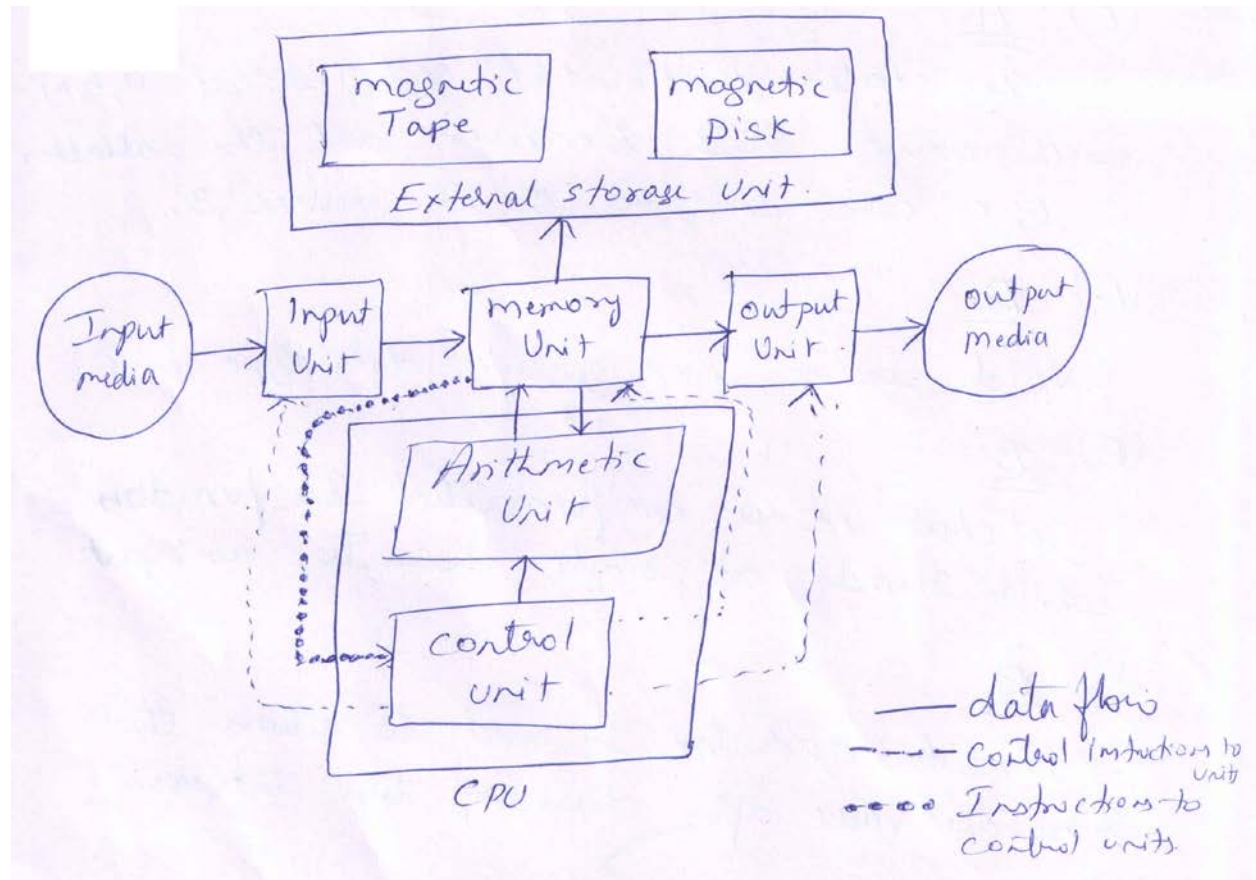


Q.2 a. Explain the structure of a computer system.

(8)

Answer:



A computer system comprises of hardware and software components, while the set of instructions known as programs constitute the computer software, the computer hardware comprises of the physical devices attached to the computer system.

Hardware: The hardware units of a computer system are the devices that are responsible for entering, storing and processing the given data, and then displaying the output to the users. The basic hardware units of a general purpose computer are keyboard, mouse, memory, CPU, monitor, & printer. CPU is the main component inside a computer system that is responsible for performing various operations and also for managing the input and output devices.

