Samuela Abigail
717621080390

18.11.21 Introduction to Programming, Algorithm, and Flowchart

1) Algorithm for interchanging numeric values of 2 variables.

Ans
Step 1: Start
Step 2: Declare variables a, b, and c.
Step 3: Initialize a and b
Step 4: Assign c = a
Assign a = b
Assign b = c
Step 5: Print a and b
Step 6: Stop

Eg: If a=10, b=20
c = a = 10
a = b = 20
b = c = 10
→ a, b
↓
20, 10

2) Algorithm that compares 2 numbers and prints message that identifies the greater number or states both numbers are equal.

Ans
Step 1: Start
Step 2: Declare variables num1 and num2
Step 3: Initialize num1 and num2
Step 4: If num1 > num2
Print num1
Else
If num2 > num1
Print num2
Else
Print num1 and num2 are equal.
Step 5: Stop

3) Algorithm to check whether a year is a leap year or not.

Ans
Step 1: Start
Step 2: Read year

Samuela Abigail
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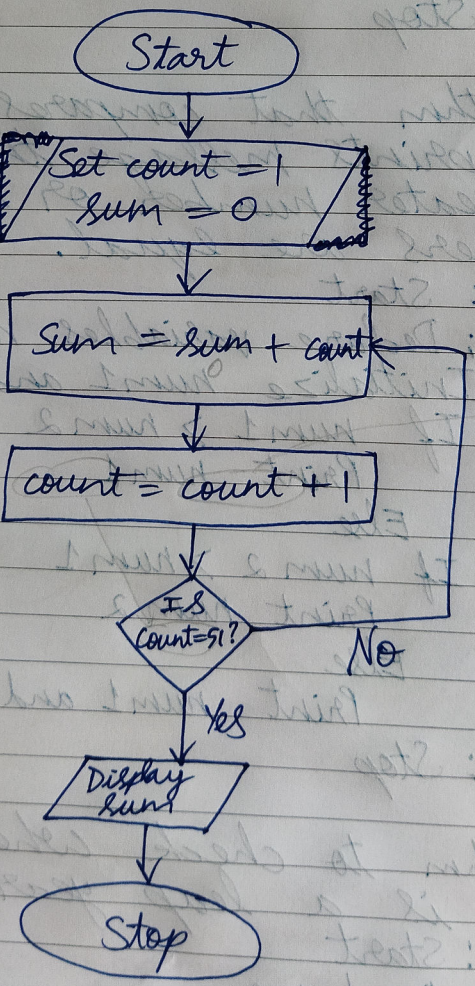
Step 3: If year % 4 = 0 and year % 100 != 0
Print leap year
Else
If year % 4 = 0 and year % 400 = 0
Print not a leap year
Else
Print not a leap year

Step 4: Stop

4) Flowchart to find sum of first 50 natural numbers.

Ans



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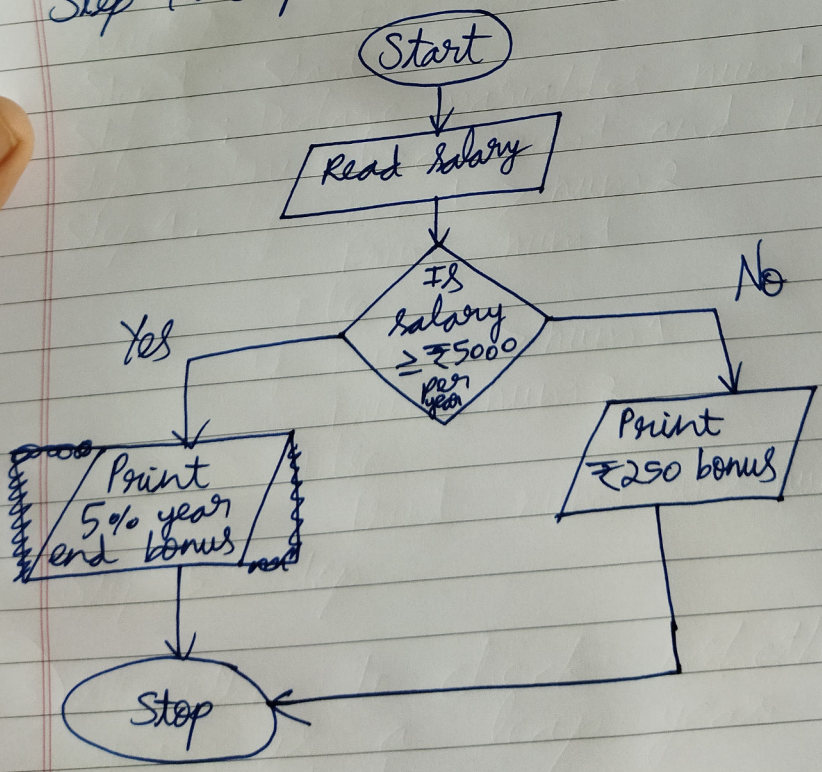
5) The XYZ construction company plans to given a 5% year-end bonus to each of it's employees earning ₹5,000 or more per year, and a fixed bonus of ₹250 to all other employees. Draw a flow chart and write step-form algorithm for printing the bonus of any employee.

