the information may be too old to useful. They are then called as unstructured data.



The term dark data is being associated with big data and operational data .Server log files that could provide clues to the website visitor behavior; customer call details records that incorporate unstructured consumer sentimental data.

This type of dark data can be used to drive new revenue sources, eliminate waste and reduce cost. As a result many organizations store dark data for regulatory compliance purposes are using HADOOP to identify useful dark bits and map them to possible business uses.

Dark data center is also known as Lights-of-data center.

Data centers that are mostly automated and remotely administrated at sometimes it may call as “Domain data centers”.

The unstructured data are known as dark data. They are Customer information, Log files, previous employee information, raw survey data, financial statements, Email correspondences and Account information.

The key in monetizing dark data lies not only in gathering it, but in analyzing it to discover hidden patterns, developing hypotheses, and then putting the insights to use. By combining data science and number crunching on large-scale analytic technologies, with the real-time execution of complex algorithms by using a graph database, businesses can bring transformative insights to their operational decisions, and combine the latest technologies with their existing data and systems.

Phone transcripts, chat logs and email data which may often dark. We already have clients doing these types of analyses with Odin Text. It is almost exploratory at first, but these clients recognize the need to look. The audio file transcripts from a call center can also be a dark data.

39 .DIGITAL DETOX

Digital Detox refers to a period of time during which a person refrains from using electronic connecting devices such as smart phones and computers. It is regarded as an opportunity to reduce stress, focus more on social interaction and connection with nature in the physical world. Claimed benefits include increased mindfulness, lowered anxiety, and an overall better appreciation of one's environment.

There have been many stories where a digital detox has lead to a more refreshed feeling along the people involved. They described the digital detox as a "gateway" in some aspect. When people get caught up in how much they need to do, the overuse of technology becomes prevalent.

This even becomes the case in a social context. People want to make sure they're up to date on the latest news stories, Instagram posts, political tweets and to do this, they need to stay plugged in.

Smartphone’s, laptops, and tablets combined with the increasing wireless Internet accessibility enable technology users to constantly be connected to the digital world. In one study in Mind, 95% of those interviewed said their mood improved after putting down their phones to spend time outside changing from depressed, stressed, and anxious to more calm and balanced.

The motivations behind digital detoxing vary. In some cases, the motivation is negative emotional responses to the technology usage, such as dissatisfaction or disappointment of the technology device and its functions.

In other cases, users see the technology as a distracting factor that consumes time and energy and wants to take back control over their everyday lives. Some people have moral, ethical or political reasons to refrain from technology usage.

Furthermore, a concern of developing addictive behavior in terms of tech addiction or Internet addiction disorder is one of the motivations for disconnecting for a period of time.

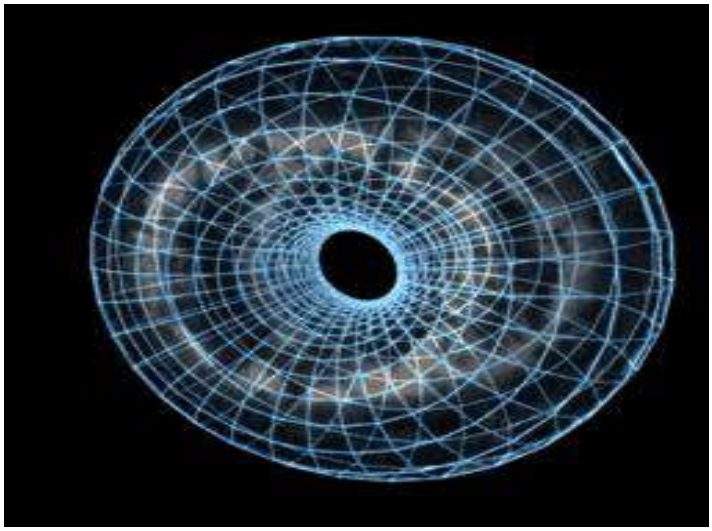
This excessive technology usage can be considered an addiction. It's said that around 50% of smart phone users check their account 5 minutes prior to going to bed and within 5 minutes post waking up. Constant engagement with digital connecting devices at the workplace is claimed to lead to increased stress levels more difficult to distinguish work from leisure.

