Practical-1

Aim: Demonstrate the usage of Constructor and Destructor.

i) Define a class **data** with data member **acct_no, balance** containing constructor **data** to initialize data member and a member function **display** for output.

Algorithm:

```
Step 1: Start
Step 2: Call function data( ) for object D1
Step 3: Call function data( ) for object D2
Step 4: Call function data( ) for object D3
Step 5: Call function display( ) for object D1
Step 6: Call function display( ) for object D2
Step 7: Call function display( ) for object D3
Step 8: Stop
```

```
Function data ( )
Step 1: Read acct_no, balance
Step 2: Return control to the calling function
```

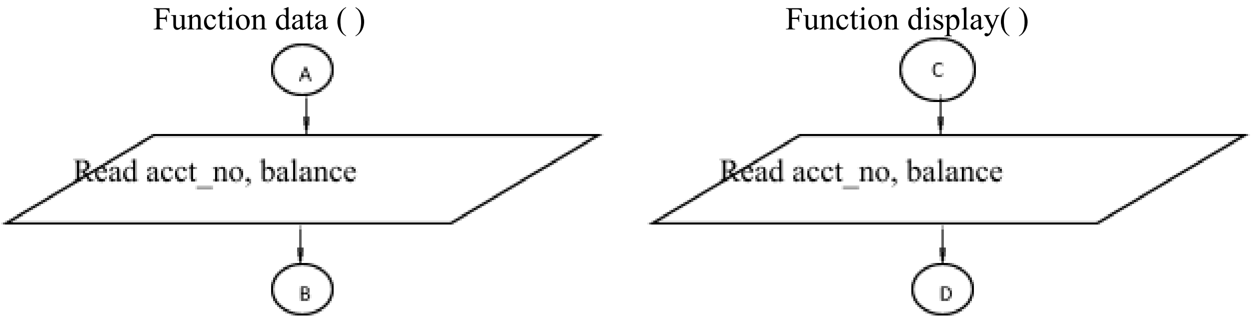
```
Function display( )
Step 1: Display acct_no, balance
Step 2: Return control to the calling function
```

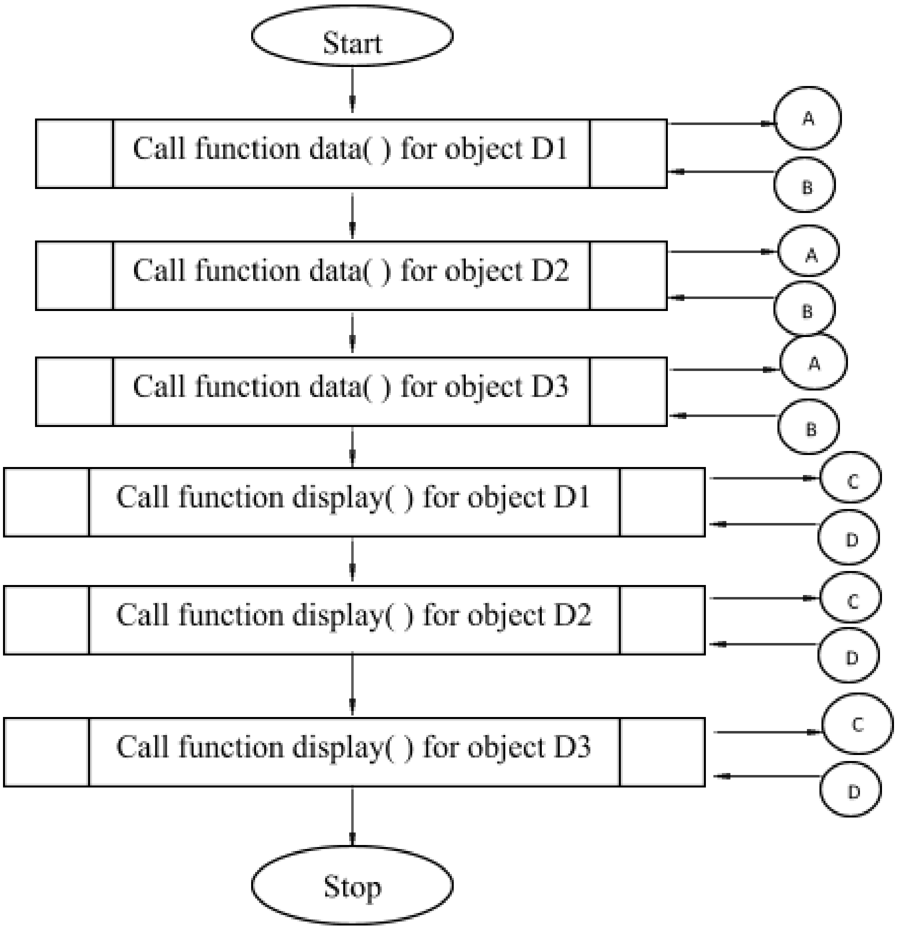
Flowchart:

Class: data

Data Members:
acct_no
balance

Member Functions:
data(long int a, long int b)
void display( )





Start
Call function data( ) for object D1
A
B
Call function data( ) for object D2
A
B
Call function data( ) for object D3
A
B
Call function display( ) for object D1
C
D
Call function display( ) for object D2
C
D
Call function display( ) for object D3
C
D
Stop

Practical-2

Aim: Program to demonstrate usage of a constructor and Destructor function. Declare a class with public data member count. The class containing one constructor and destructor to maintain updated information about active objects i.e.

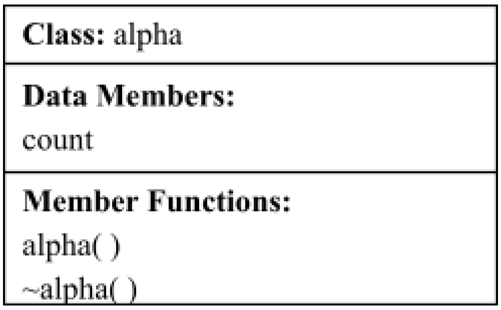
i) No of objects created.

ii) ii) No of objects Destroyed.

Algorithm:

```
Step 1: Start
Step 2: count=0
Step 3: Call function alpha( ) for object A
Step 4: Call function alpha( ) for object B
Step 5: Call function alpha( ) for object C
Step 6: Call function alpha( ) for object D
Step 7: Call function alpha( ) for object E
Step 8: Call function ~alpha( ) for object E
Step 9: Call function ~alpha( ) for object D
Step 10: Call function ~alpha( ) for object C
Step 11: Call function ~alpha( ) for object B
Step 12: Call function ~alpha( ) for object A
Step 13: Stop

Function alpha( )
Step 1: count=count+1
Step 2: Print count
Step 3: Return control to the calling function

Function display( )
Step 1: Print count
Step 2: count=count-1
Step 3: Return control to the calling function
```

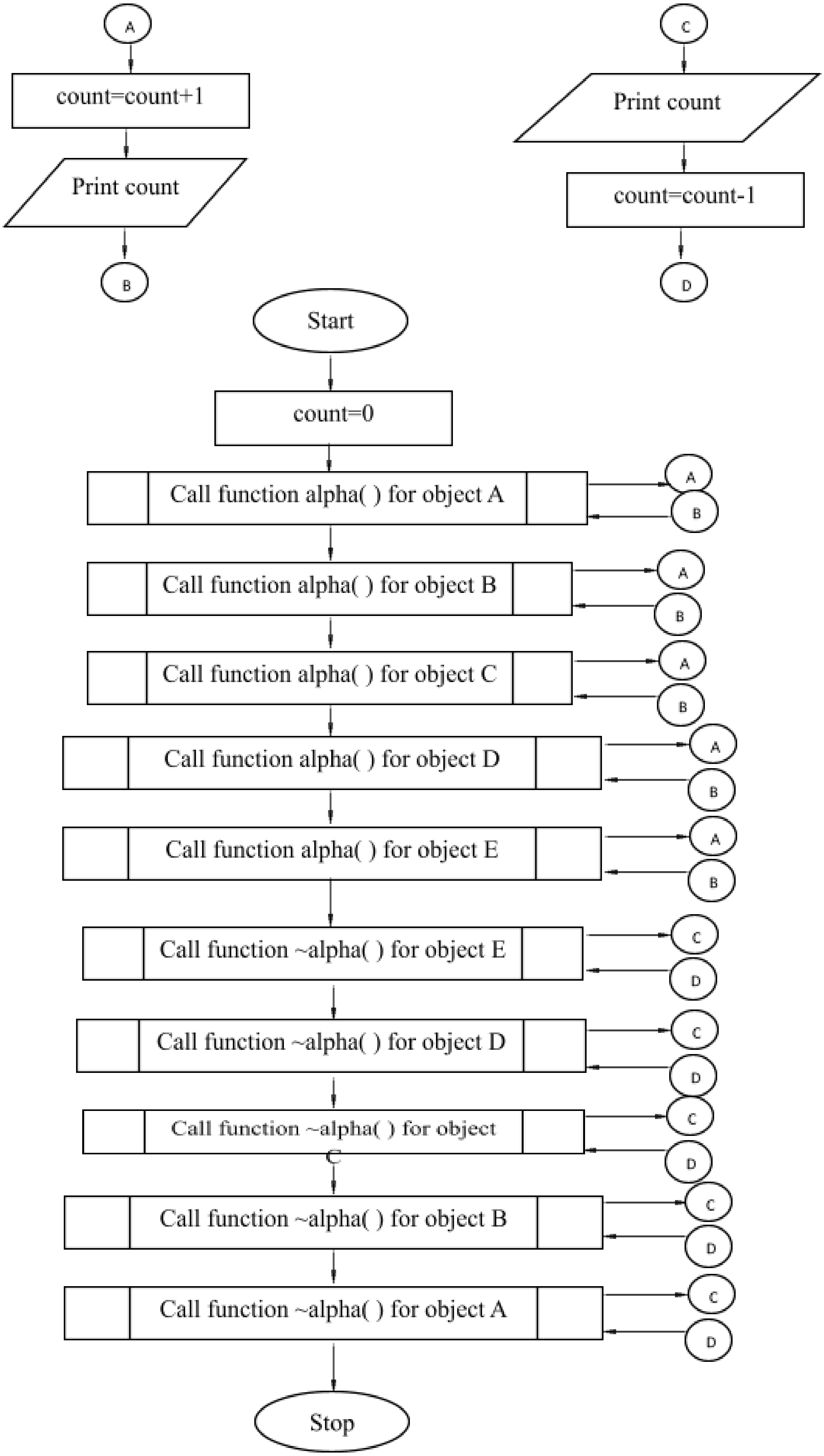
Flowchart:



