SNS COLLEGE OF ENGINEERING

Kurumbapalayam (Po), Coimbatore – 641 107

An Autonomous Institution

Accredited by NBA – AICTE and Accredited by NAAC – UGC with 'A' Grade
Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

COURSE NAME : 23ITT101 Problem Solving and C Programming

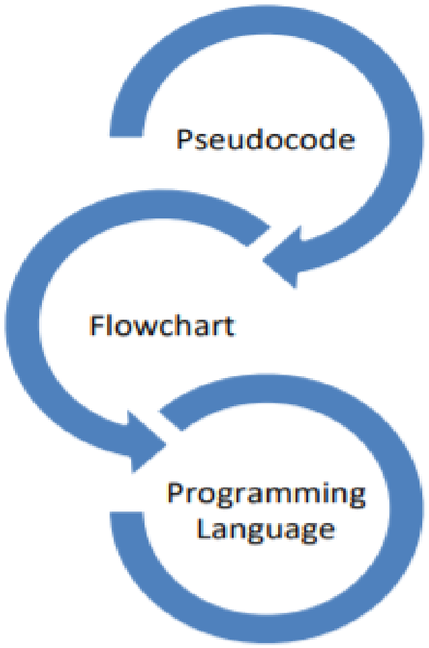
I YEAR /I SEMESTER

Unit 1- INTRODUCTION TO PROBLEM SOLVING TECHNIQUES

Topic 4: Notation (Pseudo Code, Flow Chart, and Programming Language)

Algorithm Notations(Expressing Algorithms)

- An algorithm is a sequence of finite instructions, often used for calculation and data processing.
- Algorithms can be expressed in many kinds of notation, including



What is Pseudo code?

Definition:

- Pseudo code is a detailed yet readable description of what a computer program or algorithm must do, expressed in a formally-styled natural language rather than in a programming language.
- Pseudo code is sometimes used as a detailed step in the process of developing a program.

Example

Compute the area of a rectangle:

GET THE length, l, and width, w
COMPUTE area = l*w
DISPLAY area

Compute the perimeter of a rectangle:

READ length, l
READ width, w
COMPUTE Perimeter = 2*l + 2*w
DISPLAY Perimeter of a rectangle

Write pseudocode for Calculating simple interest

BEGIN
READ P, n, r
CALCULATE S
SI=(p*n*r)/100
DISPLAY SI
END

Write pseudocode for Calculating engineering cutoff

BEGIN
READ P,C,M
CALCULATE
Cutoff= (P/4+C/4+M/2)
DISPLAY Cutoff
END

What is Flowchart?

- A flowchart is a diagram that uses symbols and arrows to represent a process, system, or algorithm in a step-by-step manner.

- A Flowchart is a diagram that graphically represents the structure of the system, the flow of steps in a process, algorithm, or the sequence of steps and decisions for execution a process or solution of a problem.

Flowchart symbols

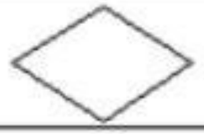
- ✓ Flow charts tend to consist of four main symbols, linked with arrows that show the direction of flow:

✓Elongated circles, which signify the start or end of a process.

✓Parallelograms, which show input and output.

