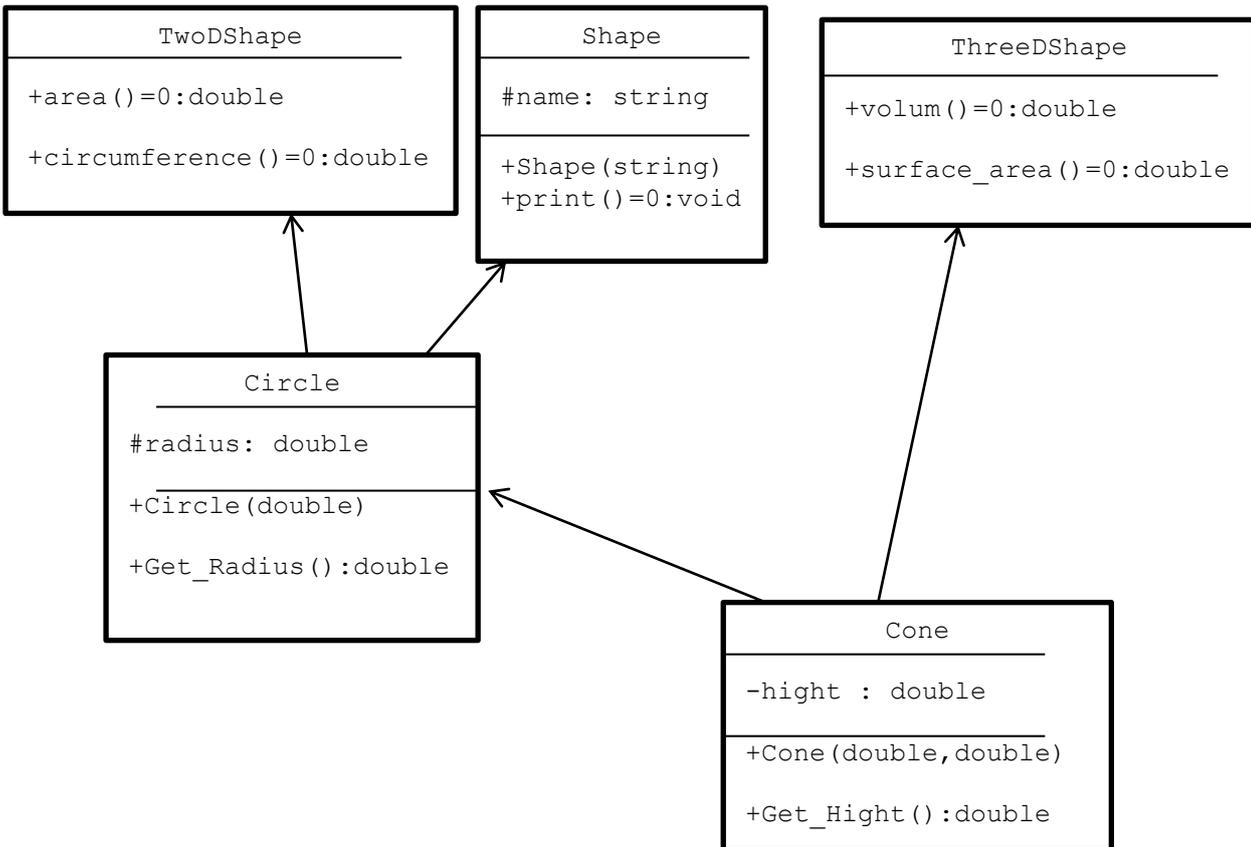


Philadelphia University Faculty of Engineering Department of Computer Engineering		Second Semester 2017/2018 Date:- 03/05/2018 Allowed time:- 60 minutes
Object Oriented Programming (630221)		Second Exam
Student Name: - ID: -		

Question 1: Mark the following statements as TRUE or False. 20 points

1- Public data member in base class are public in derived class regardless of type of inherence used.	
2- Abstract class cannot have a member data	
3- Friend function can only access public member of the class	
4- Derived class can only have one base class.	
5- Interface is an abstract class with all its methods are pure virtual methods	
6- Pure virtual methods may or may not be overridden in derived class	
7- Operator overloading function must be friend function of a class	
8- Constructor of base class must be explicitly called from derived class	
9- Template data types are specified at compile time	
10- derived class pointer can be used to reference base class object	

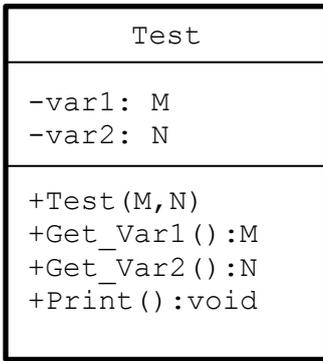
Question 2: Given the following UML diagram 25 points



Where TwoDShape and ThreeDShape are Interfaces, shape is an abstract class. Write a C++ code that construct the classes above and define the required methods

Question 3: Given the following class diagram

25 points



Where M , N are template variables. Write a C++ code that Define the class above using templates. Method Print should print var1 and var2 and the constructor should set var1 and var2.

Question 4: Given the following C++ code

10 points

```
class Test
{
private:
    int num
public:
    Test(int n){num=n;}
    int get_num(){return num;}
};
```

- 1- Override the input >> operator so class Test can be used with cin statement.
- 2- Override the % (remainder) operator so the result is class test that contain the remainder of num from the first object divided by num of the second object.

Question 5: Given the following UML diagram that represent an aggregation and composition relationships. 20 points

- 1- write C++ code that define the structure bellow.
- 2- Write a main function that test the structure bellow.