Technology is growing and will but it is necessary to take frequent breaks. We have atleast spend some time without electronic devices to reduce our stress.

40. DIMENSIONS 4D, 5D

4D - dimension:

To understand the nature of four-dimensional space, a device called dimensional analogy is commonly employed. Dimensional analogy is the study of how (n − 1) dimensions relate to n dimensions, and then inferring how n dimensions would relate to (n + 1) dimensions.

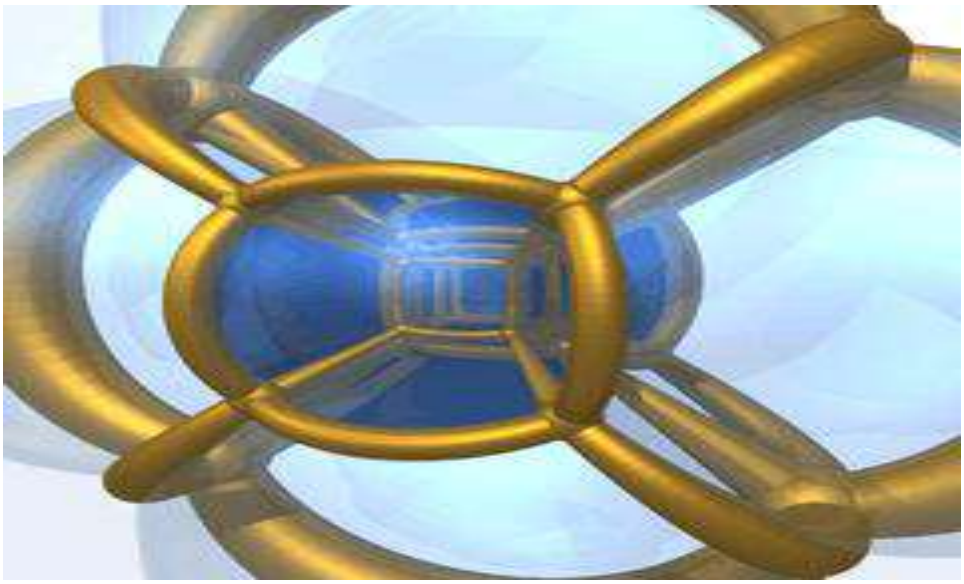


Dimensional analogy was used by Edwin Abbott in the book Flatland, which narrates a story about a square that lives in a two-dimensional world, like the surface of a piece of paper. From the perspective of this square, a three-dimensional being has seemingly god-like powers, such as ability to remove objects from a safe without breaking it open to see everything that from the two-dimensional perspective is enclosed behind walls, and to remain completely invisible by standing a few inches away in the third dimension.

As a three-dimensional object passes through a two-dimensional plane, two-dimensional beings in this plane would only observe a cross-section of the three-dimensional object within this plane. Similarly, if a four-dimensional object passed through a three dimensional surface, one could observe a three-dimensional cross-section of the four-dimensional object.

5D - dimension:

A five-dimensional space is a space with five dimensions. If interpreted physically, that is one more than the usual three spatial dimensions and the fourth dimension of time used in relativistic physics. It is an abstraction which occurs frequently in mathematics, where it is a legitimate construct.