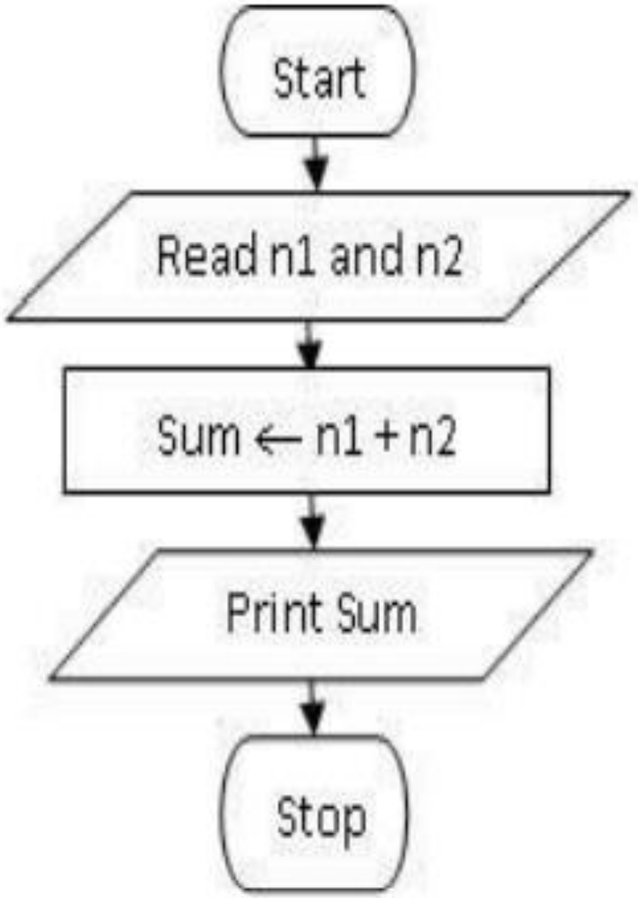
✓Rectangles, which show instructions or actions.

✓Diamonds, which highlight where you must make a decision.

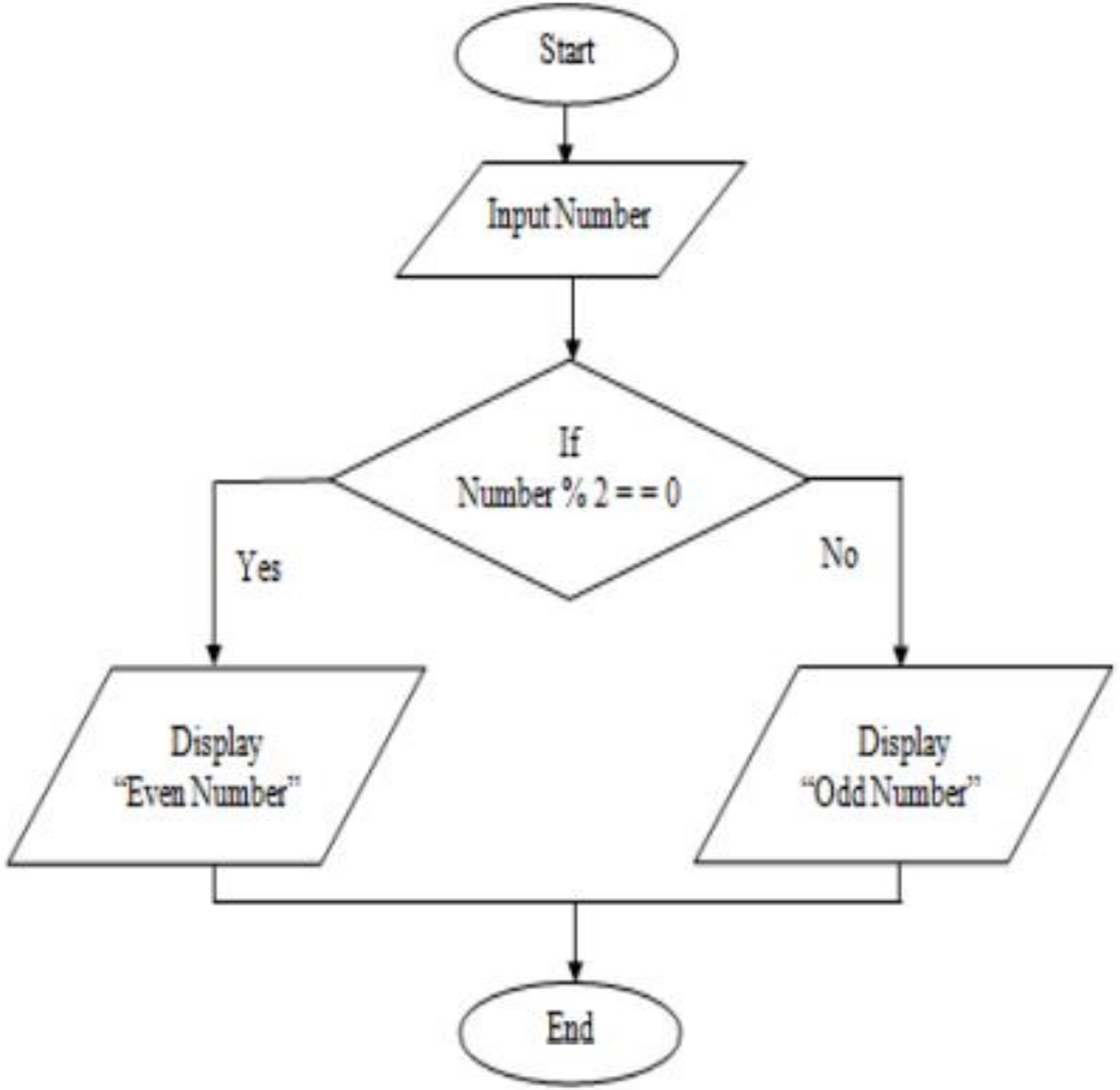
Symbol	Symbol Name	Description
	Flow Lines	Used to connect symbols
	Terminal	Used to start, pause or halt in the program logic
	Input/output	Represents the information entering or leaving the system
	Processing	Represents arithmetic and logical instructions
	Decision	Represents a decision to be made
	Connector	Used to Join different flow lines
	Sub function	used to call function

