Algorithms and Flowcharts

1. **What is an algorithm? Write any three characteristics of an algorithm.**

The step-by-step procedure to solve any logical and mathematical problem is called an Algorithm. Three characteristics of an algorithm are:

1. **Input** — An algorithm accepts an input.
2. **Generality** — An algorithm works in a set of inputs.
3. **Definiteness** — Each instruction should be written in a simple and precise manner so that everyone can understand it.

2. **What is Flowchart?**

A flowchart is a diagrammatic representation of a problem-solving process in which steps are laid out in logical order.

3. **What are the characteristics of a good algorithm?**

Following are the characteristics of a good algorithm:

a. It receives an input.
b. It works on a set of inputs.
c. The steps must be precisely defined.
d. The result of each step should depend on the results of previous steps.
e. It stops after a finite number of instructions.
f. It produces the desired output.

4. **What are the advantages of Algorithm?**

- It is a step-wise representation of a solution to a given problem, which makes it easy to understand.
- An algorithm uses a definite procedure.
- It is not dependent on any programming language, so it is easy to understand for anyone even without programming knowledge.
- Every step in an algorithm has its own logical sequence so it is easy to debug.

5. **Explain the different symbols used in a flowchart.**

Following are the different symbols used in a flowchart:

a. **Oval (Start/Stop box):** Used to indicate the start and end of the program.
b. **Rectangle (Process box):** Indicates processes or actions.
c. **Parallelogram (Input/Output box):** Indicates input and output of a program.
d. **Diamond (Decision box):** Used in situation which demands one to choose either 'Yes' or 'No'.
e. **Arrow line (Flow lines):** Shows the flow of logic in a flowchart.

Symbol	Name	Function
	Start/end	An oval represents a start or end point
	Arrows	A line is a connector that shows relationships between the representative shapes
	Input/Output	A parallelogram represents input or output
	Process	A rectangle represents a process
	Decision	A diamond indicates a decision

6. **What are the two types of connectors in a flowchart? Explain their uses.**
   Following are the two types of connectors in a flowchart:
   a. **Off-page connectors:** Used for joining the parts of a flowchart that occupies more than one page.
   b. **On-page connectors:** To join the parts of a flowchart contained within one page.
7. **What are the rules for flowcharting?**
   Following are the rules for flowcharting:
   a. A flowchart should have only one Start and one Stop symbol.
   b. The general direction of flow in a flowchart is from top to bottom or from left to right.
   c. Arrowheads are used to indicate the flow of information or sequence of steps.

d. The arrow lines should not cross each other.

e. Off-page and on-page connectors should be used when joining parts of a flowchart spanning multiple pages/same page.

8. What are the advantages of Flowchart?

- Flowchart is an excellent way of communicating the logic of a program.
- Easy and efficient to analyze problem using flowchart.
- During program development cycle, the flowchart plays the role of a blueprint, which makes program development process easier.
- After successful development of a program, it needs continuous timely maintenance during the course of its operation. The flowchart makes program or system maintenance easier.
- It is easy to convert the flowchart into any programming language code

9. What are the Disadvantage of flowchart?

- The flowchart can be complex when the logic of a program is quite complicated.
- Drawing flowchart is a time-consuming task.
- It is just a visualization of a program, it cannot function like an actual program

Write the Algorithm to solve the following problems:

Question 1

To polish your shoes.

Algorithm

Step 1: Start
Step 2: Open the shoe polish
Step 3: Put shoe polish on brush
Step 4: Polish one shoe
Step 5: Put shoe polish on brush
Step 6: Polish the other shoe
Step 7: Close the shoe polish
Step 8: Stop

Question 2

To go for a class picnic

Step 1: Start
Step 2: Decide the picnic venue, date and time
Step 3: Decide the picnic activities
Step 4: Hire a vehicle to reach to the venue and comeback
Step 5: Goto to the picnic venue on the decided date
Step 6: Do the activities planned for the picnic
Step 7: Come back to school in the hired vehicle
Step 8: Stop

