

B.Tech.

Second Semester Examination, 2009-2010

Fundamentals of Computer & Programming in C (CSE-101-F)

Note : Attempt five questions in total. Question No. 1 is compulsory. Attempt one question from each Section A, B, C & D. All questions carry equal marks.

Q. 1. (i) Which of the following is not a memory :

- (a) Flash
- (b) Bubble
- (c) Triple.

Ans. (c) Triple.

Q. 1. (ii) In MICR "C" stands for:

- (a) Color
- (b) Code
- (c) Character

Ans. (c) Character.

Q.1.(iii) What is the latest version of Windows O.S.

Ans. Window 7.

Q. I. (iv) LSI technique was used in which generation of Computers.

Ans. Fourth Generation Computers.

Q. 1. (v) Differentiate between system software and application software.

Ans. System Software : System software refers to a computer program that manages and controls hardware components of a computer system. The system software is responsible for handling the functioning of the computer hardware.

Application Software : Application software is a computer program that is executed on the system software. Application software is unable to run without the system software, such as OS and utility program.

Q. 1. (vi) What type a memory a Hard disk is? Primary or Secondary.

Ans. Secondary.

Q.1.(vii) What is bootstrap loader?

Ans. Bootstrap Loader : When the computer is turned on bootstrap loader is executed. This loader is responsible for loading the OS and transforming control to it. The bootstrap loader is present in the ROM area of main memory.

Q. 1. (viii) What is full form of TCP/IP?

Ans. Transmission Control Protocol/Internet Protocol (TCP/IP).

Q. 1. (ix) What is full form of OSI?

Ans. Open System Interconnection (OSI).

Q. 1. (x) Low level language programs are faster or slower in execution as compared to HLL programs.

Ans. Low level language programs are faster in execution as compared to HLL programs.

Q.1.(xi) What is firewall?

Ans. Firewall: A firewall is a part of a computer system or network that is designed to block unauthorized occurs while permitting authorized communication.

Q. 1. (xii) What are basic data types supported by C language?

Ans. The basic data types supported by C language are :

(i) Integer : Integer are those numbers that are whole, e.g., 12820.

(ii) Float: A floating point number is a number that can have a fractional part,
e.g., 34.5, 56.0.

(iii) Characters : The character data type in C can store a single character.
e.g. 'p', 't', 'A'.

Q. 1. (xiii) What is type casting.

Ans. Type Casting: Converting an expression of a given type into another type is known as type-casting.

Q. 1. (xiv) What is difference between exit and break statement in C.

Ans. Exit Statement: C provides a way to leave a program early (before its natural finish) with the exit () function. The format is,

exit (status);

Break Statement : When the break statement is encountered inside a loop, its loop is immediately terminated and the control of execution is transferred to the next statement immediately following the loop.

Q. 1. (xv) Define a dangling reference?

Ans. A Dangling Reference: A link or pointer to something (instruction, table element, indiv. item etc.) that no longer contains the same content. If reference is not currently valid address, or if it is a valid address but there is no content in that location, it may cause the computer crash.

Q.1.(xvi) How many passes are there in C compiler?

Ans. Two passes.

Q. 1. (xvii) Write a tertiary operator available in C language?

Ans. The general format is expression 1 ? expression 2 : expression 3.

For e.g., If (value % 2 == 0)

even = True

else even = False.

This can be written as

even = (value % 2 == 0) ? True : False.

Q. 1. (xviii) Write one homogeneous and one heterogeneous data structure available in C language.

Ans. Homogeneous data structure - Array

Heterogeneous data structure - Structure.

Q. 1. (xix) What is the significance of EOF?

Ans. EOF is End of File.

Q. 1. (xx) When you close a file, where is it stored in RAM or Hard Disk.

Ans. Hard Disk.

Section-A

Q. 2. (a) Briefly discuss the generations of microprocessors? What was the technology used in each generation?

Ans. Generations of Microprocessors : The different computing devices developed over the years can be categorized into several generations. Each generation of computer is the result of a technological develop-

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ment, which changed the way computers used to operate. As we proceed from one generation to another, we will see that the computers have become smaller and cheaper with more efficient computing capability. Computers can be categorized into five generations :

- (i) First generation (1940-1956)
- (i i) Second generation (1956-1963)
- (iii) Third generation (1964-1971)
- (iv) Fourth generation (1971-till date)
- (v) Fifth generation (1980s.....)

(i) First Generation Computers : In this generation of computers, vacuum tubes were used to build the circuiting for the computers and magnetic drum was used for the memory of the computer. A vacuum tube was a device made up of glass and used filaments to generate electrons. It was used to amplify the electronic signals. The first-generation computers used to perform calculation in milliseconds. They were the fastest known computers of their time. Since the size of the computers was very large, they used to consume a great deal of electricity and generated a large amount of heat. These computers were also prone to frequent technical faults and hence required proper maintenance at regular intervals.

The computers belonging to the first generation used machine language to perform operations and were capable of performing one operation at a time. These computers were used to take inputs from punch cards and paper tapes and displayed the result on paper as printouts. The computers that fall under the first generation of computers are ENIAC, EDVAC and UNIVAC. These computers were used for scientific calculation.

(ii) Second-Generation Computers : In the second generation of computers, transistors were used instead of vacuum tubes. Transistors were faster and more reliable than vacuum tubes. In addition, the size of transistors was smaller than vacuum tubes and they generated less heat as compared to vacuum tubes therefore the damage caused to the computers was less.