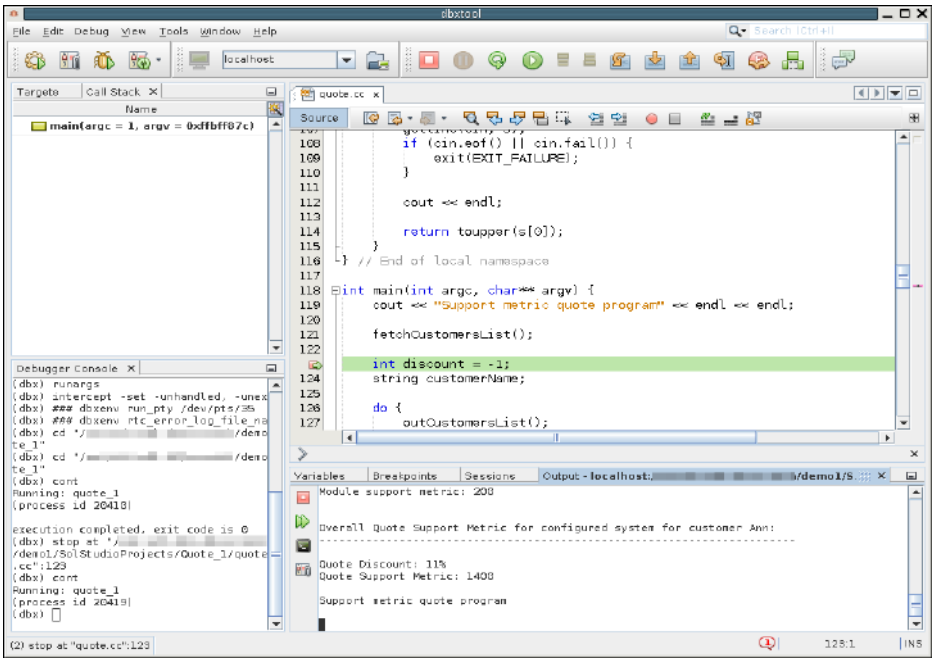
Much of the early work on five dimensional spaces was in an attempt to develop a theory that unifies the four fundamental forces in nature: strong and weak nuclear forces, gravity and electromagnetism. German mathematician Theodor Kaluza and Swedish physicist Oskar Klein independently developed the Kaluza–Klein theory in 1921, which used the fifth dimension to unify gravity with electromagnetic force.

To explain why this dimension would not be directly observable, Klein suggested that the fifth dimension would be rolled up into a tiny, compact loop on the order of 10-33 centimeters. Under his reasoning, he envisioned light as a disturbance caused by rippling in the higher dimension just beyond human perception, similar to how fish in a pond can only see shadows of ripples across the surface of the water caused by raindrops. While not detectable, it would indirectly imply a connection between seemingly unrelated forces.

41. DBX DEBUGGER

DBX is a source-level debugger found primarily on Solaris, AIX, IRIX, Tru64 UNIX, Linux and BSD operating systems. It provides symbolic debugging for programs written in C, C++, Pascal, FORTRAN and Java. Useful features include stepping through programs one source line or machine instruction at a time. In addition to simply viewing operation of the program, variables can be manipulated and a wide range of expressions can be evaluated and displayed.

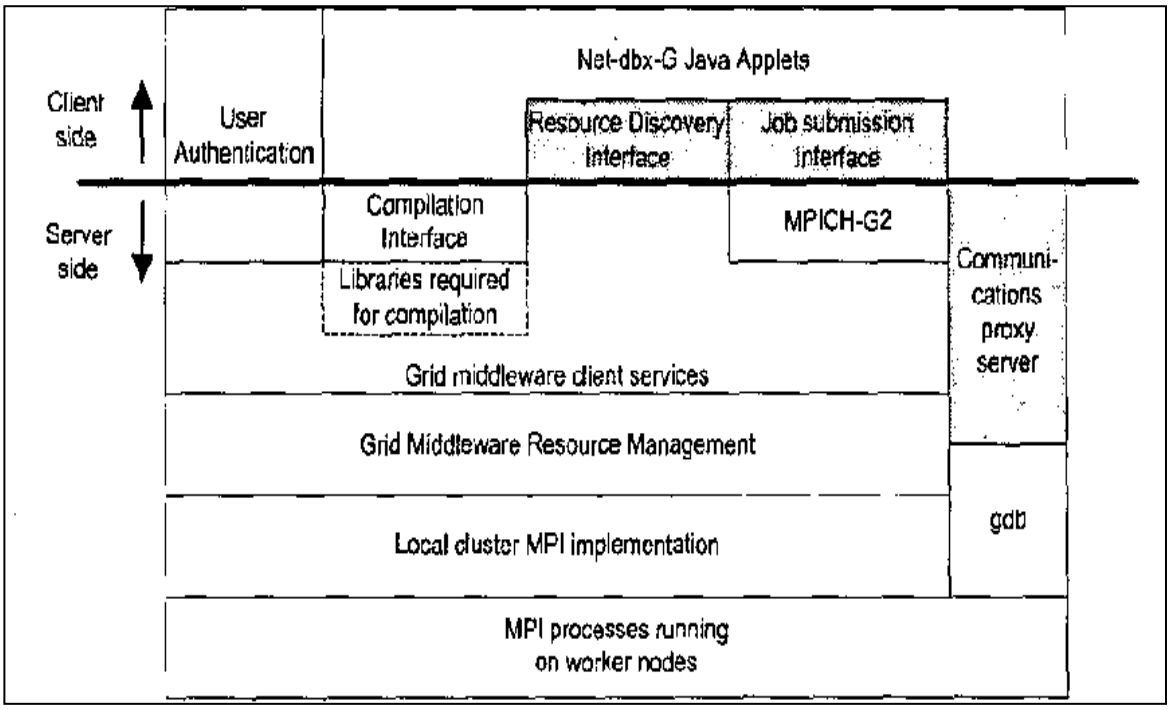
DBX was originally developed at University of California, Berkeley, by Mark Linton during the years 1981–1984and subsequently made its way to various vendors who had licensed BSD.