Question 3

To make tea/coffee

Step 1: Start
Step 2: Boil water in a saucepan
Step 3: Add tea to boiling water
Step 4: Add sugar to boiling water
Step 5: Add milk to boiling water
Step 6: Boil this water with all the ingredients for 2 mins
Step 7: Sieve the tea in a cup
Step 8: Stop

Question 4

To celebrate New Year

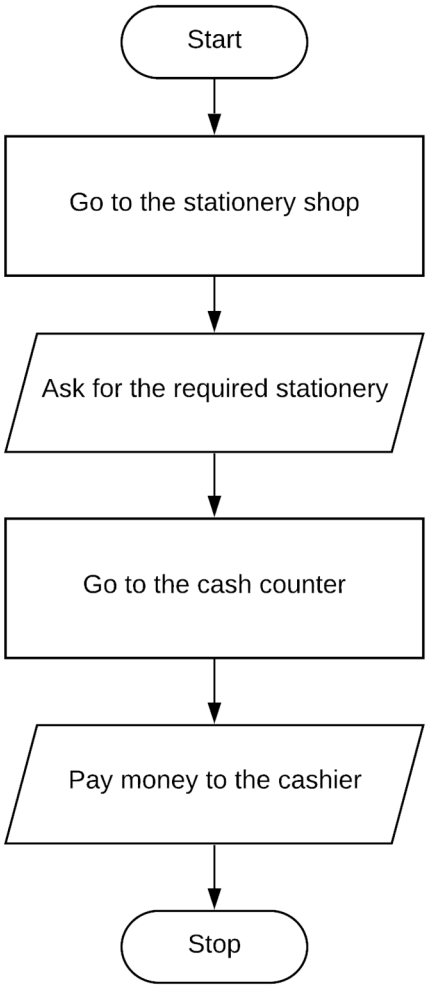
Step 1: Start
Step 2: Prepare a guest list for New Year party
Step 3: Decide the venue, food menu, games and fun activities for the party
Step 4: Invite the guests for the party
Step 5: On New Year eve, get ready and enjoy the party
Step 6: Stop

Draw the following flowcharts

Question 1

Draw a flowchart to buying stationery from the market.