The second generation computers used assembly language instead of machine language.

The main characteristic of second generation computers was they used the stored program concept, i.e., the instructions were stored in the memory of the computer like the previous generation computers, the second generation computers also accepted input from punch cards and magnetic tapes. The output was either stored in punch cards or printed on a paper. These computers use magnetic tapes and magnetic disks as external storage devices. IBM 1620, PDP8 and CDC 1604 are examples of second generation computers.

(iii) Third Generation Computers: The third generation of computers were characterized by the development of the Integrated Circuit (I.C). An IC is a silicon chip that embeds an electronic circuit, which comprises several components, such as transistors, diodes, and resistors. The use of ICs had increased the speed and efficiency of the computers to a significant extent. These computers used a keyboard, which is an input device. Several programs were developed that helped more than one application at the same time on a computer with the introduction of ICs in the development of computers, the cost of the computers decreased to such an extent that they were affordable by a large part of the common population. Examples of third generation computers include IBM 370, PDP11 and CDC 7600.

(iv) Fourth Generation Computers : The fourth generation of computers is characterized by the use of Large Scale Integration (LSI) circuits and Very Large Scale Integration (VLSI) circuits in the construction of computing components. In fourth generation computers, LSI and VLSI circuits were further integrated on a single silicon chip, termed as microprocessor, contain control logic and memory. The major change in the fourth generation of computers was seen in the replacement of magnetic core memories by semiconductor memories. In addition, two types of high speed computers networking was established for enabling connection and communication among multiple computers at one time. The first one is the Local Area Network (LAN), where

multiple computers in a local area, such as home, office or a small group of buildings, are connected and allowed to communicate among them. The second type of networking is the Wide Area Network (WAN), which facilities connection and communication of hundreds of computers located across multiple locations.

An example of a fourth-generation of computer is the Personal Computer (PC).

A special characteristics of the fourth generation computers is the Graphical User Interface (GUI), which is a user-friendly interface that provides icons and menus to users to interact with the various computer applications.

Various other characteristics of the fourth generation of computers are :

- (i) These computers were smaller and cheaper than the computers of the previous generation.
- (ii) Unlike computers of the third generation, these computers did not require proper air conditioning.
- (iii) They were more reliable than the third generation computers.
- (iv) Unlike computers of the third generation, they had larger primary and secondary storage memory.
- (v) The fourth generation of computers used high-level programming language, which allowed a program written for one computers to be easily executed in another computer with the enhancement of the computing power of the computers, it was possible to connect the computers to form networks, which in the long run led to the development of the Internet.

(v) **Fifth-Generation Computers** : The fifth generation of computers is characterized by the ultra large scale Integration technology, which is more powerful as well as faster than the microprocessors used by the computers of the fourth generation. This generation of computers has also seen the introduction of optical disks, which have soon emerged as a popular portable mass storage medium. These optical disks are popularly known as Compact Disk-Read Only Memory (CD-ROM), as they are primarily used for storing data, which is only readable. The computer communication has also becomes faster in fifth generation of computers due to the use of e-mail. The following are the characteristics of the fifth generation computers :

- (i) The PCs in the fifth generation have become portable, which are much smaller and handy than the fourth-generation PCs. Users can even use them while traveling.
- (ii) The desktop PC and workstations are several times more powerful than the fourth generation PCs.
- (iii) There is no need of air-conditioning for the portable and desktop PCs of the fifth generation.
- (iv) The fifth generation computers are more reliable and there are fewer possibilities of hardware failures in them as compared to the fourth generation computers,
- (v) The manufacturing of the fifth generation of computers does not require manual assembling of the individual components, which reduces human labour, thereby making the commercial production of system easier and cheaper,
- (vi) These computers provide user friendly interfaces with multimedia features, which help in making the system more useful in every occupation.

There are some computing devices of the fifth generation still in development phase, which are based on artificial intelligence.

The goal of fifth-generation computing is to develop devices that can respond to natural language input and can learn and self organize.

Q. 2. (b) Explain the working of a LASER Printer.

Ans. Laser Printer: A printer that uses a laser and electrophotographic method to print a full page at a time.

There are a commercial product that can be used in business or at home to produce documents from a computer. Differing from an inkjet printer, the laser printer uses dry ink that is called toner to create the image

on each page.

Laser printers have the ability to print at very high speeds. Black and white pages can be printed at the rate of 2009 pages per minute on high end machines. The laser printers may or may not be connected to a computer, to generate an output. These printers consists of a microprocessor, ROM and RAM, which can be used to store the textual information. The pointer uses a cylindrical drum a toner and the laser beam. The toner stores the ink that is used in generated the output. The fonts used for printing in a laser printer are stored in the ROM or in the cartridges that are attached to the printer. The laser printers are available as gray scale, black and white or colour models. To print high quality pages that are graphic intensive, laser printers use the Page Maker Software.

How it Works : There are typically seven steps involved in the laser printing process :

(i) Raster Image Processing : Each horizontal strip of dots across the page is known as a raster line or scan line. Creating the image to be printed is done by a Raster-Image Processor (RIP), typically built into the laser printer. TI RIP uses the page description language to generate a bitmap of the final page in the raster memory. Once the entire page has been rendered in raster memory, the printer is ready to begin the process of sending the rasterized stream of dots to the paper in a continuous stream.