Ans Step 1: Start
Step 2: Read Salary
Step 3: If Salary ≥ ₹5000 per year
Print 5% year-end bonus
Else
Print ₹250 bonus
Step 4: Stop



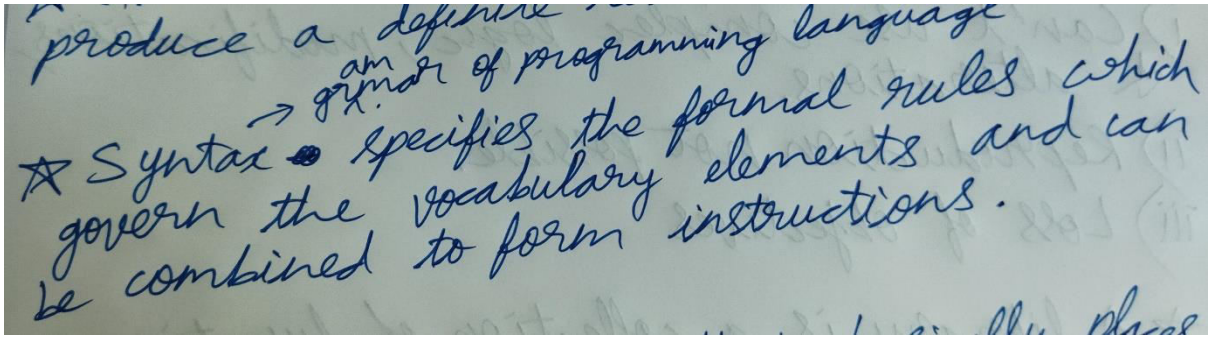
Tutorial 1

A programming language is a set of commands, instructions, and other syntax use to create a software program

6. How to define a programming language?

A program is a set of logically related instructions that is arranged in a sequence that directs the computer in solving a problem.

7. In programming, what is meant by the term “syntax”?



Top-down approach

8. Mention the difficulties faced in procedural programming?

i] inability to reuse code throughout the program.

ii] difficulty in error checking.

9. Define structured programming with pros and cons?

Structured programming is a programming paradigm aimed at improving the clarity, quality, and development time of a computer program by making extensive use of the structured control flow constructs.

Samuela Abigail
71762108039

Advantages of structured programming-

1. It is user friendly and easy to understand.
2. Similar to English vocabulary of words and symbols.
3. It is easier to learn.
4. They require less time to write.
5. They are easier to maintain.

Disadvantages of structured programming-

1. A high level language has to be translated into the machine language by translator and thus a price in computer time is paid.
2. The object code generated by a translator might be inefficient compared to an equivalent assembly language program.
3. Data type are proceeds in many functions in a structured program.

10. How object-oriented programming differs from procedure-oriented programming?

Procedural Oriented Programming-

- program is divided into small parts called functions.
- Procedural programming follows top down approach.
- Adding new data and function is not easy.
- Examples: C, FORTRAN, Pascal, Basic etc.