The dbx debugger is very useful for tracking down errors in your code. Used by itself, dbx has a rather primitive user interface, and requires some practice to use. However, the initial effort in learning to use it is often repaid by the time it saves you finding programming errors. There is a fancier X-windows interface for AIX, invoked with the command xde, but I prefer the Gnu-emacs interface, discussed below.

The dbx debugger is able to track the execution of your program line-by-line in the source code (C or FORTRAN) and tell you the status of every variable you are computing.

Dbx allows you to trace the execution of a specified object file. You can step through a program on a line-by-line basis while you examine the state of the execution environment. It is also possible to tell it to watch a particular variable and report when it changes. In order for the debugger to perform this trick, it is necessary to compile your code with a special option, so the compiled code contains information about the symbolic names of your variables and has the appropriate cross references to the source code.



By using the DBX Debugger the operations that can be done, such as the following:

- Examine object files.
- Run a program in a controlled environment.
- Set breakpoints at selected statements or run the program one line at a time.
- Debug using symbolic variables and display them in their correct format.
- View an MVS™ dump.
- Attach to a running program, and perform debugging operations.

The executable-file argument is an load module produced by a compiler. To perform source-level debugging, you need to compile your executable with symbolic information.

42. DCOM

DCOM is a programming construct that allows a computer to run programs over the network on a different computer as if the program was running locally. DCOM is an acronym that stands for Distributed Component Object Model. DCOM is a proprietary Microsoft software component that allows COM objects to communicate with each other over the network.

An extension of COM, DCOM solves a few inherent problems with the COM model to better use over a network:

Marshalling:

Marshalling solves a need to pass data from one COM object instance to another on a different computer – in programming terms, this is called "passing arguments." For example, if I wanted Zaphod's last name, I would call the COM Object LastName with the argument of Zaphod. The LastName function would use a Remote Procedure Call (RPC) to ask the other COM object on the target server for the return value for LastName(Zaphod), and then it would send the answer – Beeblebrox – back to the first COM object.

Distributed Garbage Collection:

Designed to scale DCOM in order to support high volume internet traffic, Distributed Garbage Collection also addresses a way to destroy and reclaim completed or abandoned DCOM objects to avoid blowing up the memory on webservers. In turn, it communicates with the other servers in the transaction chain to let them know they can get rid of the objects related to a transaction.

Using DCE/RPC as the underlying RPC mechanism:

To achieve the previous items and to attempt to scale to support high volume web traffic, Microsoft implemented DCE/RPC as the underlying technology for DCOM – which is where the D in DCOM came from.

How Does DCOM Work?

In order for DCOM to work, the COM object needs to be configured correctly on both computers – in our experience they rarely were, and you had to uninstall and reinstall the objects several times to get them to work.

The Windows Registry contains the DCOM configuration data in 3 identifiers:

CLSID:

The Class Identifier (CLSID) is a Global Unique Identifier (GUID). Windows stores a CLSID for each installed class in a program. When you need to run a class, you need the correct CLSID, so Windows knows where to go and find the program.

PROGID:

The Programmatic Identifier (PROGID) is an optional identifier a programmer can substitute for the more complicated and strict CLSID. PROGIDs are usually easier to read and understand. A basic PROGID for our previous example could be Hitchiker.LastName. There are no restrictions on how many PROGIDs can have the same name, which causes issues on occasion.