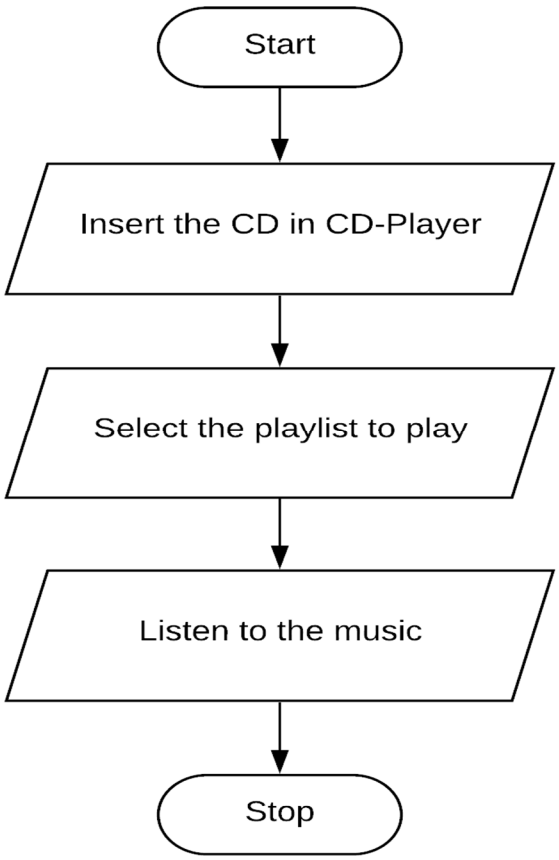
Flowchart



Question 2

Flowchart

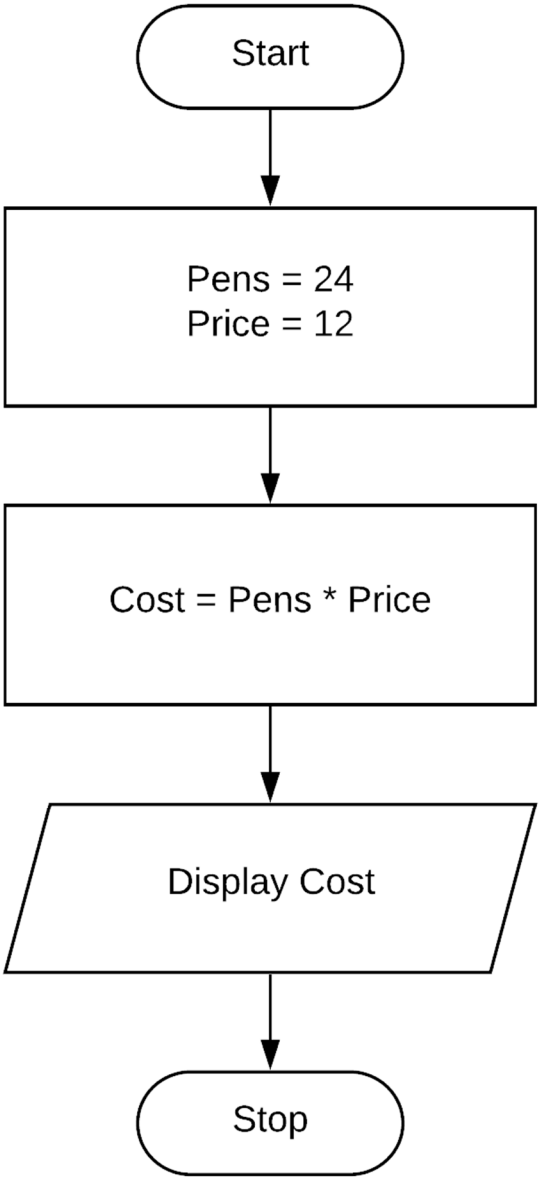
Draw a flowchart in Microsoft Word for the steps required to play music stored in a CD.



Question 3

Draw a flowchart in Microsoft Word for the steps required to find the cost of 24 pens when the cost of one pen is Rs. 12.

Flowchart



1. Algorithm & Flowchart to find the sum of two numbers

Algorithm

Step-1 Start

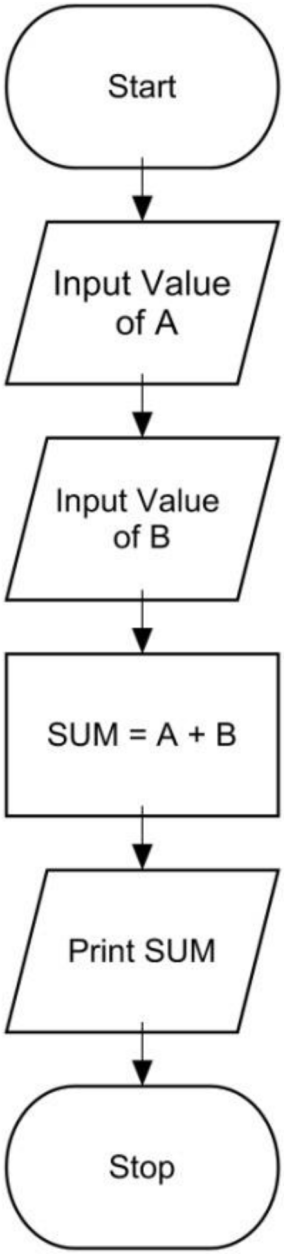
Step-2 Input first numbers say A

Step-3 Input second number say B

Step-4 SUM = A + B

Step-5 Display SUM

Step-6 Stop



2. Algorithm & Flowchart to find Area and Perimeter of Square

Algorithm

Step-1 Start

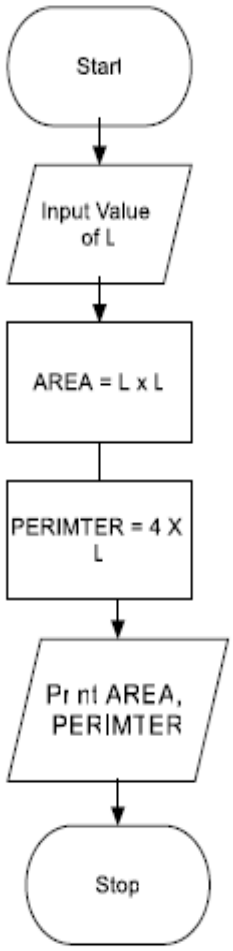
Step-2 Input Side Length of Square say L

