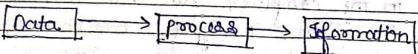


Programming for solving Problem: CKCS-1c

- Computer :- It is an electronic device that is design to accept data to perform the required mathematical operations and logical operations at high speed and output the result.

Mathematical operation $\rightarrow +, -, \times, \div$

Logical operation $\rightarrow >, <, =$

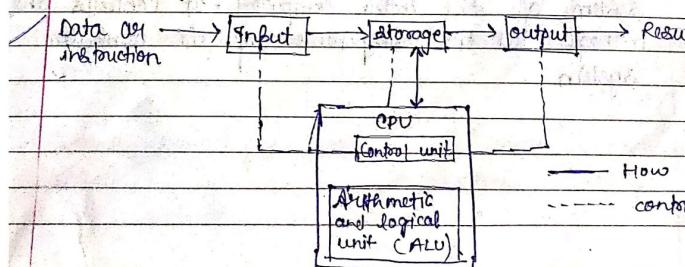


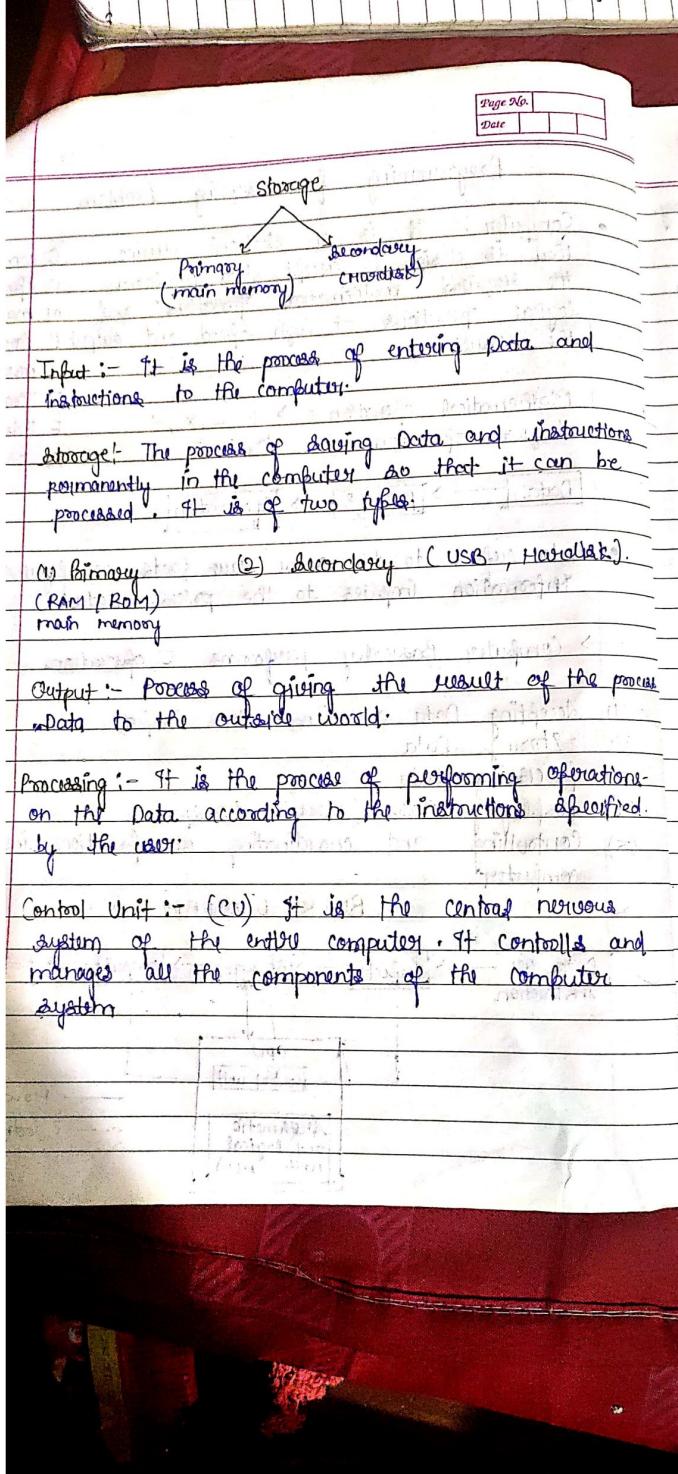
- Data refers to the some facts or figures. Information implies to the process data.

→ Computer basically performs 5 operations

- (i) Accepting Data or Instructions (Input)
- (2) Storing Data
- (3) Processing Data
- (4) Displaying Data / result / output
- (5) Controlling and coordinating all operations in computer

BLOCK DIAGRAM





Scanned with CamScanner

Scanned with CamScanner



ALU:- It performs all the kind of calculations to get the output.

→ The combination of ALU and CU is acts as the brain of the computer system.

COMPONENTS OF COMPUTER SYSTEM

There are two components.

- (1) Hardware
- (2) Software.

→ Hardware of the computer system includes Disk, memory, Processor, Input / Output devices.

→ Software Basically defines set of programs, set of instructions, set of words, set of characters (A-Z, a-z, #, @ etc).

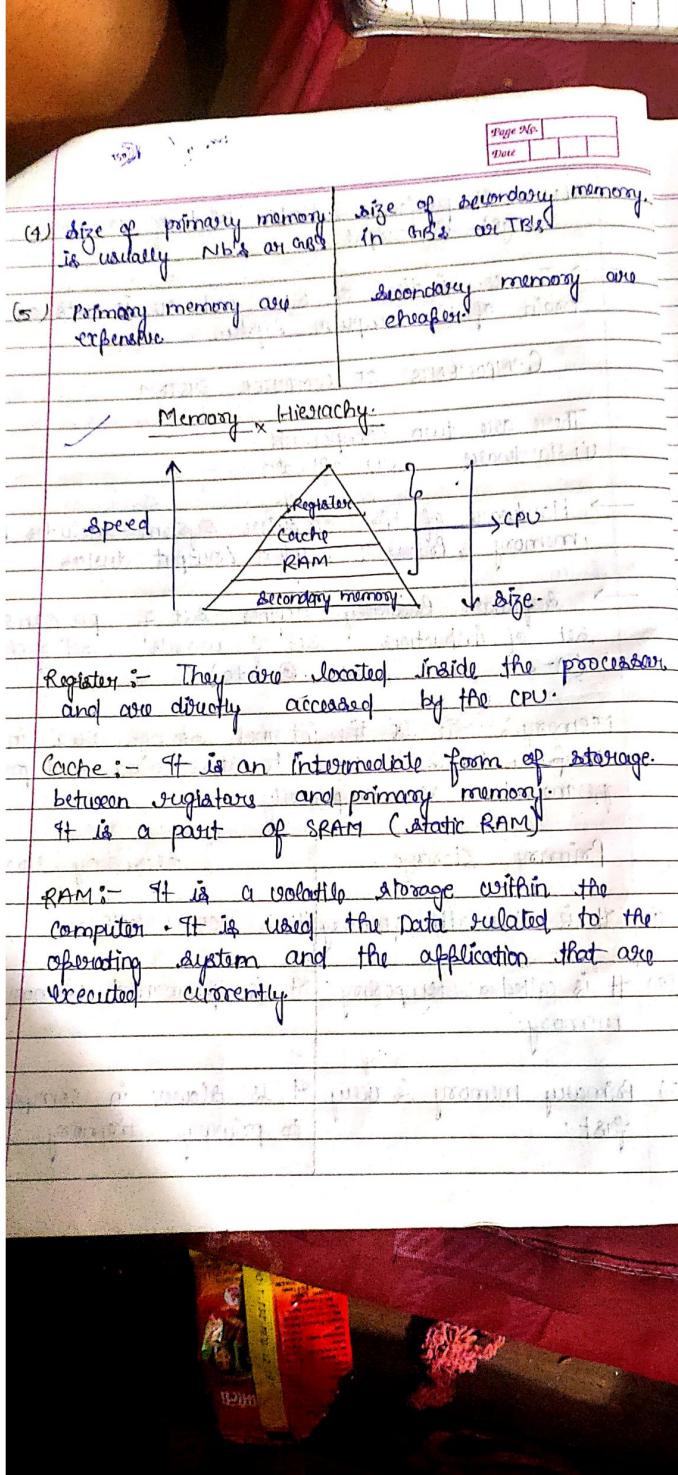
Memory:- It is the internal storage area in the computer which is used to store data and programs permanently or temporarily.

Primary Storage	Secondary Storage
(1) It is a volatile memory.	It is non-volatile.
(2) It is called as temporary memory.	It is permanent memory.
3) Primary memory is very fast.	It is slower in compared to primary memory.



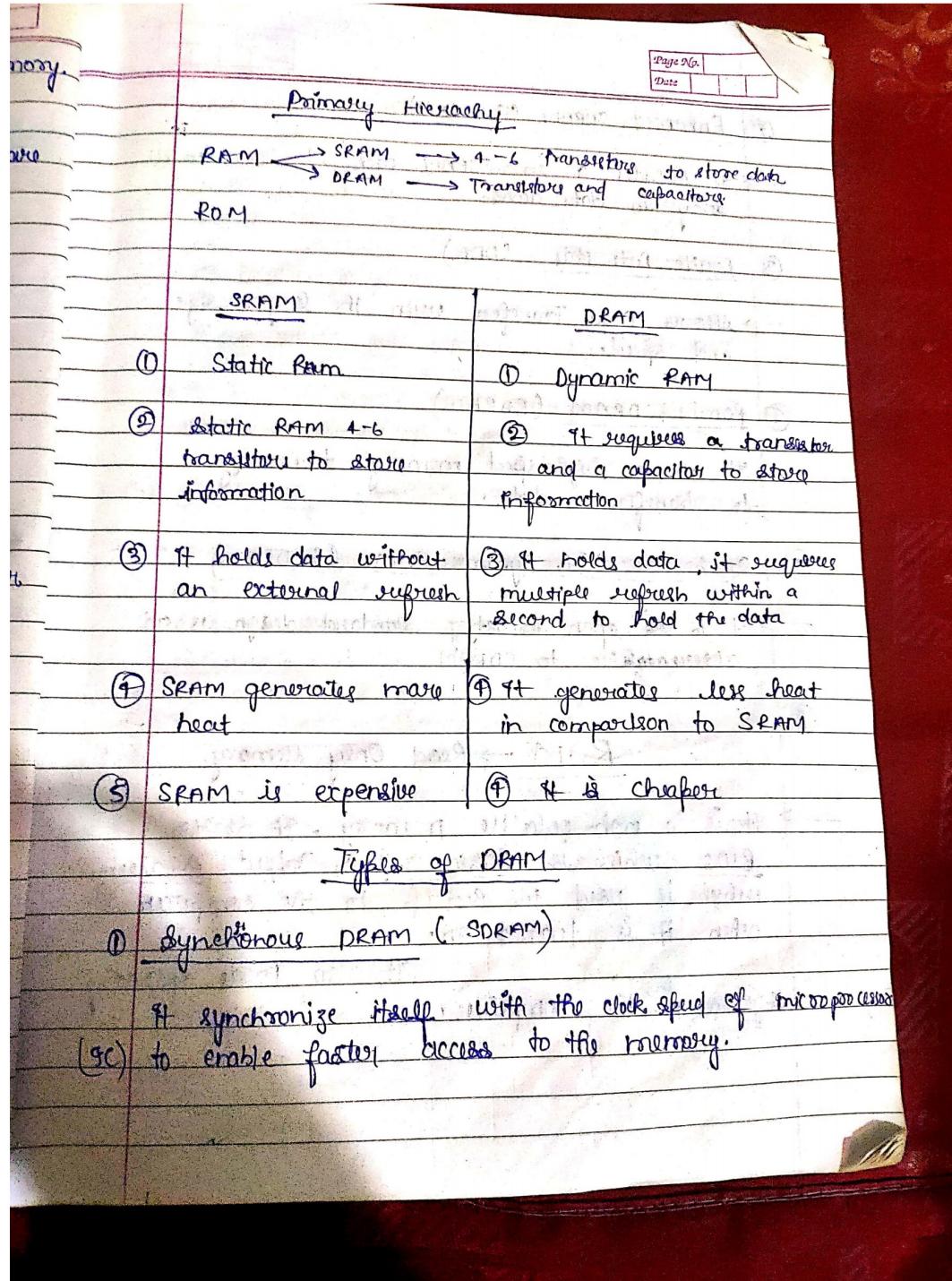
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④ Enhanced SDRAM (ESDRAM)

