Algorithm

* Set of instruction when executed in a sequence will get a solution.

Representation of Algorithm

1. Normal English
2. Flowchart
3. Pseudocode

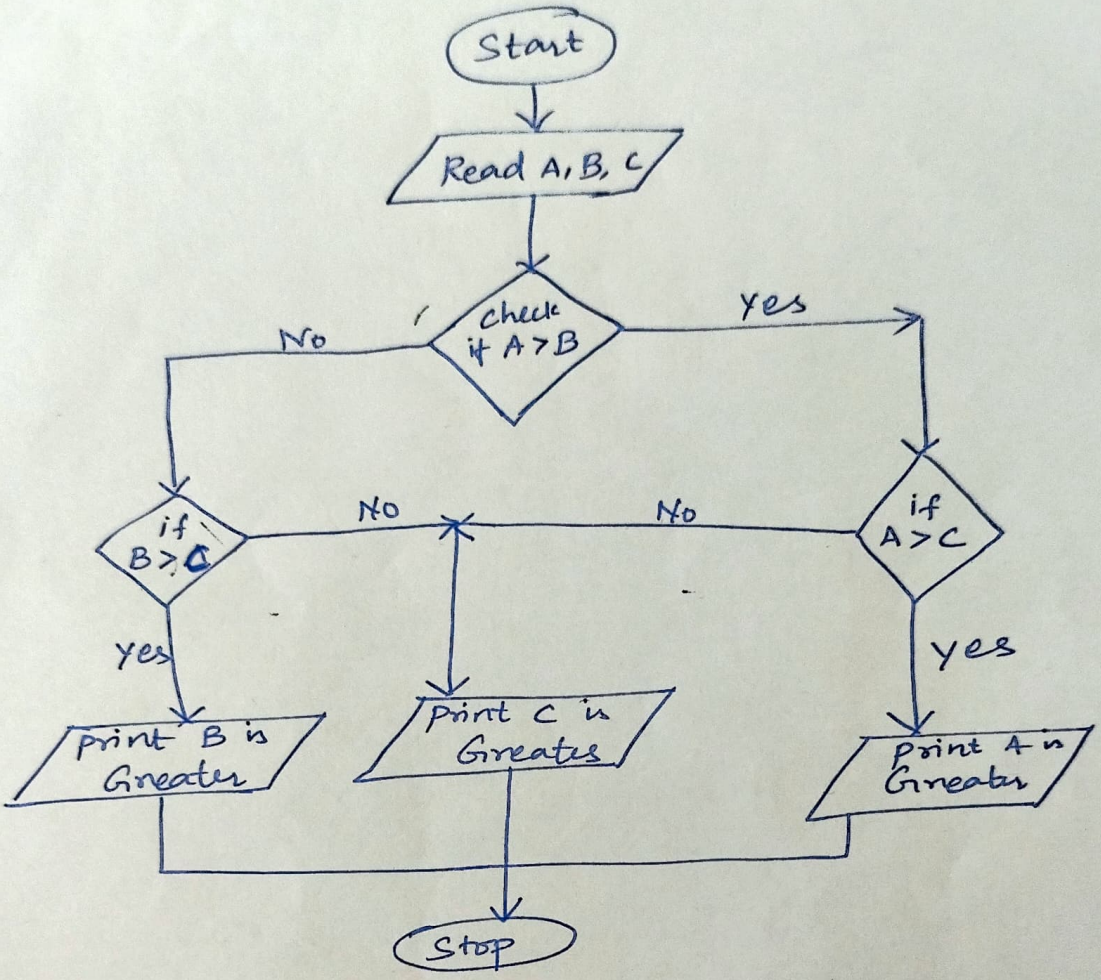
Flowchart.

① Flow lines
② Terminal Symbols
③ Input/ output Symbol
④ Process Symbol
⑤ Decision Symbol
⑥ Connectors.