CPU has two sub parts ALU and CU. Arithmetic Logic Unit performs the arithmetic operations such as addition and subtraction, and logic operations such as AND, OR, on the data.

Control unit on the other hand controls the activities related to input and output devices. It fetches the program instruction from the memory, decodes and executes them and then, delivers the desired output to the users.

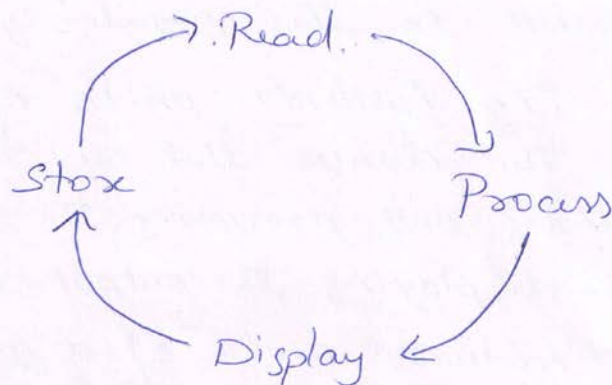
Software: It is a set of logical instructions written in a computer programming language that tells the computer how to accomplish a

particular task. Software is mainly categorized into two types, (i) System Software (ii) Application Software.

b. Write a brief note on information processing life cycle.

(8)

Answer:



The information processing life cycle comprises of four different stages, which are the following.

1. Read : In this phase, raw data is fed into the computer system through input devices, such as keyboard or mouse. The input data is passed onto the next phase in the life cycle for processing.
2. Process: - In this phase, the received input data is processed by the CPU of the computer system to generate the desired result. CPU executes program instructions for manipulating or converting the raw data elements into meaningful information. The generated results are passed onto the next phase for display.

3. Display: In this phase, the output produced by the CPU is passed on to the users through one of the output devices, such as monitor, printer or speaker. The choice of a particular output device is obviously made on the basis of the type of the processed data. Once displayed, the processed data can also be stored for future reference purpose.

4. Store :- In this phase, the processed data is stored permanently in secondary storage devices such as hard disk or CD. This prevents the user from having to process the raw data time and again, instead he can simply open the processed information stored in the storage device.

Q.3 a. Define operating system, explain different functions of operating system.(6)
Answer:

operating system, also called OS, is a system software that allows the users to interact with the hardware and other resources of a computer system.

Functions of operating system.

* Process management: - It manages the processes running in a computer system. A process is basically a program that is being currently run by a user on a computer system.

Memory management:- It manages the memory resources of a computer system including primary memory or RAM and Secondary memory like hard disk. All the programs are required to be loaded on to the main memory before their execution. It is the function of the operating system to determine how much memory should be provided to each process.

File management:- It manages the files and directories of a computer system. An OS allows us to create, modify, save, or delete files.

Device management:- This function of operating system deals with the management of peripheral devices such as printer, mouse, and keyboard attached to a computer system. It is one of the primary tasks of an operating system to manage the input/output operations performed by the end users.

Security management:- It ensures security for a computer system from various threats such as virus attacks and unauthorized access. An operating system uses various techniques such as authentication, authorization, cryptography, etc.

b. Explain the need for networks.

(4)

Answer:

need for networks.

(x) Data sharing:- There is no way for two stand alone computer systems to share data with each other in an efficient manner. networking provides the capability of sharing data among multiple users over a network.

Remote data access:- Even if we make two stand alone computers that are physically nearby to share data through the use of portable storage devices, it is quite inefficient for two remote computer systems to do the same. networking eliminates this limitation through the concept of remote data access.

Resource sharing:- Resource sharing is the process of sharing the resources such as storage devices, input/output devices, etc over a network. when the users want their documents to be printed they can simply give the print command from their computers and get their documents printed.