→ It includes a small SRAM cache to reduce delay in data access.

(1) P

⑤ Double Data Rate (DDR)

→ Allows Data Transfer with the larger size and speed.

(2) Q

⑥ Rambus DRAM (RDRAM)

→ It allows high-speed memory technology to transfer data.

(3) R

⑦ Synchronous Link Dynamic RAM (SLDRAM)

→ It is an open industry standard design as an alternative to RDRAM.

(4) S

⑧ ROM

→ Read Only Memory.

Important Information

→ It is a non-volatile memory. It stores BIOS which is Basic Input Output system which is used to boot up to the computer when it is turned on.

It also loads operating

system in the computer.

Type of ROM

(i) Programmable ROM (PROM)

→ It is known as one-time programmable ROM and can be rewritten using a special device called PROM programmer.

(2) Erasable Programmable ROM (EPROM)

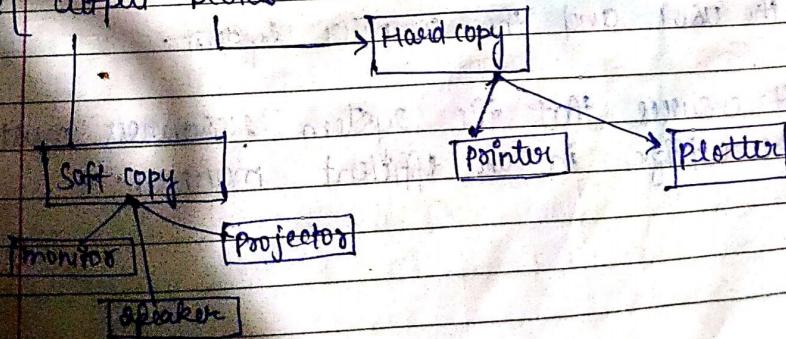
→ It can be erased and reprogram easily using strong ultra-violet rays.

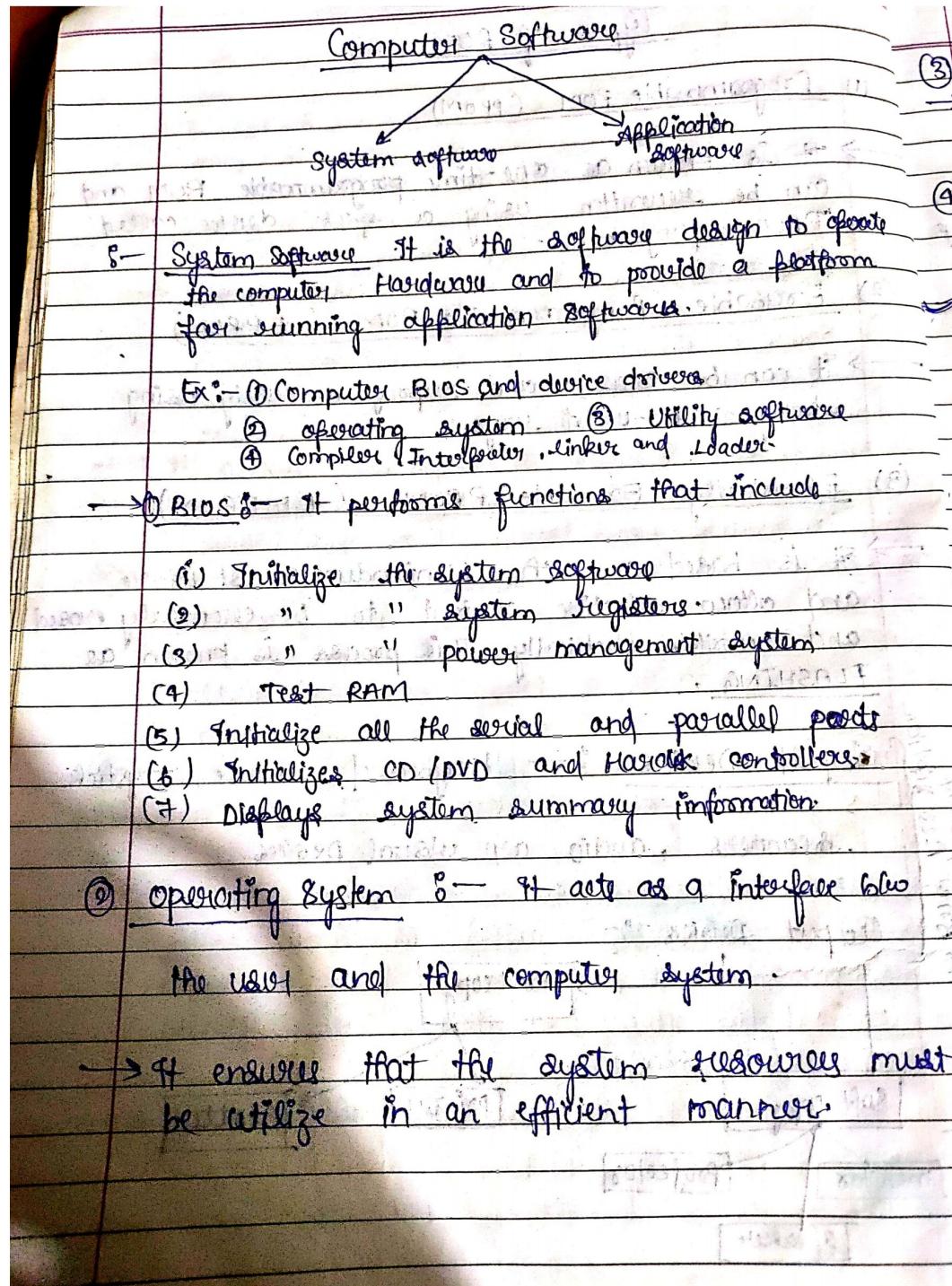
(3) Electrically Erasable PROM (EEPROM)

→ It is based on the semiconductor structure and allow selective content to be electrically erased and rewritten electrically. This process is known as FLASHING.

Input Devices :- Keyboard, mouse, joystick, scanners, audio or visual devices.

Output Device :-





Debugging: finding the location
of errors.

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Date _____

(3) UTILITY SOFTWARE

They are used to analyze, configure, optimize and maintain the computer system.

(4) Compiler, interpreter, linker and loader

Compiler and Interpreter both are used to convert source code from high level language to a lower level language.

Compiler

Interpreter

(i) Compiler scans the program and shows error as a ~~soft~~ while i.e., ~~whole~~ line by line and shows the error accordingly.

(2) It takes large amount of time to analyze the source code but overall execution ~~time~~ is the fastest.

(2) It takes the less amount of time to analyze but overall execution is slow.

(3) Compiler requires more memory because the intermediate object code is generated in it.

(3) NO object code is generated therefore it is memory efficient.

(4) Debugging is hard.

(4) Debugging is easy.

(5) C, C++ using compiler like Python, Nubi, Java

KEYBOARD :-

A standard keyboard includes alphanumeric keys, function keys, modifier keys, cursor movement keys, a spacebar, escape key, numeric keypad, and some special keys, such as Page Up, Page Down, Home, Insert, Delete and End. The alphanumeric keys include the number keys and the alphabet keys. The function keys are the keys that help perform a specific task such as switching a file or refreshing a web page. The modifier keys such as shift and control keys modify the writing style of a character or symbol. The spacebar key shifts the cursor to the right by one position.

MOUSE :-

The mouse allows the user to select elements on the screen, such as tools, icons, and buttons, by pointing and clicking them. We can also use a mouse to draw and paint on the screen of the computer system. The mouse is also known as a pointing device because it helps change the position of the pointer or cursor on the screen. The mouse consists of two buttons, a wheel at the top and a ball at the bottom of the mouse. When the ball moves, the cursor on the screen moves in the direction in which the ball rotates.

SCANNER :-

A scanner is an input device that converts documents and images as the digitized images understandable by the computer system. The digitized images can be produced as black and white images, gray images or coloured images. In case of coloured images, an image is considered as a collection of dots with each dot representing a combination of red, green, and blue colors, varying in proportion. The proportions of red, green, and blue colors assigned to a dot are together called as color description.

Following types of scanners:-

- (1) Flatbed scanner
- (2) drum scanner
- (3) slide scanner
- (4) Handheld scanner.

PROCESSOR :-

The CPU consists of control unit (CU) and ALU. CU stores the instruction set, which specifies the operations to be performed by the computer. CU transfers the data and the instructions to the ALU for an arithmetic operation. ALU performs arithmetical or logical operation on the data received. The CPU registers store the data to be processed by the CPU and the processed data. Also apart from CU and ALU, CPU seeks help from the following hardware devices to process the data. Some main are Motherboard, Bus, system clock, Microprocessor, Rom.

RAM: It refers to primary memory of a computer that stores information and programs until the computer is used. RAM is available as a chip that can be connected to the RAM slots in the mother board.

end user
comes
computer

OUTPUT DEVICES

MONITOR:-

A monitor is the most commonly used output device that produces visual displays generated by the computer. The monitor, also known as a screen, is connected as an external device using cables or connected either as a part of the CPU case. The monitor connected using cables, is connected to the video card placed on the expansion slot of the motherboard. The display device is used for visual presentation of textual and graphical information.