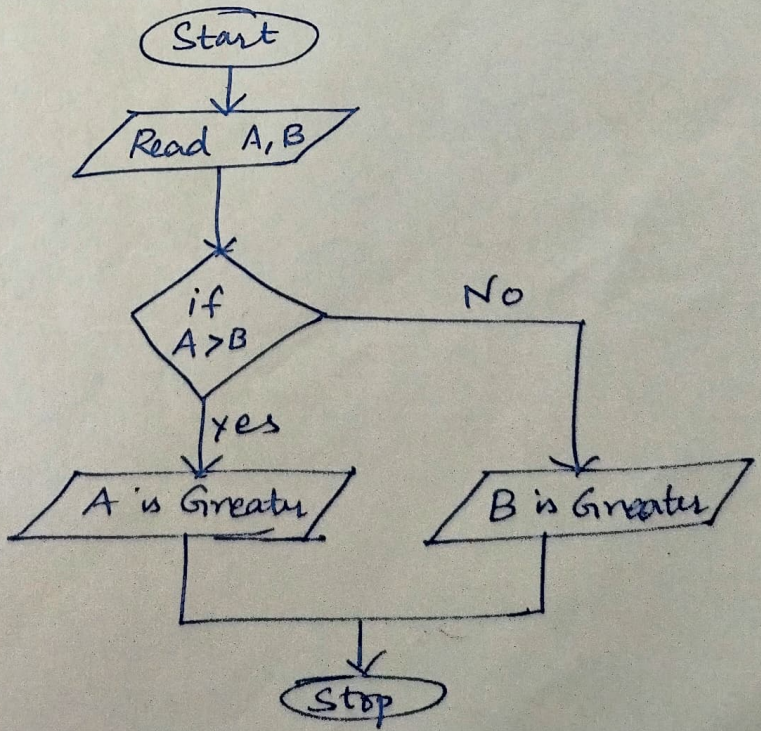
Example:

1. Addition of two numbers
2. Greatest of two numbers, even/odd, Neg/Positive.
3. Calculate the SI, Area of circle
4. Calculate Total & Average of Students in a class
5. Sum of 5 numbers.

Greatest of Three Numbers.



Greatest of two numbers.



* Algorithm. After plan for developing pgm by logic - correct seq & Procedure of instn required to carryout the task.

* Algorithm - logic of the program. It is the basic tool used to develop problem solving.

* " a sequence (Unambiguous - (clear)) of instructions designed in such a way that if the instn are executed in specified sequence, the desired results will be obtained".

Characteristics:

* Algorithm - precise & Unambiguous
  - instn should not be repeated again.
  - instn should be in sequence.
  - Result produced after algorithm terminates.

Representation of Algorithms.

* Normal English
* Flowchart
* Pseudocode
* Decision table
* program.

Flowchart

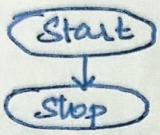
* pictorial representation of an algorithm. Sequential steps are represented in flowchart using standard symbols.
* layout & visual representations of the plan.
* Symbol - oriented design - identifies the type of stmt from the symbols used.
* Arrows ← Connecting b/w 2 symbols.
* process of drawing flowchart for an algorithm is called Flowcharting.
* Flowcharts : Easy to Understand.
  - helps in reviewing & debugging of a pgm.
  - easy to analyze & compare various methods.

Symbols used:

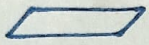
① Flowlines → L ← R ↑ Top ↓ Bottom

Exact sequence in which instructions are to be executed. Drawn with arrow head.

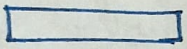
② Terminal Symbol



[oval shape] → begin + end
→ start (no entering ↓)
→ stop (no ↓ exit flow line.)

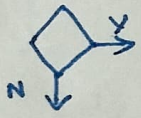
③ Input/output Symbol.  [parallelogram]

- Input (Read) & output (write)
- denotes fn of I/o devices in the pgm.