(ii) Charging : In laser printer, a primary charger roller, projects an electrostatic charge onto the photoreceptor, a revolving photosensitive drum or belt, which is capable of holding an electrostatic charge on its surface while it is in the dark.

(iii) Exposing : The laser is aimed at a rotating polygonal mirror, which directs the laser beam through a system of lenses and mirrors onto the photoreceptor. The beam sweeps across the photoreceptor at an angle to make the sweep straight across the page; the cylinder continues to rotate during the sweep and the angle of sweep compensates for this motion.

Laser are used because they generate a narrow beam over great distance. The laser beam neutralizes (or reverse) the charge on the block parts of the image, leaving a static electric negative image on the photoreceptor surface to lift the toner particles. A beam deted (BD) sensor is used to synchronize the laser sweeping process at the end of each sweep cycle.

(iv) Developing: The surface with the latent image is exposed to toner, fine particles of dry plastic powder mixed with carbon black or colouring agents. The overall darkness of the printed image is controlled by the high voltage charged applied to the supply toner. At the darkest setting the supply toner voltage is high enough that it will also start coating the drum where the initial unwritten drum charge is still present and will give to entire page a dark shadow.

(v) Transferring : The photoreceptor is pressed or rolled over paper, transferring the image. Higher end machines use a positively charged transfer roller on the back side of the paper to pull the toner from the photoreceptor to the paper.

(vi) Fusing : The paper passes through rollers in the fuser assembly where heat (upto 200 Celsius) and pressure bond the plastic powder to the paper.

(vii) Cleaning : When the print is complete, an electrically neutral soft plastic blade cleans any excess toner from the photoreceptor and deposits it into a waste reservoir, and a discharge lamp removes the remaining charge from the photoreceptor.

Once the raster image generation is complete all steps of the printing process can occur one after the other in rapid succession. This permits the use of a very small and compact unit, where the photoreceptor is charged, rotates a few degrees and is scanned, rotates a few more degrees and is developed. The entire process can be completed before the drum completes one revolution.

Q. 3. What are the functions of an operating system? Compare the characteristics of DOS and UNIX.

Ans. Operating System: Operating system is the most important program that runs on a computer. A very general purpose computer must have an operating system to run other programs. Operating systems perform basic tasks, such as recognizing input from the keyboard, sending out to the display screen, keeping track of files and directories on the disk and controlling peripheral devices such as disk drives and printers.

Operating system provides a software platform on top of which other programs, called application programs, can run.

Functions of Operating System : An operating system performs large number of functions. Each function is carried out by a component of the operating system. An operating system provides an environment for the execution of programs. The operating system provides certain services to programs and to the users of those programs. The specific services provided will differ from one operating system to another, but there are some common classes that we can identify. These operating system services are provided for the convenience of the programmer, to make the programming task easier.

The functions of operating system are :

- (i) To control the functionality of the computer system.
- (ii) To initialize the hardware of the computer system.
- (iii) To provide basic routines for device control.
- (iv) To provide management tasks.
- (v) To provide scheduling tasks.
- (vi) To provide interaction of tasks.
- (vii) To maintain system integrity and handle errors.

DOS : This is an acronym for disk operating system. It is a single user operating system. It was developed by Bill Gates and Paul Allen in 1980 for IBM PCs.

Characteristics:

- (i) DOS does not allow multitasking, so only one application can be open at a given time.
- (ii) DOS is text based, although applications can be graphical.
- (iii) DOS does not support mice, although it supports applications that use them.
- (iv) DOS is case insensitive although it is common to use upper case.

Variable Target:

- (i) Single hosts or whole domains.
- (ii) Computer system or network.
- (iii) Active network component (e.g., routers) also vulnerable and possible target.
- (iv) Variable uses & effects.
- (v) Hacker "turf" war.
- (vi) High profile commercial target.
- (vii) Useful in cyber-warfare, terrorism etc.

UNIX : UNIX is primarily designed to allow multiple users access the computers at the same time and share resources. In other words, the operating system coordinates the use of resources of the computer by its users. The UNIX operating system controls all the commands generated from the user keyboards as well as the data generated in such a way that each user believes that he/she is the only person working on the computer.

The UNIX OS is written in C language. In UNIX, everything is treated as a file and its core part is known

as kernel.

Characteristics of UNIX are as follows :

(i) **Multiuser Capability** : It allows more than one user to access different resources of the computer at the same time.

(ii) **Multitasking Capability** : It allows a user to run multiple programs concurrent!), which can share both CPU time as well as resources of the computer.

(iii) **Portability** : It allows a user to execute the operating system code on any machine having minimum hardware requirements for running the operating system.

(iv) **Flexibility** : It uses modular programming where reuniting several small software routines forms a complete application.

(v) **Security** : It supports a strong security system that maintains security at various levels and helps in securely execute a program on the Internet.

Section-B

Q. 4. (a) Write the advantages, disadvantages of HLL. Low level language & Assembly language.

Ans. Programming Language : A program is a setup instructions which is executed by computer. A programming language consists of all the symbol, characters and usage rules that permit the people to communicate with computers.

These instructions of the program enables the computer:

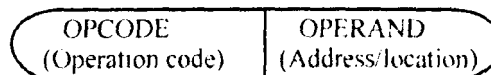
- (i) To process the data.
- (ii) To locate the position in the computer from where the required data shall be available.
- (iii) To locate the position to solve the data.

Programming language is a vocabulary and set of grammatical rules lor instructing a computer to perform specific tasks.

