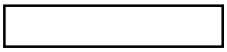
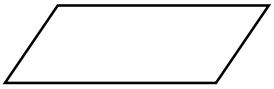
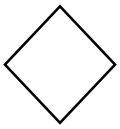
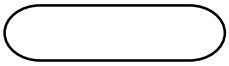
Problem solving methodology

One marks

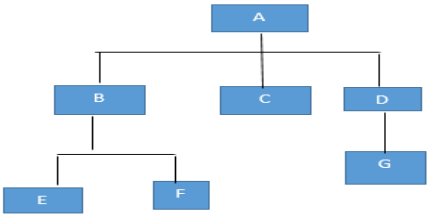
1. Define stepwise refinement
   Refining the solution at each stage of solving the problem
2. What is flow chart?
   Pictorial or graphical representation of solution to any problem
3. What is top down design?
   The process of dividing the complex problem into sub problem, and then dividing into sub more so that very easily we can arrive at solution.
4. What are sequential construct?
   The ability of a programming language to execute the statement one after the other from beginning to end.
5. we can use for loop
   Only when we know how many time the loop is repeating
6. What are selection construct?
   The ability of the programming language to allow the user to decide on the execution of a certain set of statements based on condition.
7. Define iteration construct. Or define looping
   The ability of the programming language to allow the user to repeat the execution of certain set of statement again and again until the condition is satisfied.
8. Name the pre tested looping statement
   While loop
9. Which is the fixed iteration statement
   for loop
10. Define debugging
    It is the process of checking and correcting the errors
11. What is top down design?
    It is the process of dividing complex problem into sub problem and further dividing the sub problem into sub more problem until easily arrive at solution
12. Define Algorithm
    An algorithm is a step by step procedure to implement the solution to solve a problem
13. Which is the post testing looping statement
    Do-while

Two marks

1. **Write the various symbols used in flow chart**

Symbol	Meaning
	Process
	Input or output
	Decision
	Terminator (Start and stop)

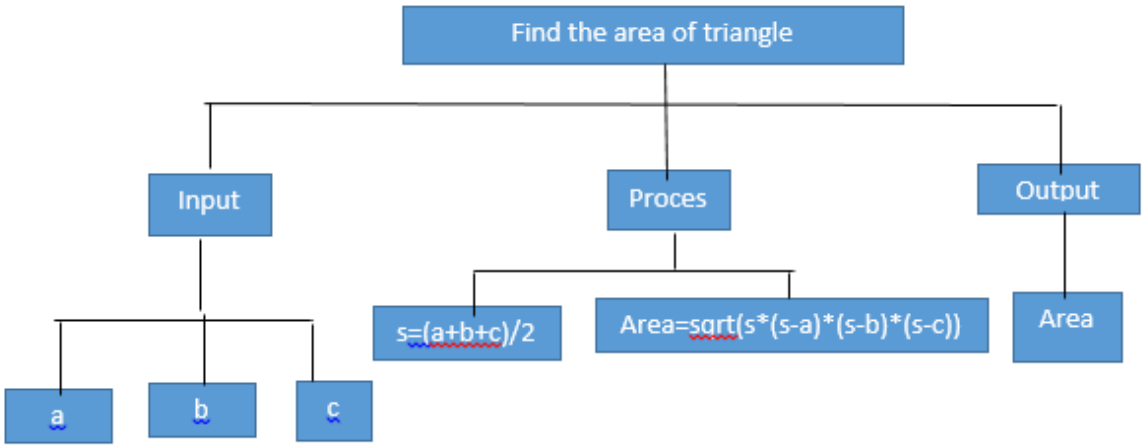
2. **Give the advantages of flow chart**
   Independent of programming language
   It is easy to convert it into program
   It is easy to understand
   Easy to test and debug
3. **Give the advantages of Algorithm**
   Easy to write
   Independent of programming language
   It is easy to understand
   Easy to test and debug
4. **What is iteration? Name the iteration construct**
   It is the ability of the programing language to execute certain set of statement again and again until given condition is satisfied.
   The some of iteration constructs are while loop , do-while loop ,for loop
5. **What is source code and object code?**
   Source code is the program written by the user in any programming language
   Object code is the machine understandable code created by compiler
6. **Write a note on top down approach**
   It is the process of dividing complex problem into sub problem and further into sub more problem. This approach is easy to understand , easy to develop. There will be less chance of error



7. **Briefly explain documentation**
   Documentation: The process of writing comment and text that makes the program easier for others to read and modify.