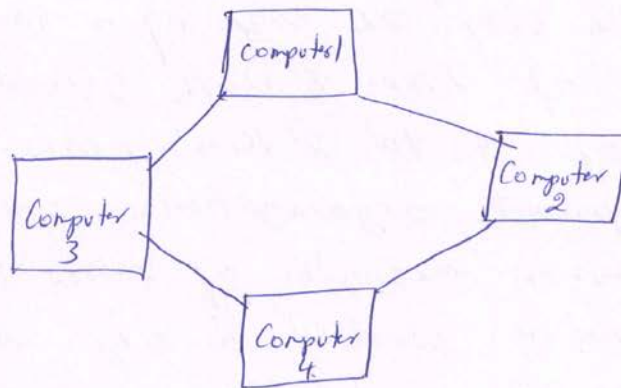
Personal Communication :- Further to data communication, instant communication is one such application area of networking that has revolutionized the way we carry out our routine business and personal tasks. Examples are electronic mail & video conferencing.

c. Write a note on (i) LAN (ii) MAN

(6)

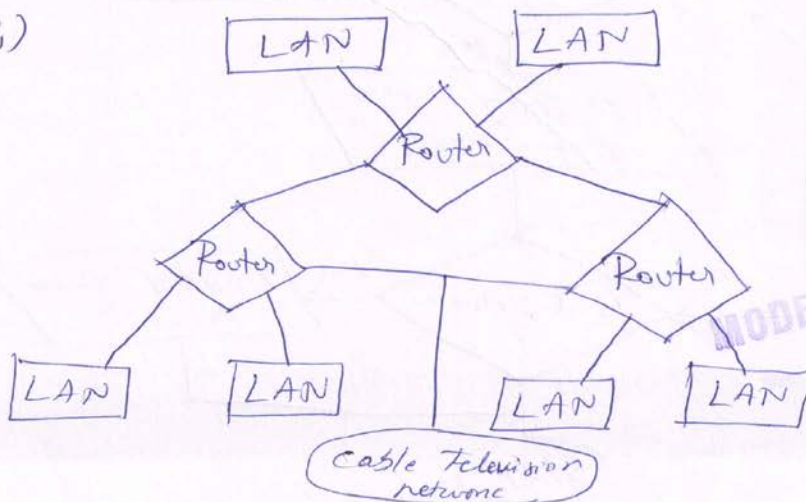
Answer:

(i) Local Area Network.



