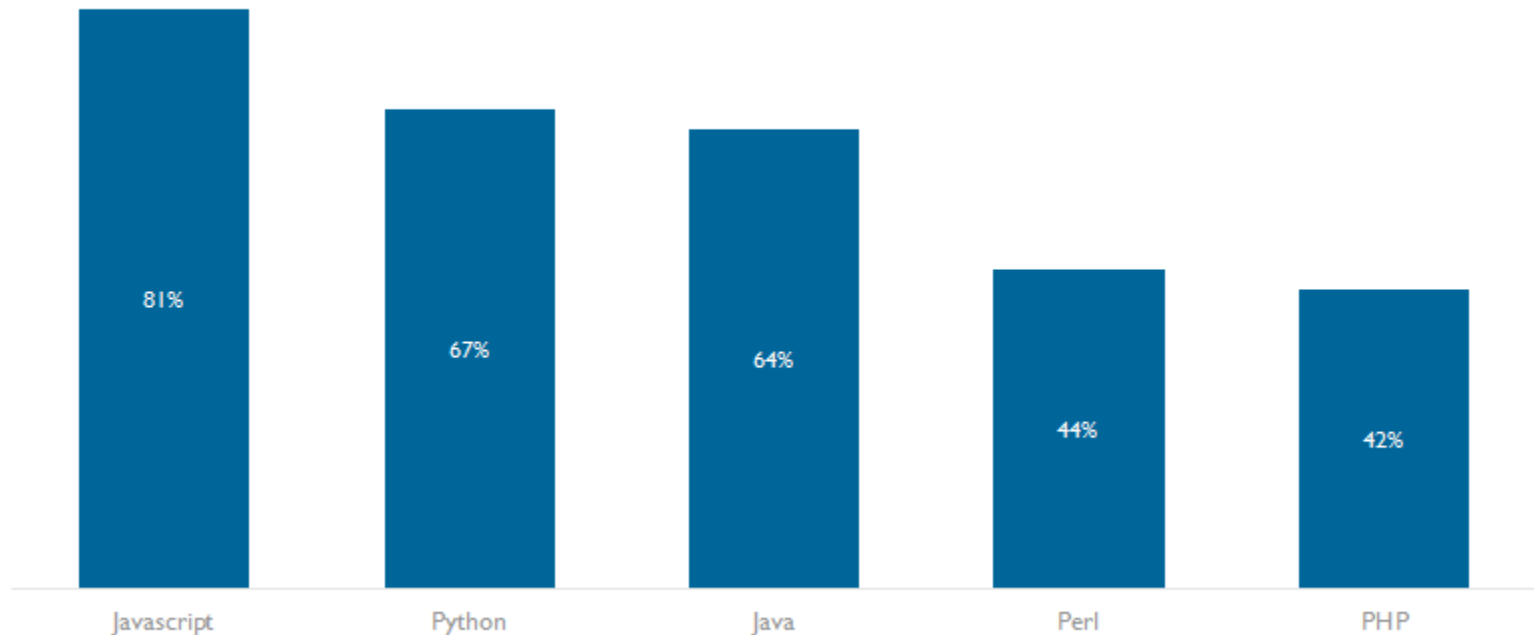# Programming Essentials (66631)

- Some Programming Languages are:
  - BASIC
  - Visual BASIC
  - C
  - C++
  - C#
  - Java
  - Pascal
  - Swift
  - Fortran
  - Python etc.

Python-most popular language in the world.

Top 5 Programming Languages
$1B+ VC-Backed Private Companies, by % of company usage

Javascript	Python	Java	Perl	PHP
81%	67%	64%	44%	42%

CB INSIGHTS

www.cbinsights.com

Python-named from Monty Python Group by by [Guido van Rossum](#)

Guido Van Rossum
Monty Python Group

1.1 State Computer Program and Programming

What is Program & Programming:

Program: In computing, a program is a specific set of ordered operations for a computer to perform a task. Typically, the program is put into a storage area accessible to the computer. The computer gets one instruction and performs it and then gets the next instruction. The storage area or memory can also contain the data that the instruction operates on.