Object Oriented Programming-

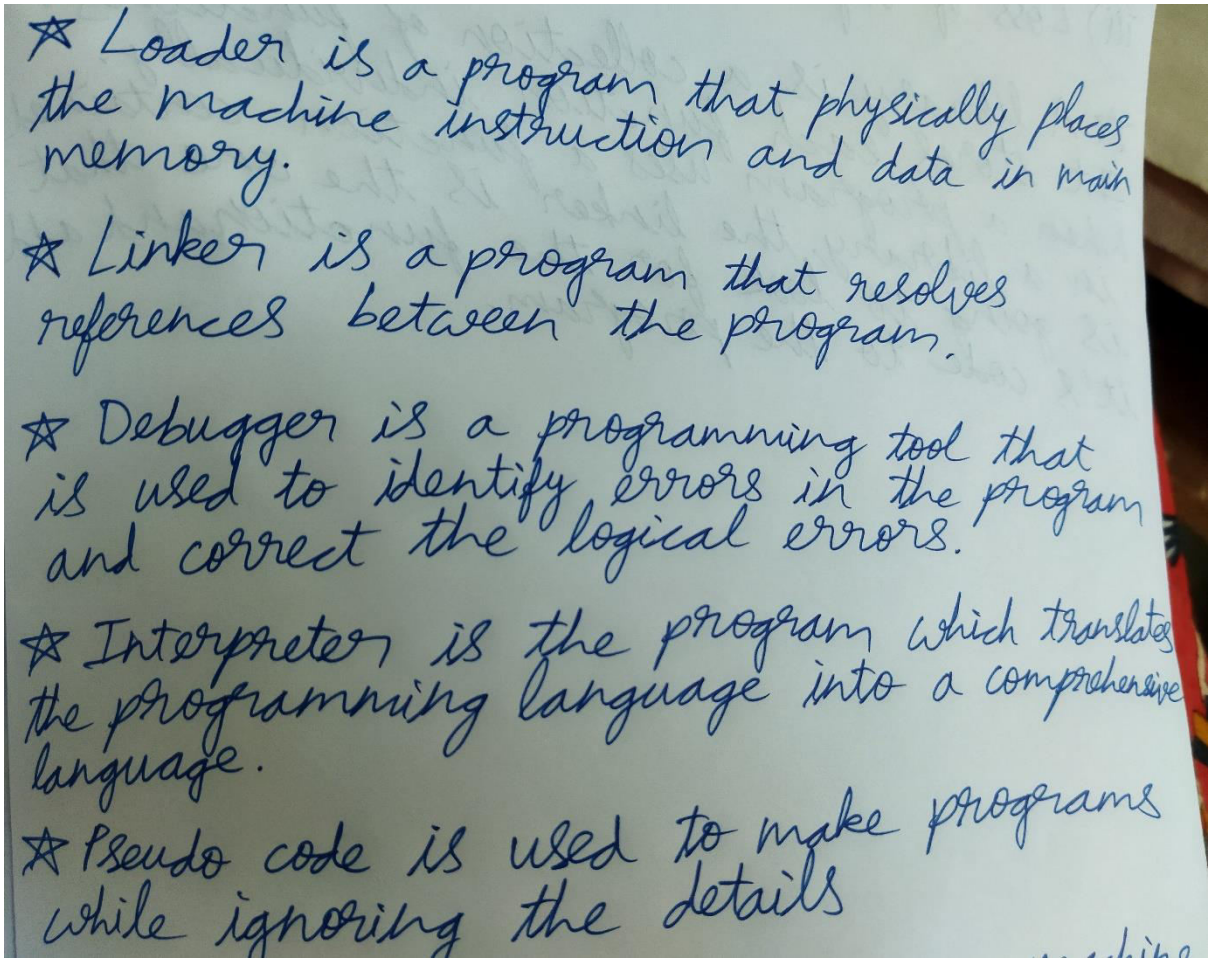
- program is divided into small parts called objects.
- Object oriented programming follows bottom up approach.
- Adding new data and function is easy.
- Examples: C++, Java, Python, C# etc.

Samuela Abigail
71762108039

11. Explain the concept of top down programming?

- We focus on breaking up the problem into smaller parts.
- Each part is programmed separately therefore contain redundancy.
- It is used in debugging, module documentation, etc.
- In top down approach, decomposition takes place.