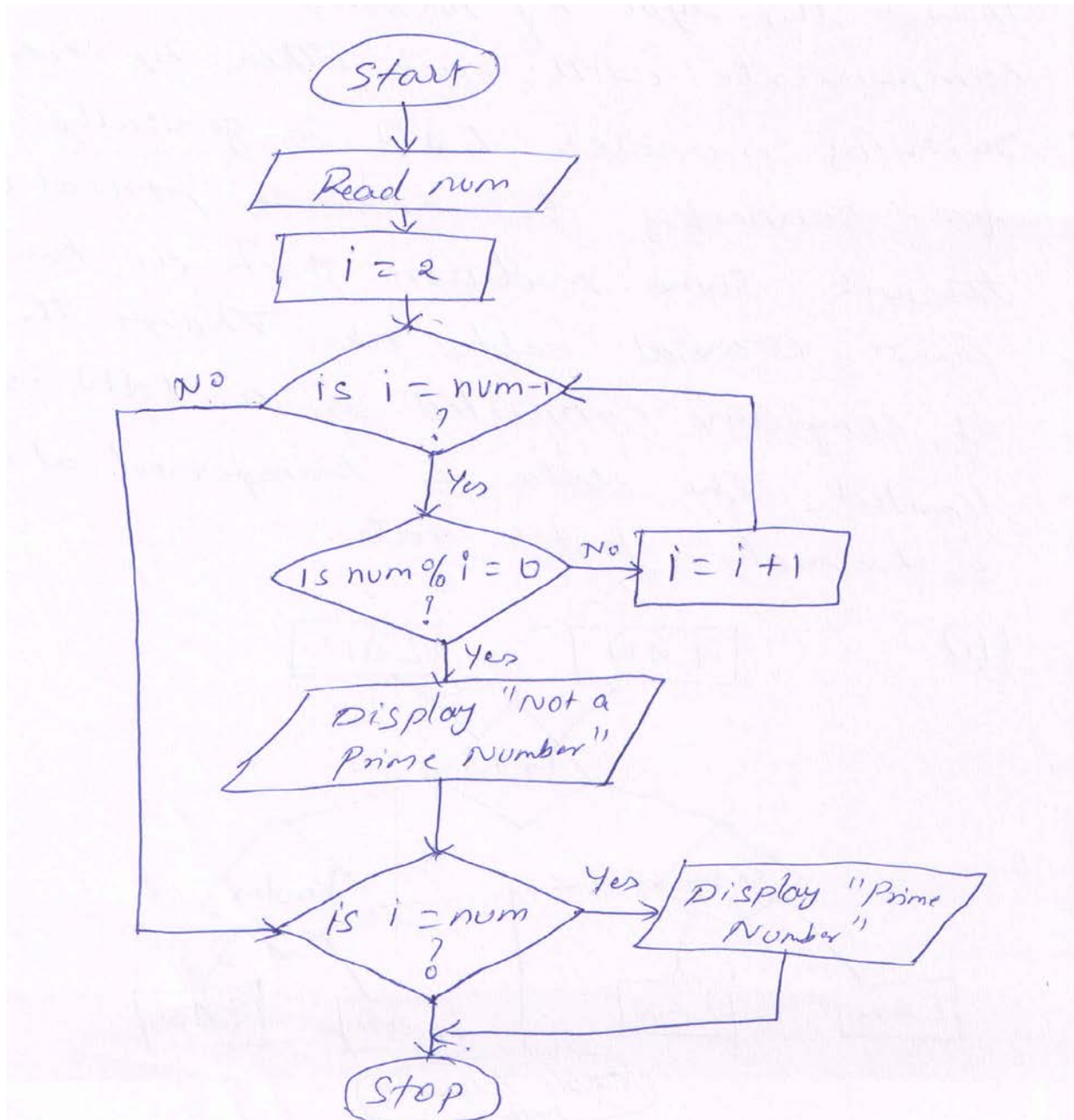
LAN is a group of computers that are connected in a small area such as building, home etc. Through this type of network, users can easily communicate with each other by sending and receiving messages. LAN is generally used for connecting two or more personal computers through some medium such as twisted pair, coaxial cable etc. Though the number of computers connected in a LAN is limited, the data is transferred at an extremely faster rate.

(ii)

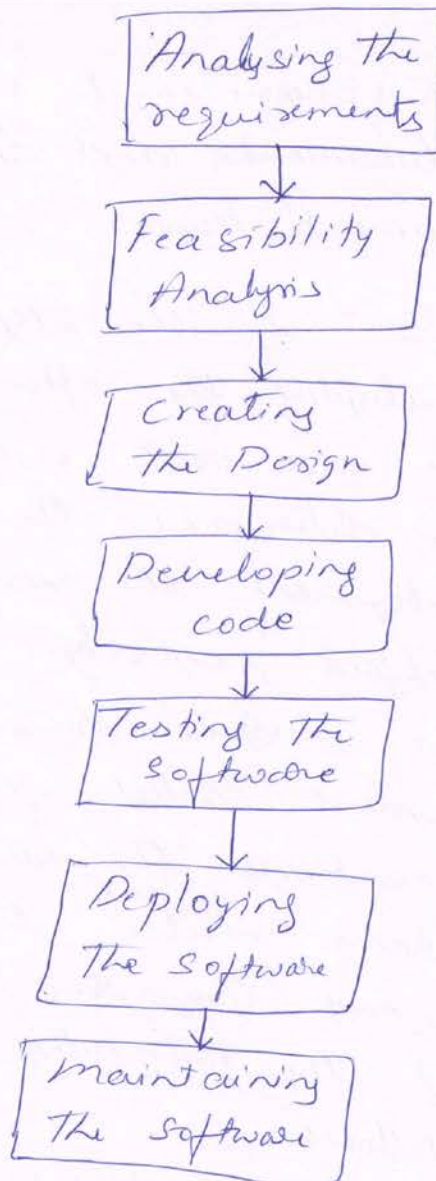


MAN is a network of computers that covers a large area like city. The size of a MAN lies between that of LAN & WAN, generally covering a distance of 5 to 50Kms. MAN is generally owned by private organizations. One of the most common examples of MAN is cable television network within a city. A network device known as router is used to connect the LANs together. The router directs the information packets to their desired destination.