Classification of Computer Language : Computer language have been classified into the following three categories :

- (i) Machine language or low level language
- (ii) Assembly language.
- (iii) High-level language.

(i) **Machine Language or Low Level Language**: In this language the programs are written in binary digit which are understood by the computer without any help of a translator. The instruction given by machine language are divided into two parts.



Instruction format

The first part consists of command of operation which instructs the computer as what to do. The second part consists of operand through which computer knows :

- (i) The location from where to procure the data with other instructions and
- (ii) The location where the data is to be stored inside it.

Advantage of Low Level Language:

- (i) Processing speed of programs written in this language is high.

- (ii) No translator is required.

Disadvantages of Low Level Language:

- (i) **Dependent on Machine:** Separate machine language has to be used for different computers.
- (ii) **Difficulty in Programming:** The coding process to make programs in this language is very difficult.
- (iii) **Difficult to Make Corrections :** It is difficult task to amend or rectify some mistake in the program written in this language.
- (iv) There are great chances of committing error while programming in this language.

(ii) **Assembly Language:** In this language the program is written in terms of the symbols represented by alphabets of English language which is converted into machine language by the computer itself. For example, ADD is converted into 10 and SUB is converted into 15.

The program written in this language is called assembly code or symbolic program. The process of conversion of assembly code into machine code is achieved through a translator program called Assembler. Assembler is a system program which is supplied by the company with the computer.

Advantages of Assembly Language:

- (i) There is nothing else on your machine.
- (ii) The facilities you want are not available in a higher language.
- (iii) The compiled code takes too long or uses too much storage or both.
- (iv) Assembly programs are easier to modify the machine language programs.
- (v) Debugging facilities are better in assembly language.
- (vi) Real programmers use assembly language.

Disadvantages of Assembly Language:

- (i) It takes 2 to 5 times more lines to do something in assembler as it does in a high level language.
- (ii) Assembly language are not transportable from one machine type to another. Each machine type has its own instruction set/assembly language.
- (iii) Harder to read for some people.
- (iv) Real computer scientists don't use assembly language.

(iii) **High Level Languages :** These languages are not based on any specific computer. We can easily write a program in this language with the help of words of English language and simple mathematical notations. Every instruction of the programs written in English language is converted into different machine language instruction with the help of a compiler. A particular high level language is more appropriate to solve a specific problem.

e.g., Fortran, Pascal, PL/S, APL etc.

Advantages of High Level Language:

- (i) The same high level language can be used in different computers after a slight modification.
- (ii) It is easy to learn and use these language.
- (iii) There are less chances of committing error in a high level language.
- (iv) It take less time and labour to write a program in high level language.
- (v) It is easy to understand a program written in high level language.
- (vi) It is easy to make changes in the programs written in high level language.

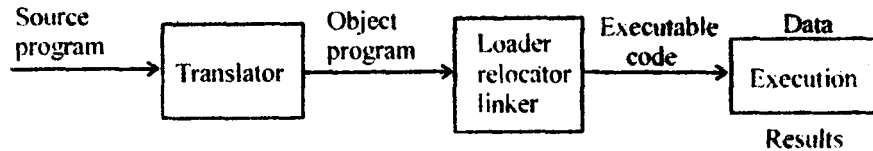
Disadvantages of High Level Language:

- (i) It becomes difficult to make a program in these languages related to some specific problems.

(ii) it takes a long time to run a program in these languages.

Q. 4. (b) What is the function of a Loader and a linker? How they are different from each other?

Ans. Loader's and Linkers : Loaders and linkers is important part of any translator (assembler and compiler).



Loader: Loader is an operating system utility that copies programs from a storage device to main memory where they can be executed. In addition to copying a program into main memory, the loader can also replace virtual addresses with physical addresses.

Most loaders are transparent i.e.. you cannot directly execute them, but the operating system uses them when necessary.

Types of Loaders and Their Function:

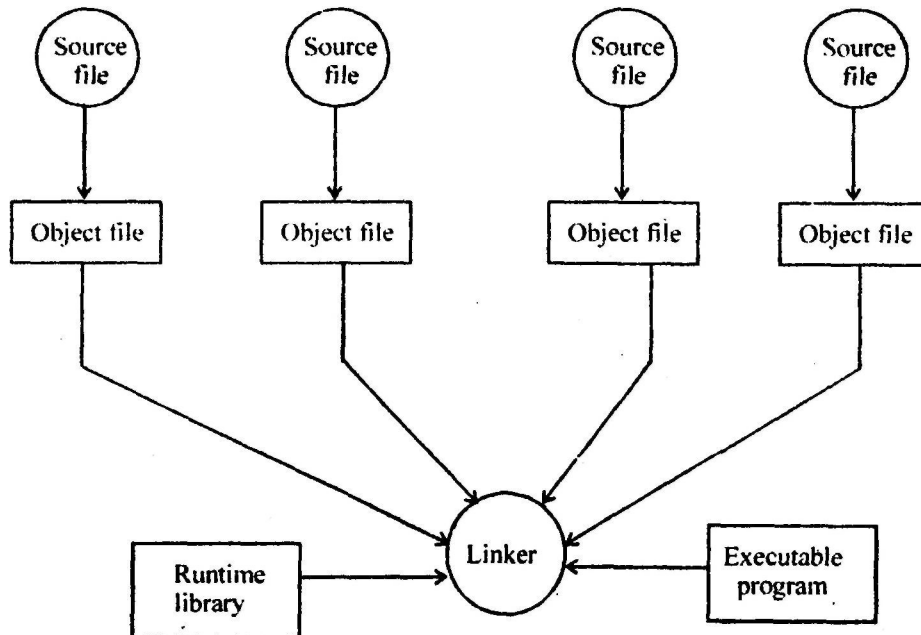
(i) **Absolute Loader:** Absolute loader is a primitive type of loader which does only the loading function.