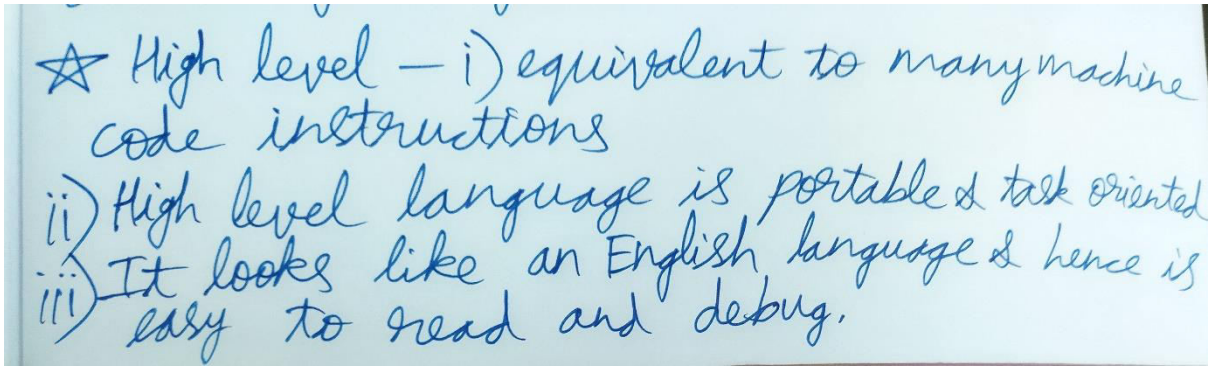
12. Explain the keywords: a) loader b) debugger c) compiler d) interpreter e) pseudocode

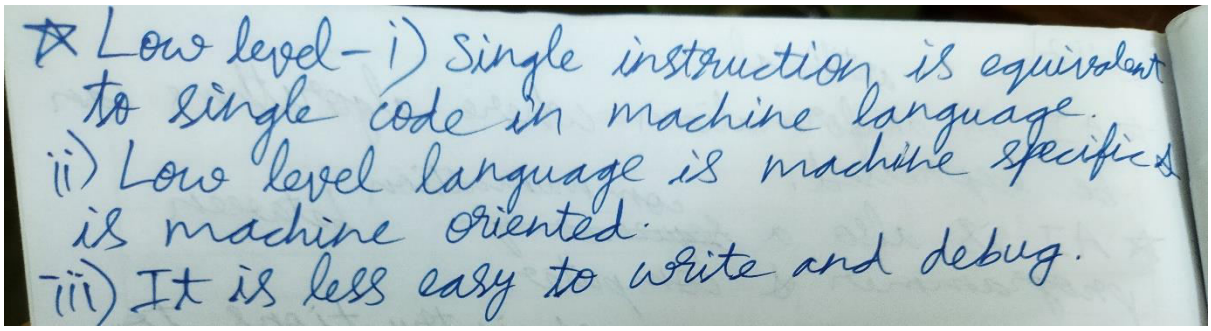


a compiler is a computer program that translates computer code written in one programming language into another language

Samuela Abigail
71762108039

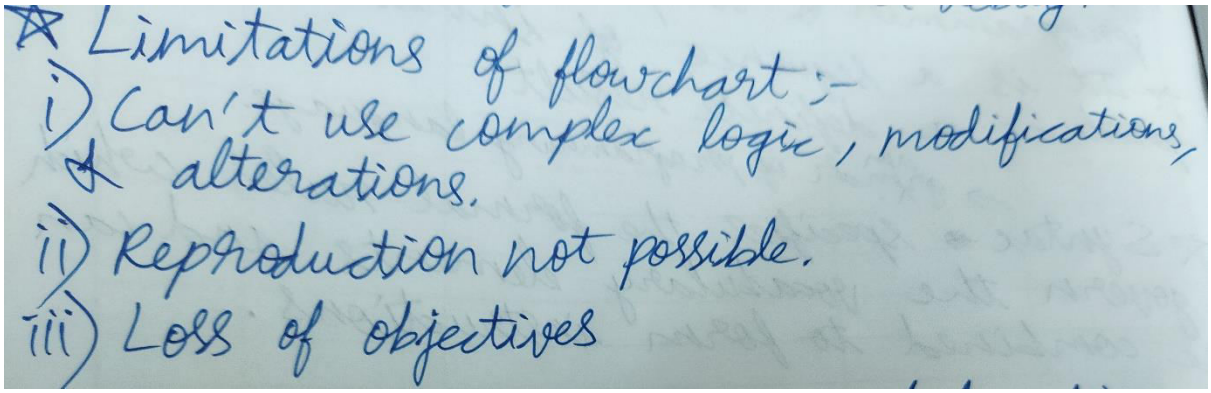
13. Differentiate between low level and high-level programming?





14. Explain the term flowchart? Are there any limitations in flowchart?

A flowchart comprises of a set of standard shaped boxes that are interconnected by flow lines to represent an algorithm.



Difficult to show branching and looping
Time consuming

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