Printer :-

The printer is an output device that transfers the text displayed on the screen, onto paper sheets that can be used by the end user. The various types of printers used in the market are generally categorized as dot matrix printers, inkjet printers and laser printers. The printer is an output device that is used to produce a hard copy of the electronic text displayed on the screen, in the form of paper sheets that can be used by the

computer

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and user. The printer is an external device that is connected to the computer system using cables. The computer needs to convert the document that is to be printed to data that is understandable by the printer.

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Speaker :-

The speaker is an electromechanical transducer that converts an electrical signal into sound. They are attached to a computer as output devices, to provide audio output, such as warning sounds and internet audios.

- We can have built-in speakers or attached speakers in a computer to warn end users with error audio messages and alerts. The audio drivers need to be installed in the computer to produce the audio output.
- The sound card being used in the computer system decides the quality of audio that we listen using music CDs or over the Internet. The computer speakers vary widely in terms of quality and price.

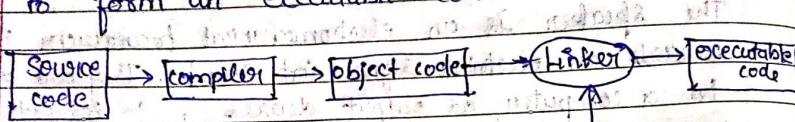
Plotter: \rightarrow printet die Konstruktion

The plotter is another commonly used output device that is connected to a computer to print large documents such as engineering or constructional drawings. Plotters use multiple ink pens or inkjets with color cartridges for printing. A computer transmits binary signals to all the print heads of the plotter. Each binary signal contains the co-ordinates of where a print head needs to be positioned for pointing. Plotters are classified on the basis of their performance.

- (1) Drum plotter (2) Flat-bed plotter (3) Inkjet plotter
(4) Electrostatic plotter

* Difference b/w compiler and Interpreter
* Linker and Loader

LINKER :- It is a program that combines objects module to form an executable code.



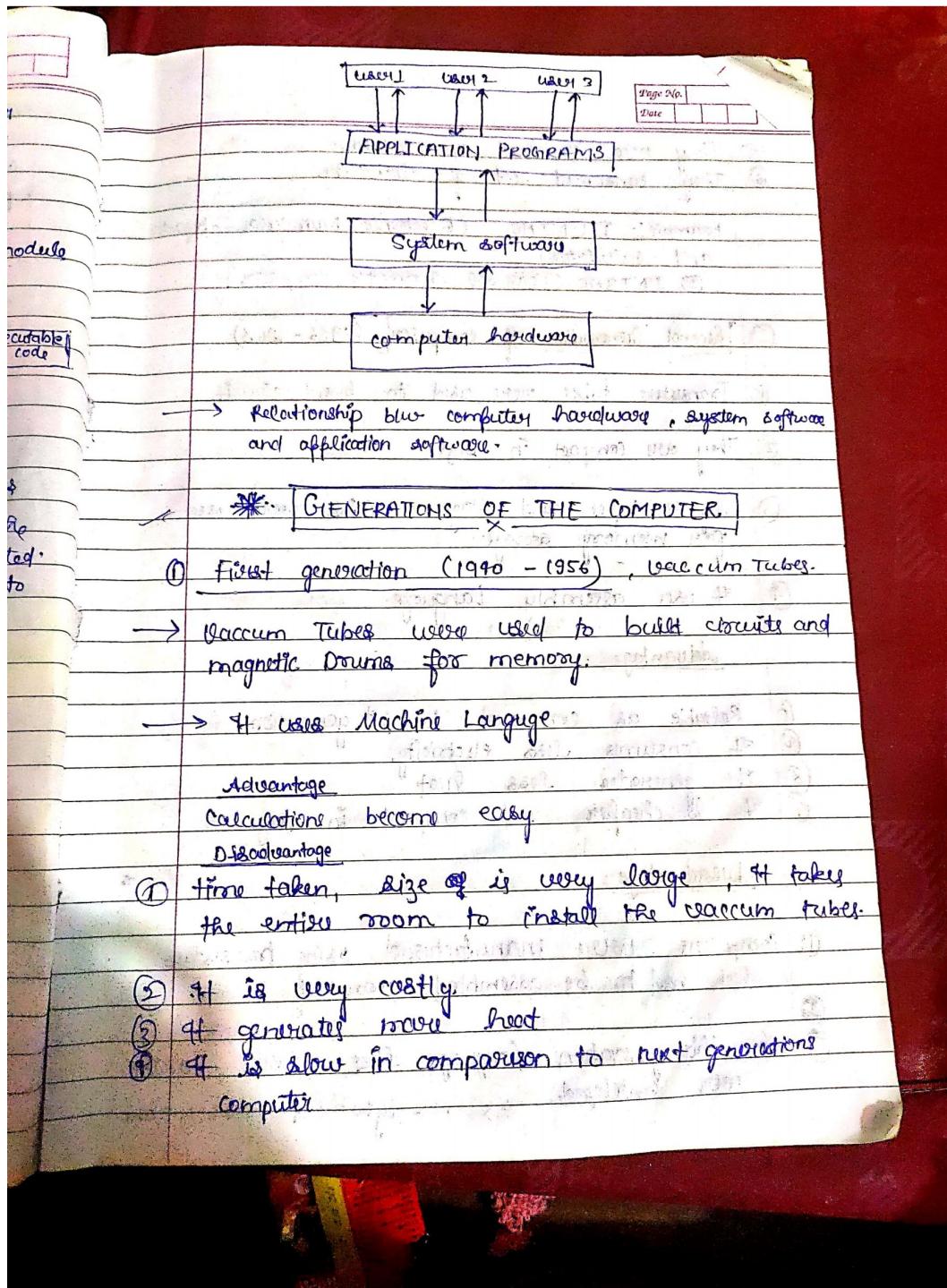
LOADER :- It is a program that copies files from memory to disk.

It is a special type of program that copies programs from memory to disk. It reads the main memory where they can be executed. It brings all the selected files of the program to the main memory.

APPLICATION SOFTWARE

It is a type of computer system or software that gives the capability of computer (system software) directly to perform user define functions.

Ex - word processor, office automation, etc.



GENERATIONS OF THE COMPUTER.

① First generation (1940 - 1956) - Vacuum Tubes.

→ Vacuum Tubes were used to build circuits and magnetic drums for memory.

→ It uses Machine Language.

Advantage

Calculations become easy.

Disadvantage

① Time taken, size of is very large, it takes the entire room to install the vacuum tubes.

② It is very costly.

③ It generates more heat.

④ It is slow in comparison to next generations

Computer

- (5) They need constant maintenance
- (6) They consumed lot of electricity.

Example:-

- (1) ENIAC (Electronic Numerical Integrator and calculator)
- (2) UNIBAC (Universal Automatic computer)

(2) [Second Generation of computer] (1956 - 1963)

- (1) Transistor tubes were used to build circuit
- (2) They are compact in size.

(3) Magnetic tapes and Magnetic Disk were used for memory storage.

- (4) It uses assembly language.

Advantage

- (1) Reliable as compared to 1st generation.
- (2) It consumes less electricity.
- (3) It generates less heat.
- (4) It is cheaper and compact in size.

Disadvantage

- (1) Computers were manufactured using transistors which had to be assembled manually.
- (2) In this generation languages like COBOL, FORTRAN were developed.
Ex - Honeywell 400, IBM 7030

(3) Third G

(1) Transistor

(2) Magnetic

(3) It genera
PASCAL

Advan:

- (1) It is
- (2) It co
- (3) It g
- (4) It is

Disco

- (1) They
- (2) They

(4) Power

(1) Micro
of

(2) Fis

to

(3) Hi

③ [Third Generation] (IC) 1963 - 1971

- ① Transistors were replaced by ICs.
- ② Magnetic cores were used for storage.
- ③ It generally uses high level languages for example PASCAL, COBOL, FORTAN.

Advantages:-

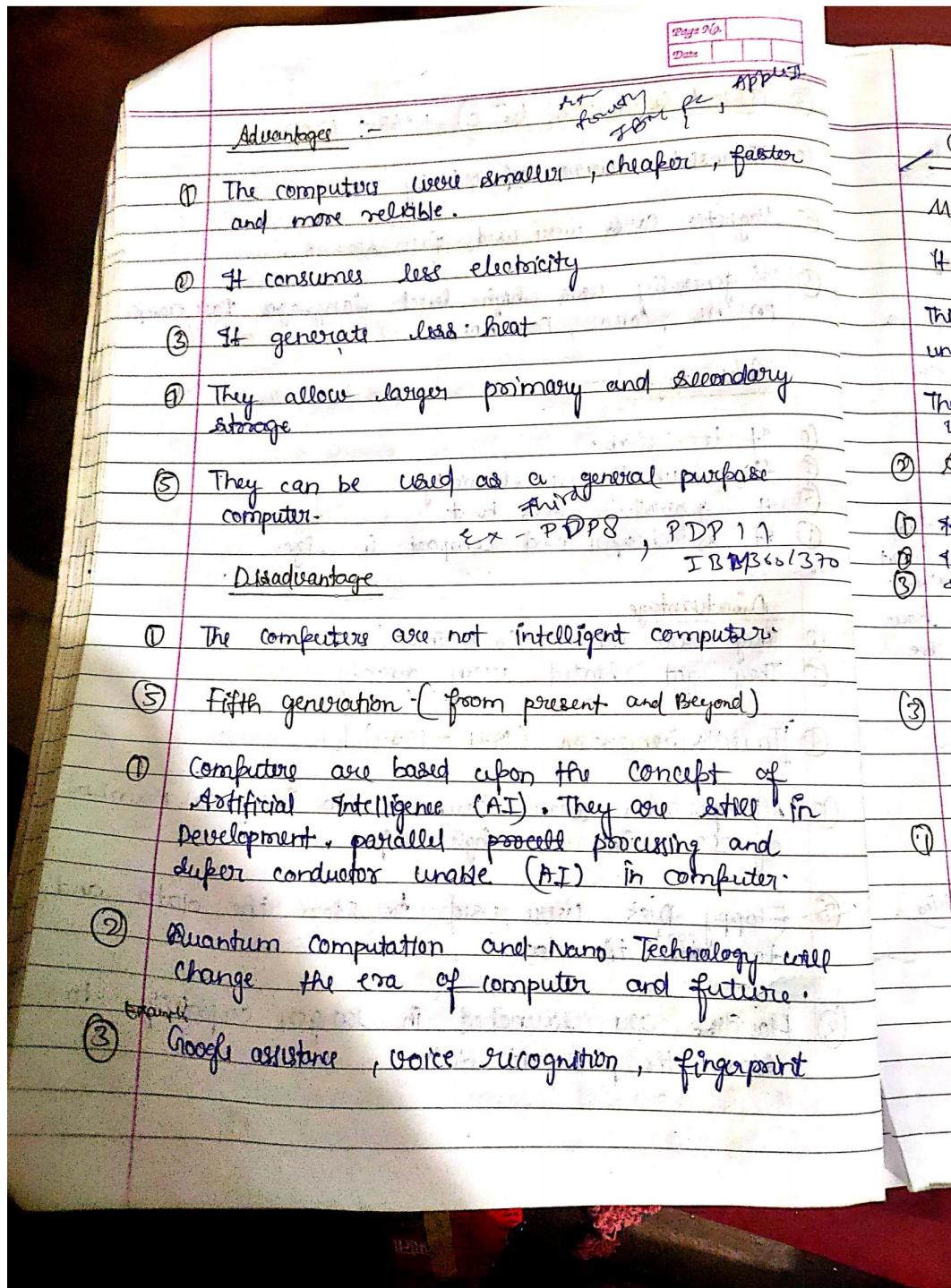
- ① It is reliable.
- ② It consumes less electricity and more power.
- ③ It generates less heat.
- ④ It is cheaper and compact in size.