APPID:

The Application Identifier (APPID) identifies all of the classes that are part of the same executable and the permissions required to access it. DCOM cannot work if the APPID isn't correct. You will probably get permissions errors trying to create the remote object, in my experience.

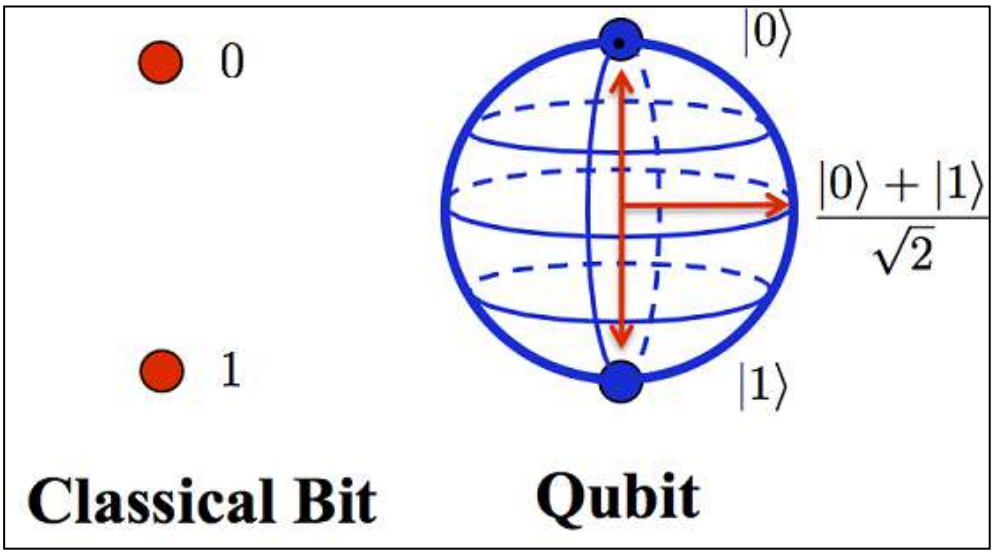
DCOM didn't win the battle to become the standard protocol for the internet, but it remains integrated into the Windows OS and is how many Windows services communicate –like Microsoft Management Console (MMC).

43. QUANTUM COMPUTING

Quantum computing is computing using quantum-mechanical phenomena, such as superposition and entanglement. A quantum computer is a device that performs quantum computing. Such a computer is completely different from binary digital electronic computers based on transistors and capacitors. Whereas common digital computing requires that the data be encoded into binary digits (bits), each of which is always in one of two definite states (0 or 1), quantum computation uses quantum bits or qubits, which can be in superpositions of states. A quantum Turing machine is a theoretical model of such a computer and is also known as the universal quantum computer. The field of quantum computing was initiated by the work of Paul Benioff and Yuri Manin in1980, Richard Feynman in 1982, and David Deutsch in 1985.

Overview of Quantum Computing:

A classical computer has a memory made up of bits, where each bit is represented by either a one or a zero. A quantum computer, on the other hand, maintains a sequence of qubits, which can represent a one, a zero, or any quantum superposition of those two qubit states; a pair of qubits can be in any quantum superposition of 4 states and three qubits in any superposition of 8 states.