Class: alpha

Data Members:
count

Member Functions:
alpha( )
~alpha( )



Function alpha( )

Function ~alpha( )

A
count=count+1
Print count
B
C
Print count
count=count-1
D
Start
count=0
Call function alpha( ) for object A
Call function alpha( ) for object B
Call function alpha( ) for object C
Call function alpha( ) for object D
Call function alpha( ) for object E
Call function ~alpha( ) for object E
Call function ~alpha( ) for object D
Call function ~alpha( ) for object C
Call function ~alpha( ) for object B
Call function ~alpha( ) for object A
Stop

Practical-3

Aim: Program to accept the distance between city **1st & 2nd**, city **2nd & 3rd**. calculate the distance between city **1st & 3rd**. Define a class **road** with private data member **d1, d2, d3** containing member function getdata to accept values of **d1, d2** and **calculate** for calculating distance.

Algorithm:

```
Step 1: Start
Step 2: Call function data getdata( ) for R
Step 3: Call function calculate( ) for R
Step 4: Call function putdata( ) for R
Step 5: Stop

Function getdata ( )
Step 1: Read d1, d2
Step 2: Return control to the calling function

Function calculate( )
Step 1: d3=d1+d2
Ste[ 2: Return control to  the calling function

Function putdata( )
Step 1: Display d1, d2, d3
Step 2: Return control to the calling function
```

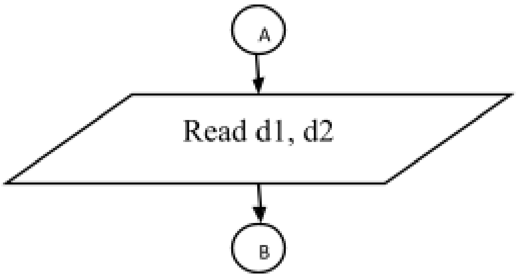
Flowchart:

Class: road

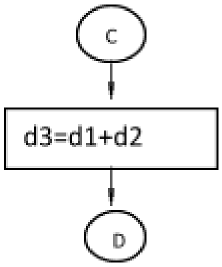
Data Members:
d1, d2, d3

Member Functions:
getdata( )
calculate( )
putdata( )

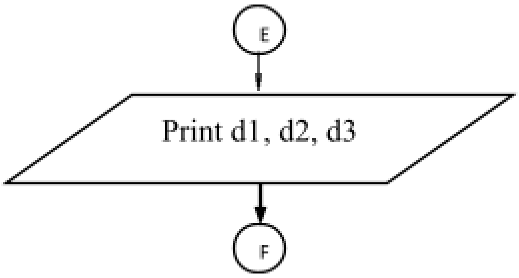
Function getdata( )

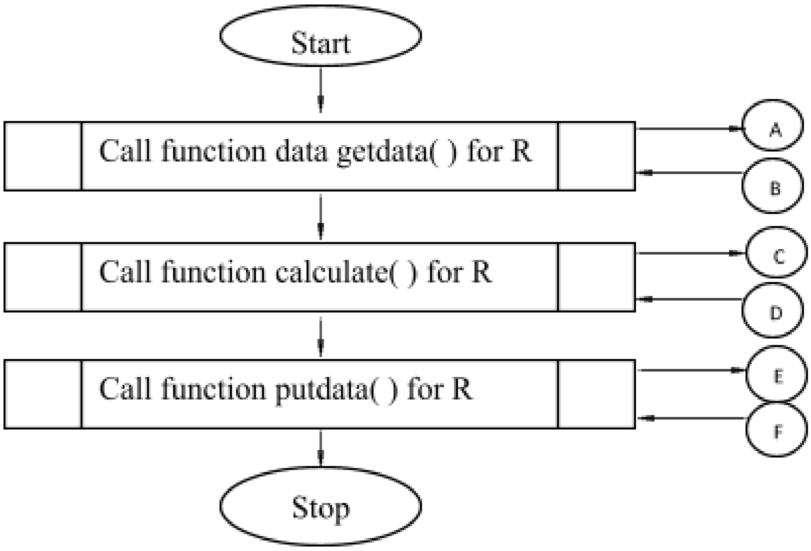


Function calculate( )



Function putdata( )




Start
Call function data getdata( ) for R
A
B
Call function calculate( ) for R
C
D
Call function putdata( ) for R
E
F
Stop

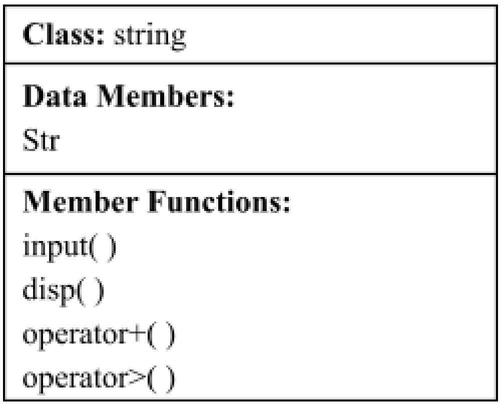
Practical-4

Aim: Demonstrate the use of operators overloading (string manipulation: + for concatenation and relational operators for alphabetical comparison).

Algorithm:

```
Step 1: Start
Step 2: Call function input( ) for S1
Step 3: Call function input( ) for S2
Step 4: Call function operator>(S2) for S1
Step 5: Call function operator+(S2) for S1
Step 6: Call function disp( ) for S3
Step 7: Stop

Function input ( )
Step 1: Read str
Step 2: Return control to the calling function

Function display( )
Step 1: Print str
Ste[ 2: Return control to  the calling function

Function operator+( )
Step 1: temp.str=str+c.str
Step 2: Return control to the calling function

Function operator>( )
Step 1: if  str>c.str
                Yes a) Return 1 to the calling function
        else
                No b) Return 0 to the calling function
```

Flowchart:

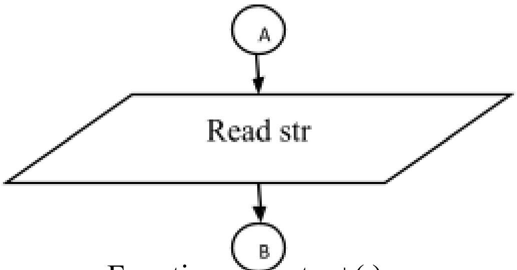


Class: string

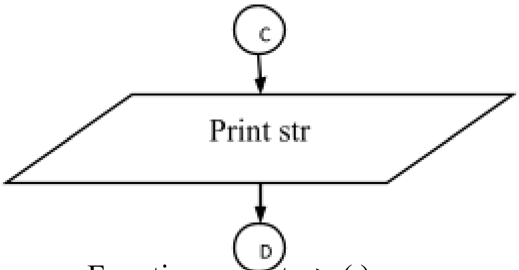
Data Members:
Str

Member Functions:
input( )
disp( )
operator+( )
operator>( )

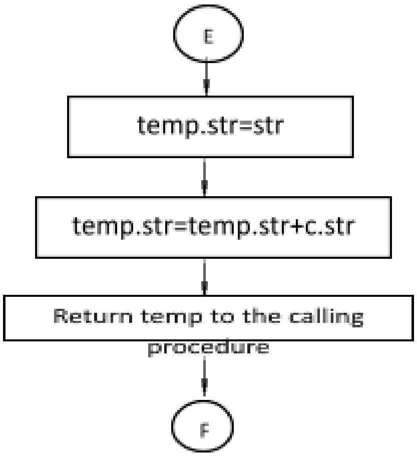
Function input( )



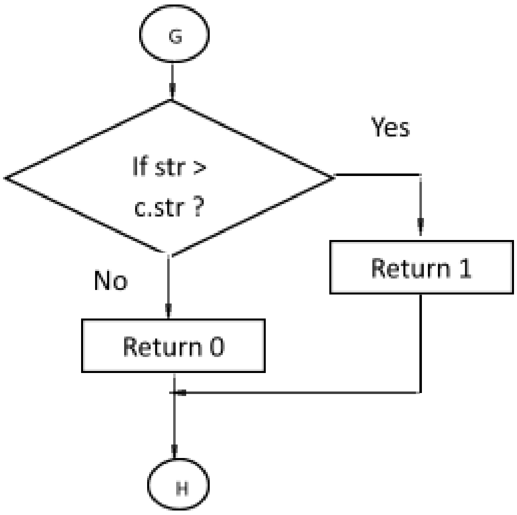
Function disp( )