It loads the object program from translation time address and simply transfers control to it. It does not perform linking and program relocation.

(ii) **Bootstrap Loader:** When the computer is turned on this loader is executed. This loader is responsible for loading the operating system and transferring control to it. The bootstrap loader is present in the ROM area of main memory.

(iii) **Relocatable Loader:** This loader is responsible for relocation and loading.

Linker :



A linker is a program that combines object modules to form an executable program. Many programming

language allow you to write different pieces of code, called modules, separately. This simplifies the programming task because you can break a large program into small, more manageable pieces. Eventually, though, you need to put all the modules together. This is job of the linker.

Linking is the process of combining various pieces of code and data together to form a single executable that can be loaded in memory. Linking can be done at compile time, at load time and also at run time.

Types of Linker and Their Function:

(i) **Linking Loader:** The linking loader performs all the linking and relocation operations and loads the linked program directly into the main memory for, execution.

(ii) **Linkage Editor:** A linkage editor produces a linked version of the program called as a load module or an executable image. This load module is written onto a file or library for later execution.

(iii) **Dynamic Linker:** This scheme postpones the linking function until execution time. Any subroutine is loaded and linked to the rest of the program when it is first called. This type of linking is called dynamic linking.

Linkers vs Loaders : Linkers and loaders perform various related but conceptually different tasks:

(i) **Program Loading:** This refers to copying a program image from hard disk to the main memory in order to put the program in a ready-to-run state. In some cases program loading also might involve allocating storage space or mapping virtual address to disk pages.

(ii) **Relocation :** Compilers and assemblers generate the object code for each input module with a starting address of zero. Relocation is the process of assigning load addresses to different parts of the program by moving all sections of the same type into one section. The code and data section also are adjusted so they point to the correct runtime addresses.

(iii) **Symbol Resolution:** A program is made up of multiple subprograms: reference of one subprogram to another is made through symbols. A linker's job is to resolve the reference by finding the symbol's location and patching the caller's object code.

So a considerable overlap exists between the functions of linkers and loaders. One way to think of them is : the loader does the program loading; the linker does the symbol resolution; and either of them can do the relocation.

Q. 5. (a) What are different issues related with Network Security? Briefly discuss some.

Ans. Different issues related with Network Security are as follows :

(i) **Authentication :** Process of verifying identity of a user.

(ii) **Integrity :** Data that arrives is the same as that sent.

(iii) **Confidentiality :** Sensitive information should not be visible to eavesdropper use encryption.

(iv) **Non-Repudiation :** Assurance that any transaction that takes place (on subsequently, be proved to have taken place.

(v) **Authorization :** Assigning access rights to users.

(i) **Authentication :** Authentication is a method designed to allow a web browser or other clients, to provide credentials-in the form of a user and password-when making a request.

This mechanism help establish proof of identities. The authentication process ensures that the origin of a electronic message or document is correctly identified.

Fabrication is a type of attack which is possible in absence of proper authentication mechanism.

(ii) **Integrity :** When the content of a message changed after the sender sends it, but before reaches the intended recipient, we say integrity of the message is lost.

Modification is a type of attack which causes loss of missing integrity.

(iii) Confidentiality : The principal of confidentiality specifies that only the sender and the intended recipient should be able to access to content of a message. Confidentiality get compromised if an unauthorized person is able to access a message.

Interception is a type of attack causes loss of message confidentiality.

(iv) Non-Repudiation: There are situations where a user sends a message and later in refuses that he/she had sent that message. The principal of non-repudiation defeats possibilities of denying something, having done.

Non-repudiation does not allow the sender of a message to refers the claim of not sending that message,

(v) Authorization : The principal of authorization determines who should be able to access what. For instance, we should be able to specify that user A can view the records in a database, but cannot update them. Authorization specifies and controls who can access what.

Ethical & Legal Issues : The ethical issues in society system are classified into following four categories:

(i) Privacy : This deal with the right of an individual to control personal information.

(ii) Accuracy : This talk about the responsibility for the authenticity, and accuracy of information,

(iii) Property : Here we find out the owner of information. We also talk about who controls access.

(iv) Accessibility : This deal with the issue of the type of information an organization has the right to collect. And in that situation, it also expects to know the measures which will safe-guard against any unforeseen eventualities.

When dealing with legal issues, we need to remember that there is a hierarchy of regulatory bodies that govern the legality of information security. We can classified them as follows :

(i) International: e.g., International Cybercrime Treaty,

(ii) Federal: e.g., FERPA, GLB, HIPA A, Teach Act etc.

(iii) State: e.g., UCITA, SB 1386 etc.

(iv) Organization: e.g.. computer use policy.

Q. 5. (b) How internet can be useful for society? What are the drawbacks of net addiction.

Ans. Internet is very useful for the society. Firstly about internet what it is? Internet is one of the most powerful tools throughout the world. The Internet is a collection of various services and resources. The Internet's main components are E-mail and world wide web.