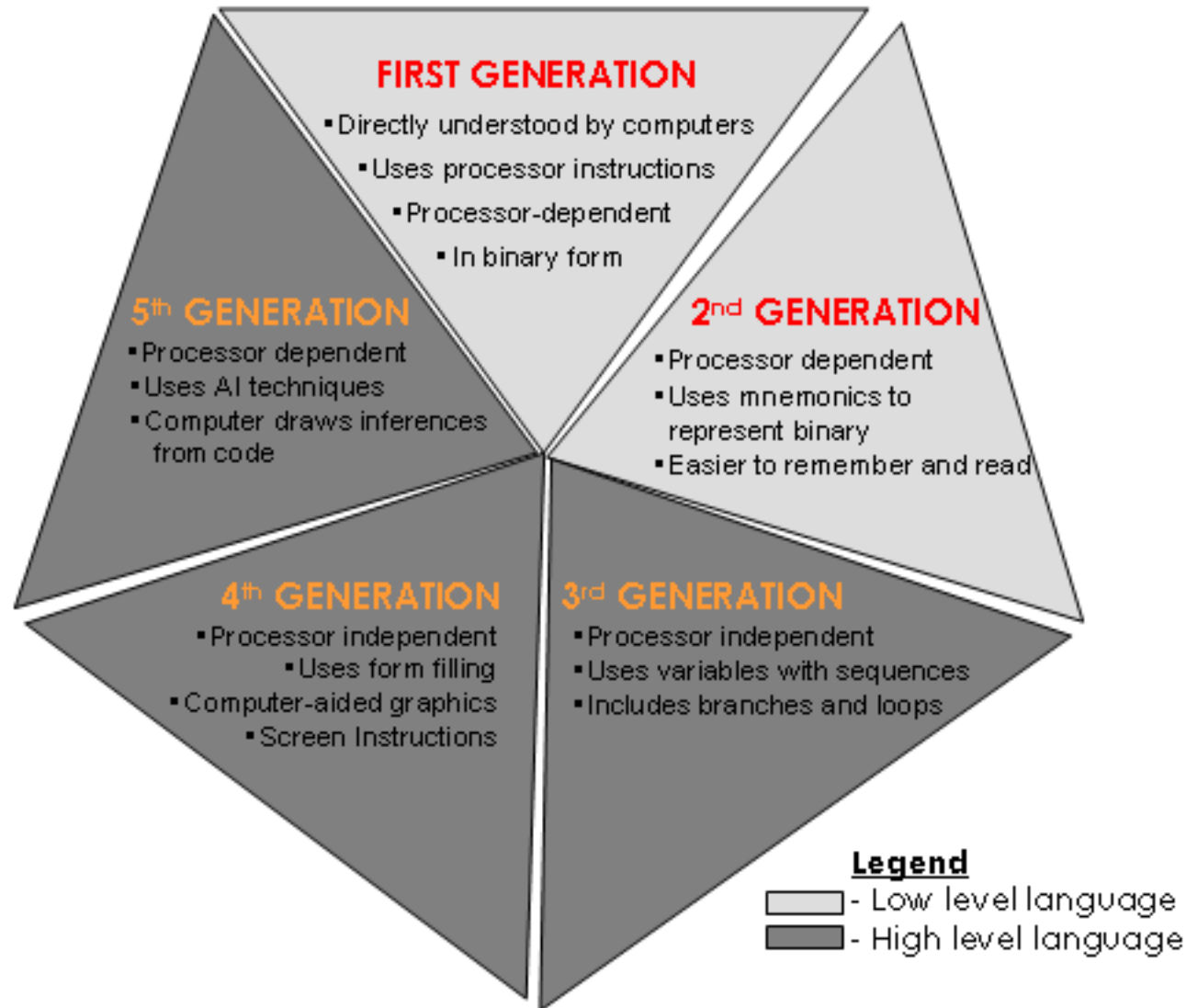Programming: the planning, scheduling, or performing of a computer program

1.2 Explain Programming Language and its classification.

Programming Language: A programming language is a formal language that specifies a set of instructions that can be used to produce various kinds of output. Programming languages generally consist of instructions for a computer. Programming languages can be used to create programs that implement specific algorithms.