Q.4 a. Draw a flow chart to find out whether a given number is prime or not. (4)
Answer:



b. With a neat block diagram explain different steps of software development. (12)
 Answer:



Analysing the Requirements: - In this step, the requirements related to the software, which is to be developed, are understood. Analysing the requirements or requirement analysis is an important step in the process of developing a software. The task of requirement analysis is typically performed by a business analyst. The person is a professional in this field.

who understands the requirements of novice end user, and documents and shares it with the development team.

Feasibility Analysis:- In this step, the feasibility of developing the software in terms of resources and cost is ascertained. In this order to determine the feasibility of software development, the existing system of user is analysed properly. The analysis done in this step involves documentation in a standard document called feasibility report, which contains the observations and recommendations related to the task of software development. Important activities performed during the feasibility analysis stage are as follows:-

- * Determining development alternatives.
- * Analysing economic feasibility.
- * Assessing technical feasibility.
- * Analysing operational feasibility.

Creating the Design:- In this step creating the architecture and design of the new software is carried out. This step involves developing a logical model or basic structure of the

of the new software. The key features which are considered while designing a software,

- * Extensibility, * modularity, * compatibility
- * Security, * Fault tolerance, * maintainability.

Developing Code: In this step, the code for the development of different modules is accomplished. The code can be written using programming languages such as C, C++, or JAVA. The choice of the programming language to be used for developing the code is made on the basis of software that is to be developed.

Testing the software: Testing is basically performed to detect the prevalence of any errors in the new software and rectify those errors.

The two important activities that are performed during testing are verification and validation. Verification is the process of checking the software based on some pre-defined specifications, while validation involves testing the product to ascertain whether it meets the user's requirements. During validation, the tester inputs different values to ascertain whether it ~~meets~~ the software is generating the right output as per the original requirements.

Deploying the software

In this step, the newly developed and fully tested software is installed in its target environment. Software documentation is handed

over to the users and some initial data are entered in the software to make it operational. The users are also given training on the software's interface and its other functions.

Maintaining the software: Once the software has been deployed successfully, a continuous support is provided to it for ensuring its full time availability. A corrupt file, a virus infection and a fatal error are some of the situations where maintenance personnel are asked to fix the software and bring it back to its normal functioning.

Q.5 a. Write a program that calculates the sum of all perfect squares between 1 and 1000. (8)

Answer:

b. Write a program in C to determine the greatest common divisor (GCD) of two numbers. (8)

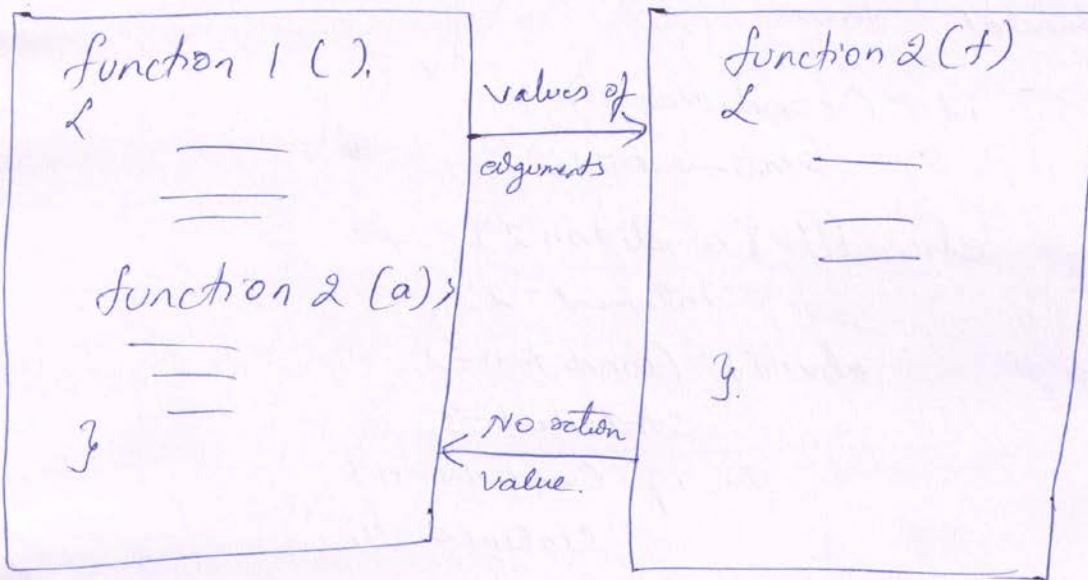
Answer:

```
#include <stdio.h>
#include <conio.h>
#include <math.h>
int GCD (int m, int n);
void main()
{
    int num1, num2;
    clrscr();
    printf("Enter the two numbers whose
           GCD is to be found;");
    scanf("%d %d", &num1, &num2);
    printf("In GCD of %d and %d is %d\n",
           num1, num2, GCD(num1, num2));
    getch();
}
int GCD (int a, int b)
{
    if (b > a)
        return GCD(b, a);
    if (b == 0)
        return a;
    else
        return GCD (b, a % b);
}
```