There are two types of documentation
1) Internal documentation: It can also called as technical documentation which is easy to update program in later stage
2) External documentation : It is the process of providing additional textual information by means of user manual

8. **Write the advantages of structured programming**
   Complexity can be reduced using the concepts of divide and conquer.
   Code reusability
   reduces complexity and
   increase readability
9. **Briefly explain maintenance**
   Maintenance: The process of updating or providing new version of the program so that the program meets the present day requirement of the user
   Normally we have to maintain the program wen the user requirements are changed or newly purchased hardware is not supported by the software.
10. **Write top down design to find area of triangle**



Three marks

1. **Write an algorithm to find the area and circumference of circle**
   Step1: Start
   Step2: Read R
   Step3: Find Area= 3.142*R*R
   Step4: Find C=2*3.142*R
   Step5: Print Area and C
   Step6: Stop
2. **Explain different types of error**
   Syntax error: Error due to wrong usage of syntax or grammar of programming
   Semantic error: These are error due to wrong usage of logic
   Runtime error: Error that we get during running of the program
   Logical error: These error occurs by the correct translation of algorithm
3. **Explain three basic programming constructs**
   The tree basic programming constructs are
   sequential construct: The ability of a programming language to execute the statement one after the other from beginning to end.
   Selection construct: The ability of the programming language to allow the user to decide on

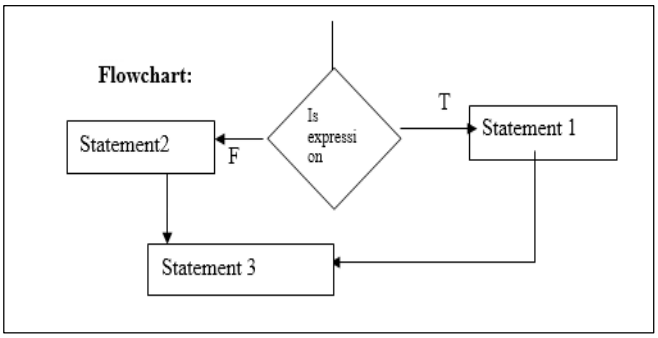
the execution of a certain set of statements based on condition.

Iteration construct: The ability of the programming language to allow the user to repeat the execution of certain set of statement again and again until the condition is satisfied

4. **Explain if else statement with an example**

The if else statement is also called as two way branching statement.

syntax: if(expression)
statement1;
else
statement2;



Ex: if(n%2= = 0)

cout<<"is even";
else
cout<<"is odd";

5. **What are advantages of modular programming**

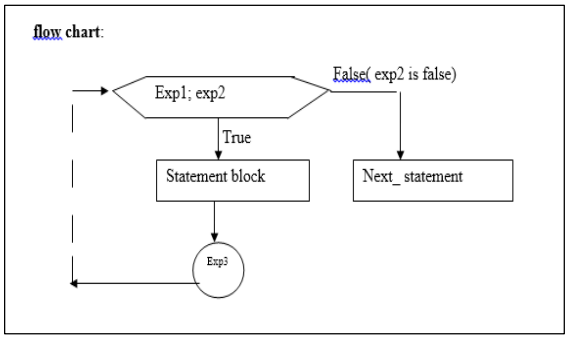
Code reusability
Debugging is easier
Portability
Building library

6. **Explain for loop**

The for statement is also called as fixed iteration looping statement .Because we can use the for loop only if we know how much time a loop repeats.

Syntax:

for(exp1;exp2;exp3)
{
statement1;
statement2;
}
next_ statement



Where

exp1 is initialization of expression
exp2 is termination condition for loop
exp3 is increment or decrement value of loop

Ex: for(i=1;i<4;i++)
cout<<i<<"\t";

Working of for loop:

1)The expression 1 is evaluated first.