Classification of Programming Language:

- Machine Language / Low level Language

- Assembly Language (MASM, ACK, IBM ALP)

- High Level Language (Python, Ada, Algol, BASIC, VB, COBOL, C, C++, FORTRAN, Pascal etc)

1.3 State Generation of Programming Languages.

FIRST GENERATION
- Directly understood by computers
- Uses processor instructions
- Processor-dependent
- In binary form

5th GENERATION
- Processor dependent
- Uses AI techniques
- Computer draws inferences from code

2nd GENERATION
- Processor dependent
- Uses mnemonics to represent binary
- Easier to remember and read

4th GENERATION
- Processor independent
- Uses form filling
- Computer-aided graphics
- Screen Instructions

3rd GENERATION
- Processor independent
- Uses variables with sequences
- Includes branches and loops

Legend
- Low level language
- High level language

1.4 Describe Translator Program.

- **Translator Program:** A **translator** or **programming language processor** is a computer program that performs the translation of a program written in a given programming language into a functionally equivalent program in another computer language (the target language), without losing the functional or logical structure of the original code). such as C, C++, Java, Python etc.

- **Classification of Translator Program:**
  - ➢ Interpreter type
  - ➢ Compiler type

1.5 Uses of Computer Programs

In the Field of

- ✓ Official Documentation
- ✓ Database Management
- ✓ ICT
- ✓ Education
- ✓ Health Sector
- ✓ Computer Networking
- ✓ Machine Learning system, etc

1.6 Describe Algorithm and Flowchart.

- Algorithm:

  a process or set of rules to be followed in calculations or other problem-solving operations, especially by a computer.

Algorithm (Simple example)

Add two numbers:

Step-1: Start

Step-2: Input two numbers from Keyboard.

Step-3: Add two numbers

Step-4: Print result

Step-5: Stop.

1.7 Prepare Algorithm and Flowchart for simple problems.

- Flowchart:

➢ a graphical representation of a computer program in relation to its sequence of functions.

➢ Flowcharts use simple geometric symbols and arrows to define relationships.

1.7 Symbols of Flowchart:

Symbol	Name	Description
→	Flow line (Arrowhead)	Shows the process's order of operation. A line coming from one symbol and pointing at another.
(rounded terminal shape)	Terminal (Start & Stop)	Indicates the beginning and ending of a program or sub-process.
(rectangle)	Process	Represents a set of operations that changes value, form, or location of data.
(diamond)	Decision	Shows a conditional operation that determines which one of the two paths the program will take. The operation is commonly a yes/no question or true/false test.
(parallelogram)	Input / Output	Indicates the process of inputting and outputting data, as in entering data or displaying results.
(open rectangle with line)	Annotation (Comment)	Indicating additional information about a step the program. Represented as an open rectangle with a dashed or solid line connecting it to the corresponding symbol in the flowchart.
(rectangle with double vertical edges)	Predefined Process	Shows named process which is defined elsewhere. Represented as a rectangle with double-struck vertical edges.
(small circle)	On-page Connector	Pairs of labeled connectors replace long or confusing lines on a flowchart page. Represented by a small circle with a letter inside.
(pentagon/home plate shape)	Off-page Connector	A labeled connector for use when the target is on another page.