Step-3 Area = L x L

Step-4 PERIMETER = 4 x L

Step-5 Display AREA, PERIMETER

Step-6 Stop



3. Algorithm & Flowchart to find Area and Perimeter of Rectangle

Algorithm

Step-1 Start

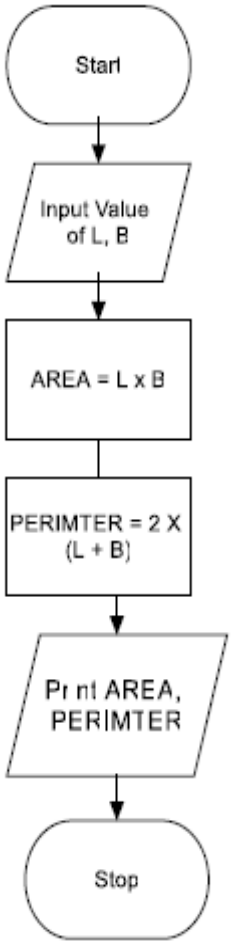
Step-2 Input Side Length & Breadth say L, B

Step-3 Area = L x B

Step-4 PERIMETER = 2 x (L + B)

Step-5 Display AREA, PERIMETER

Step-6 Stop



4. Algorithm & Flowchart to find Area and Perimeter of Circle

Algorithm

Step-1 Start

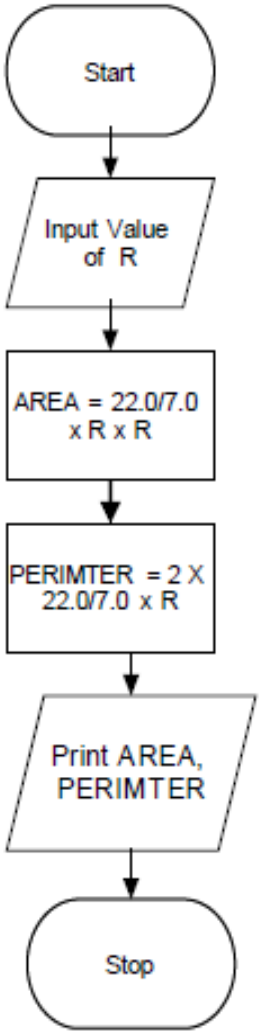
Step-2 Input Radius of Circle say R

Step-3 Area = 22.0/7.0 x R x R

Step-4 PERIMETER = 2 x 22.0/7.0 x R

Step-5 Display AREA, PERIMETER

Step-6 Stop

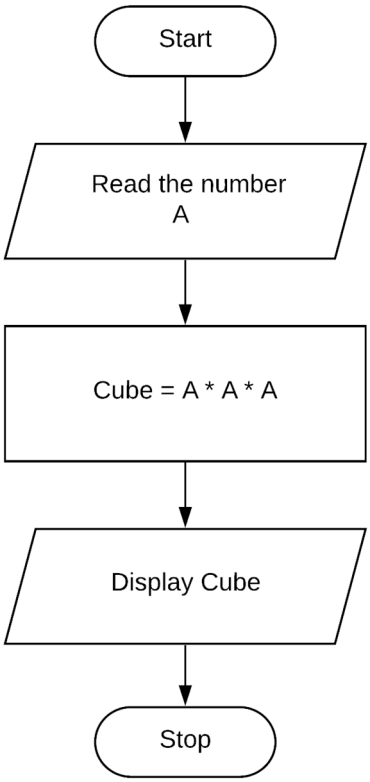


5.Finding the cube of a given number.