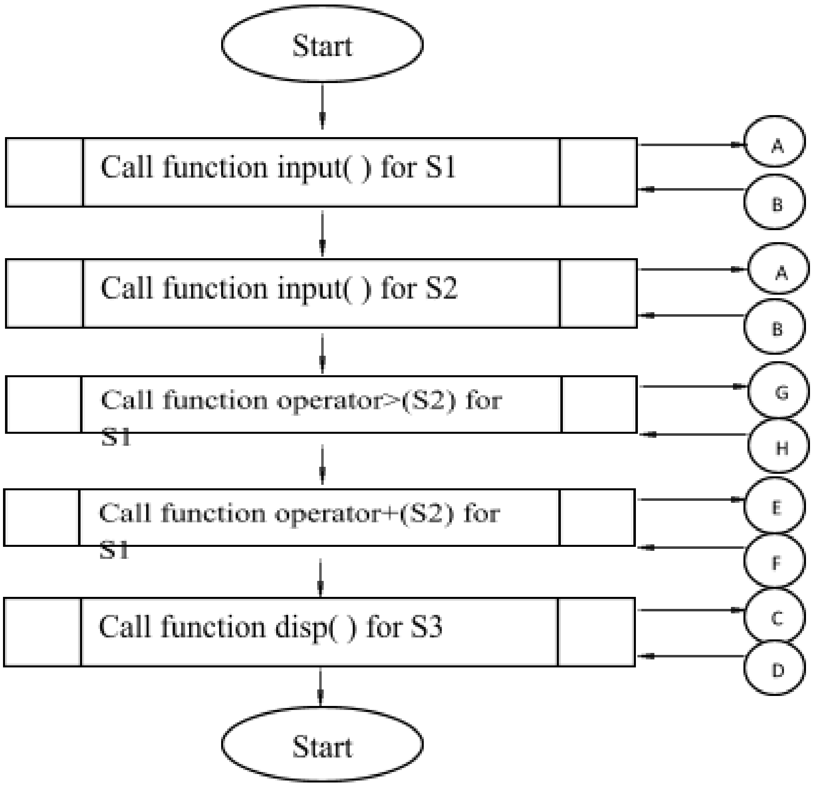


Function operator+( )



Function operator> ( )




Start
Call function input( ) for S1
A
B
Call function input( ) for S2
A
B
Call function operator>(S2) for S1
G
H
Call function operator+(S2) for S1
E
F
Call function disp( ) for S3
C
D
Start

Practical-5

Aim: In a bank N depositor deposit the amount, write a program to find total amount deposited in the bank. Declare a class deposit with private data member **Rupee** and **Paisa** containing member function **getdata, putdata.**

i) Use array of objects

ii) Use Operator '+' overloading.

Algorithm:

```
Step 1: Start
Step 2: Call function deposit( ) for D[0] to D[9] Each
Step 3: Call function deposit( ) for SUM
Step 4: i=0
Step 5: if i<=9
            Yes a) Call function getdata( ) for D[i]
                b) i=i+1
                c) goto step 5
            No  d) goto step 6
Step 6: i=0
Step 7: if i<=9
            Yes a) Call function putdata( ) for D[i]
                b) Call function operator+(D[i] ) for SUM
                c) i=i+1
                d) goto step 7
            No  e) goto step 8
Step 8: Call function putdata( ) for SUM
Step 9: Stop
```

```
Function deposit( )
Step1: Rupee=0, Paisa=0
Step2: Return control to the calling function
```

```
Function getdata ( )
Step 1: Read Rupee, Paisa
Step 2: Return control to the calling function
```

```
Function putdata( )
Step 1: Print Rupee, Paisa
Ste[ 2: Return control to  the calling function
```

```
Function operator+( )
Step 1: temp.Paisa=Paisa+c.Paisa
Step2:  if (temp.Paisa>=100)
            Yes i) temp.Rupee=temp.Paisa/100
               ii) temp.Paisa=Remainder of (temp.Paisa÷100)
              iii) goto Step 3
Step 3: temp.Rupee=temp.Rupee+Rupee+c.Rupee
Step 4: Return temp to the calling function
```

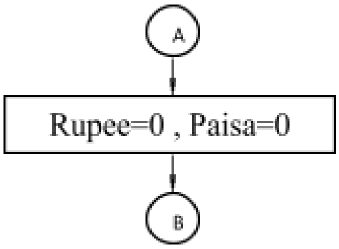
Flowchart:

Class: deposit

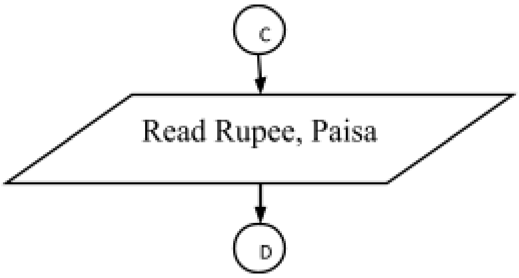
Data Members:
Rupee, Paisa

Member Functions:
deposit( )
getdata( )
putdata( )
operator+( )

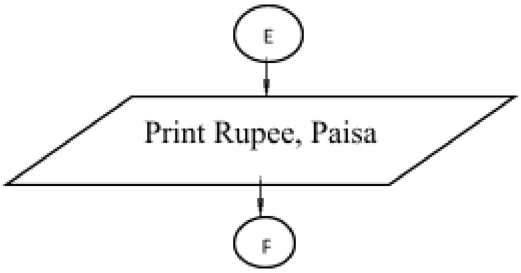
Function deposit( )



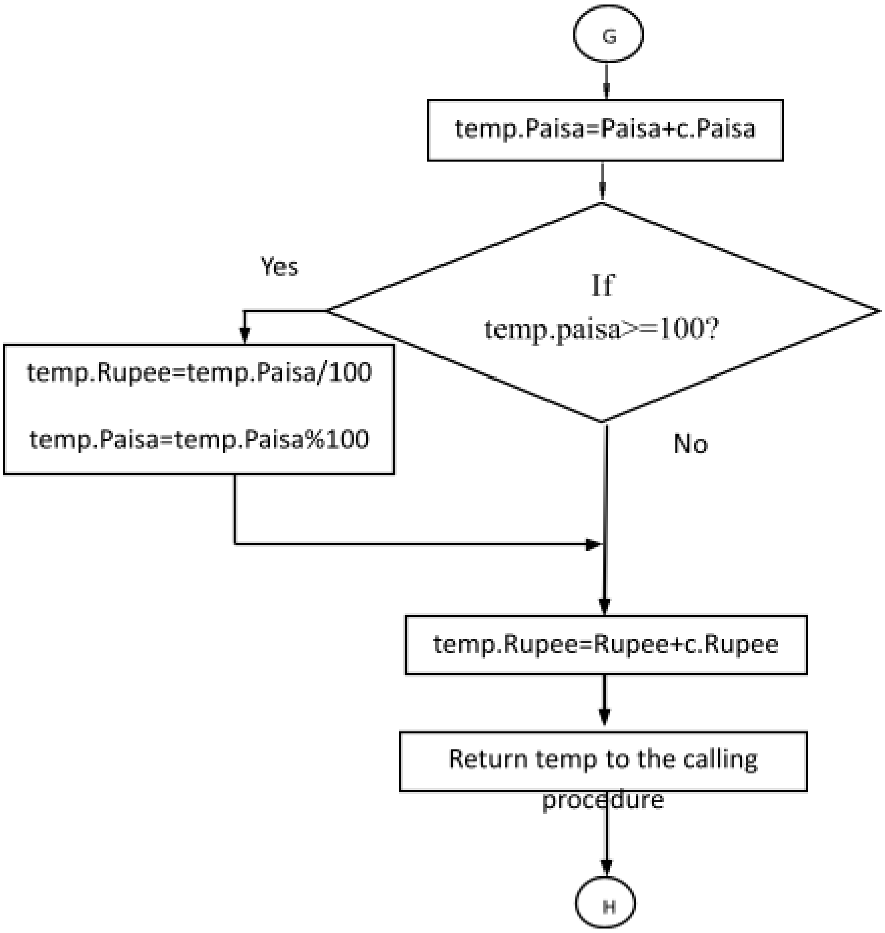
Function getdata( )