1.7 Prepare Algorithm and Flowchart for simple problems (Example):
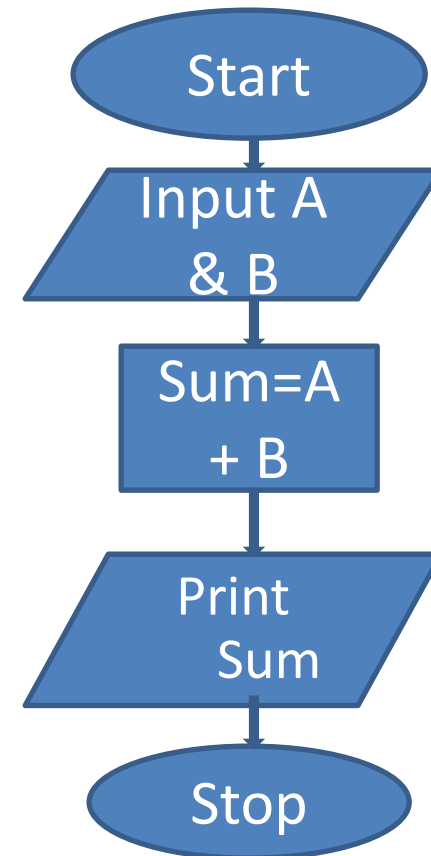
Algorithm: Add two numbers

Step-1: Start

Step-2: Input two numbers
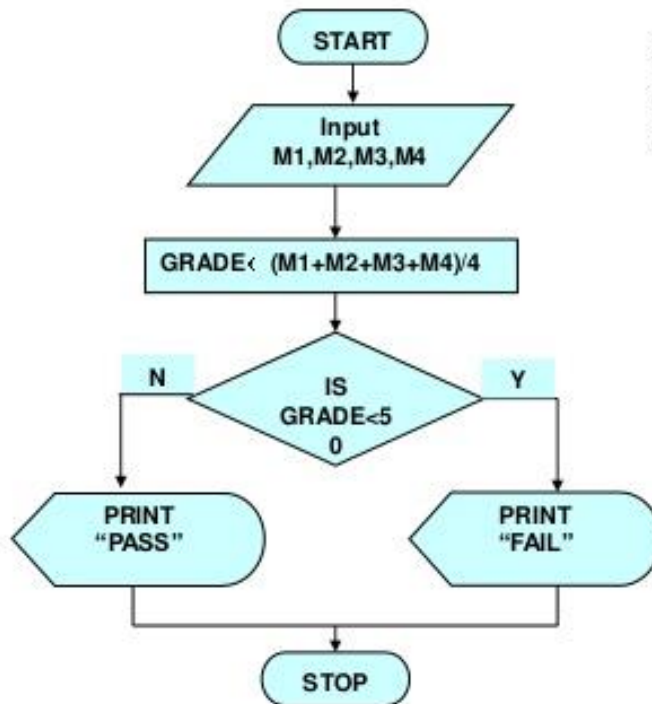from Keyboard.

Step-3: Add two numbers

Step-4: Print result

Step-5: Stop.