- Q.6 a. What are the different types of mathematical and logical operators available in C language? Explain precedence of arithmetic operators. (8)
 b. Write a program to evaluate the roots of a quadratic equation. (8)
- Q.7 a. What are the different elements of a function definition? With a suitable example explain: (10)
 (i) Functions with arguments but no return.
 (ii) Function with arguments and one return.

Answer:

(iii) Function with arguments but no return value.
 The nature of data communication between the calling function and the called function with arguments but no return value is shown below.



Example.

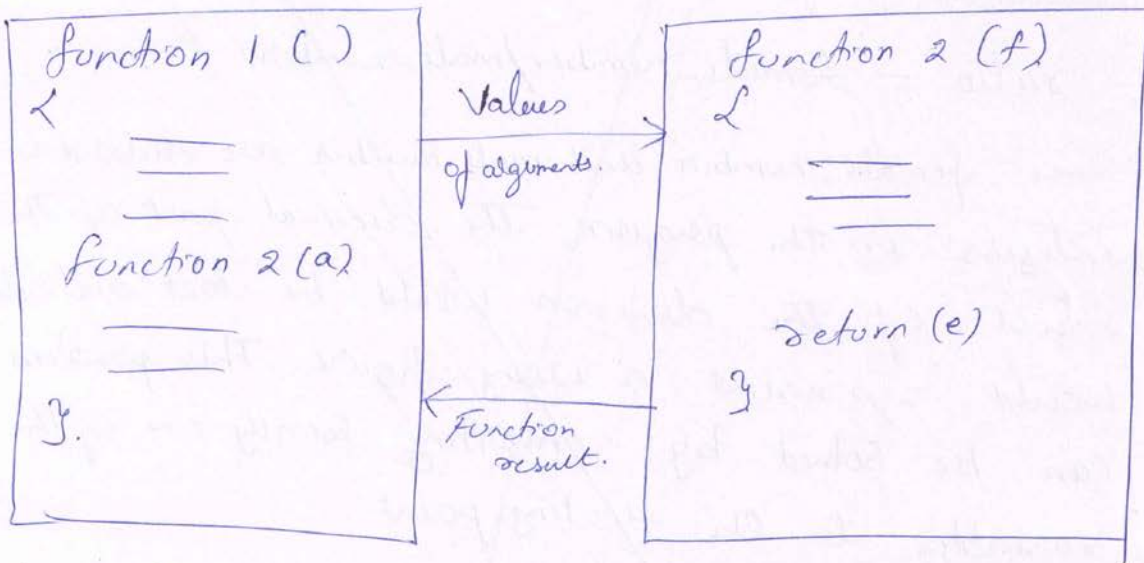
```
void add (int a, int b)
{
    int sum;
    sum = a + b;
    printf (" %d ", sum);
}
```

MODERATION-I

```
void main()
{
    int a, b;
    printf("enter the values for a, b\n");
    scanf("%d %d", &a, &b);
    add(a, b);
}
```

(ii) Function with arguments with return values.