(i) The most common thing the Internet is used for is research. Children and students are among the top people who use the Internet for research. Today, it is almost required that students use the Internet for research. The Internet has become one of the biggest sources for research, websites have become available for people to research diseases and talk to doctors online at sites such as America's Doctor,

(ii) Entertainment is another popular reason why many people surf the Internet. Downloading games, going into chatrooms, or just surfing the web. There are numerous games that may be downloaded from the Internet at no charge. When people surf the web. there are numerous things that can be found. Music, hobbies, news and more can be found on the Internet,

(iii) Another popular thing to do on the Internet is to check out news. Almost all local news can be obtained through the Internet. Upto date sports scores are probably the most popular looped at news. Sports scores are updated on the Internet as soon as the game ends weather is also a popular source to look up on the Internet. Using the Internet to get the weather allows people to view

weather all over world.

- (iv) Shopping online has also become a huge success and is considered a great advantages of the internet. No matter what people are shopping for, it can be found on the Internet. People do not even have to leave their homes. Just are click of the mouse on the items they want to purchase and the items are delivered to their front door.
- (v) Internet has facilitated communication and made it faster by many time through emails and instant messages. It has helped do make our business dealing faster as a result,
- (vi) Internet is cheaper, postal mails and couriers cost something to be delivered whereas emails are free,
- (vii) Internet has also become a means of socializing. You can meet new people through chat rooms and many communities (like output) who have similar interest with you.
- (viii) You can pay bills online.

Internet Addiction : It means Internet overuse, problematic computer use or pathological computer use. is excessive. Computer use that interferes with daily life.

Drawbacks:

Signs and Symptoms of Internet Addiction:

- (i) Increasing amounts of time spent on computer and Internet activities.
- (ii) Failed attempts to control behaviour.
- (iii) Heightened sense of Euphoria while involved in computer and Internet activities.
- (iv) Craving more times on the computer and Internet.
- (v) Neglecting friends and family.
- (vi) Feeling restless when not engaged in the activity.
- (vii) Being dishonest with others.
- (viii) Computer use interfering with job/school performance.
- (ix) Feeling guilty, ashamed, anxious or depressed as a result of behaviour.
- (x) Change in sleep patterns.
- (xi) Physical changes such as weight gain or loss, backaches, headaches, carpal tunnel syndrome.
- (xii) Withdrawing from other pleasurable activities. •

Section-C

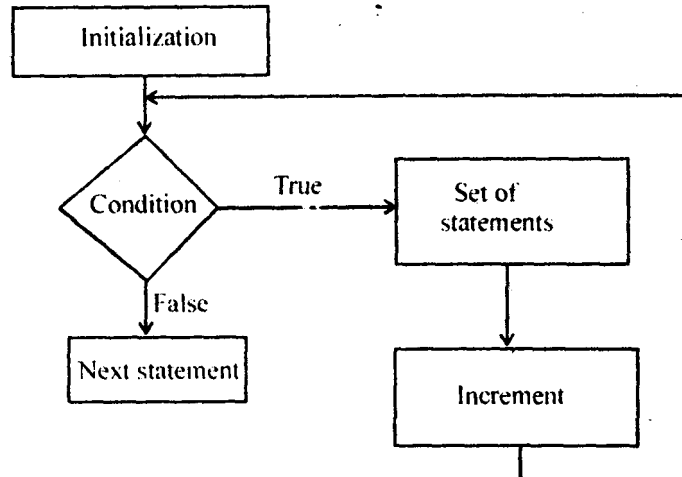
Q. 6. Explain with syntax and proper mechanisms provided for loops in C.

Ans. Loop Statements : The loop statement allows a set of instructions to be performed repeatedly until a certain condition is fulfilled. The loop statements are essential to construct systematic block styled programming. In C there are various ways one may define the control structure using the different type of loop operations. C gives you a choice of three types of loop, while, do while and for.

- (i) The While Loop keeps repeating an action until an associated test return false. This is useful where the programmer does not know in advance how many times the loop will be traversed.
- (ii) The DOWHILE loop is similar, but the test occurs after the loop body is executed. This ensures that the loop body is run at least one.
- (iii) The for loop is frequently used, usually where the loop will be traversal a fixed number of time. It is very flexible and noice programmers should take care not to abuse the power it offers.
- (i) For Loop: The for loop is the simplest and most commonly used loop in C. This loop consists of three expression. The first expression is used to initialize the index value, the second is used to check whether or not

the loop is to be continued again and the third to change the index value for further alteration. The syntax of the for loop is,

```
for (expression 1; expression 2; expression 3)
body_of_the_loop;
```



Flow chart of for loop

e.g., Sample program using **a** for statement.

```
# include <stdio.h>
# include <conio.h>
main ()
{
    int num;
    for(num= 1;num<= 10; num = num+1 )
    printf ("%d", num);
    return 0;
}
```

Output: 123456789 10

nested For : The nested for loop is related to placing of one for loop inside the other for loop. This operation is frequently used in C in various programs which helps- in solving the complicated problems.

