

Experiment No. 2.

Aim :- Write a program in c/c++ to find the areas of circle, triangle, square and rectangle and perform Equivalence Class Testing.

Theory :- In Equivalence class testing, we find two types of equivalence classes

- i) Input Domain
- ii) Output Domain

Input Domain is formed from one valid sequence and two invalid sequence. The output Domain is obtained from different types of output of the problem.

Program :-

```
#include <conio.h>
#include <stdio.h>
#include <iostream.h>
int main()
{
    int ch; char c; float b,h,a;
    cout << "Enter your choice";
    cout << "\n1. Triangle \n2: Square
\n3. Rectangle \n4: Circle
\n5. Exit";
    cin >> ch;
    switch (ch)
```

case 1: b; cout << " Enter base of the triangle (1-200)";
cin >> b;
if ((b <= 0) || (b > 200)) {
cout << " Invalid entry ";
goto b; }
b; cout << " Enter height of the triangle (1-200)";
cin >> h;
if ((h <= 0) || (h > 200)) {
cout << " Invalid entry ";
goto h; }
a = 0.5 * b * h;
cout << " The area is " << a;
cout << "\n Want to enter more? (Y/N)";
cin >> c;
if ((c == 'Y') || (c == 'y'))
goto first;
break;

case 2: s; cout << " Enter the side of the square (1-200)";
cin >> b;
if ((b <= 0) || (b > 200)) {
cout << " Invalid Entry ";
goto s; }

$a = s * s;$

$\text{cout} \ll " \text{The area of square is } " \ll a;$

$\text{cout} \ll " \text{Want to enter more? (Y/N)} ";$

$\text{cin} \gg c;$

if ($c == 'y'$) || ($c == 'Y'$) {

 goto first; }

break;

case 3: d: $\text{cout} \ll " \text{Enter breadth (1-200)} ";$

$\text{cin} \gg b;$

if ($(b <= 0)$) || ($b > 200$) {

 cout \ll " Invalid Entry ";

 goto d; }

p: $\text{cout} \ll " \text{Enter height (1-200)} ";$

$\text{cin} \gg h;$

if ($(h <= 0)$) || ($h > 200$) {

 cout \ll " Invalid Entry ";

 goto p; }

$a = b * h;$

$\text{cout} \ll " \text{Area of rectangle: } " \ll a;$

$\text{cout} \ll " \text{Want to enter more (Y/N)} ";$

$\text{cin} \gg c;$

if ($c == 'y'$) || ($c == 'Y'$) {

 goto first; }

break;

case 4 : t : cout << "Enter the radius" ;

cin >> b;

if ((b <= 0) || (b > 200)) {

cout << "Invalid entry" ;

goto t; }

a = 3.14 * b * b;

cout << "\n The area is " << a;

cout << "Want to enter more
(y/n)" ;

cin >> c;

if ((c == 'y') || (c == 'Y')) {

goto first; }

break;

case 5 : exit (0);

break;

default : cout << "\n WRONG CHOICE" ;

goto first;

} getch();

}

1. Triangle

Input Domain

$$I_1 = \{ h : h \leq 0 \}$$

$$I_2 = \{ h : l \leq h \leq 200 \}$$

$$I_3 = \{ h : h > 200 \}$$

$$I_4 = \{ b : b \leq 0 \}$$

$$I_5 = \{ b : l \leq b \leq 200 \}$$

$$I_6 = \{ b : b > 200 \}$$

Output Domain

$$O_1 = \{ : \text{Triangle if } h > 0, b > 0 \}$$

$$O_2 = \{ : \text{Not a triangle if } h \leq 0, b \leq 0 \}$$

Test Case ID	l	b	Expected Output.
--------------	---	---	------------------

1	0	100	Invalid Input
---	---	-----	---------------

2	100	100	10000
---	-----	-----	-------

3	201	100	Invalid Input
---	-----	-----	---------------

4	100	0	Invalid Input
---	-----	---	---------------

5	100	100	10000
---	-----	-----	-------

6	100	201	Invalid Input.
---	-----	-----	----------------

2. Circle

Input Domain

$$I_1 = \{ r : r \leq 0 \}$$

$$I_2 = \{ r : l \leq r \leq 200 \}$$

$$I_3 = \{ r : r > 200 \}$$

Output Domain

O1 = { : circle if $1 \leq r \leq 200 \}$

O2 = { : Not a circle if $r < 0 \}$

Test Case r Expected Output

I0

1 0 Invalid output

2 100 31400

3 201 Invalid output.

3. Rectangle

Input Domain

I1 = { l : $l \leq 0 \}$

I2 = { l : $1 \leq l \leq 200 \}$

I3 = { l : $l > 200 \}$

I4 = { b : $b \leq 0 \}$

I5 = { b : $1 \leq b \leq 200 \}$

I6 = { b : $b > 200 \}$

Output Domain

O1 = { : Rectangle if $l > 0, b > 0 \}$

O2 = { : Not a rectangle if $l \leq 0,$
 $b \leq 0 \}$

Test Case ID	a	b	Expected Output.
1	0	100	Invalid Output
2	100	100	10000
3	201	100	Invalid Output
4	100	0	Invalid Output
5	100	100	10000
6	100	201	Invalid Output.

