Assignment No.: Date:

* **Problem Statement:**

**Define 3 class Rectangle,triangle, circle. Use constructor (default & parameterised ) to assign values into the data members, calculate the area ,perimeter for each of the space class using three function.**

* **Algorithm:**
* **Name of the class :-** rectangle
* **Private data members of the class :-**h,w.
* **Public member functions of the class :-**
  + **rectangle( ) :-** This method is used to input the values.
  + **Perimeter\_rectangle( ) :-** This method is used to find the perimeter of thr rectangle .
  + **Area\_rectangle():-** This method is used to find the area of the rectangle.
* **Name of the class :-** triangle
* **Private data members of the class :-**a,b,c
* **Public member functions of the class :-**
  + **triangle( ) :-** This method is used to input the values.
  + **Perimeter\_triangle( ) :-** This method is used to find the perimeter of thr triangle .
  + **Area\_triangle():-** This method is used to find the area of the triangle.
* **Name of the class :-** circle
* **Private data members of the class :-**r
* **Public member functions of the class :-**
  + **circle( ) :-** This method is used to input the values.
  + **Perimeter\_circle( ) :-** This method is used to find the perimeter of thr circle .
  + **Area\_circle():-** This method is used to find the area of the circle.

**Algorithm for method rectangle() :-**

1. Set h=2
2. Set w=3
3. stop

[End of method rectangle( )]

**Algorithm for method rectangle(int x,int y ) :-**

1. Set h=x
2. Set w=y
3. stop

[End of method rectangle(int x,int y )]

**Algorithm for perimeter\_rectangle( ) for class rectangle :-**

1. pr=2\*(h+w)
2. print the perimeter of the rectangle.

[End of method perimeter\_rectangle( )]

**Algorithm for area\_rectangle( ) for class rectangle :-**

1. ar=(h\*w)
2. print the arear of the rectangle.

[End of method area\_rectangle( )]

**Algorithm for method rectangle() :-**

1. Set a=2
2. Set b=3
3. Set c=4
4. stop

[End of method triangle( )]

**Algorithm for method triangle(int x,int y ) :-**

1. Set a=x
2. Set b=y
3. Set c=z
4. stop

[End of method triangle(int x,int y )]

**Algorithm for perimeter\_triangle( ) for class triangle:-**

1. pt=a+b+c;
2. print the perimeter of the triaangle.

[End of method perimeter\_triangle( )]

**Algorithm for area\_ triangle ( ) for class triangle :-**

1. s=(a+b+c)/2;
2. at=sqrt(s\*(s-a)\*(s-b)\*(s-c));

step 3: print the arear of the triangle.

[End of method area\_triangle( )]

**Algorithm for method circle () :-**

1. Set r=3
2. stop

[End of method circle( )]

**Algorithm for method circle (int x) :-**

1. Set r=x
2. stop

[End of method circle (int x )]

**Algorithm for perimeter\_ circle ( ) for class circle:-**

Step 1 : pc=2\*3.14\*r;

step 2 : print the perimeter of the circle.

[End of method perimeter\_ circle ( )]

**Algorithm for area\_ circle ( ) for class circle:-**

Step 1 : ac=3.14\*r\*r;

Step 2 : print the arear of the triangle.

[End of method area\_circle( )]

**Algorithm for method main( ) :-**

Step 1 : Create an object,r1 for the class Rectangle

Step 2 : Create an object,r2 for the class Rectangle

Step 3 : Create an object,t1 for the class Triangle

Step 4 : Create an object,t2 for the class Triangle

Step 5 : Create an object,c1 for the class Circle

Step 6 : Call the method Perimeter\_rectangle()for object r1 of the class Rectangle

Step 7 : Call the method Area\_rectangle()for object r1 of the class Rectangle

Step 8 : Call the method Perimeter\_rectangle()for object r2 of the class Rectangle

Step 9 : Call the method Area\_rectangle()for object r2 of the class Rectangle

Step 10 : Call the method Perimeter\_rectangle()for object t1 of the class Triangle