Algorithm

Step 1: Start
Step 2: Read the number and store it in a.
Step 3: Calculate cube of number as a * a * a
Step 4: Print cube of number
Step 5: Stop

Flowchart



6.Algorithm & Flowchart to find Simple Interest

P : Principle Amount

N : Time in Years

R : % Annual Rate of Interest

SI : Simple Interest

Algorithm

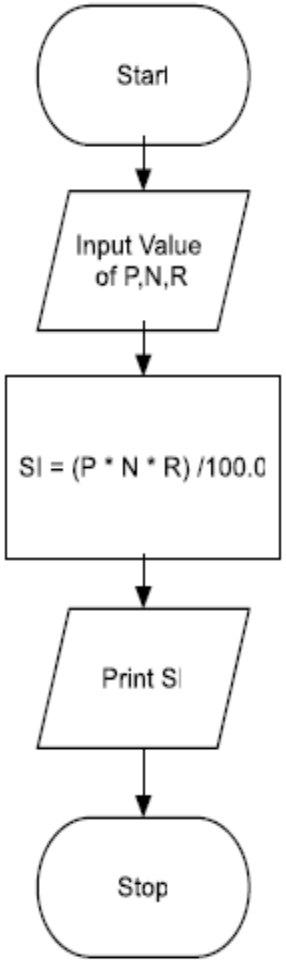
Step-1 Start

Step-2 Input value of P, N, R

Step-3 SI = (P x N x R)/100.0

Step-4 Display SI F

Step-6 Stop



7.

Algorithm & Flowchart to find the smallest of two numbers

Algorithm

Step-1 Start

Step-2 Input two numbers say NUM1,NUM2

Step-3 IF NUM1 < NUM2 THEN

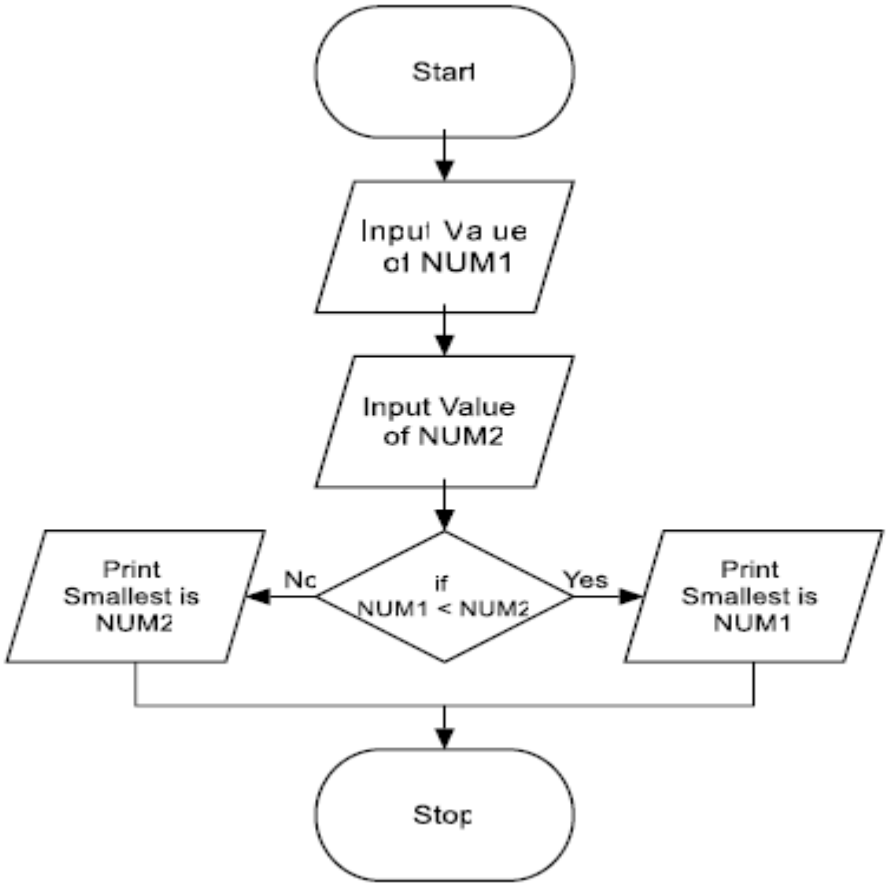
print smallest is NUM1

ELSE

print smallest is NUM2

ENDIF

Step-4 Stop



8.Accept the age of a person. Display the message Eligible for Role if the age is equal to or greater than 18, otherwise display the message Not Eligible.