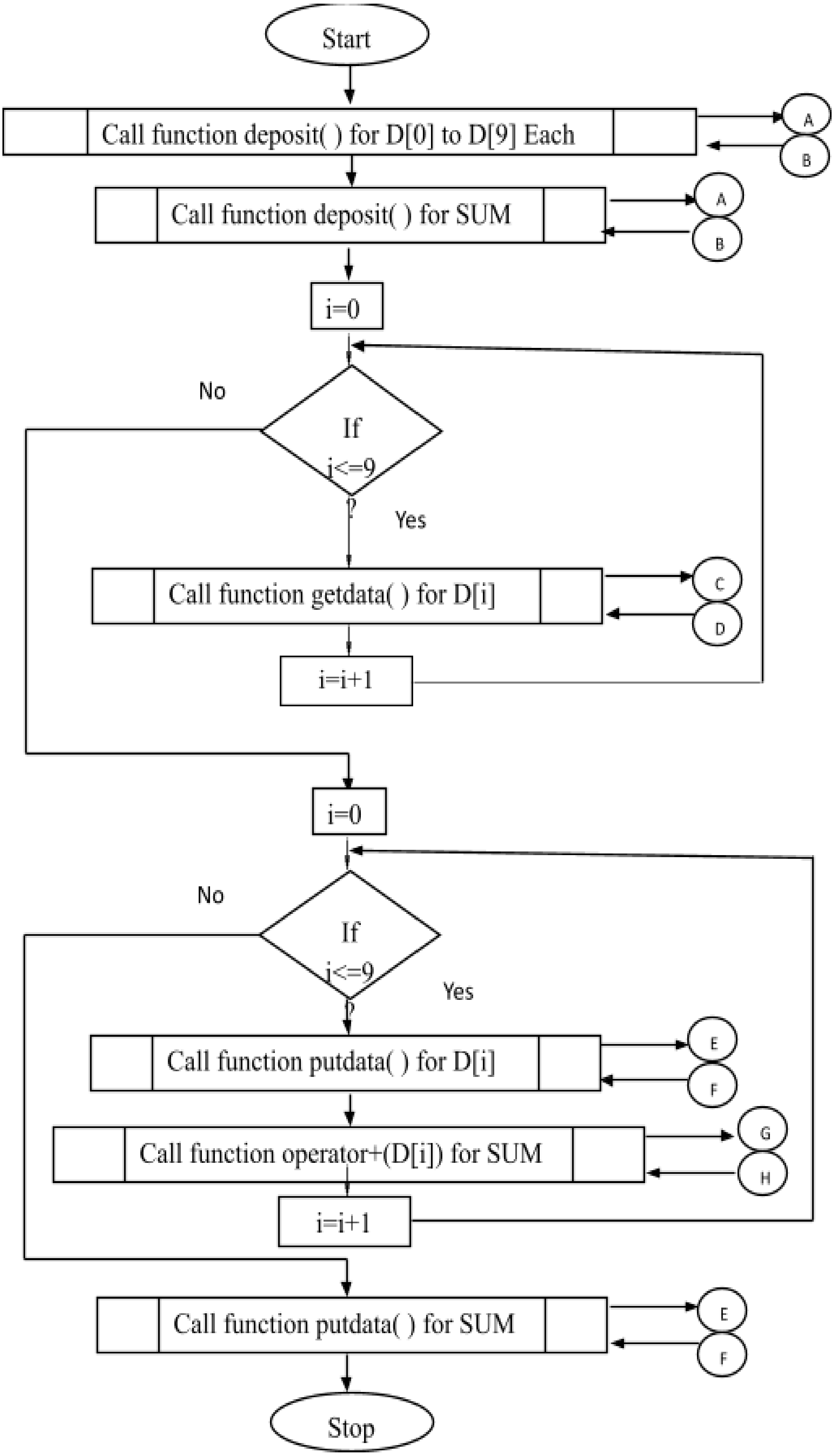


Function putdata( )



Function operator+( )


G
temp.Paisa=Paisa+c.Paisa
If
temp.paisa>=100?
Yes
temp.Rupee=temp.Paisa/100
temp.Paisa=temp.Paisa%100
No
temp.Rupee=Rupee+c.Rupee
Return temp to the calling procedure
H


Start
Call function deposit( ) for D[0] to D[9] Each
A
B
Call function deposit( ) for SUM
A
B
i=0
No
If
i<=9
?
Yes
Call function getdata( ) for D[i]
C
D
i=i+1
i=0
No
If
i<=9
?
Yes
Call function putdata( ) for D[i]
E
F
Call function operator+(D[i]) for SUM
G
H
i=i+1
Call function putdata( ) for SUM
E
F
Stop

Practical-6

Aim: Declare class event and accept time of first event and second event and find the difference between 1st and 2nd event. Containing public member function **getdata** and **display** with private data member **hour**, **minute, second and total.**

i) Use Operator '-' overloading.

Algorithm:

```
Step 1: Start
Step 2: Call function gettime( ) for E1
Step 3: Call function gettime( ) for E2
Step 4: E3=Call function operator-(E2) for E1
Step 5: Call function puttime( ) for E3
Step 6: Stop

Function gettime ( )
Step 1: Read hour, minute, second
Step 2: Return control to the calling function

Function operator-( )
Step 1: temp.second=second-c.second
Step 2: if temp.second<0?
            Yes i) minute=minute-1
                ii) temp.second=60+temp.second
               iii) goto step 3
Step 3: temp.minute=minute-c.minute
Step 4: if temp.minute<0?
            Yes i) hour=hour-1
                ii) temp.minute=60+temp.minute
               iii) goto step 5
Step 5: temp.hour=hour-c.hour
Step 6: Return temp and transfer the control to  the calling function

Function putdata( )
Step 1: Print hour, minute, second
Step 2: Return control to the calling function
```

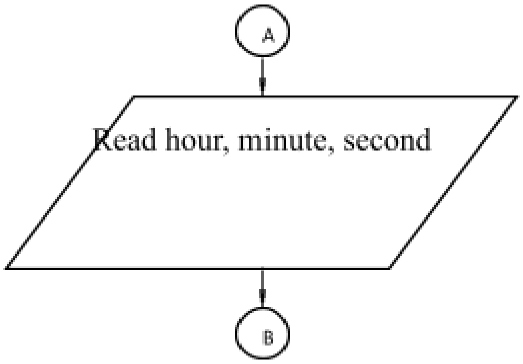
Flowchart:

Class: road

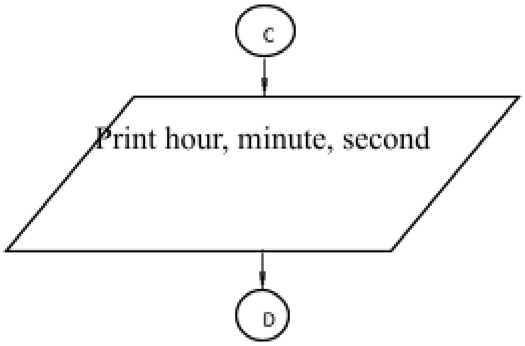
Data Members:
hour, minute, second

Member Functions:
gettime( )
puttime( )
operator-( )

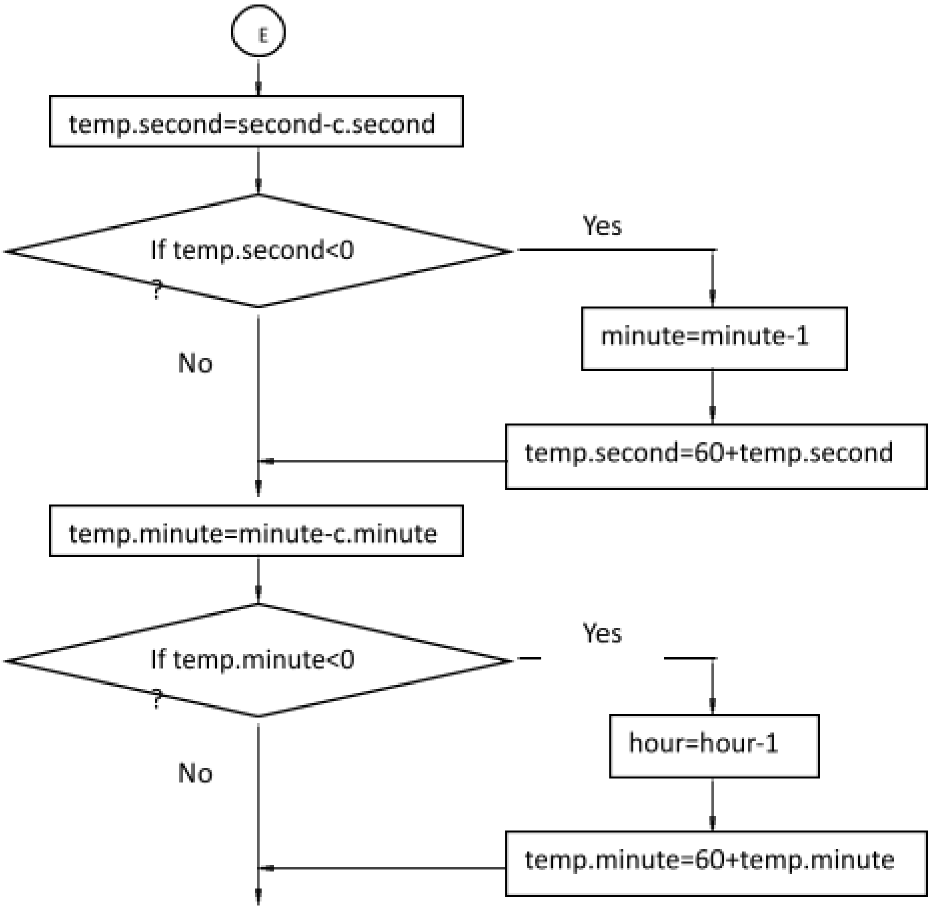
Function gettime( )