Disadvantage

- ① They were difficult to maintain.
- ② They got heated very quickly.

④ [Fourth Generation] (1971 - 1989)

- ① Microprocessor were launched to integrate number of ICs into a single chip.
- ② Floppy disk were used to store the data and to port the data.
- ③ Harddisk are launched in larger capacity to store the permanent data.



Generation of Languages.

Machine Language.

It is the lowest level programming language.

This is the only language that computer can understand.

The values are expressed using 0 or 1.
It is difficult to edit and read.

(2) Assembly Language

- (1) It is the low level language.
- (2) It uses symbolic code known as (mnemonic code)
- (3) It is easy to edit and read in comparison to machine language.
e.g - `Mov A X, 4`

(3) Third generation Language

- (1) It is refinement of second generation language.
In this the program statements are not closely related to internal architecture of the computer.
Therefore referred as high level language.

NOTE:- One statement in assembly language generates one machine level language instruction
While high level language generates number of machine level language instruction.
Ex:- COBOL, FORTRAN, PASCAL, etc.

They need a translator to convert into machine language such as Compiler and interpreter

→ 4th generation (very high level languages)

→ These languages are non-procedural languages.

→ These languages are non-procedural languages like SQL used to create a Database.

Procedural

Non-Procedural

① The programmer has to tell the computer how a task is done.

① The programmer defines only what they want the computer should do without telling how the task is to be performed.

Advantages:-

If executes program fast and easy

Disadvantage:- It does not make efficient use of machine resources.

5th generation Language :- (Visual Basic)

They solve the problems using the constraints (condition) given to the program using ~~as~~ tools rather than using algorithm written by a programmer.

The programmer only needs to worry about what problems need to be solved with the given conditions or constraints without worrying about how to implement an algorithm to solve a problem.

It make use of natural languages to solve a problem.

Intelligent compilers are developed to translate natural language into machine language instruction so the computer can understand.

Ex:- Visual Basic

ALGORITHMS

∴ If is steppig step procedure to solve the problem.

Example :- Add two number

Step 1 :- Input the first number A

Step 2 :- Input the second number B

Step 3 :- Sum = A+B / Add the two number
A and b

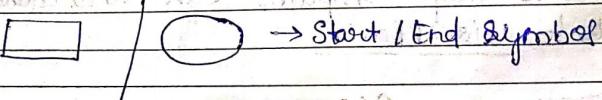
Step 4 :- Point Sum / Point the output of Addition.
Step 5 :- End.

→ To find an Algorithm to of largest of two numbers.

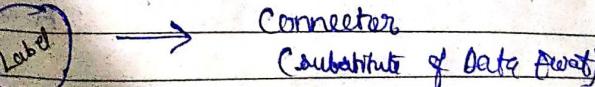
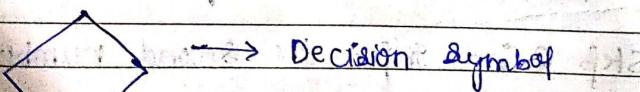
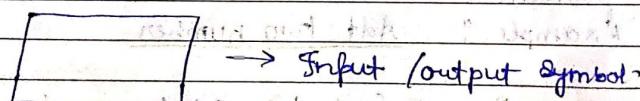
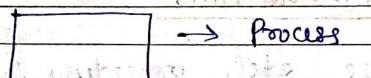
- (1) Step 1 :- Enters the two numbers, a and b .
- (2) Step 2 :- Comparison a and b . ($a > b$)
- (3) Step 3 :- a is largest than b otherwise a is largest.
- (4) Step 4 :- Point the largest number / output.
- (5) Step 5 :- End.

FLOWCHART

It is a graphical representation of a process or algorithm.



PROCESS SYMBOL

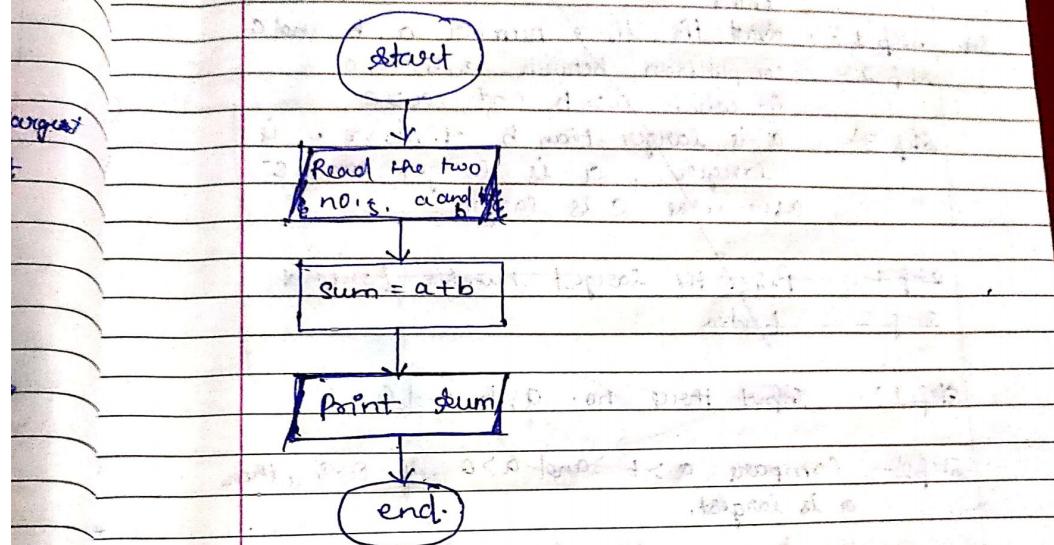


4) $\frac{3}{2}$

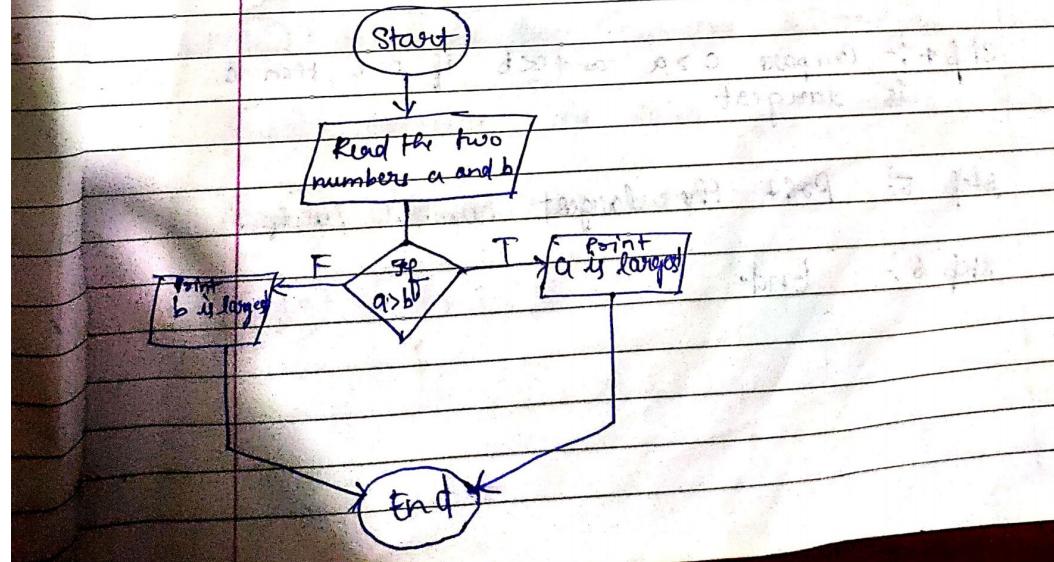
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→ Data Flow.

Flowchart of Adding



Flowchart of Larger number.



Q) Write an algorithm and discuss of flowchart for identifying largest of three numbers!

Step 1 :- ^{Enters} Read the three numbers a, b and c.

Step 2 :- Comparison between a, b and c

in which $a > b$ and $a > c$

Step 3 :- a is larger than b, otherwise b is larger, a is larger than c
otherwise c is larger

Step 4 :- Print the largest number / output

Step 5 :- End.

Step 1 :- Input three no. a, b and c.