A program segment sharing the for loop within one more for loop is shown below :

```
for(i = 0;i<=10;i++)
{
    forO = 0;j<=10;j++)
    {
        statement;
    }
}
```

To understand how nested loops work; look at the program given below :

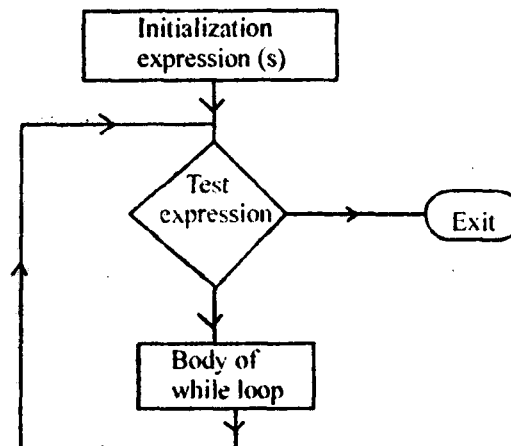
```
main()
{
    int i, j, sum;
    for (i = 1; j <= 3; i++)    /* outer loop */
    for (j = 1; j <= 2; j++)    /* inner loop */
    {
        sum = i + j;
        printf("i = %d j = %d sum = %d \n", i, j, sum);
    }
}
```

(ii) **While Loop:** The second loop available in C is the while loop. The while loop is used when we are not certain that the loop will be executed. After checking whether the initial condition is true or false and finding it to be true, only then the while loop will enter into the loop operations. The general form of the while loop is:

For single statement:

```
While (expression)
    body of the loop;
For block of statements :
While (condition)
{
    Statement 1;
    Statement 2;
}
```

The control will enter the loop only when condition is satisfied. Therefore while loop is also called an entry controlled loop. In a while loop, a loop control variable expression. The loop variables should be updated inside the body of the while.



Flow chart showing use of while loop

e.&, Program to find sum and average of ten different numbers using WHILE Loop.

```

void main()
{
    int n, i, sum = 0, avg;
    clrscr();
    printf ("Enter Any Ten Numbers :");
    i = 0;
    while(i <= 9)
    {
        scanf("%d",&n);
        sum = sum + n;
        ++ i;
    }
    printf ("The sum of the Entered numbers is : %d\n", sum);
    avg = sum/10;
    printf Average of the entered numbers is : %d", avg);
    getch();
}

```

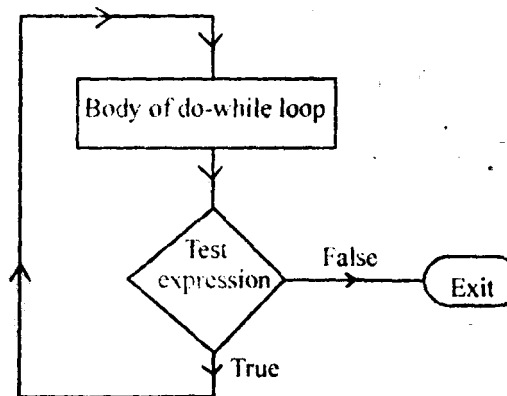
(iii) The Do-While loop is another repetitive loop used in C programs. Whenever one is certain about a test condition, then the do-while loop can be used, as it enters into the loop at least once and then checks whether the given condition is true or false. As long as the test condition is true, the loop operations or the statements will be repeated again and again. Here also three expression 2 to change the index value and the expression 3 to check whether or not the loop is to be repeated again. The general syntax of the do-while loop is:

```

do
{
    statement 1;
    statement 2,
}
while (expression);

```

The do-while loop is also called as Exit control loop.



Flow chart showing the use of do-while loop.

e.g., Program to find sum and average of ten different numbers using DO-WHILE loop

```
void main()
{
    int n, i, sum = 0, avg;
    clrscr();
    printf ("Enter any ten 'Numbers'");
    i = 0
    do
    {
        scanf ("%d", &n);
        sum = sum + n;
        ++ i;
    }
    while(i<=9);
    printf ("The sum of the entered numbers is : %d\n", sum);
    avg = sum/10;
    printf ("Average of the entered number is: %d", avg);
    getch();
}
```

Q. 7. WAP in C to accept the following information of 50 students.

Name (First, Middle, Last)'

Age

Roll No.

Date of Birth (DD-MM-YY) and display this information on screen under proper headings.

```
Ans.    #include <stdio.h>
        #include <conio.h>
        struct student
        {
            struct name
            {
                char first name [20];
                char middle name [20];
                char lastname [20];
            } Name;
            float age;
            int roll no.;
            struct date
            {
                int dd;
```



```

        int mm;
        int yy;
    }date of_Birth;
}
main()
{
    clrscr();
    int i;
    struct student students [50];
    printf ("Type in information of 50 students \n"),
    for(i = 0;i<50;i++)
    {
        printf ("Enter the name of student:");
        scanf("%c%c%c%c", &students [i].SStudent.Firstname, & students[i]
Student.middlename,& students[i], student, last name);
        printf ("Enter the age of student");
        scanf("%f", &students [i].age);
        printf ("Enter Roll no. of student:); \
        scanf ("%d", & students[i]. roll no);
        printf ("Enter Date of Birth of student:");
        scanf ("%d%d%d", &students [i], Sdate.dd, &students].S. d a t e. m m.
&students[i], Sdate.yy);
    }
    printf".....\n");
    printf("Name, Age Roll No. Date of Birth");
    printf ("_____ \n");
    for(i = 0;i<50;i++)
    {
        printf ("%c%c%c%c", students [i].SStudent.firstname,
students[i].SStudents.Middlename.Students[i].SStudent.lastname);
        printf ("%f%d", students [i]. SStudent.age, students [i], SStudent.roll no);
        printf ("%d,%d, %d", students[i].SStudent. date.dd, students[i].
SStudent.date.mm., students[i]. SStudent.date.yy);
    }
    getch();
}

```

Type in Information of 50 students. \

Enter the name of student: A

Enter the age of student: 15

Enter the Roll no. or student: 0305313039

Enter Date of birth of student: 25-02-95

(i) Enter the name of student.