Flow Chart Examples

To find the sum of two number:

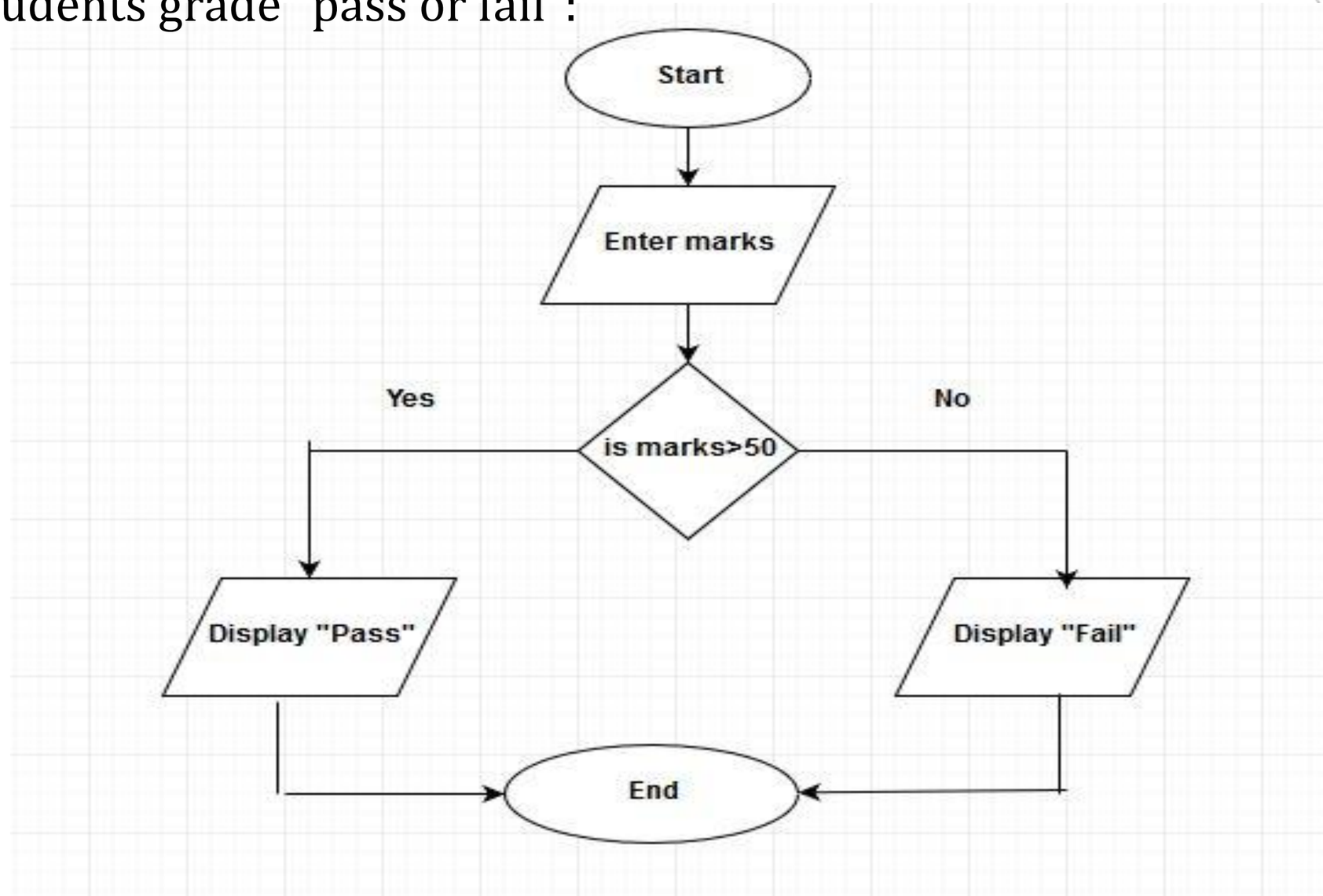


To find odd or even



Example

To find students grade “pass or fail”:



Programming Languages

- Algorithms describe the solution to a problem in terms of the data needed to represent the problem instance and the set of steps necessary to produce the intended result.