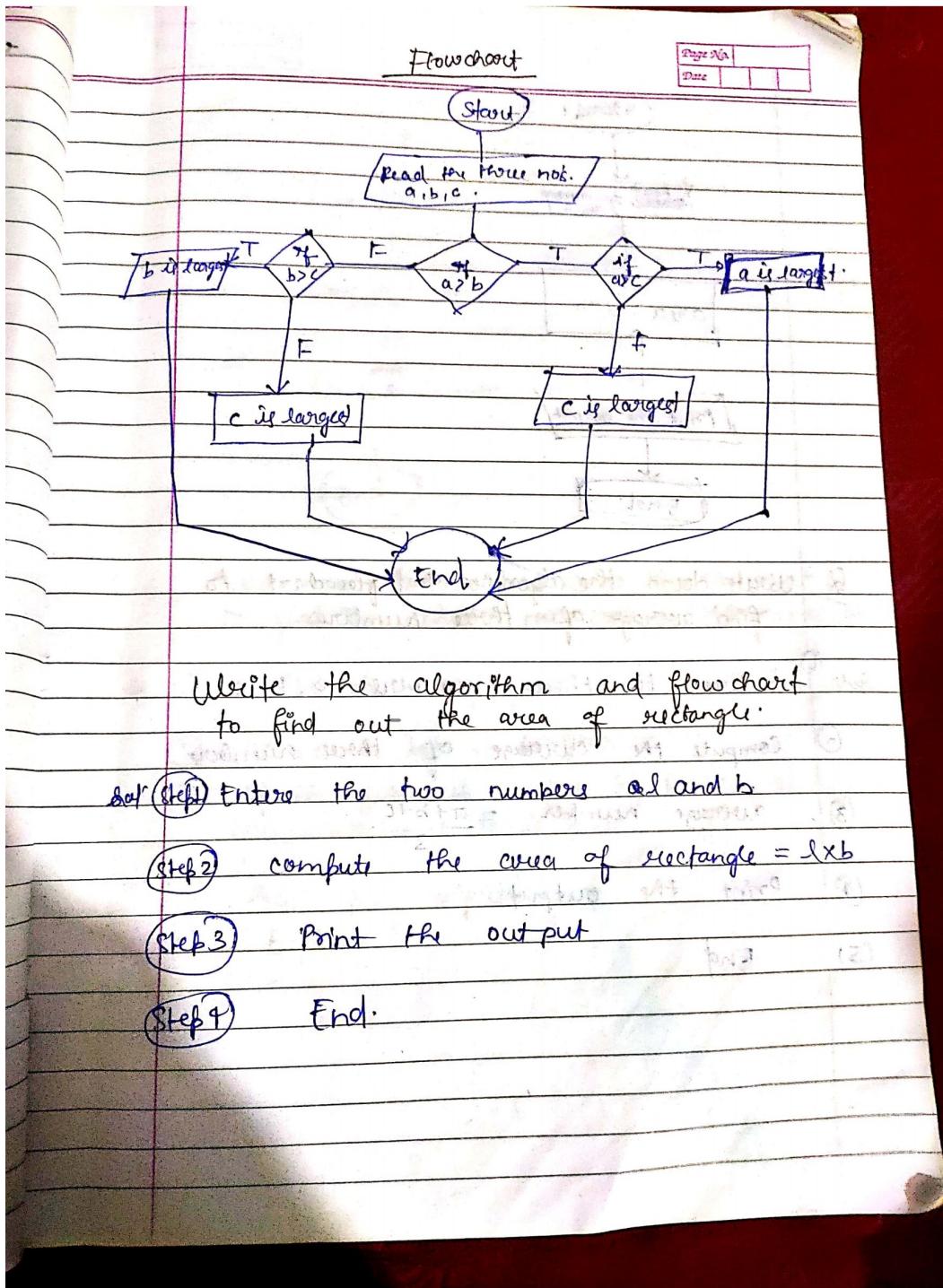
Step 2 :- Compare $a > b$ and $a > c$ if true, then
a is largest.

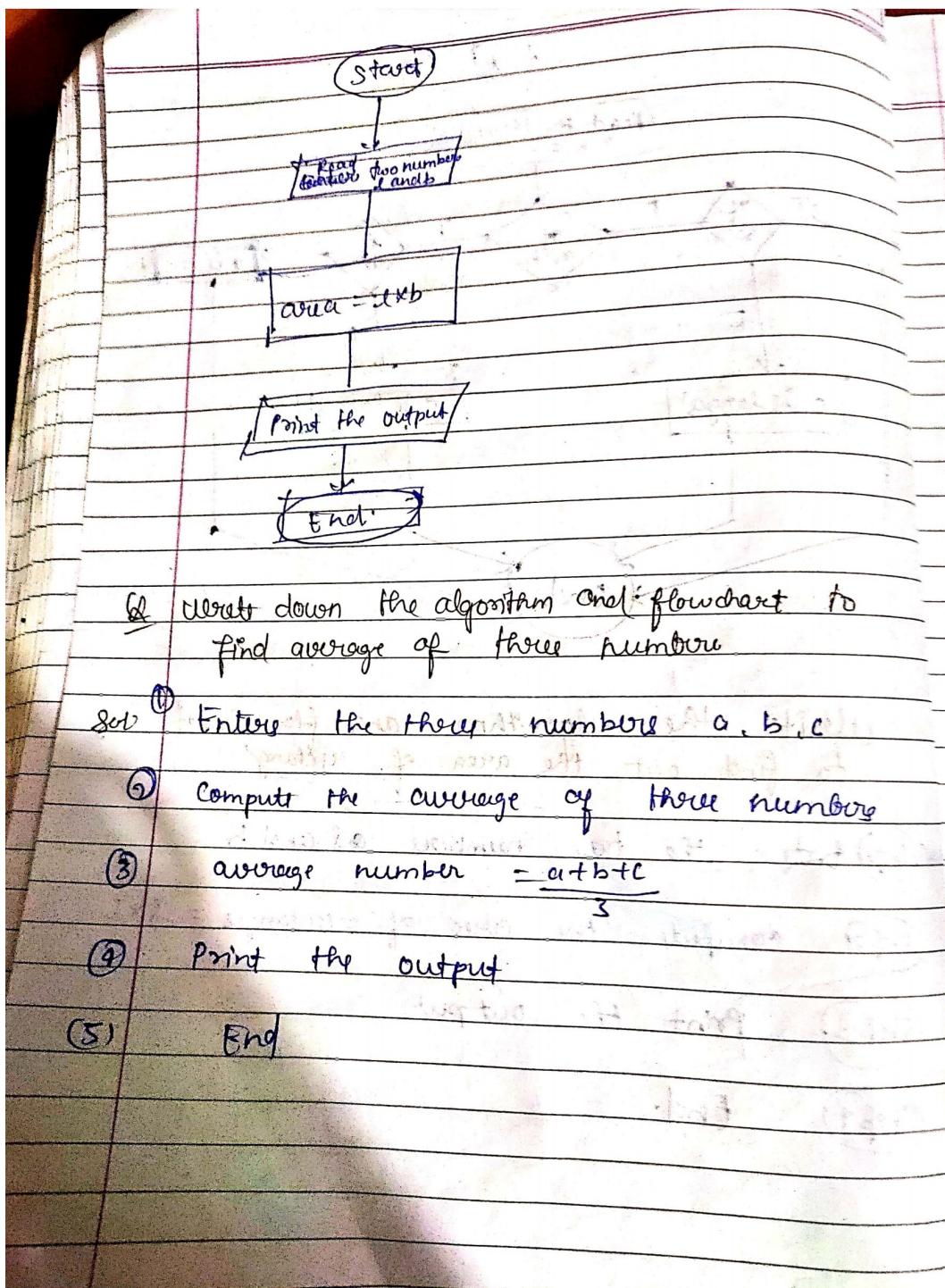
Step 3 :- Compare $b > c$ and $b > a$ if true, then
b is largest

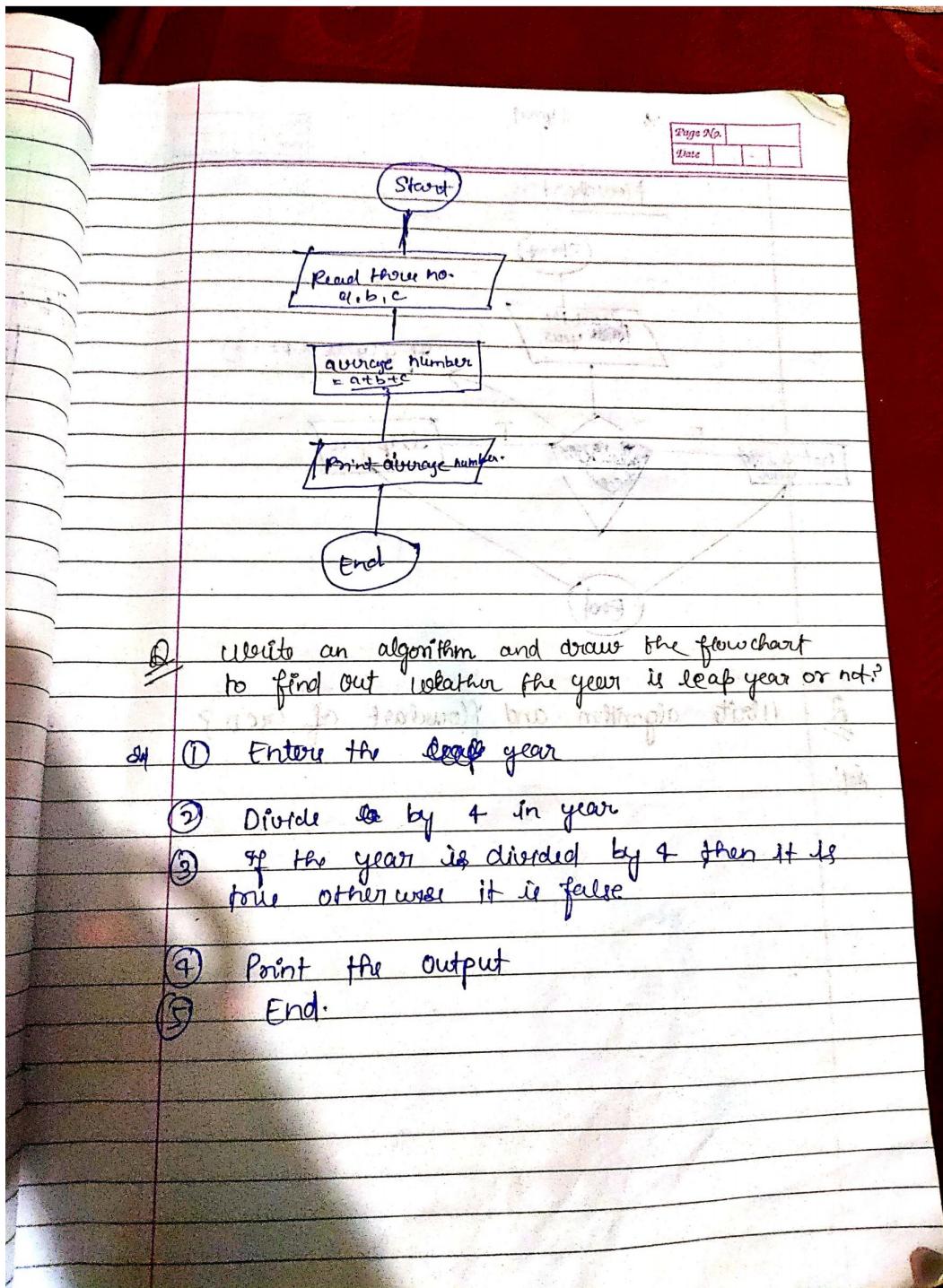
Step 4 :- Compare $c > a$ and $c > b$ if true, then c
is largest.

Step 5 :- Print the largest number / output

Step 6 :- End.







Q) Write an algorithm and draw the flowchart to find out whether the year is leap year or not?