.....

(ii) Enter date of birth of student: 19-03-95

Name	Age	Roll No.	Date of Birth
A 15 0305313039	25	02	95

... ..

Section-D

Q. 8. (a) Using pointer WAP in C to find the desired element in an array of N elements.

Ans. WAP in C to find the desired element in an array of N elements.

```
#include <stdio.h>
#include <conio.h>
void main()
{
    int i, n, element [100], data, POS;
    clrscr();
    printf ("\n Please enter how many elements do you :");
    scanf ("%d", & n);
    for(i= 1; i<n;i++)
    {
        printf ("\n Enter %d element:", i);
        scanf ("%d", &element[i]);
    }
    printf ("\n Enter a elements to be searched:");
    scanf ("%d", & data);
    i = 1, POS=0;
    while ((i<n) || (POS==0))
    {
        if (data == element [i])
        {
            POS = i;
            printf ("\n The data %d is found in the record at position %d:",
            data, POS);
            i = i+j;
```

```

        continue;
    }
    else
        i = i+j;
    if(i == n)
        break;
}
if(POS ==0)
    printf ("\n The data %d is not found in the record :", data);
    getch ();
}

```

Q. 8. (b) What are the disadvantages of pointer variables.

Ans. Pointer: A pointer is a variable which contains the address of another variable. It can be defined as a pointer to any variable type.

The syntax for declare a pointer to a variable is

```
int * pointer;
```

A pointer must be associated with a particular type. One can't assign the address of a short int to a long int.

A pointer to any variable type is an address in memory.

Pointers are used frequently in C, as they offer a number of benefits to the programmers. They include:

- (i) Pointers are more efficient in handling arrays and data tables.
- (ii) Pointers can be used to return-multiple values from a function via function arguments.
- (iii) Pointers permit references to functions and thereby facilitating passing of functions as arguments to other functions.
- (iv) Pointers provide an efficient tool for manipulating dynamic data structures such as structures, linked list, queues, stacks and trees.
- (v) They increase the execution speed and thus reduce the program execution time,
- (vi) Pointers allow C to support dynamic memory management.

There are also some disadvantages of pointer which are as follows :

- (i) If sufficient memory is not available during runtime for the storage of pointers, the program may crash (least possible).
- (ii) If the programmer is not careful and consistent with the use of pointers, the program may crash very possible.
- (iii) The drawback of pointer in C that if used carelessly, you can access and overwrite some critical memory.

For Example: If you declare an array of 5 int, arr (5) and if try to write an arr [S], you will end up writing outside the array and eventually corrupt some memory location. So data security is lost while handling pointers.

- (iv) The final code must read the variable's pointer from memory, then read the variable from the pointed to memory. This is slower than reading the value directly from memory.

- (v) When we are using pointers the main disadvantage is that hacker, can easily to identified address of the source code and change source code.
- (vi) Distributing of database is difficult when it is in the server.
- (vii) If we cannot handle properly with pointer. Here is a chance of occurring dangling pointers & memory leak.
- (viii) It is difficult to write codes in this.
- (ix) Pointers are not managed-so if you dynamically allocate some space, store the address in a pointer and later someone frees that memory, the pointer will continue to have the (now invalid) address as its value. If you use the address you might cause all sorts of havoc.

Q. 9. (a) What are the typical error situation which can occur while dealing with files in C.

Ans. The typical error situation which can occur while dealing with files in C are:

- (i) Trying to read beyond the end-of-file mark.
- (ii) Device overflow.
- (iii) Trying to use a file that has not been opened.
- (iv) Trying to perform an operation on a file, when the file is opened for another type of operation.
- (v) Opening a file with an invalid filename.
- (vi) Attempting to write to a write-protected file.

If we fail to check such read and write errors, a program may behave abnormally when an error occurs.

The feof function can be used to test for an end of file condition. It takes a FILE pointer as its only argument and returns a non-zero integer value if all of the data from specified file has been read and return zero otherwise. If fp is a pointer to file that has just been opened for reading, then the statement.

```
if(feof(fp))
    printf("End of data.\n");
```

would display the message "End of data", on reaching the end of file condition.

would print the error message, if the reading is not successful.

We know that whenever a file is opened using fopen function, a file pointer is returned. If the file cannot be opened for some reason, the function returns a NULL pointer. This facility can be used to test whether a file has been opened or not.

Example:

```
if(fp==NULL)
    printf("File could not be opened.\n");
```

Q. 9. (b) Write a code to open a file in binary write and read mode.

```
Ans.      #include <stdio.h>
          #include <conio.h>
          main()
          «
            int alpha, i;
            FILE*fp;
            fp = fopen ("SS.doc", "wb");
            if(fp== NULL)
                printf ("could not open file\n");
            else
            {
                for(i = 0;i<=99;i++)
                    fprintf(fp,"%d",i);
                fclose(fp);
                /* now read the contents */
                fp = fopen ("SS.doc", "rb");
                for(i = 0;i<100;i++)
                {
                    fscanf (fp, "%d", & alpha);
                    printf ("%d", alpha);
                }
                fclose (ftp);
            }
        }
```

Result:

0 1 2 3 4 9 7 9 8 9 9