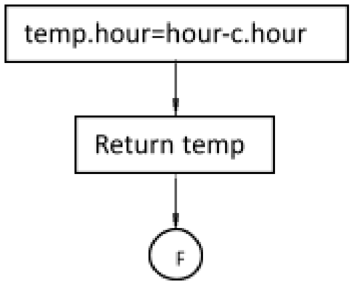


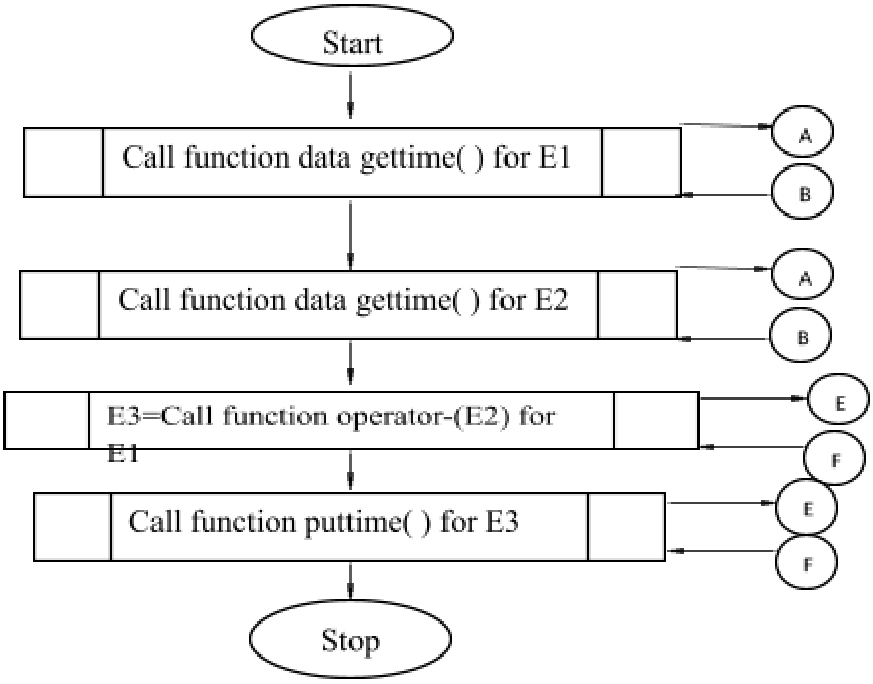
Function puttime( )



Function operator-( )


E
temp.second=second-c.second
If temp.second<0
?
Yes
No
minute=minute-1
temp.second=60+temp.second
temp.minute=minute-c.minute
If temp.minute<0
?
Yes
No
hour=hour-1
temp.minute=60+temp.minute


temp.hour=hour-c.hour
Return temp
F


Start
Call function data gettime( ) for E1
A
B
Call function data gettime( ) for E2
A
B
E3=Call function operator-(E2) for E1
E
F
Call function puttime( ) for E3
E
F
Stop

Practical-7

Aim: Program to demonstrate **Single Inheritance**. Declare a class **B** and derive publically class **D** from **B**.

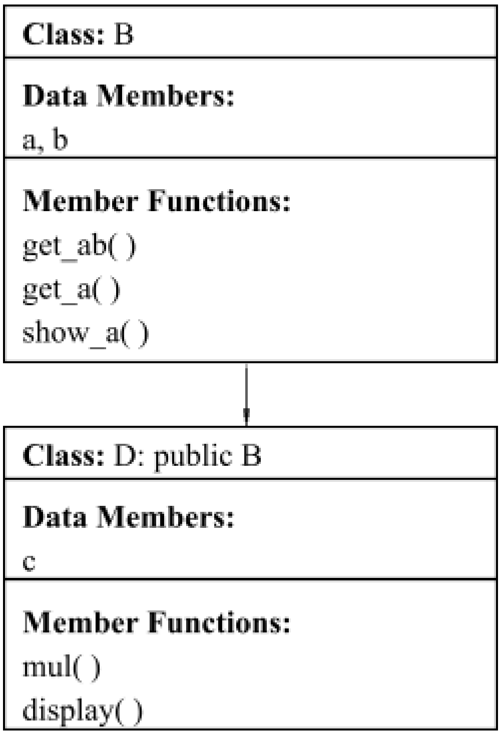
i) The class **B** contains private data member **a**, public data member **b** with member function **get_ab, get_a, show_a.**

ii) The derived class **D** contains data member **c** with member function **mul** and **display.**

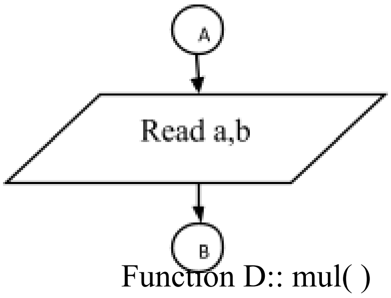
Algorithm:

```
Step 1: Start
Step 2: Call function get_ab( ) for object
Step 3: Call function mul( ) for object
Step 4: Call function display( ) for object
Step 5: Stop

Function get_ab ( )
Step 1: Read a,b
Step 2: Return control to the calling function

Function get_a( )
Step 1: Return a along with the control to the calling function

Function show_a( )
Step 1: Print a
Step 2: Return control to the calling function

Function mul( )
Step 1: c=call to function get_a( )*b
Step 2: Return control to the calling function

Function display( )
Step 1: Call to function show_a( )
Step 2: Print b, c
Step 3: Return control to the calling function
```

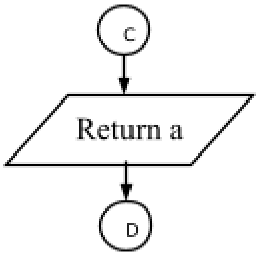
Flowchart:



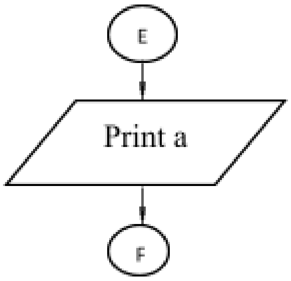
Function B::get_ab( )



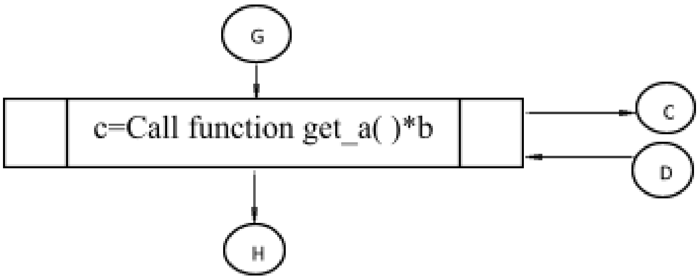
Function B::get_a( )



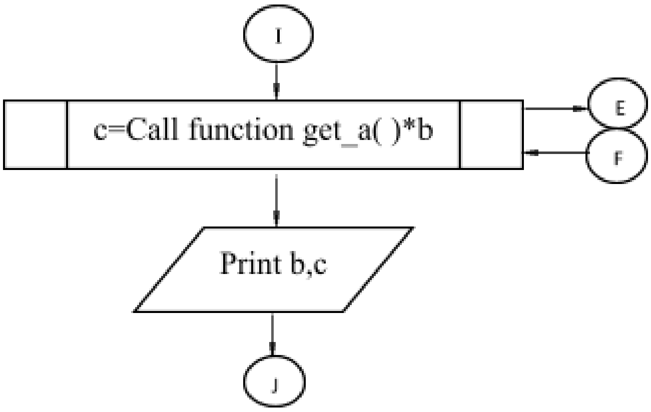
Function B::show_a( )

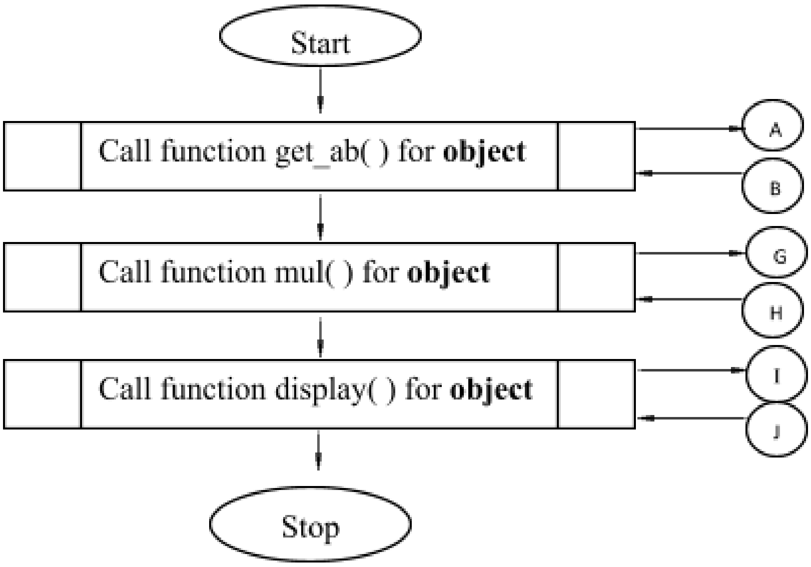


Function D:: mul( )



Function D:: display( )




Start
Call function get_ab( ) for **object**
A
B
Call function mul( ) for **object**
G
H
Call function display( ) for **object**
I
J
Stop

Practical-8

Aim: Program to demonstrate **Multiple Inheritances. Declare class M** and **N** and derive publically class **P** from **M** and **N.**

i) Declare a class **M** with protected data member **m** and public member function **get_m.**