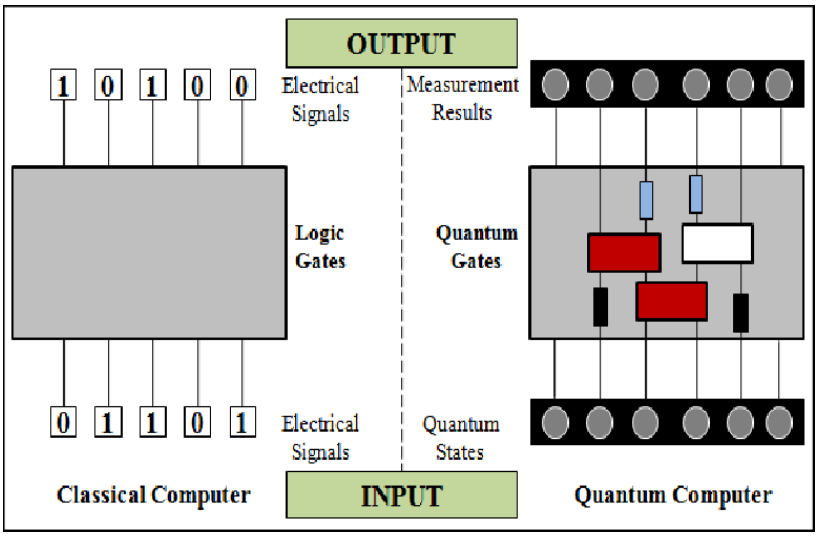


In general, a quantum computer with n qubits can be in an arbitrary superposition of up to 2^n different states simultaneously. A quantum computer operates on its qubits using quantum gates and measurement.

An algorithm is composed of a fixed sequence of quantum logic gates and a problem is encoded by setting the initial values of the qubits. The outcome can, therefore, be at most n classical bits of information. If Such unobserved states may be sent to other computers as part of distributed quantum algorithms.

Operation:

While a classical 3-bit state and a quantum 3-qubit state are each eight-dimensional vectors, they are manipulated quite differently for classical or quantum computation. For computing in either case, the system must be initialized, for example into the all-zeros string, corresponding to the vector (1,0,0,0,0,0,0,0). In quantum computation, on the other hand, allowed operations are unitary matrices, which are effectively rotations rotations can be undone by rotating backward, quantum computations are reversible.



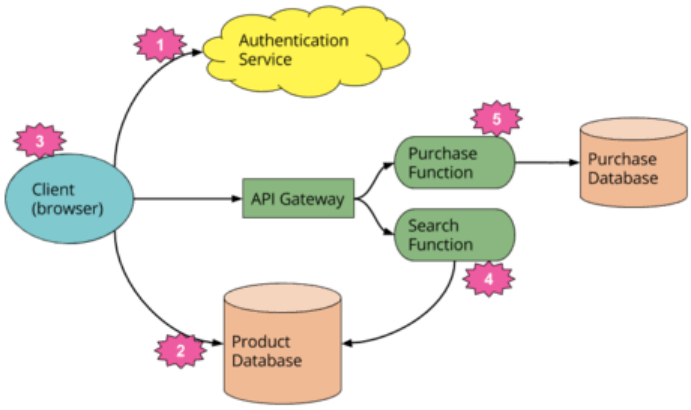
Obstacles:

There are a number of technical challenges in building a large-scale quantum computer, and thus far quantum computers have yet to solve a problem faster than a classical computer. David DiVincenzo, of IBM, listed the following requirements for a practical quantum computer

- scalable physically to increase the number of qubits;
- qubits that can be initialized to arbitrary values;
- quantum gates that are faster than decoherence time;
- qubits that can be read easily.

44. SERVERLESS ARCHITECTURE

Serverless architecture(also known as serverless computing or function as a service, FaaS) is a software design pattern where applications are hosted by a third-party service, eliminating the need for server software and hardware management by the deployment.



Serverless framework:

The easy, open way to build serverless applications.

The Serverless Framework is an open-source CLI for building and deploying serverless applications. With over 6 million deployments handled, the Serverless Framework is the tool developers trust to build cloud applications.

Infrastructure as Code:

With the Serverless Framework you can define your entire Serverless application, utilizing popular Serverless technologies like AWS Lambda, with a simple yaml configuration file.

Simple Serverless Development:

The Serverless Framework provides a simple, intuitive CLI experience that makes it easy to develop and deploy applications to cloud platforms like AWS, Microsoft Azure, Google Cloud Platform, IBM OpenWhisk, and more.

Provider Agnostic:

The Serverless Framework is open source and provider agnostic, meaning you only need one tool to tap in to the power of all the cloud providers.