Step 11 : Call the method Area\_rectangle()for object t1 of the class Triangle

Step 12 : Call the method Perimeter\_rectangle()for object t2 of the class Triangle

Step 13 : Call the method Area\_rectangle()for object t2 of the class Triangle

Step 14 : Call the method Perimeter\_rectangle()of the class Circle

Step 15 : Call the method Area\_rectangle()of the class Circle

Step 16 : Stop

* **Source Code:**

#include<iostream.h>

#include<conio.h>

#include<math.h>

using namespace std;

class rectangle

{

private:

float h,w;

public:

rectangle()

{

h=2;

w=3;

}

rectangle(int x,int y)

{

h=x;

w=y;

}

void perimeter\_rectangle(void)

{

int pr;

pr=2\*(h+w);

cout<<"\n the perimeter of the rectangle is "<<pr;

}

void area\_rectangle(void)

{

int ar;

ar=(h\*w);

cout<<"\n the perimeter of the rectangle is "<<ar;

}

};

class triangle

{

private:

float a,b,c;

public:

triangle()

{

a=2;

b=3;

c=4;

}

triangle(int x,int y,int z)

{

a=x;

b=y;

c=z;

}

void perimeter\_triangle()

{

int pt;

pt=a+b+c;

cout<<"\n the perimeter of the triangle is "<<pt;

}

void area\_triangle()

{

int at,s;

s=(a+b+c)/2;

at=sqrt(s\*(s-a)\*(s-b)\*(s-c));

cout<<"\n the area of the triangle is "<<at;

}

};

class circle

{

private:

float r;

public:

circle()

{

r=3;

}

circle(int x)

{

r=x;

}

void perimeter\_circle(void)

{

int pc;

pc=2\*3.14\*r;

cout<<"\n the perimeter of the circle is "<<pc;

}

void area\_circle(void)

{

int ac;

ac=3.14\*r\*r;

cout<<"\n the perimeter of the circle is "<<ac;

}

};

void main()

{

rectangle r1,r2(10,20);

triangle t1,t2(10,20,25);

circle c1,c2(10);

r1.perimeter\_rectangle();

r1.area\_rectangle() ;

r2.perimeter\_rectangle();

r2.area\_rectangle();

t1.perimeter\_triangle();

t1.area\_triangle();

t2.perimeter\_triangle();

t2.area\_triangle();

c1.perimeter\_circle();

c1.area\_circle();

c2.perimeter\_circle();

c2.area\_circle();

getch();

}

* **Input & Output:**

the perimeter of the rectangle is 10

the perimeter of the rectangle is 6

the perimeter of the rectangle is 60

the perimeter of the rectangle is 200

the perimeter of the triangle is 9

the area of the triangle is 0

the perimeter of the triangle is 55

the area of the triangle is 80

the perimeter of the circle is 18

the perimeter of the circle is 28

the perimeter of the circle is 62

the perimeter of the circle is 314

* **Discussion:**

A constructor is different from normal functions in following ways:

Constructor has same name as the class itself.

Constructors don’t have return type.

A constructor is automatically called when an object is created.

If we do not specify a constructor, C++ compiler generates a default constructor for us

(expects no parameters and has an empty body).

When are constructors called?

When are the constructors called for different types of objects like global, local, static local,

dynamic?

1. Global objects: For a global object, constructor is called before main() is called.

2. Function or block scope(automatic variables and constants) : For a non-static local object,

constructor is called when execution reaches point where object is declared.

3. Local objects :For a local static object, the first time (and only the first time) execution reaches

point where object is declared.

4. Class scope: When an object is created, compiler makes sure that constructors for all of its

subobjects (its member and inherited objects) are called. If members have default constructors

or constructor without parameter then these constructors are called automatically, otherwise

parameterized constructors can be called using initializer list.

5. Dynamic objects: For a dynamically allocated object, constructor is invoked by new operator.