

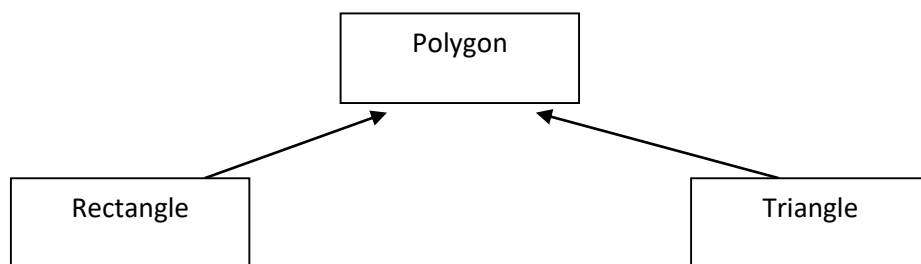
ANKARA UNIVERSITY
COM102B-COM120
Spring 2020
LAB10

Date: 30/04/2020

Due Date: 06/05/2020 23:59

Topic: Abstract Classes, Polymorphism.

Task: Implementation of Virtual Functions.



Details:

Write three classes conforming the relation shown above, i.e. A Rectangle is a Polygon, a Triangle is a Polygon. Each polygon has two fundamental functions: **getArea** and **getName**, which will be defined as below:

double getArea()

string getName()

Polygon class will be defined as an **abstract class**, in which the two functions mentioned above will be defined as pure virtual functions. Write all the class definitions in Shapes.h and implementations of the methods in Shapes.cpp.

Your classes will be run with the following main function. Write the main function exactly as shown in your projects. The expected output of this main function is also provided in the next page.

```

#include <iostream>
#include "Shapes.h"

using namespace std;

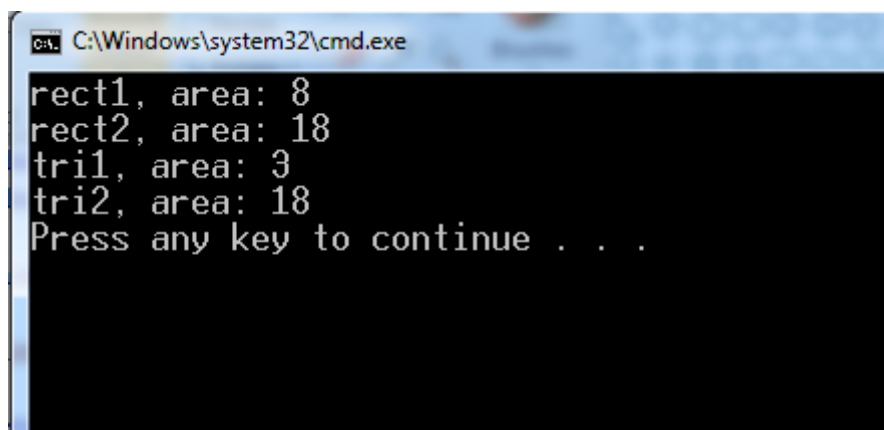
int main()
{
    Rectangle r1("rect1",2,4),r2("rect2",3,6);
    Triangle t1("tri1",2,3), t2("tri2",4,9);
    Polygon* p[] = {&r1, &r2, &t1, &t2};

    for(int i=0;i<4;i++)
        cout<<p[i]->getName()<<"", area: "<<p[i]->getArea()<<"\n";

}

```

The expected output is shown below:



```

C:\Windows\system32\cmd.exe
rect1, area: 8
rect2, area: 18
tri1, area: 3
tri2, area: 18
Press any key to continue . . .

```

Hints:

Area of shapes:

Area of rectangle=width*height

Area of triangle=width*height*0.5

You can search "**C++ separate header and implementation files**" from internet.

Compilation:

>g++ Main.cpp Shapes.cpp -o Lab10

Then, you can run your executable using:

>./Lab10

Submission Files:

1. Firstly create your files with Shapes.h and **StudenNo.cpp** names.

2. You must write `#include "Shapes.h"` in your `StudentNumber.cpp` file as in main (above picture).
3. However before uploading your files, rename your `Shapes.h` file as **StudentNo.h**. Do not change the line `#include "Shapes.h"` in `StudentNo.cpp`.
4. Finally submit `StudentNo.h` and `StudentNo.cpp`. (DO NOT zip them. You can upload two files.)

Your files must be as the following:

```
class ....  
{  
  
};  
  
TODO:  
Write class  
prototypes
```

StudentNo.h

```
#include "Shapes.h"  
  
TODO:  
Write class  
implementations
```

StudentNo.cpp