2) And then checking of condition will takes place ie. The expression 2 is evaluates

3) If the value evaluates in expression 2 is true then the statement block is executes

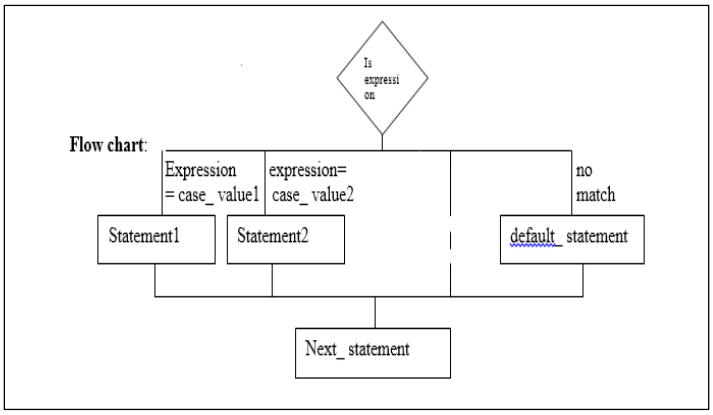
4) Then the expression 3 is evaluates and control transfer back and again checks the condition or evaluates expression 3 and repeat the steps.

7. **Write the algorithm to interchange the two values using third variable**
   Step1: Start
   Step2: Read A and B
   Step3: T=A
   Step4: A=B
   Step5: B=T
   Step6: Print A and B
   Step7: Stop
8. **Write the algorithm to interchange the two values using third variable**
   Step1: Start
   Step2: Read A and B
   Step3: A=A+B
   Step4: B=A-B
   Step5: A=A-B
   Step6: Print A and B
   Step7: Stop
9. **Define a) Coding b) Debugging c)testing**
   Coding: The process of writing program instruction for an analyzed problem in a programing language.
   Debugging: Process of finding and correcting program errors
   Testing: The process of checking whether the program works correctly according to the users requirement.
10. **Explain different types of error**
    Syntax Error: The error due to wrong use of rule
    Semantic Error: The error due to wrong use of logic
    Logical Error: The error due to correct translation of the algorithm
    Runtime Error: The error detected during the execution of the program

Five marks

1. **Explain working of switch statement with example**
   The switch statement allows to select one statement among group of statement.
   Syntax:

```
switch (expression)
{
 case case_value1: statement1;
                   break;
case case_value2: statement2;
                   break;
case case_value3: statement3;
                   break;

default:  default_ statement;

}
```

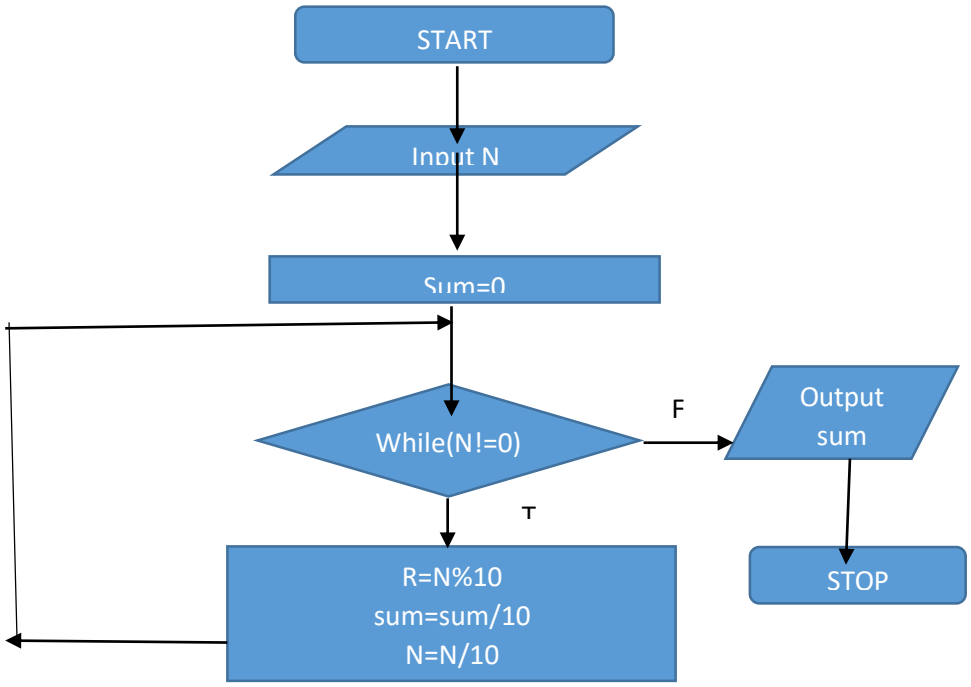


In switch statement the expression (control statement) is evaluated first and that value is matched with corresponding case value if match is found between the case value and the value

of expression then that block is executed. If there is no match then the default statement is executed.
The break statement at the end of each block indicates the end of a particular case value and causes the end of switch statement.
Note: The expression of switch (control expression) is evaluated first and it may have either integer or character value.
No two case values have identical case value
The default statement is optional