- Programming languages must provide a notational way to represent both the process and the data.
- To this end, languages provide control constructs and data types.

Conti...

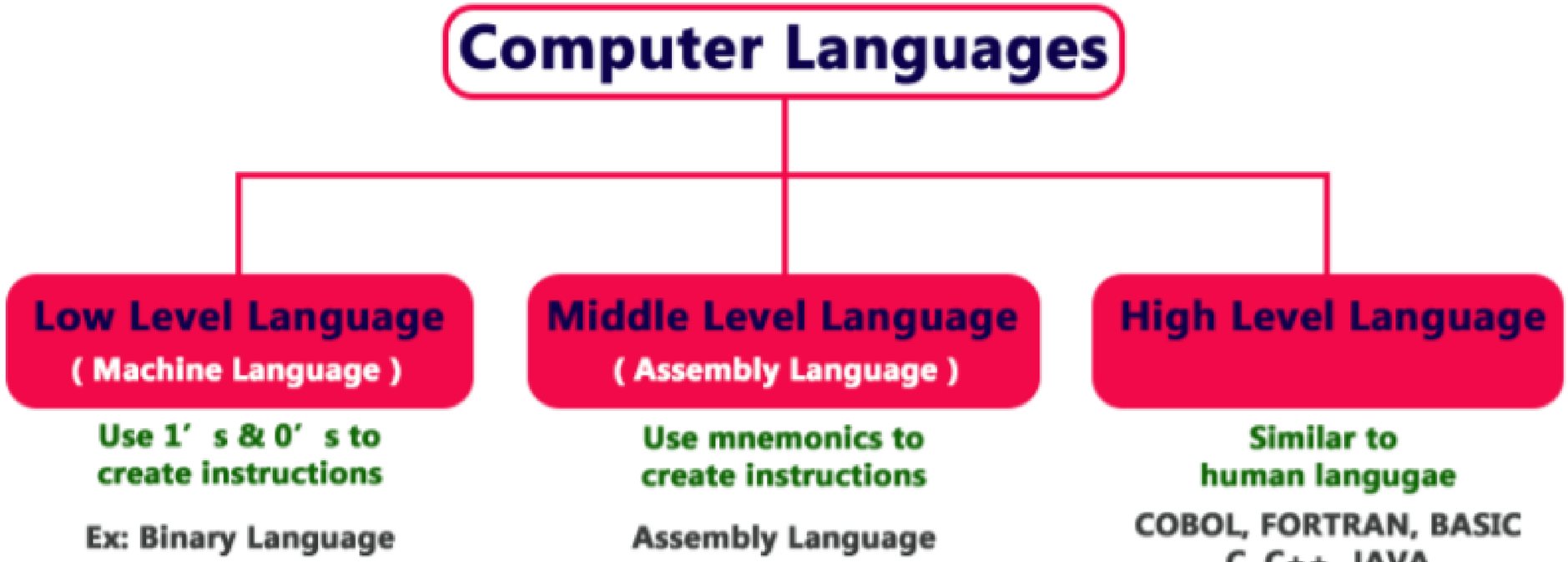
Programming is the process of taking an algorithm and encoding it into a notation, a programming language, so that it can be executed by a computer.