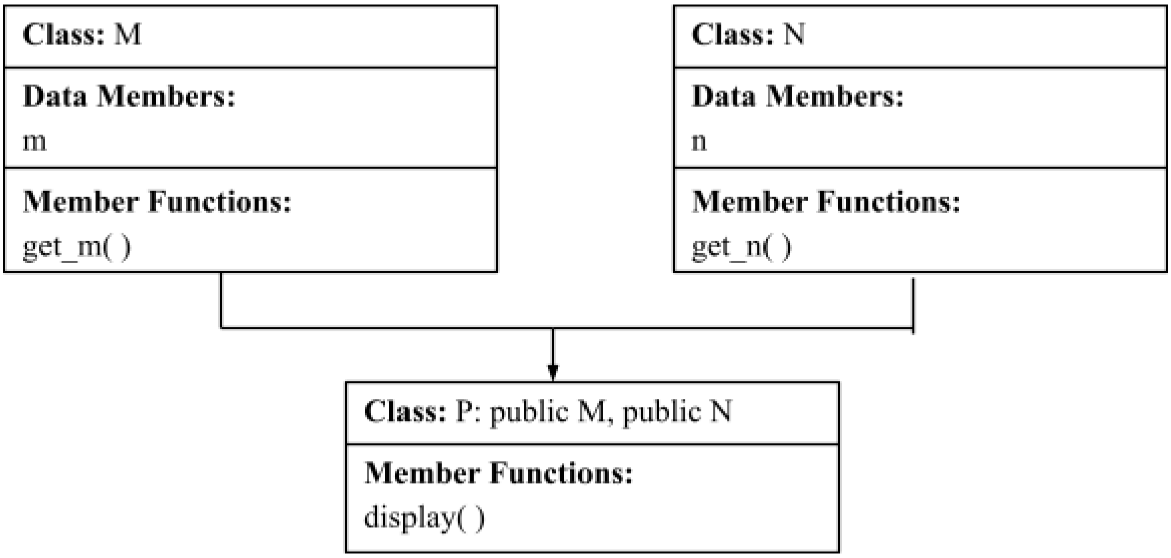
ii) Declare a class **N** with protected data member **n** containing member function **get_n.**

iii) Declare class **P** containing member function **display.**

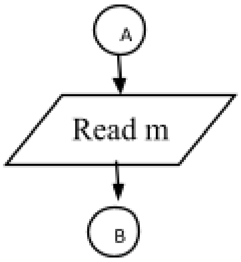
Algorithm:

```
Step 1: Start
Step 2: Call function display( ) for object
Step 3: Stop

Function get_m ( )
Step 1: Read m
Step 2: Return control to the calling function

Function get_n( )
Step 1: Read n
Step 2: Return the control to the calling function

Function display( )
Step 1: Call to function get_m( )
Step 2: Call to function get_n( )
Step 3: Print m,n
Step 4: Return control to the calling function
```

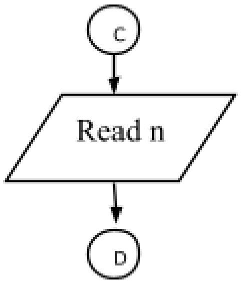
Flowchart:



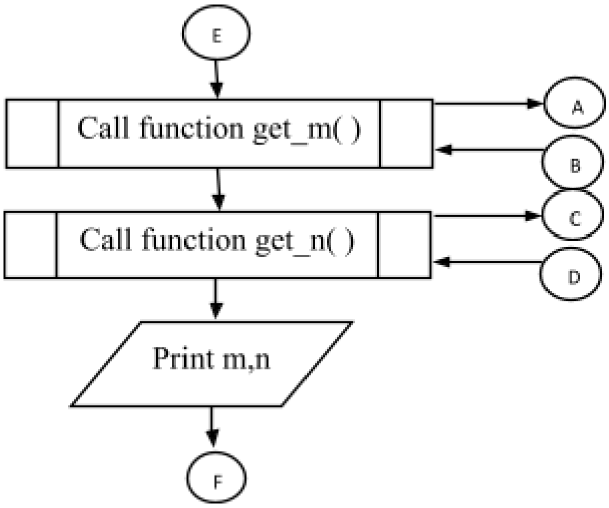
Function M :: get_m( )

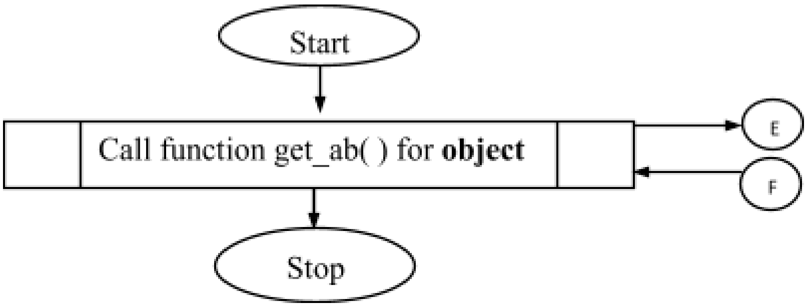


Function N::get_n( )



Function P::display( )





Practical-9

Aim: Program to demonstrate Multilevel Inheritance. Declare a class **student** and derive publically a class **test** and derive publically class **result** from class **test.**

i) The class student contains protected data member **roll_number** with public member functions **get_number** and **put_number.**

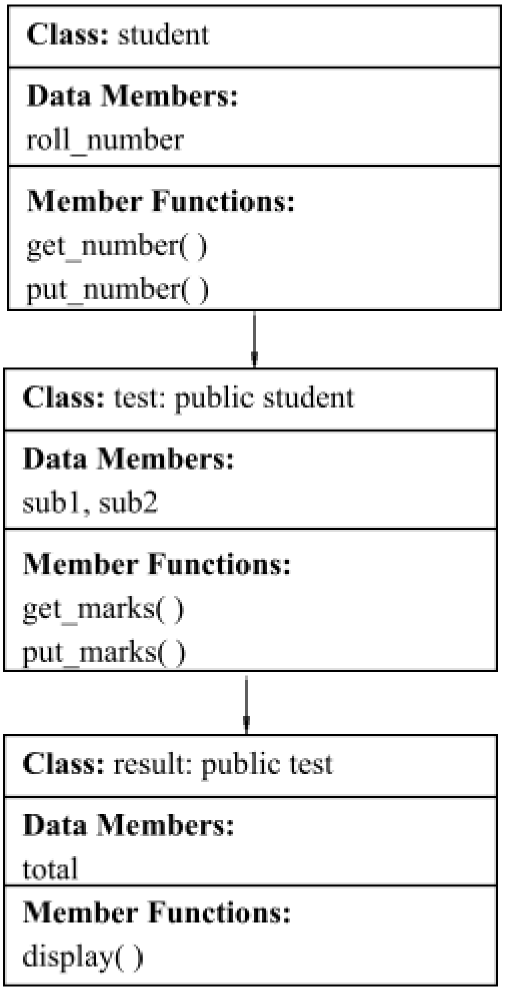
ii) The class **test** containing protected data member **sub1, sub2** with public member function **get_marks** and **put_marks.**

iii) The class **result** contains data member **total** and public member function **display.**

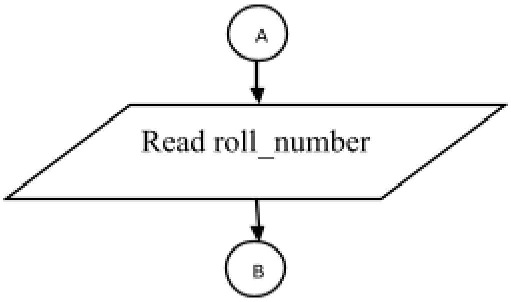
Algorithm:

```
Step 1: Start
Step 2: Call function get_number( ) for R
Step 3: Call function get_marks( ) for R
Step 4: Call function display( ) for R
Step 5:  Stop

Function get_number ( )
Step 1: Read roll_number
Step 2: Return control to the calling function

Function put_number( )
Step 1: Print roll_number
Step 2: Return the control to the calling function

Function get_marks ( )
Step 1: Read sub1, sub2
Step 2: Return control to the calling function

Function put_marks( )
Step 1: Print sub1, sub2
Step 2: Return the control to the calling function

Function display( )
Step 1: total=sub1+sub2
Step 2: Call to function put_number( )
Step 3: Call to function put_marks( )
Step 4: Print total
Step 5: Return control to the calling function
```

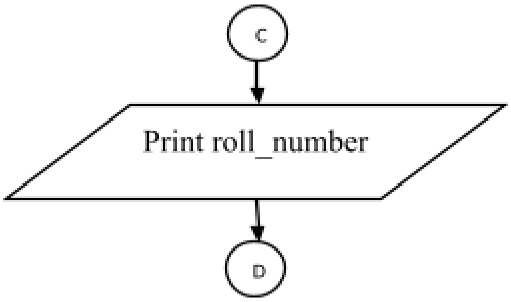
Flowchart:



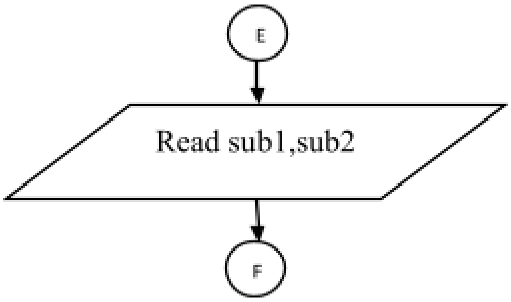
Function student :: get_number( )



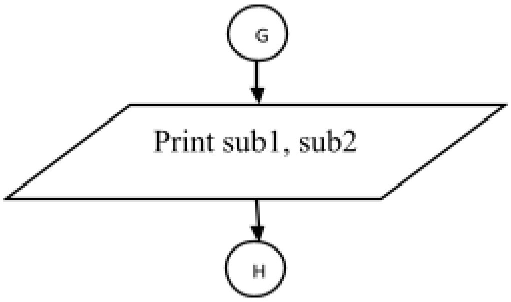
Function student :: put_number( )