Example: **Ex:** switch(j)
{
case 1: cout<<“one”;
break;
case 2: cout<<“two”;
break;
default: cout<<“enter valid number”;
}

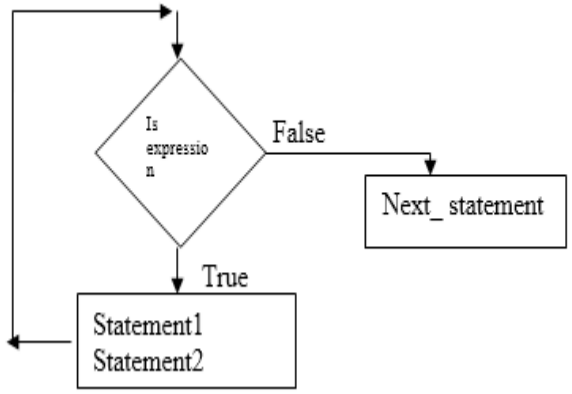
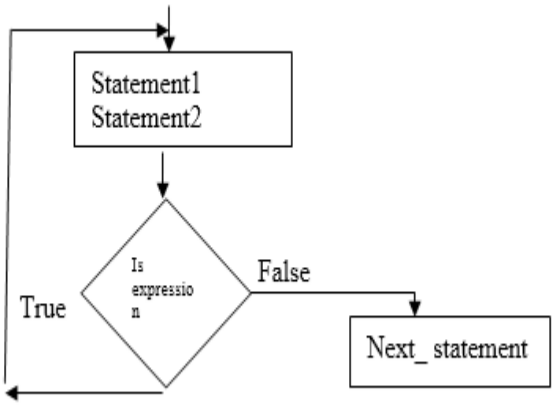
2. **Write algorithm to find largest(greatest) of three number**
   Step1: Start
   Step2: Read A, B and C
   Step3: Big=A
   Step4: if(Big<B)
   Big=B
   else if(Big<C)
   Big=C
   [End IF]
   Step5: Print Big
   Step6: Stop
3. **Draw flowchart to find sum of digits in a given number**



4. **Write the difference between while and do while**

While	Do while
Pre tested looping structure	Post tested looping structure
If given condition is true then only the body of the condition will be executed	Even though the condition is false he body of the looping will be executed at least once
It is entry control looping statement	It is exit control looping statement

Syntax: while(expression)
{
statement1;
statement2;
}
next_ statement;
	Syntax: do
	{
	statement1;
	statement2;
	} while(expression);
	next_ statement;

Ex: count=1;
while(count<=5)
{
cout<<count<<"\n";
count++;
}
	Ex: count=1;
	do
	{
	cout<<count<<"\t";
	count++;
	} while(count<=5);

5. **Write an algorithm to find factorial of a number**
   Step1: Start
   Step2: Read N
   Step3: Initialize F=1
   Step4: for (I=1 to N) Do
   F=F*I
   Step5: Print F
   Step6: Stop
6. **Briefly explain different stages of problem solving**
   The term problem solving can be defined as the task of expressing the solution of complex problems in terms of simple operations understood by the computer. It has 7 stages
   1) Problem definition: We can define only when we know what we want to do
   2) Problem Analysis: Once we understand the problem we can solve by asking the different

types of questions

3) Design of problem solution and use of design tool : By using the design tools like flow chart and algorithm we can implement the solution to the problem

4) Coding: The process of writing program instructions for analyzed problem in an programming language

5)Testing and de bugging: Testing is the process of checking whether the program works correctly or not to the requirement of the user. The Debugging is the process of finding and correcting the program errors

6) Documentation: The process of writing comment and text that makes the program easier for others to read and modify

7)Maintenance: The process of updating or providing new version of the program so that the program meets the present day requirement of the user