Flowchart: Add two numbers

Start

Input A & B

Sum=A + B

Print Sum

Stop

1.7 Prepare Algorithm and Flowchart for simple problems (Example).

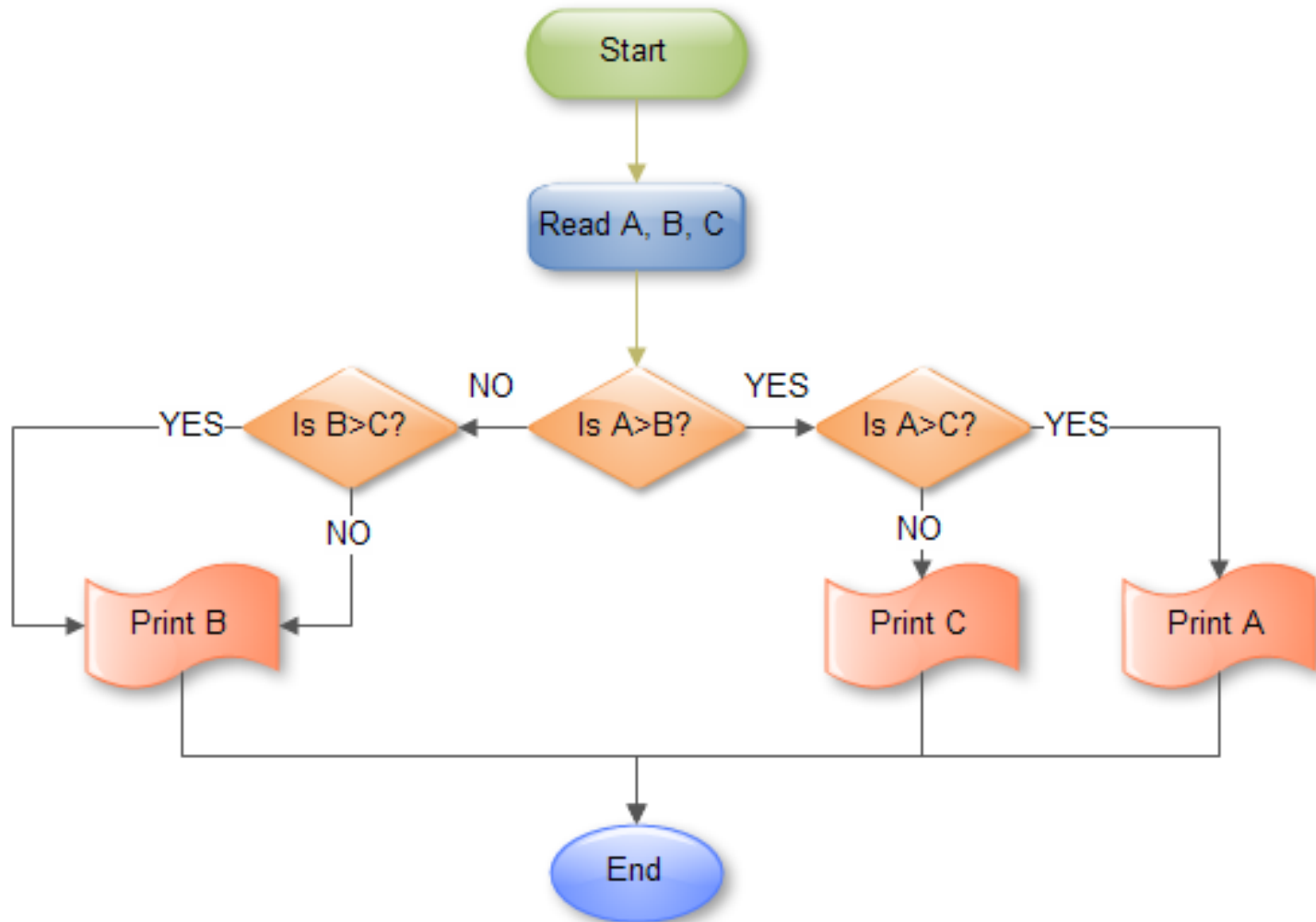## EXAMPLE 1

Step 1: Input M1,M2,M3,M4
Step 2: GRADE ← (M1+M2+M3+M4)/4
Step 3: if (GRADE <50) then
Print "FAIL"
else
Print "PASS"
endif