A self-contained and independent function should behave like a "black box" that receives a predefined form of input and outputs a desired value. Such functions will have two-way data communication as shown.



Example:-

```

void Printline (char ch, int len);
Value (float, float, int);
main()
{
    float P, I, A;
    int Period;
    Printf("Enter principal amount, interest");
    Printf("rate & period \n");
    scanf("%f %f %d", &P, &I, &Period);
    A = value (P, I, Period);
    Printf("%f %f %d %f", P, I, Period, A);
}
    
```

```

float value (float p, float r, int n)
{
    int year;
    float sum;
    s = p; year = 1;
    while (year <= n)
    {
        sum = sum * (1 + r);
        year = year + 1;
    }
    return (sum);
}

```

- b. What are the three rules to pass an array to a function? Using functions write a program to calculate the average of an array of values. The array elements are read from the terminal. (6)

Answer:

- Q.8 a. With a flow chart explain the syntax of else if ladder. (6)

Answer:

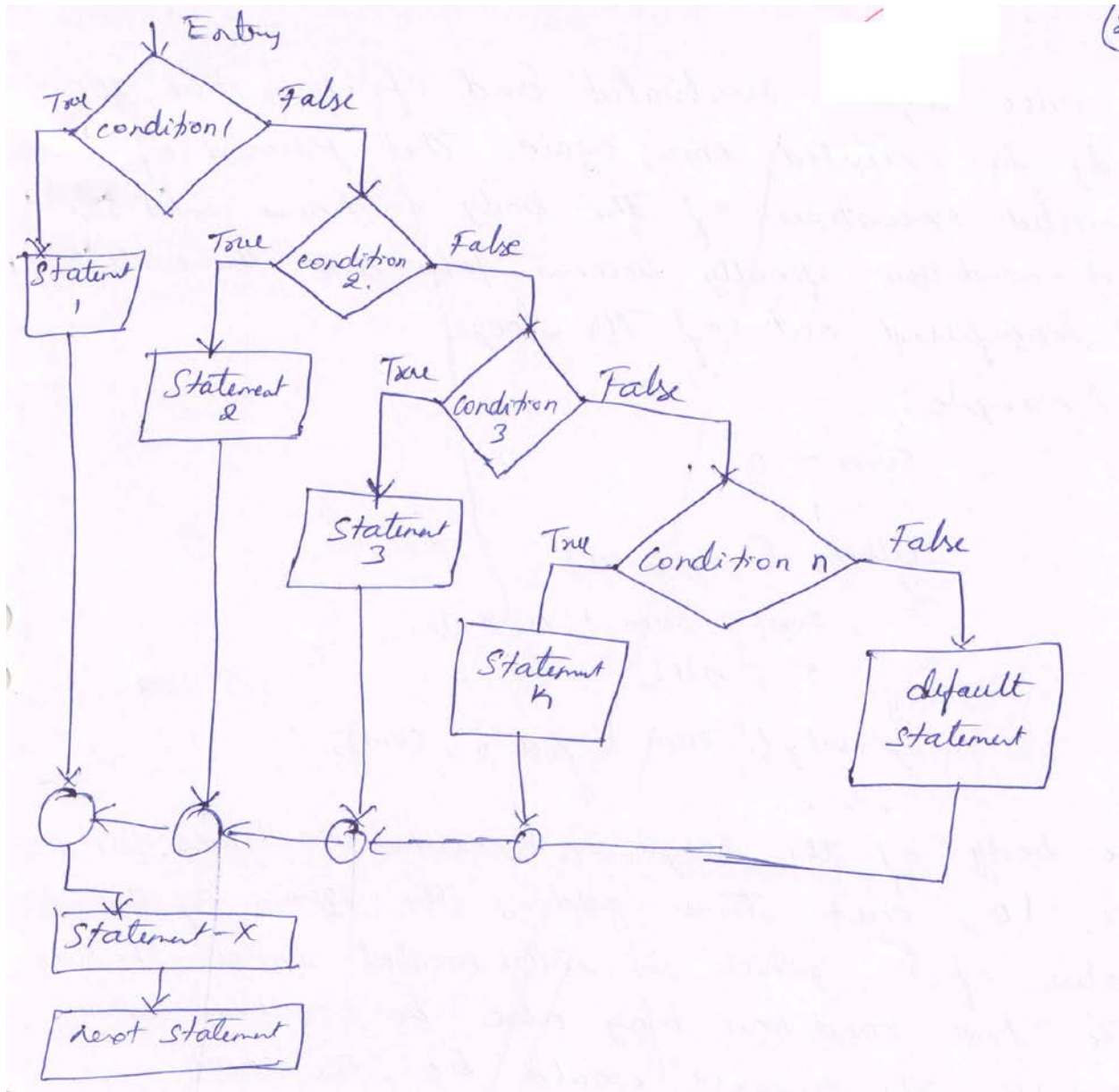
The another way of potting it's together when multiple decisions are involved. A multipath decision is a chain of it's in which the statement associated with each else is an it. It takes the following general form.

```

if (condition1)
    statement - 1;
else if (condition2)
    statement - 2;
else if (condition3)
    statement - 3;
else if (condition4)
    statement - 4;
else if (condition n)
    statement - n;
else
    default - statement;

Statement - X;