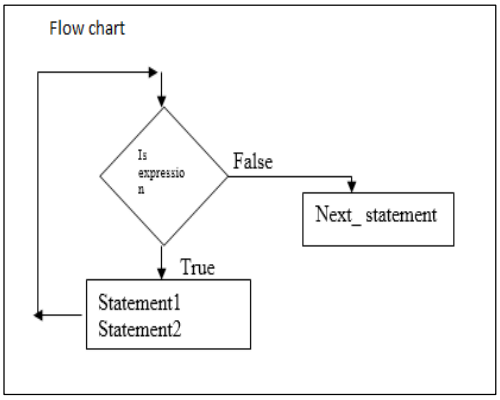
7. **Explain while construct with an example**

In while statement the condition is checked fist. If the value of condition is true then it enters within side of loop if it is false then terminates from loop. Due to checking of condition at fist this loop is also **called as pre tested loop or entry control loop**

Syntax: while(expression)
{
statement1;
statement2;
}
next_ statement;

Ex: count=1;

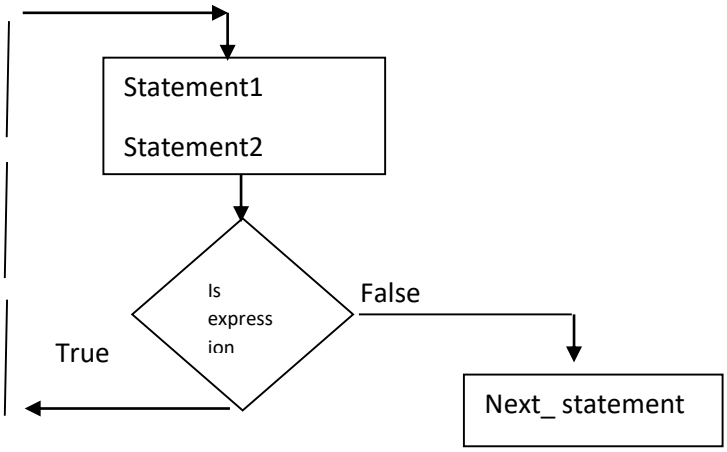
```
while(count<=5)
{
cout<<count<<"\n";
count++;
}
```



8. **With syntax and example explain do while loop**

Syntax: do
{
statement1;
statement2;
} while(expression);
next_ statement;

Flow chart:



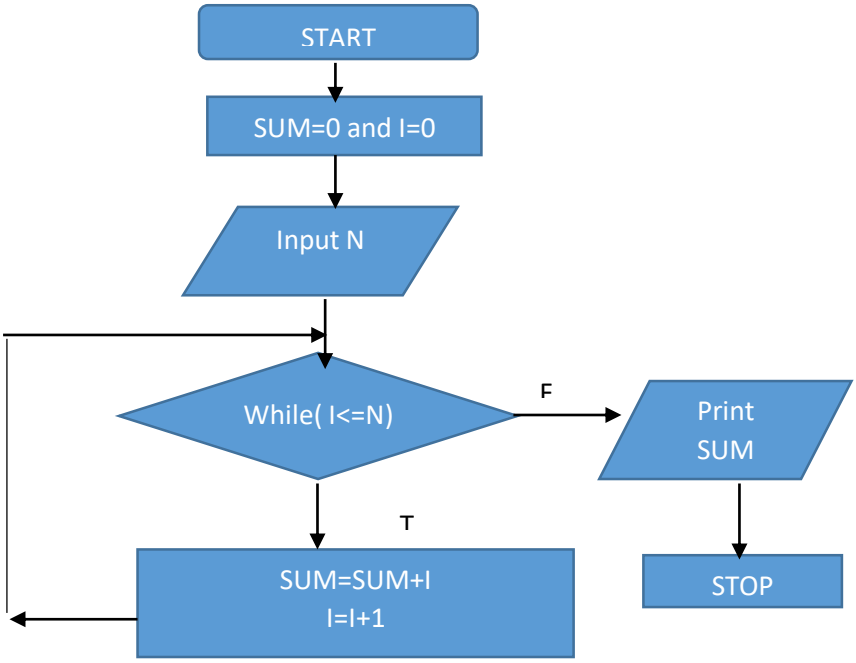
Ex: count=1;

```
do
{
cout<<count<<"\t";
count++;
} while(count<=5);
```

The do while statement is also known as **post tested looping statement or exit control loop**