④ Process Symbol  [Rectangle]

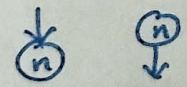
- used for calculations & initializations of memory locations.
- Arithmetic operations, data movements.

⑤ Decision Symbol



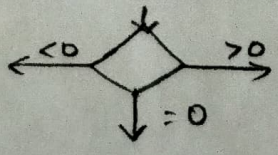
[Diamond shaped symbol]

- Indicate at a point decision is to be made b/w two alternatives.
- Yes (True), NO (False).

⑥ Connectors  [circle & a digit/letter placed in link to specify the link].

Rules: Example: Greatest of 2 nos, odd/even, +ve/-ve number.

* Standard symbols should be used.
* only one should enter decision symbol, 2/3 flow lines can leave decision according to the possible answer.



* Annotation Symbol - describe data/ computational steps more clearly ----[This is top secret data

- Flow lines should not cross eachother.

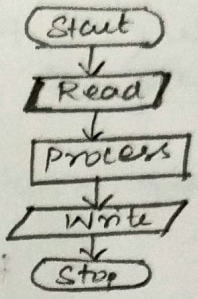
words in Flowchart - common stmts & easy to understand.

Design structures in Flowcharts.

Design flowchart for any program & later we can combine to get the solution for complex problems, 3 designs:

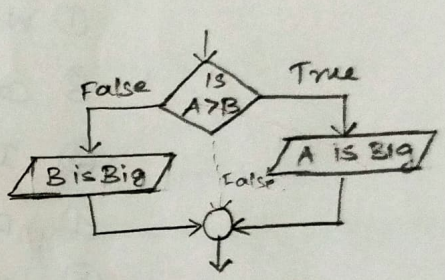
(1) Sequence structure.

- simplest, series of stmts
- sequence (same direction)
- can include any number of instn.



(2) Selection structure.

- Decision (make questions).
- operations done on decision made.
- 2 exists (two branches
  ↓
  rejoined to single flow to exit the structure)



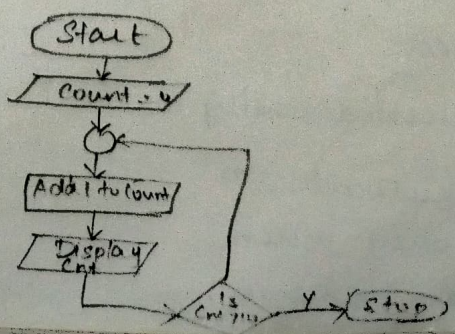
- Selection (True → one-sided selection)
  * null-sided should end with Exit.

(3) Loop structure.

Execute sequence of steps in no. of times until particular Condition is met

(i) Top tested loop → if Count < 10 → T → goes into loop
F → goes to stmt after loop.

(ii) Bottom tested loop → Trailing decision loop
decision - last stmt of loop.



Pseudocode.

* Flowcharting symbols were established bf structured program
* So flowchart will not be able to handle some concepts.
* pseudocode - formal design tool with structured design
  - visual, narrative, used for planning prog. logic

Pseudocode (Also called PDL) Program Design Language
- pseudo (initiation / false).
- code (set of stmts / instn in pgm. lang).
- written in English, very clear.
- Rules:
  1. Write one stmt per line.
  2. Capitalize initial keywords.
  3. Indent to show hierarchy
  4. End multiline structure.
  5. keep stmt lang independent.

Example. To calculate student total and average.

```
READ    name, class, M1, M2, M3
        Total = M1+M2+M3
        Average = Total/3
IF      average is greater than 75
        Rank = Distinction
ENDIF
WRITE   name, Total, Average, Rank
```

Advantages.
- word processor
- easily Modified
- read & understood easily
- converting pseudocode to pgm. lang is easy when compared with flowchart.

Disadvantages.
- Not visual (pictorial represent)
- No standardised style/Format