Although many programming languages and many different types of computers exist, the important first step is the need to have the solution.

Without an algorithm there can be no program.

Programming is implementing the already solved problem (algorithm) in a specific computer language where syntax and other relevant parameters are different, based on different programming languages.

Conti…


Computer Languages
Low Level Language
(Machine Language)
Use 1' s & 0' s to create instructions
Ex: Binary Language
Middle Level Language
(Assembly Language)
Use mnemonics to create instructions
Assembly Language
High Level Language
Similar to human langugae
COBOL, FORTRAN, BASIC
C, C++, JAVA

Conti...

Low level Language(Machine level Language)

A *low-level language* is a programming *language* that deals with a computer's hardware components and constraints.

In simple we can say that ,low level language can only be understand by computer processor and components.

Binary and assembly languages are examples for low level language.

Middle level Language(Intermediate Language)

Medium-level language serves as the bridge between the raw hardware and programming layer of a computer system.

Medium-level language is also known as intermediate programming language and pseudo language.

C intermediate language and Java byte code are some examples of medium-level language.

Conti…

High level Language (Human understandable Language)

A high-level language is any programming language that enables development of a program in a much more user-friendly programming context.

High-level languages are designed to be used by the human operator or the programmer.

They are referred to as "closer to humans." In other words, their programming style and context is easier to learn and implement than low-level languages

BASIC, C/C++ and Java are popular examples of high-level languages.

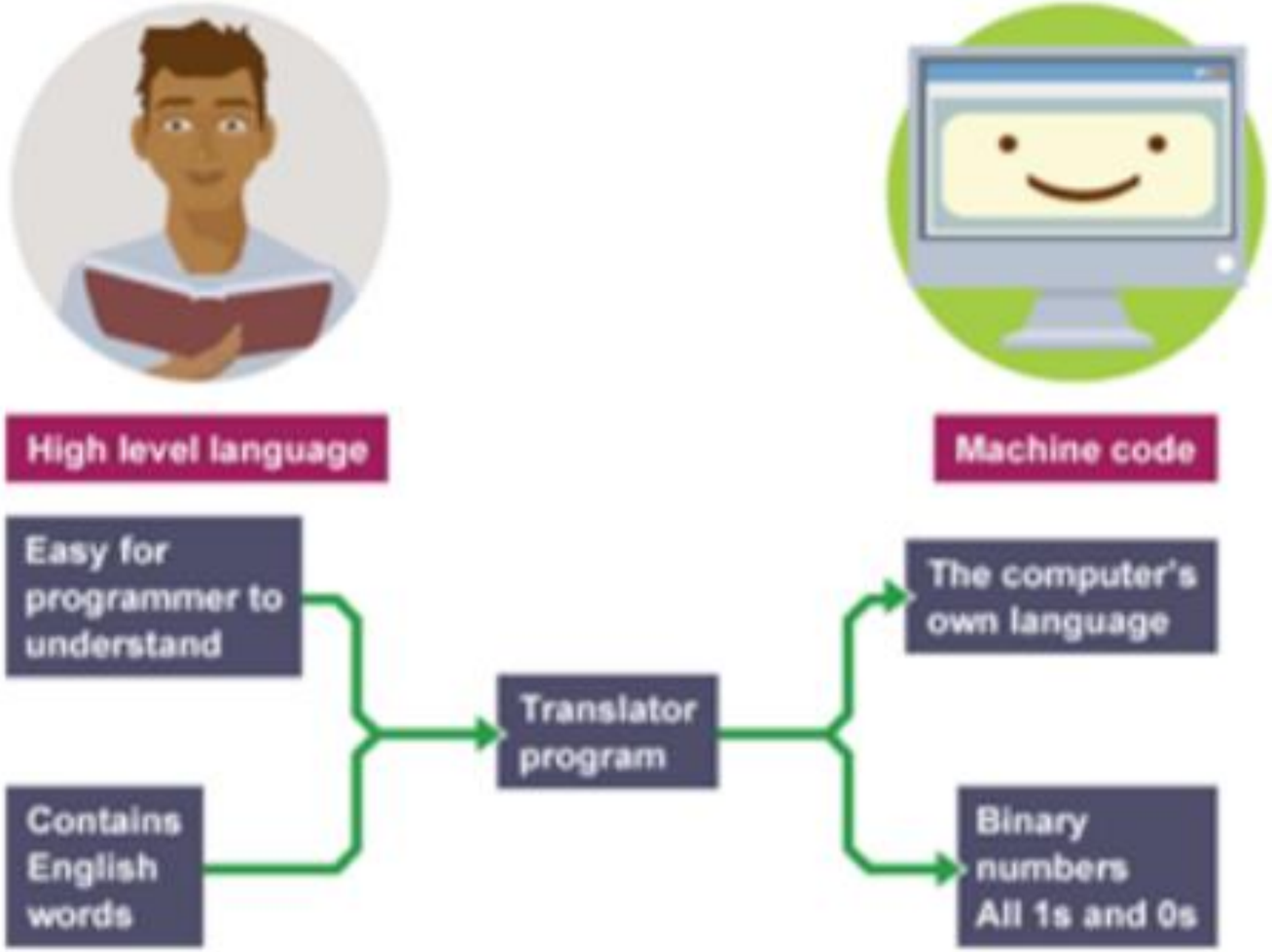
Example-Assembly language-Adding two numbers

```
DATA SEGMENT
      NUM1 DB 9H
      NUM2 DB 7H
      RESULT DB ?
ENDS

CODE SEGMENT
    ASSUME DS:DATA CS:CODE
START:
       MOV AX,DATA
       MOV DS,AX

       MOV AL,NUM1
       ADD AL,NUM2

       MOV RESULT,AL

       MOV AH,4CH
       INT 21H
ENDS
END START
```