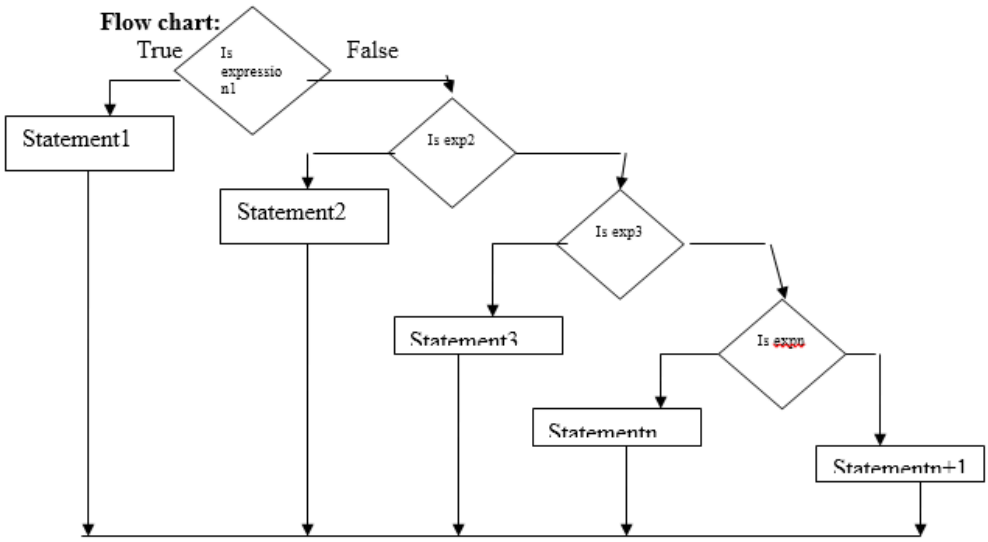
because it checks the condition at the end. If the value of test condition is false then the loop is terminates other wise it repeats the process. *In do while even though the condition is false the body of loop will executes at least ones.*

9. **Draw a flowchart to find the sum of 'n' natural numbers**



10. **Explain the working of if else if statement with suitable example**

This structure helps the programmer to decide the execution of the statement from multiple statements based on condition. There is more than one condition to check so this structure is also called as multiple way branch statement.



Syntax: if(expression1)

Statement1;
else if(expression2)

```
        statement2;
            else if(expression3)
                statement3;
                    else
                        statement4;
```

```
Example: If(mark>=85)
  cout<<"disitinction";
else If(mark>=60)
  cout<<"First class";
else  If(mark>=50)
  cout<<"Second class";
 else If(mark>=35)
  cout<<"Pass class";
else
cout<<"Fail";
```

11. **Give the syntax, flow chart for if lese construct , explain with example**

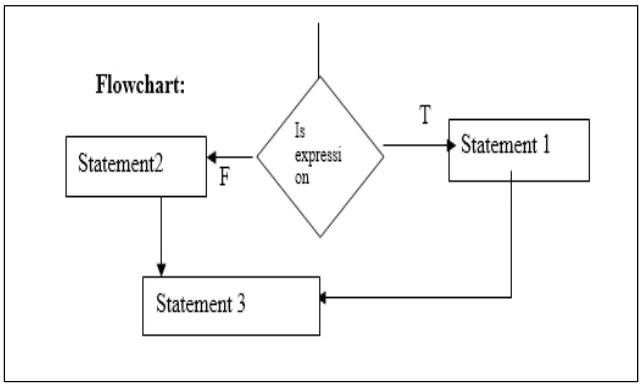
    The if else statement is called as two way branching statement

    syntax:

    ```
    if(expression)
    statement1;

    else
    statement2;
    ```

    Ex:

    ```
    if(n%2= = 0)

     cout<<"is even";
    else

    cout<<"is odd";
    ```



The statement 1 is executed only if the expression evaluated is true and continuous with execution of statement 3. If expression is false then statement 2 is executed directly by skipping statement 1 and continuous with execution of statement 3.

12. **Write the algorithm to find compound interest**

    Step1: Start
    Step 2: Input P,T,R
    Step3: Calculate CI=P*pow((1+R/100),T)-P
    Step4: Print CI
    Step5: STOP

13. Write the algorithm to convert temperature in Fahrenheit to Celsius

    Step1: Start
    Step2: Input temperature in F
    Step3: Find C=(F-32)*5/9
    Step4: Print temperature in C
    step5: Stop