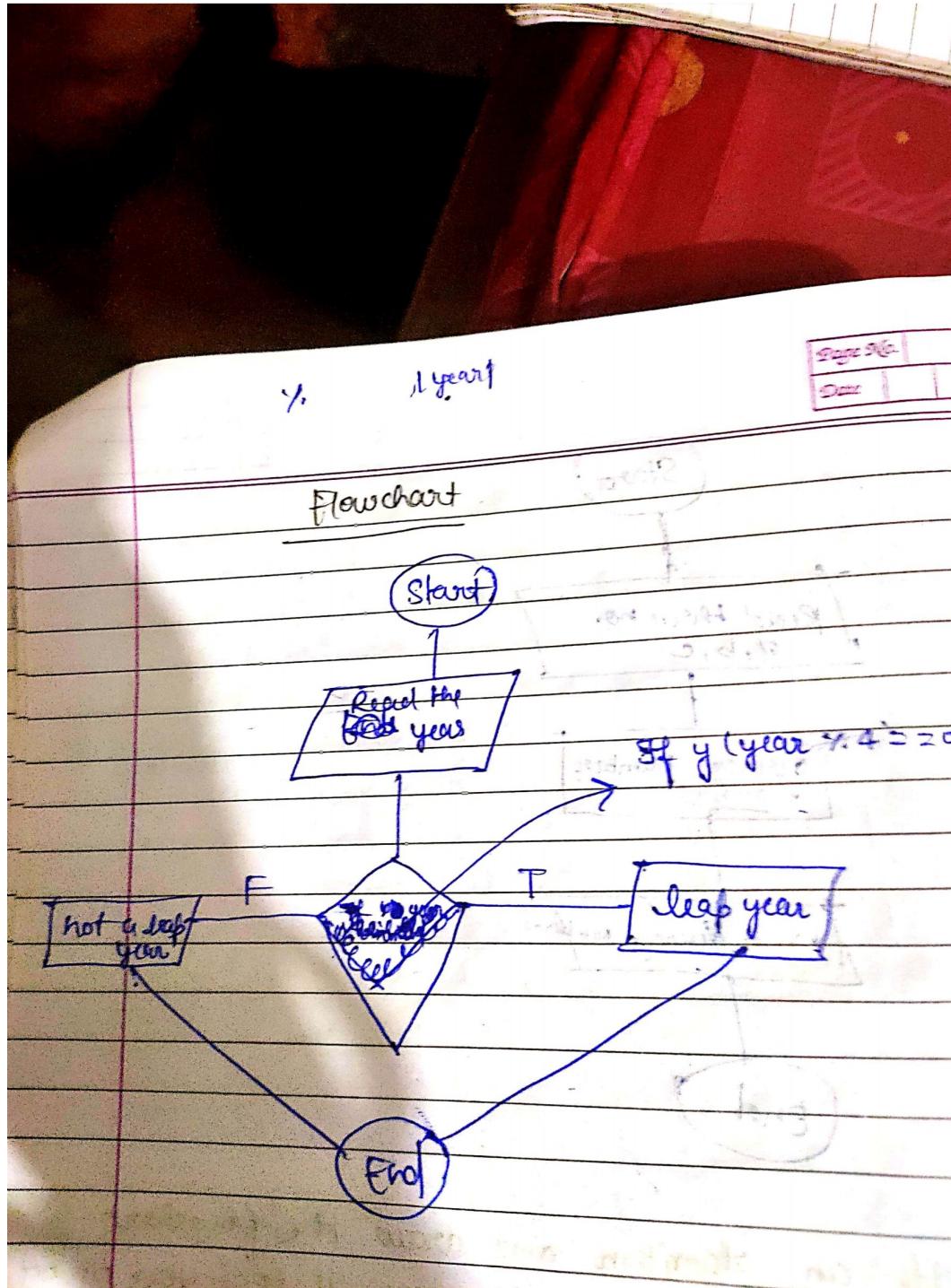
Ans (1) Enter the ~~leap~~ year

(2) Divide ~~it~~ by 4 in year

(3) If the year is divided by 4 then it is true otherwise it is false

(4) Point the output

(5) End.



VARIABLE

Add two numbers

```
#include <stdio.h>
#include <conio.h>
void main()
{
    clrscr();
    int a, b;
    clrscr();
    printf("Enter the two numbers");
    scanf("%d %d", &a, &b);
    s = a+b;
    printf("%d,%d", s);
    getch();
}
```

Q. Write a program to add, multiply,
divide and subtraction of two numbers

```
#include <stdio.h>
#include <conio.h>
void main()
{
    clrscr();
    int a=2, b=3;
    int c, d, f;
    c = a - b;
    d = a / b;
    f = a * b;
    printf("%d", c);
    printf("%d", d);
    printf("%d", f);
    getch();
}
```

For Scanf

```
#include <stdio.h>
#include <conio.h>
void main()
{
    clrscr();
    int a, b;
    clrscr();
    printf ("Enter the two numbers");
    scanf ("%d %d", &a, &b);
    s = a+b;
    printf ("%d", s);
    getch();
}
```

Q. Write a program to write an area of the circle

```
#include <stdio.h>
#include <conio.h>
void main()
{
    clrscr();
    int r, area;
    clrscr();
    printf ("Enter the radius");
    scanf ("%d", &r);
    area = 3.14 * r * r;
    printf ("%d", area);
    getch();
}
```

B Write a program to calculate the area of rectangle

```
#include <stdio.h>
#include <conio.h>
void main ()
{
    clrscr ();
    int l, b;
    int area;
    printf ("Enter the length & breadth");
    scanf ("%d %d", &l, &b);
    area = (l * b);
    printf ("\n% of d", area);
    getch ();
}
```

B Write down a program to convert degree fahrenheit to celcius?

Algorithm

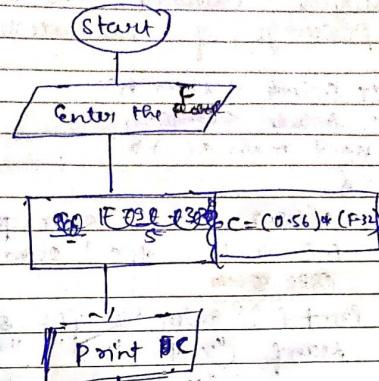
```
#include <stdio.h>
#include <conio.h>
void main ()
{
    clrscr ();
    int f, c;
    float Fahrenheit;
    printf ("Enter the Fahrenheit and celcius");
    scanf ("%d", &f);
    c = (0.56) * (f - 32);
    printf ("\n% of d", c);
    getch ();
}
```

$$\frac{F}{9} = \frac{(C+32)}{5}$$

$$\frac{9C}{5} =$$

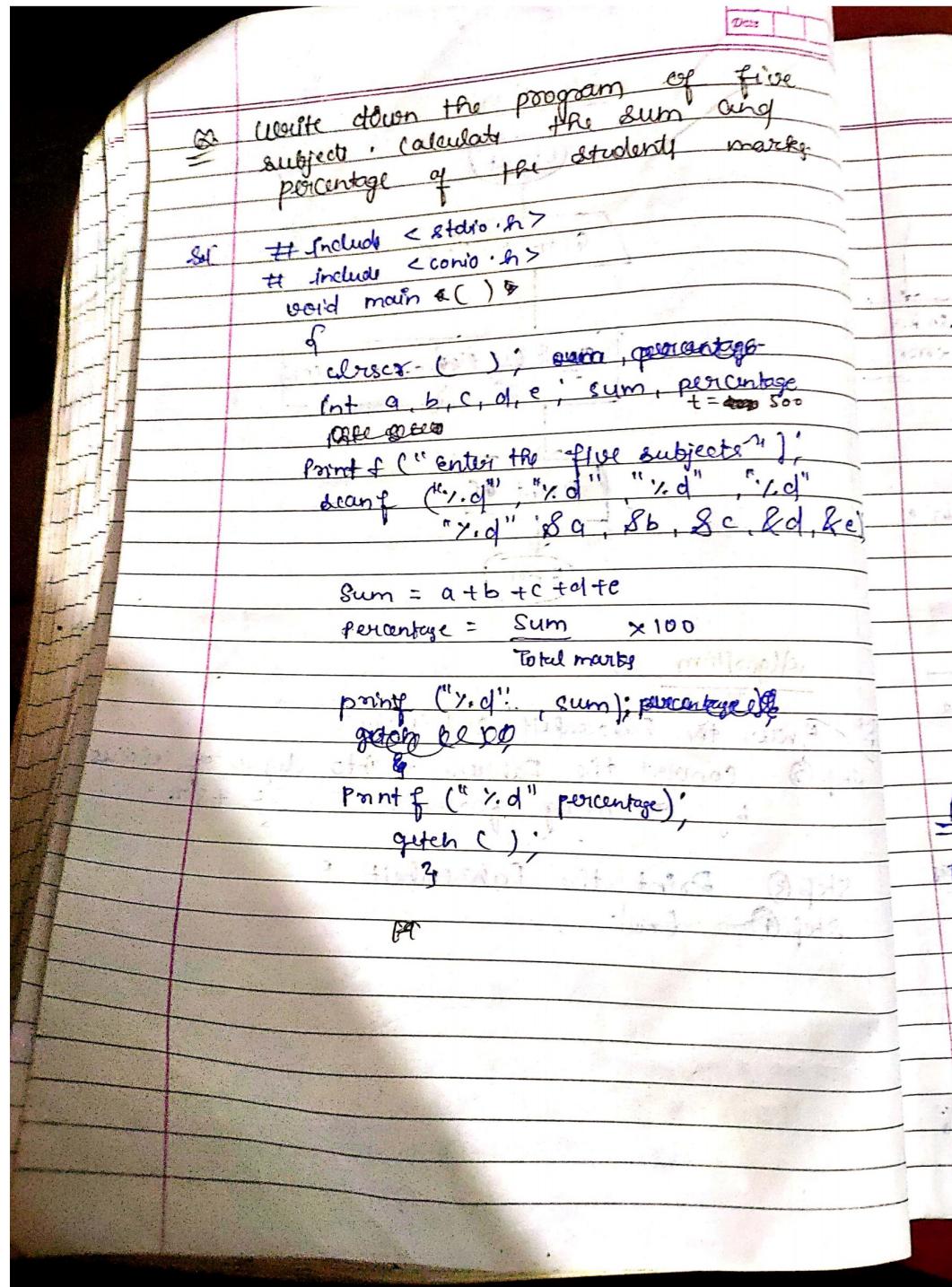
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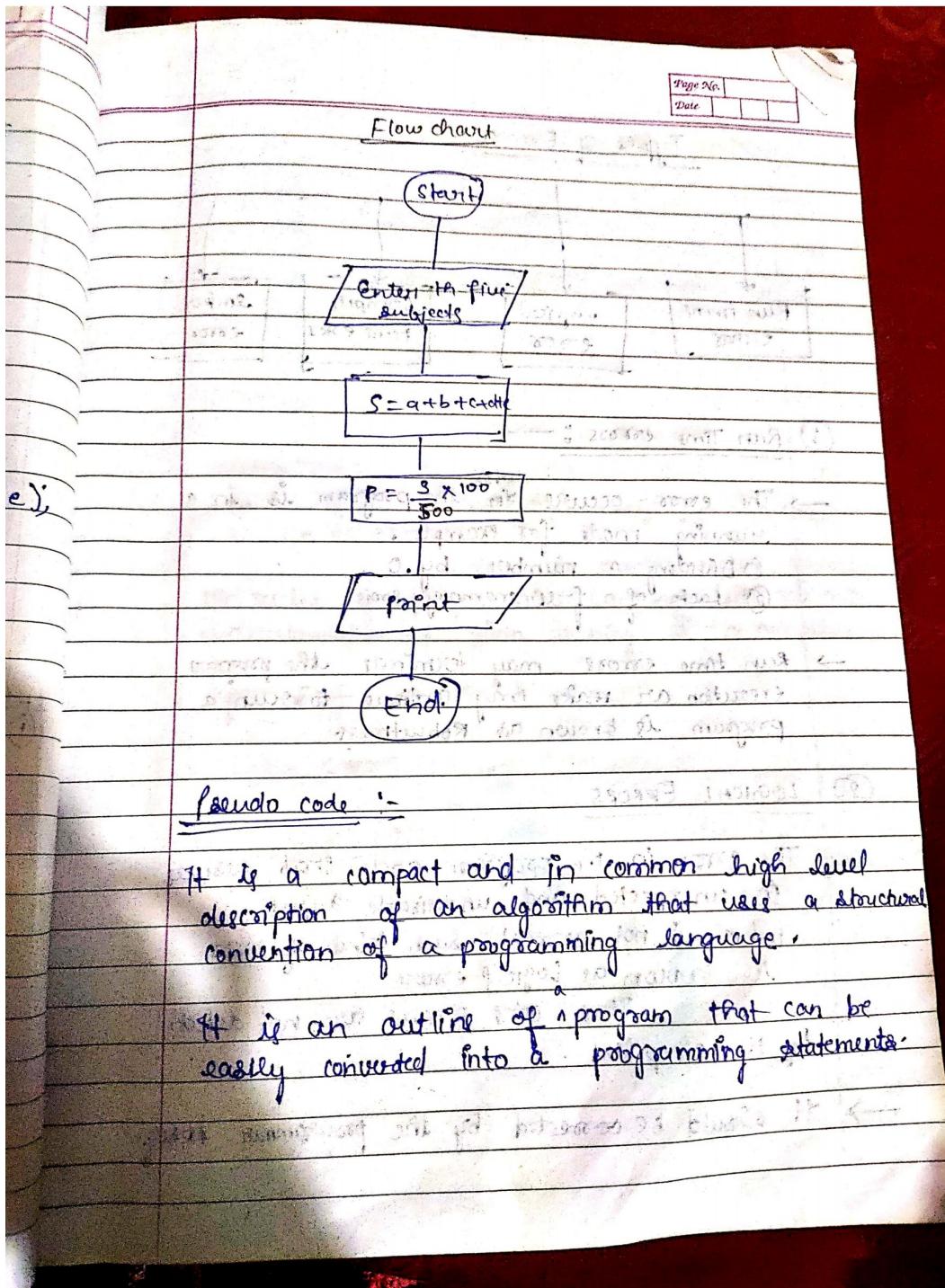
Flowchart