4. Square

Input Domain :

$$I_1 = \{ s : s \leq 0 \}$$

$$I_2 = \{ s : 1 \leq s \leq 200 \}$$

$$I_3 = \{ s : s > 200 \}$$

Output Domains

$$O_1 = \{ : \text{If } s > 0 \}$$

$$O_2 = \{ : \text{Not a square if } s \leq 0 \}$$

Test Case ID	s	Expected Output
--------------	---	-----------------

1	0	Invalid Output
---	---	----------------

2	100	10000
---	-----	-------

3	201	Invalid Output.
---	-----	-----------------

Conclusion :- Thus we have studied + executed program to find the area of a circle, triangle, square + rectangle and performed Equivalence class testing with sample test cases.

```
F:\#PROGRAMS\exp2.exe
Enter your choice
1.Triangle
2.Square
3.Rectangle
4.Circle
5.Exit
1
Enter the base of the triangle(1-200)
100
Enter the height of the triangle(1-200)
0
Invalid height
```

```
E:\#PROGRAMS\exp2.exe
Enter your choice
1.Triangle
2.Square
3.Rectangle
4.Circle
5.Exit
1
Enter the base of the triangle(1-200)
100
Enter the height of the triangle(1-200)
100
The area is 5000
Want to enter more?(y/n)
```

```
E:\#PROGRAMS\exp2.exe
Enter your choice
1.Triangle
2.Square
3.Rectangle
4.Circle
5.Exit
1
Enter the base of the triangle(1-200)
0
Invalid entry for base n
Enter the base of the triangle(1-200)
```

```
F:\#PROGRAMS\exp2.exe
Enter your choice
1.Triangle
2.Square
3.Rectangle
4.Circle
5.Exit
1
Enter the base of the triangle(1-200)
100
Enter the height of the triangle(1-200)
201
Invalid height
Enter the height of the triangle(1-200)
```

```
F:\#PROGRAMS\exp2.exe
Enter your choice
1.Triangle
2.Square
3.Rectangle
4.Circle
5.Exit
1
Enter the base of the triangle(1-200)
100
Enter the height of the triangle(1-200)
100
The area is 5000
Want to enter more?(y/n)
```

```
F:\#PROGRAMS\exp2.exe
Enter your choice
1.Triangle
2.Square
3.Rectangle
4.Circle
5.Exit
1
Enter the base of the triangle(1-200)
201
Invalid entry
Enter the base of the triangle(1-200)
```

```
F:\#PROGRAMS\exp2.exe
Enter your choice
1.Triangle
2.Square
3.Rectangle
4.Circle
5.Exit
2
Enter the side of the square(1-200)
0
Invalid entry
Enter the side of the square(1-200)
```

```
F:\#PROGRAMS\exp2.exe
Enter your choice
1.Triangle
2.Square
3.Rectangle
4.Circle
5.Exit
2
Enter the side of the square(1-200)
100
The area is: 10000
Want to enter more?(y/n)
```

```
F:\#PROGRAMS\exp2.exe
Enter your choice
1.Triangle
2.Square
3.Rectangle
4.Circle
5.Exit
2
Enter the side of the square(1-200)
201
Invalid entry
Enter the side of the square(1-200)
```

```
F:\#PROGRAMS\exp2.exe
Enter your choice
1.Triangle
2.Square
3.Rectangle
4.Circle
5.Exit
3
Enter the breadth of rectangle(1-200)
100
Enter the height of rectangle(1-200)
9
Invalid Entry
Enter the height of rectangle(1-200)
```

```
F:\#PROGRAMS\exp2.exe
Enter your choice
1.Triangle
2.Square
3.Rectangle
4.Circle
5.Exit
3
Enter the breadth of rectangle(1-200)
100
Enter the height of rectangle(1-200)
100
The area is
10000Want to enter more?(y/n)
```

```
F:\#PROGRAMS\exp2.exe
Enter your choice
1.Triangle
2.Square
3.Rectangle
4.Circle
5.Exit
3
Enter the breadth of rectangle(1-200)
100
Enter the height of rectangle(1-200)
201
Invalid Entry
Enter the height of rectangle(1-200)
```

```
F:\#PROGRAMS\exp2.exe
Enter your choice
1.Triangle
2.Square
3.Rectangle
4.Circle
5.Exit
3
Enter the breadth of rectangle(1-200)
0
Invalid entry
Enter the breadth of rectangle(1-200)
```

```
F:\#PROGRAMS\exp2.exe
Enter your choice
1.Triangle
2.Square
3.Rectangle
4.Circle
5.Exit
3
Enter the breadth of rectangle(1-200)
100
Enter the height of rectangle(1-200)
100
The area is 10000
Want to enter more?(y/n)
```

```
F:\#PROGRAMS\exp2.exe
Enter your choice
1.Triangle
2.Square
3.Rectangle
4.Circle
5.Exit
3
Enter the breadth of rectangle(1-200)
201
Invalid entry
Enter the breadth of rectangle(1-200)
```

```
R:\#PROGRAMS\exp2.exe
Enter your choice
1.Triangle
2.Square
3.Rectangle
4.Circle
5.Exit
4
Enter the radius of the circle
9
Invalid entry
Enter the radius of the circle
```

```
R:\#PROGRAMS\exp2.exe
Enter your choice
1.Triangle
2.Square
3.Rectangle
4.Circle
5.Exit
4
Enter the radius of the circle
100
The area is 31400
Want to enter more?(y/n)
```

```
R:\#PROGRAMS\exp2.exe
Enter your choice
1.Triangle
2.Square
3.Rectangle
4.Circle
5.Exit
4
Enter the radius of the circle
201
Invalid entry
Enter the radius of the circle
```