1.7 Prepare Algorithm and Flowchart for simple problems (Largest number from three).
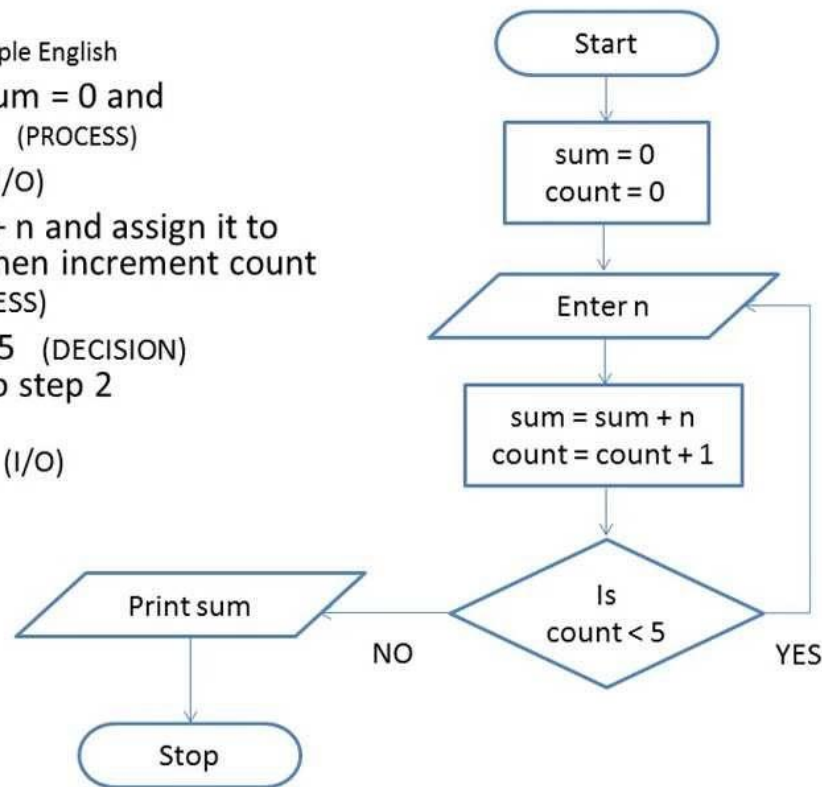
1.7 Prepare Algorithm and Flowchart for simple problems (Example-2):

Find the sum of 5 numbers

Algorithm in simple English
1. Initialize sum = 0 and count = 0 (PROCESS)
2. Enter n (I/O)
3. Find sum + n and assign it to sum and then increment count by 1 (PROCESS)
4. Is count < 5 (DECISION)
   if YES go to step 2
   else
   Print sum (I/O)

Flowchart

Start

sum = 0
count = 0

Enter n

sum = sum + n
count = count + 1

Is count < 5

Print sum

NO

YES

Stop

1.8 Explain the Process of Program Planning.

Steps of Program Planning:

- Problem Analysis
- Input / Output selection
- Algorithm & Flowchart development
- Program Coding
- Program Testing & Debugging
- Documentation & Maintenance

১. প্রোগ্রাম, প্রোগ্রামিং, প্রোগ্রামিং ল্যাংগুয়েজ, ট্রান্সলেটর প্রোগ্রাম, ইন্টারপ্রেটার ও কম্পাইলার বলতে কী বোঝায়?

২. বিভিন্ন প্রকার প্রোগ্রামিং ল্যাংগুয়েজের শ্রেণীবিভাগ উদাহরণসহ সংক্ষেপে লেখ।

৩. বিভিন্ন প্রজন্মের কম্পিউটার ল্যাংগুয়েজের বৈশিষ্ট সমূহ সংক্ষেপে লেখ।

৪. কম্পিউটার প্রোগ্রামের কয়েকটি ব্যবহারিক ক্ষেত্রের নাম লেখ।

৫. অ্যালগরিদম ও ফ্লোচার্ট বলতে কী বোঝায়? পার্থক্য লেখ।

৬. ফ্লোচার্টে ব্যবহৃত প্রতিক সমূহ সংক্ষেপে বর্ণনা কর।

৭. প্রোগ্রাম পরিকল্পনার ধাপসমূহ বর্ণনা কর।

৮. নিম্নের সমস্যা সমূহ সমাধানের অ্যালগরিদম ও ফ্লোচার্ট দেখাওঃ
দুটি/তিনটি সংখ্যার যোগফল, তিনটি সংখ্যার গড় মান, বৃত্ত/ত্রিভূজের ক্ষেত্রফল, দুটি/তিনটি সংখ্যার মধ্যে বড় /ছোট সংখ্যা নির্ণয়।