Program in C language:

```
#include <stdio.h>
int main() {
    int num1, num2, sum;
       printf(“Enter the first number: “);
    scanf(“%d”, &num1);
    printf(“Enter the second number: “);
    scanf(“%d”, &num2);
        sum = num1 + num2;
       printf(“The sum of %d and %d is
%d\n”, num1, num2, sum);
Return 0; }
```

Conti...


High level language
Machine code
Easy for programmer to understand
Contains English words
Translator program
The computer's own language
Binary numbers All 1s and 0s

Assessment 1

1. What is Algorithm and flowchart?

Ans : _____

2. Draw the flowchart to find greatest of 3 numbers.

Ans : _____

References

TEXT BOOKS

1.E.Balagurusamy, “Fundamentals of Computing and Computer Programming”, 2nd Edition Tata McGRaw-Hill Publishing Company Limited, (2012). (UNIT – I, II, III, IV, V)

2.Ashok.N.Kamthane,“ Computer Programming”, Pearson Education (India) (2010). (UNIT –II, III IV, V)

3.Reema Thareja, “Programming in C”, 2nd Edition, Oxford University Press,(2015). (UNIT –I,II, III, IV, V)

REFERENCES

1.Byron Gottfried, “Programming with C”, 2nd Edition, (Indian Adapted Edition), TMH Publications, (2006). (Unit II, III, IV)

2.Stephan G kochan, “Programming in C” Pearson Education (2008), (UNIT II, III, IV, V)

3.P.Sudharson, “Computer Programming”, RBA Publications (2008), (UNIT I, II, III, IV)

4.Yashavant P. Kanetkar. “Let Us C”, BPB Publications, 2014.(Unit II, III, IV, V)

5.Anita Goel and Ajay Mittal, “Computer Fundamentals and Programming in C”, Dorling Kindersley (India) Pvt. Ltd., Pearson Education in South Asia, 2011. (UNIT – I, II, III, IV, V)

Thank You