Drawbacks of Serverless computing :

1. Problems due to third-party API system:

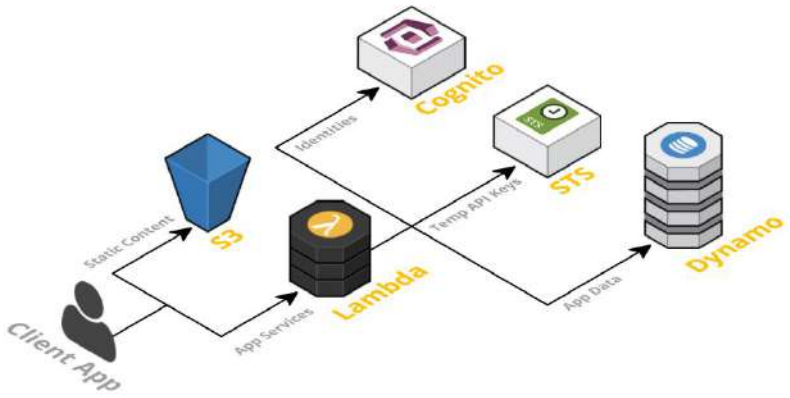
Vendor control, multitenancy problems, vendor lock-in and security concerns are some of the problems due to the use of 3rd party APIs. Giving up system control while implementing APIs can lead to system downtime, forced API upgrades, loss of functionality, unexpected limits and cost changes.

2. Lack of operational tools:

The developers are dependent on vendors for debugging and monitoring tools. Debugging Distributed Systems is difficult and usually requires access to a significant amount of relevant metrics to identify the root cause.

3.Architectural complexity:

Decisions about how small (granular) the function should be, takes time to assess, implement and test. There should be a balance between the number of functions should an application call. It gets cumbersome to manage too many functions and ignoring granularity will end up creating mini-monoliths.



Benefits of Serverless Architecture:

1. Easier operational management.

2. Faster innovation.

3.Reduced operational costs.

55. 5G TECHNOLOGY

5G is the fifth generation of cellular mobile communications. It succeeds the 4G, 3G and 2G systems. 5G performance targets high data rate, reduced latency, energy saving, cost reduction, higher system capacity, and massive device connectivity.

Usage scenario:

There are three main types of usage scenario that the capability of 5G NR is expected to enable. They are Enhanced Mobile Broadband, Ultra Reliable Low Latency Communications, and Massive Machine Type Communications.

Enhanced Mobile Broadband:

Enhanced Mobile Broadband refers to the use case of using 5G as an evolution to 4G LTE mobile broadband services with faster connection with higher throughput and more capacity. 5G would need to deliver higher capacity, enhance connectivity, and higher user mobility to match these demands, which would require capabilities in the above table with Enhanced Mobile Broadband mark to deliver.

Speed:

5G promises superior speeds in most conditions to the 4G network. Qualcomm presented a simulation at Mobile World Congress that predicts 490 Mbit/s median speeds for 3.5 GHz 5G Massive MIMO and 1.4 Gbit/smedian speed for 28 GHz mmWave 5G NR speed in sub-6 GHz bands can be slightly higher than the 4G with a similar amount of spectrum and antennas, though some 3GPP 5G networks will be slower than some advanced 4G networks, such as T-Mobile's LTE/LAA network.

Low Communication Latency:

Latency is the time it takes to pass a message from sender to receiver. Low communication latency is one improvement in 5G. Lower latency could help 5G mobile networks enable things such as multiplayer mobile gaming, factory robots, self-driving cars and other tasks demanding quick response.

Deployment:

Development of 5G is being led by companies such as Qualcomm, Huawei, and Intel modem technologyand Nokia, Ericsson, ZTE, Cisco, and Samsung for infrastructure. Worldwide commercial launch is expected in 2020. Numerous operators have demonstrated 5G as well, including Korea Telecom for the 2018 Winter Olympics and Telstra at the 2018 Commonwealth Games. In the United States, the four major carriers have all announced deployments: AT&T's millimetre wave commercial deployments in 2018, Verizon's 5G fixed wireless launches in four U.S. cities and millimetre-wave deployments, Sprint's launch in the 2.5 GHz band, and T-Mobile's 600 MHz 5G launch in 30 cities.

Vodafone performed the first UK trials in April 2018 using mid-band spectrum, and China Telecom's initial 5G build out in 2018 will use mid-band spectrum as well. The world first service of 5G was in South Korea, as the South Korean telecoms deployed it all at once on the first day of December, 2018.

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 our Department ....