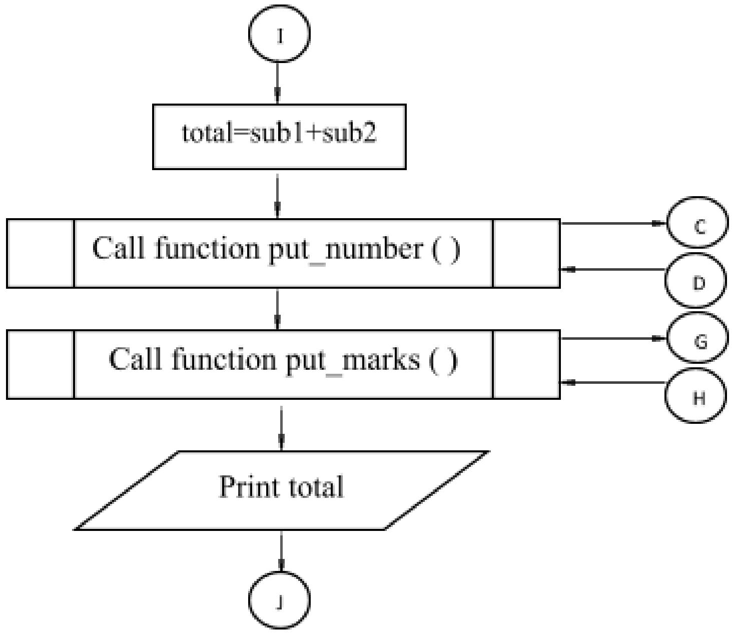
Function test :: get_marks( )

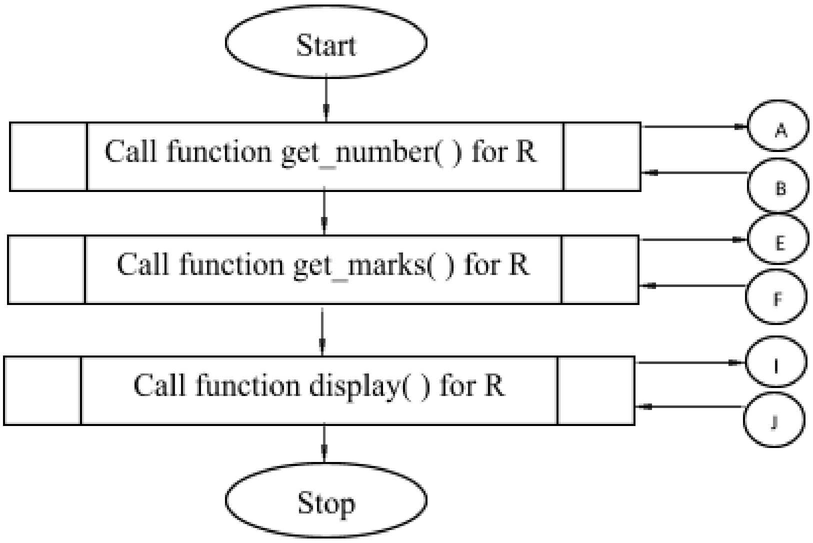


Function test :: put_marks( )



Function result :: display( )




Start
Call function get_number( ) for R
A
B
Call function get_marks( ) for R
E
F
Call function display( ) for R
I
J
Stop

Practical-10

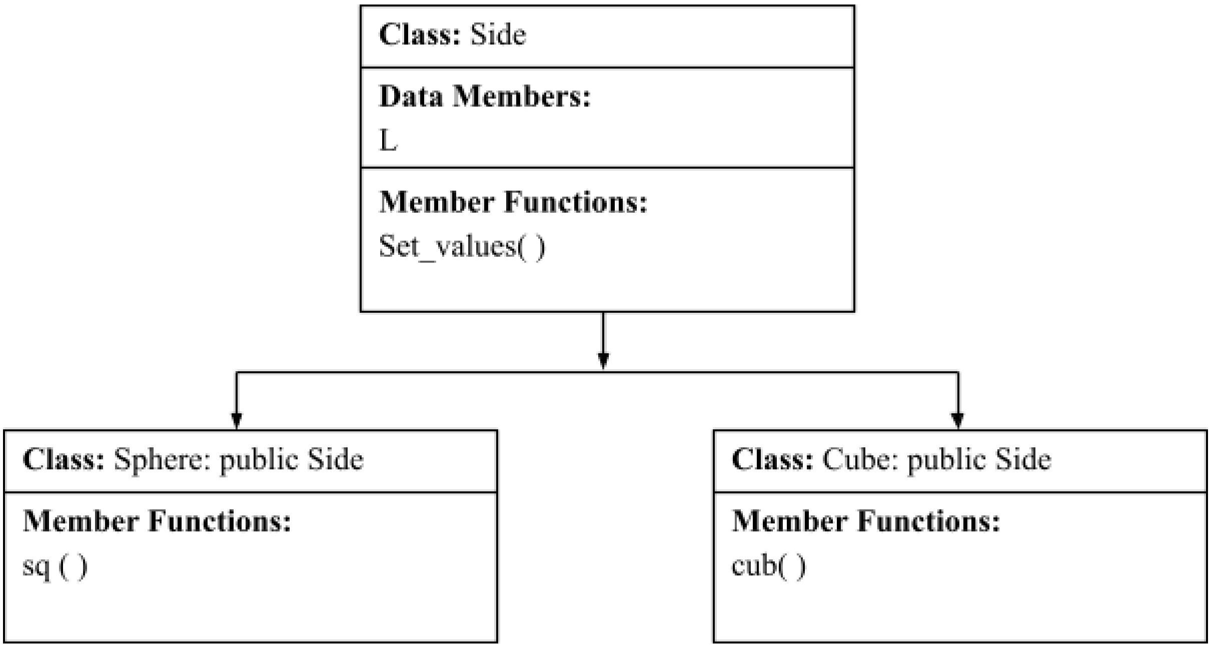
Aim: Program to demonstrate Hierarchical Inheritance. Declare a class **Side** and derive publically class **Square** from base class **side** and also derive publically class **cube** from base class **side.**

i) Class **Side** contains protected data member **L** with a member function **set_values.**
ii) Class **Square** contains member function **sq.**
iii) Class **Cube** contains member function **cub.**

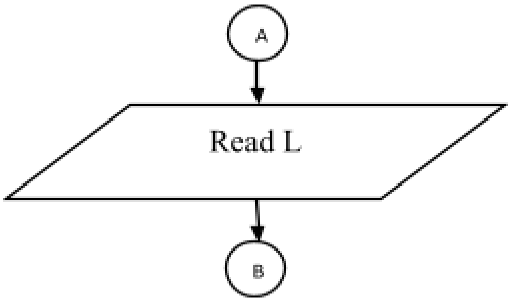
Algorithm:

```
Step 1: Start
Step 2: Call function set_values( ) for object1
Step 3: Call function sq( ) for object1
Step 4: Call function set_values( ) for object2
Step 5: Call  function cub( ) for object2
Step 6:  Stop

Function set_values ( )
Step 1: Read L
Step 2: Return control to the calling function

Function sq( )
Step 1: Print L*L
Step 2: Return the control to the calling function

Function cub( )
Step 1: Print L*L*L
Step 2: Return control to the calling function
```

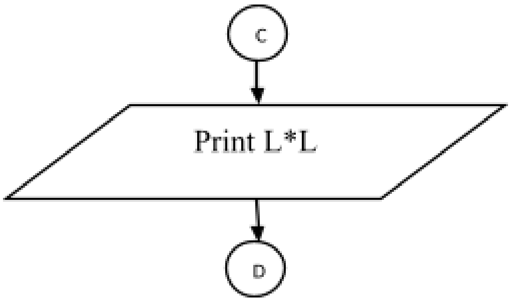
Flowchart:



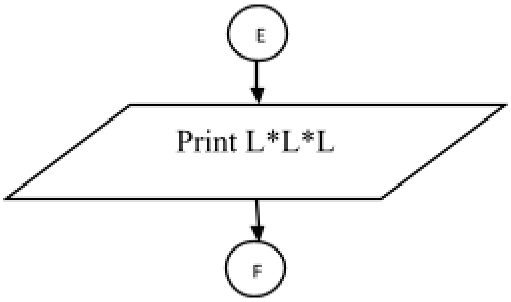
Function side :: set_values( )