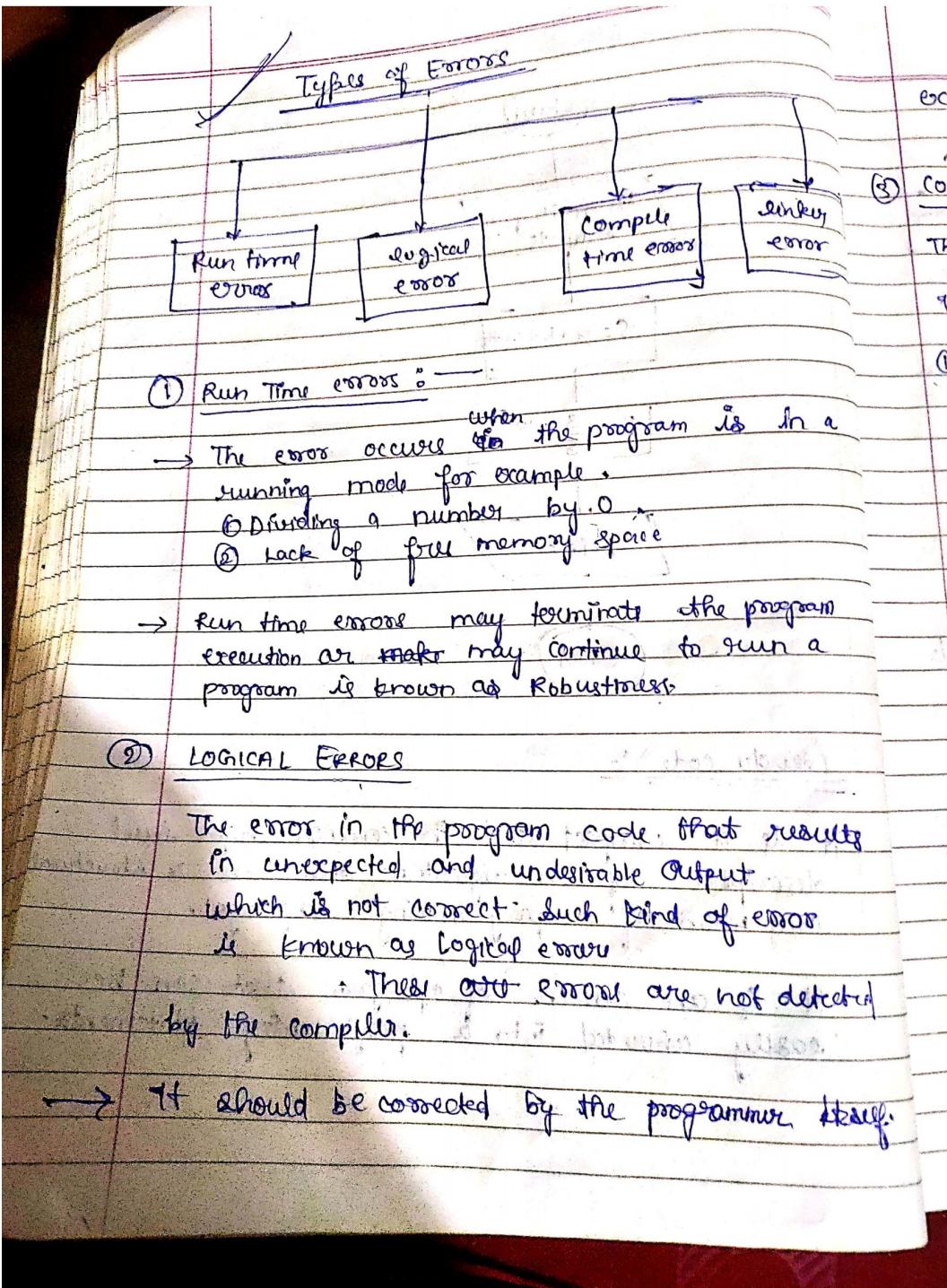


Algorithm

- ① Enter the Fahrenheit and Celsius
- ② Convert the Fahrenheit into degree of Celsius by using formula $F = \frac{9C}{5} + 32$.
- ③ Print the Fahrenheit F
- ④ End.







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Date	

ex:- programmers want to add $a+b$ but given $a*b$.

(3) Compile time errors :-

The error occurs at time of compilation.

It has two types:

- (1) Syntax errors
- (2) Semantic errors

Syntax when the programmer is violating the rules of C programming language is known as syntax error.

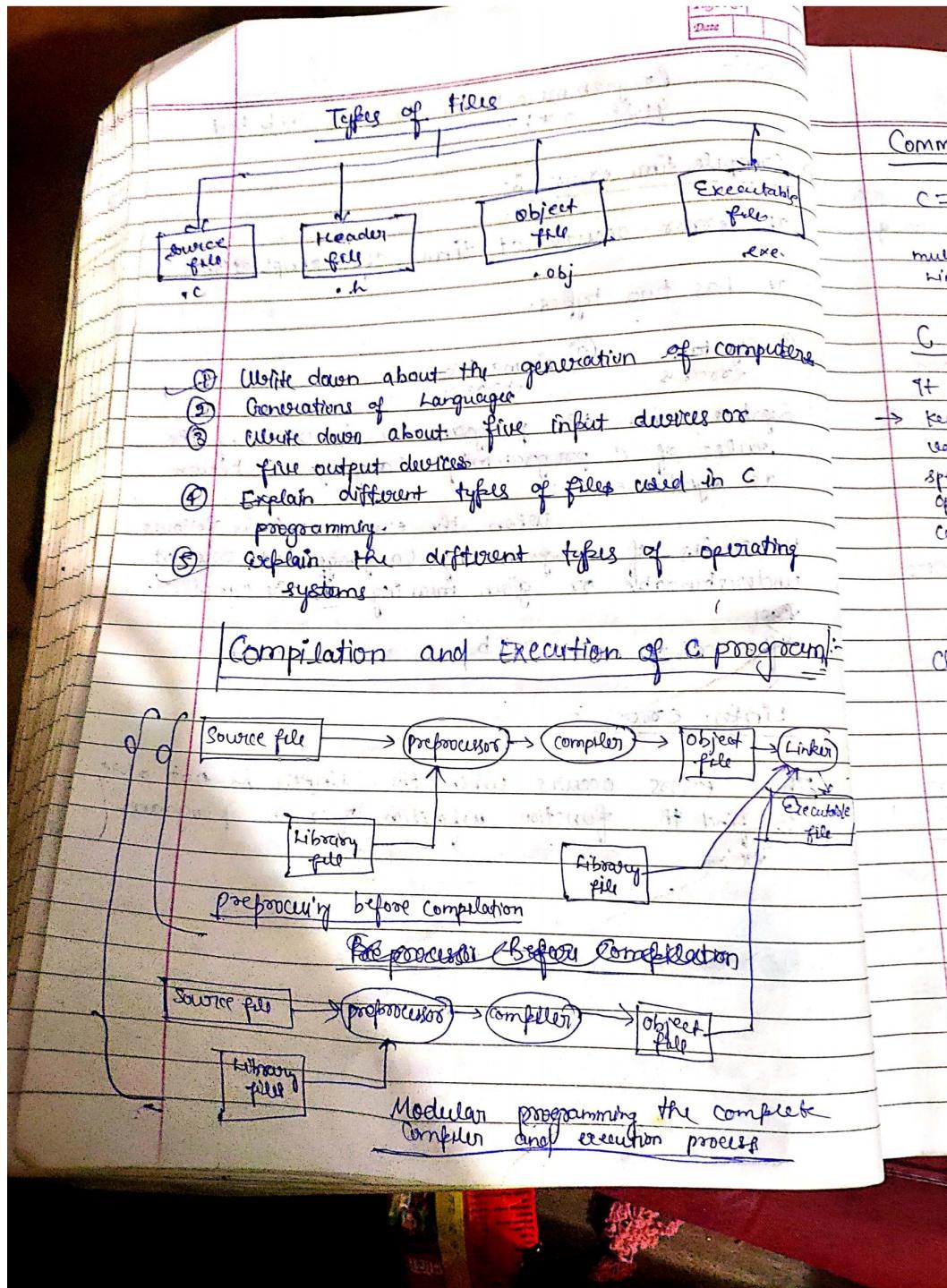
When the errors which follows the rules of programming language but are not understandable or given meaning to the compiler.

for ex:- $c = a * b$

Linker errors :-

These errors occurs when the linker is not able to find the function definition for a program.

ex:-



Comments :-

$C = a + b$ // addition of two no.

multiple of /* */
written as
Block Comment

C Tokens (Basic building blocks of C language.)