```



- b. Given are two one dimensional arrays A and B which are sorted in ascending order. Write a program to merge them into a single sorted array C that contains every item from arrays A and B, in ascending order. (10)

Answer:

- Q.9 a. The names of employees of an organization are stored in three arrays, namely First-name, Middle-name and Last-name. Write a program to concatenate the three parts into one string to be called name. (8)

Answer:

- b. Explain the following string handling functions with an example. (8)
- (i) Strcat()
 - (ii) Strcmp()
 - (iii) Strcpy()
 - (iv) Strlen()

Answer:

(i) strcat().

This function joins two strings together. It takes the following form:

strcat (string1, string2);

string1 & string2 are character arrays, when the function strcat is executed, string2 is appended to string1. It does so by removing the null character at the end of string1 and placing string2 from there. The string at string2 remains unchanged.

Ex:-

Part1 = "Vely"

Part2 = "Good"

strcat (Part1, Part2) :-

result:-

Part1 = "Vely Good"

Part2 = "Good".

(ii) strcmp ();

This function compares two strings identified by the arguments and has a value 0 if they are equal. If they are not, it has the numeric difference between the first non matching characters in the strings. It takes the form:

strcmp (string1, string2);

string1 and string2 may be string variables or string constants.

Ex:- `strcmp("their", "there");`

This comparison will return a value of -9 which is the numeric difference between ASCII "i" and ASCII "r". That is "i" minus "r" in ASCII code is -9. If the value is negative, string 1 is alphabetically above string 2.

(iii) `strcpy()`

This function works almost like string-assignment operator. It takes the form:

`strcpy(string1, string2);`

and assigns the contents of string 2 to string 1. string 2 may be a character array variable or a string constant.

Ex:- `strcpy(city, "DELHI");`

will assign the string "DELHI" to the string variable city.

(iv) `strlen()`

This function counts and returns the number of characters in a string.

It takes the form.

`n = strlen(string);`

where n is an integer variable, which receives the value of the length of the string.

The arguments may be a string constant.
The counting ends at the first null
character.

Marks distribution

2 (a). Diagram - 2M
Explanation - 6M.

(b) Diagram - 2M.
Explanation - 6M.

3 (a). Definition - 2M.
Functions - 4M.

(b). Each subdivision 1M $4 \times 1 = 4M$.

(c). (i) Diagram - 1M, Explanation 3M.

(ii) Diagram - 1M, Explanation 3M

4 (a) Flow chart - 4M.

(b) Diagram - 2M, Explanation - 10M.

(b). program - 8M.

7 (a) (i) Example - 2M Explanation - 3M.

(ii) Example - 2M Explanation - 3M.

8 (a). Syntax - 3M, Flowchart - 3M, Explanation - 2M.

9(b) Each Subdivision - 3M $3 \times 4 = 12M$

Text book

Computer Concepts and Programming in C, E. Balagurusamy, Tata McGraw – Hill, 2010