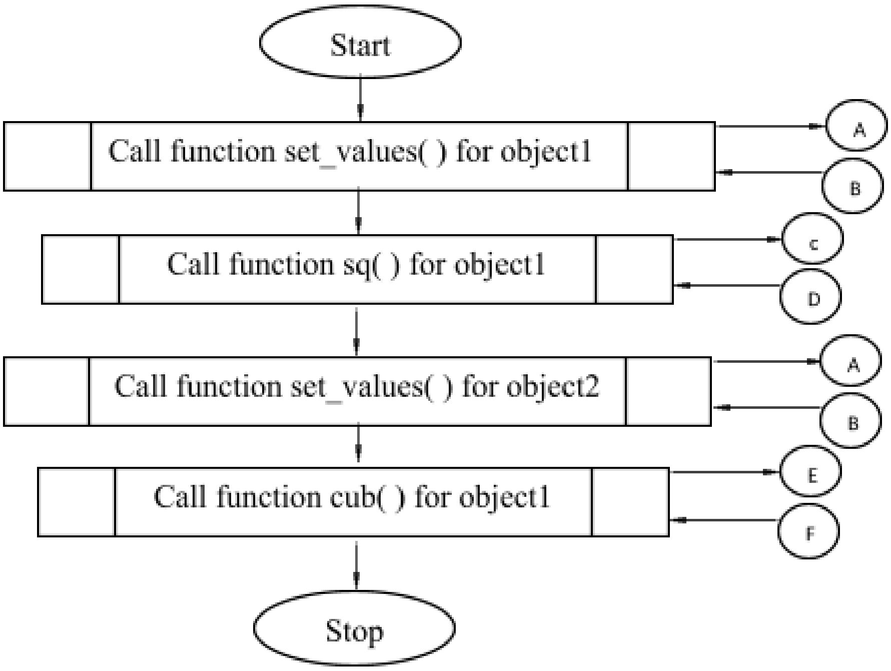


Function sphere :: sq( )



Function cube :: cub( )




Start
Call function set_values( ) for object1
A
B
Call function sq( ) for object1
C
D
Call function set_values( ) for object2
A
B
Call function cub( ) for object1
E
F
Stop

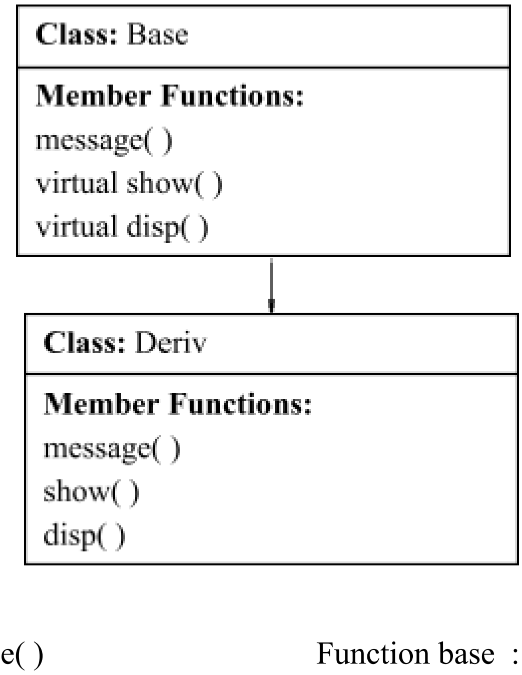
Practical-11

Aim: Program to demonstrate usage of normal virtual function and pure virtual Function with abstract class.

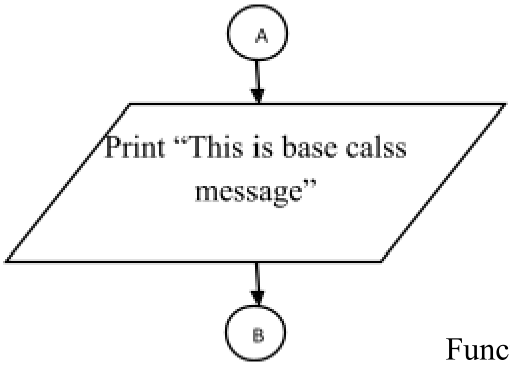
Algorithm:

```
Step 1: Start
Step 2: Let bptr point object B
Step 3: Call function message( ) using bptr
Step 4: Call function show( ) using bptr
Step 5: Call  function disp( ) using bptr
Step 6:  Stop

Function base::message( )
Step 1: Print “This is base class message”
Step 2: Return control to the calling function

Function base::show( )
Step 1: Print “Show Base”
Step 2: Return the control to the calling function

Function base::disp( )
Step 1: Return control to the calling function

Function deriv::message( )
Step 1: Print “This is derived class message”
Step 2: Return control to the calling function

Function deriv::show( )
Step 1: Print “Show Derived”
Step 2: Return the control to the calling function

Function deriv::disp( )
Step 1: Print “Display Derived”
Step 2: Return control to the calling function
```

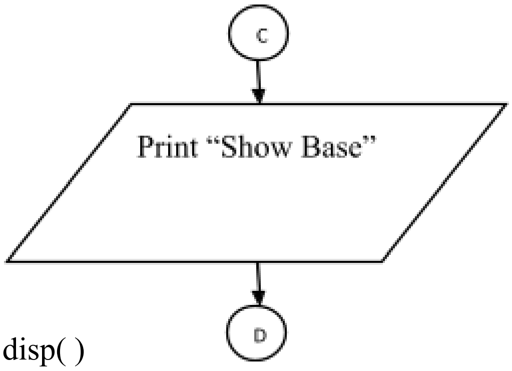
Flowchart:



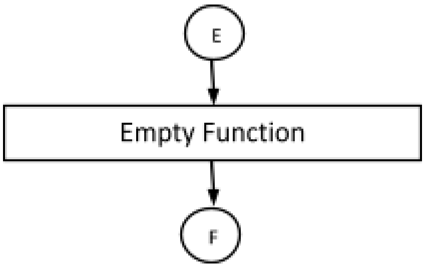
Function base :: message( )



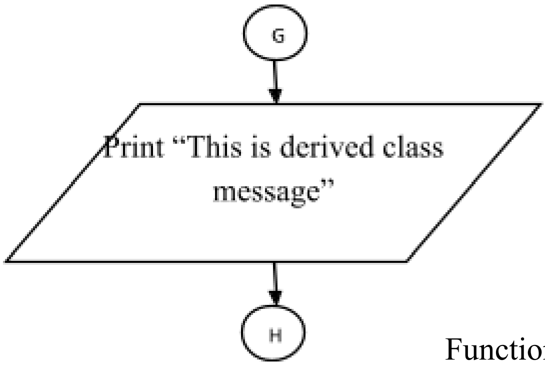
Function base :: show( )



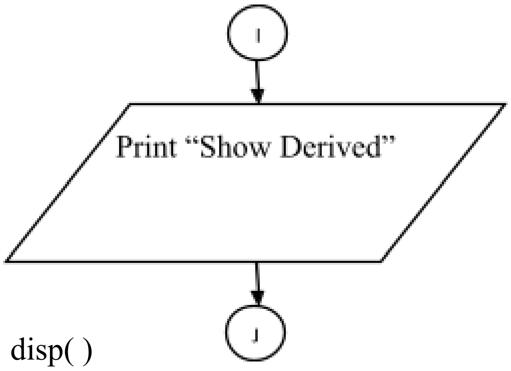
Function base :: disp( )



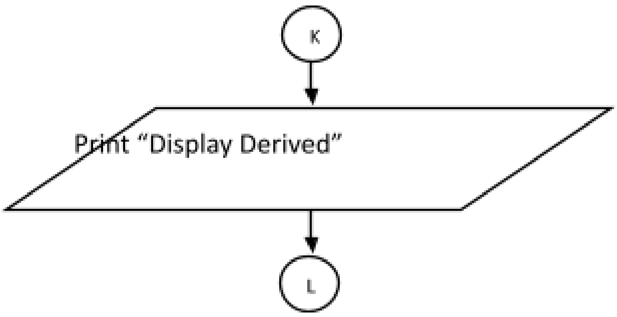
Function deriv :: message( )

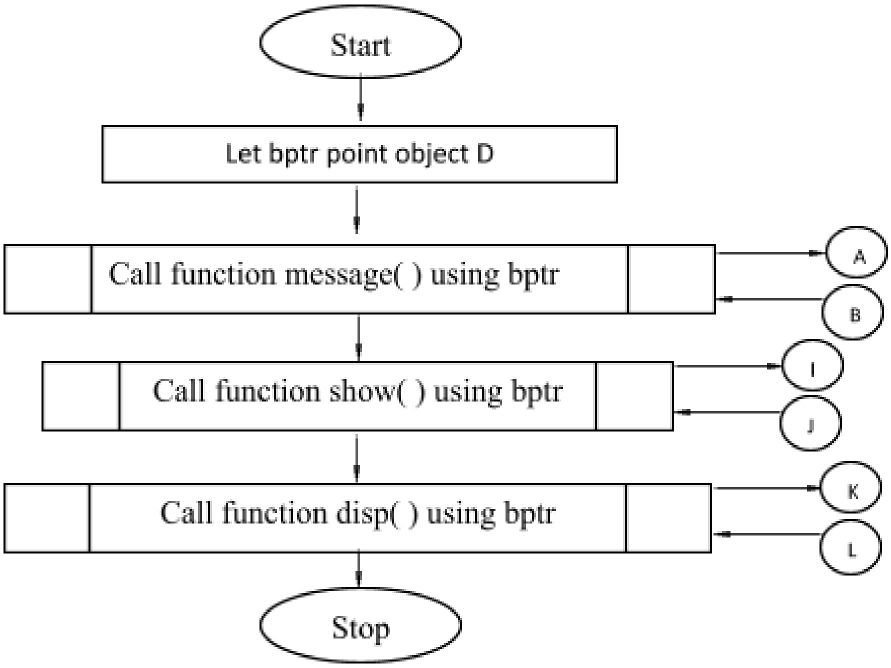


Function deriv :: show( )



Function deriv :: disp( )


K
Print “Display Derived”
L


Start
Let bptr point object D
Call function message( ) using bptr
A
B
Call function show( ) using bptr
I
J
Call function disp( ) using bptr
K
L
Stop