It includes:-

- Keywords, strings, identifiers, operators, variables, special characters, operators, constants.

CHARACTERS IN C

Characters set include English Alphabets both lower and upper case, digits, special characters, escape sequences, white space.

KEYWORDS IN C (32 keywords)

It is a set of reserved words that cannot be used as an identifier. It must be written in lower case. In general in C, we are having 32 keyword for ex:- void, int, float, double, enum.

IDENTIFIER (variable / Identifier)

→ It helps us to identify data and other objects in the program. It may consist of sequence of letters, numbers and underscore for ex - aa, aaa, aall

RULES FOR FORMATTING IDENTIFIERS

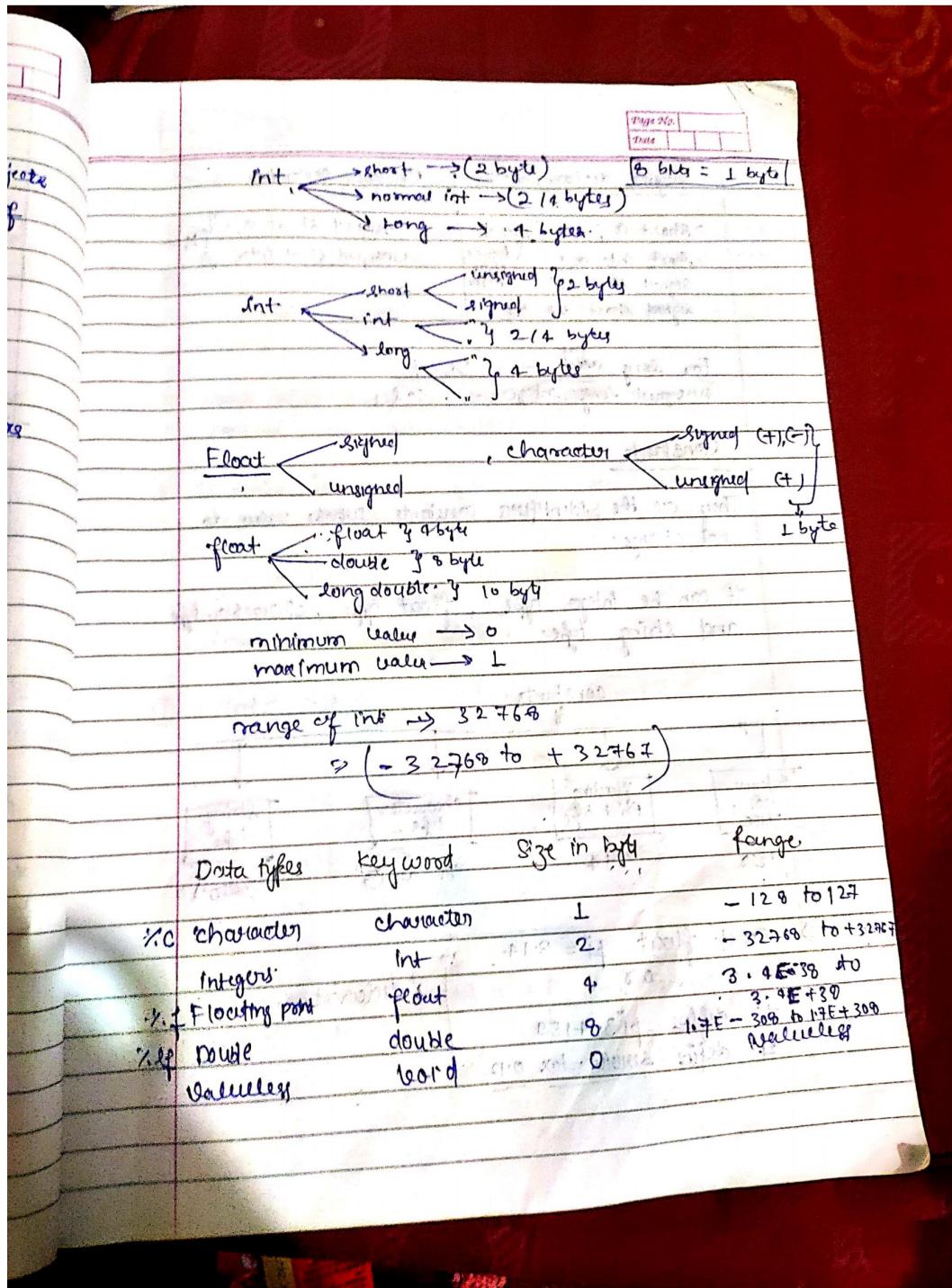
- (1) It must not include any special characters except underscore.
- (2) There cannot be two successive underscores.
- (3) keywords cannot be used as identifiers.
- (4) The case used to form an identifier should be specific.
- (5) It must begin with the letter.
- (6) It can be of any reasonable length.

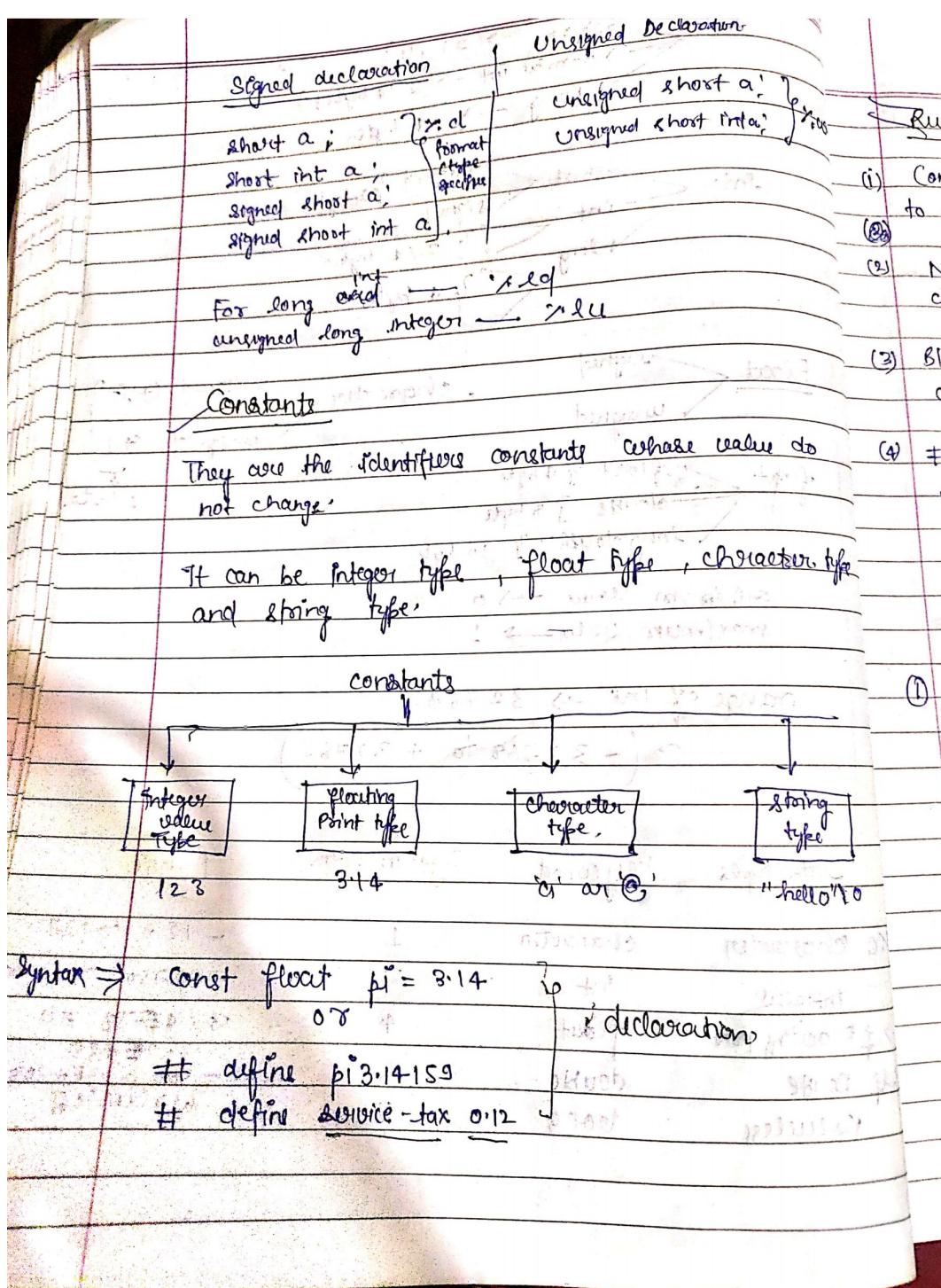
Basic Data Type :-

Int

float :- 0.1

double :- 0.77





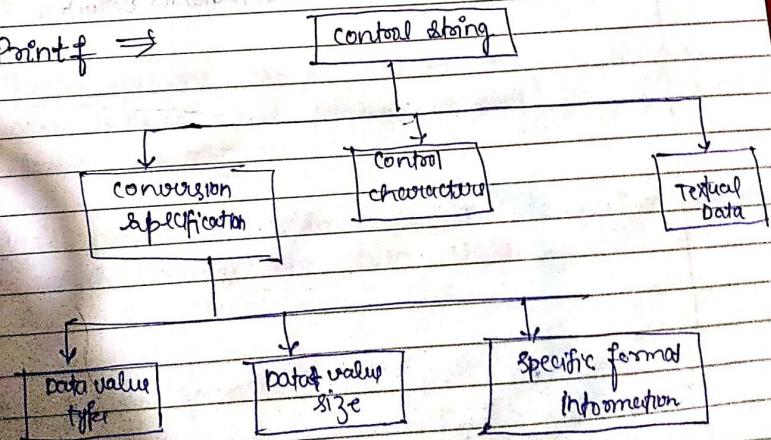
Rules for defining constants

- (1) Constant names usually written in capital letters to distinguish between them from other variable names.
- (2) No blank space is permitted between `#define` and define.
- (3) Blank space must be used between `#define` and constant name and constant value.
- (4) `#define` is a preprocessor directive and not a statement therefore it does not end a semicolon.

Input output statements in C

Formatted Input Output :-

① `printf` ⇒



example:- `printf ("%f\nResult: %d %c %f", 12, 'a', 2.3);`

o (P → Result : 12 a 2.3)

eg → $\%d \n %c %f$
width precision width precision

eg → $\%7.2f$ (white space)
flag (left justification) -

eg → $\%.06d$ → 000012
flag (appended 0)
before the defining number

eg → $a = \% + 7.2f$
flag (display sign when its
numerical value)