OOP in Python   **Date: 09 Feb 2020**
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Topic:

- ▪ **Object Oriented Analysis and Design**
- ▪ **OOP in Python**

Submission Deadline: **16 Feb 2020, 11:55 PM**

Name	
Roll Number	
Obtained Marks	
Total Marks	**10**

Note: This is an individual assignment. Copying from internet or other students is not allowed. In case of plagiarism, you will get ZERO.

Exercises

1. From the below given problem statement:
   - Identify the classes which we need to create for required system
   - Identify the attributes for each class
   - Identify the functions for each class
   - Draw a UML diagram
   - Write python code to create all the classes which are mentioned in the UML diagram.

Problem Statement

You have to develop an application to support the operations of a library for a university. This includes the searching for and lending of technical library materials, including books, DVDs and journals. All library items have registration code. Each borrower can borrow up to 10 items. Each type of library item can be borrowed for a different period of time (books 2 weeks, journals 10 days, DVD 3 week). If returned after their due date, the employee will be charged a fine, based on the type of item (books and journals 15 per day, DVDs 20 per day).

Materials will be lent to employees only if they have

- no overdue lendable
- fewer than 10 items borrowed
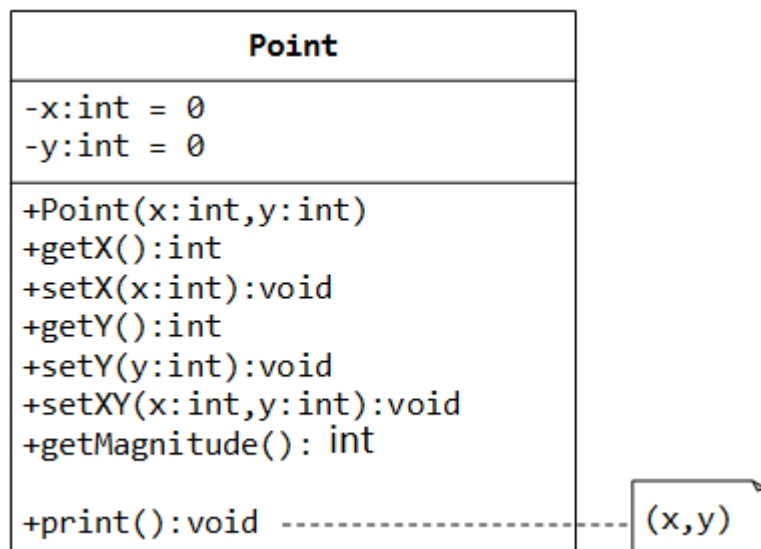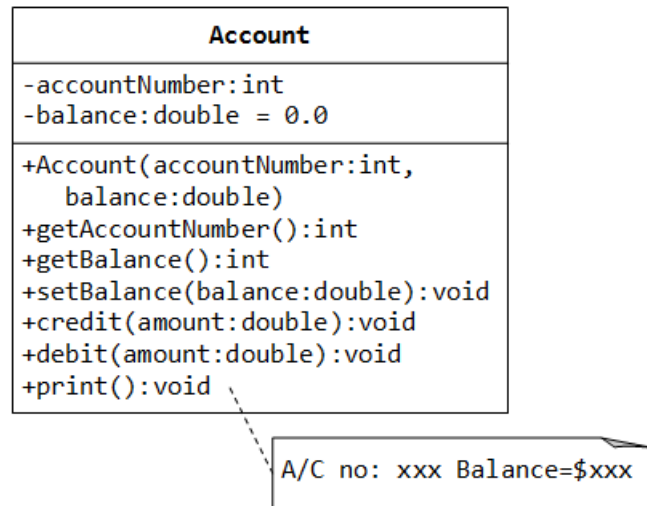- total fines less than 50

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2. Write python code to develop the classes shown in the following UML diagrams.

[hint: In the diagram: minus '-' shows that attribute is private while '+' shows function/attribute is public.]

Account

```
-accountNumber:int
-balance:double = 0.0
```
```
+Account(accountNumber:int,
    balance:double)
+getAccountNumber():int
+getBalance():int
+setBalance(balance:double):void
+credit(amount:double):void
+debit(amount:double):void
+print():void
```

A/C no: xxx Balance=$xxx

Point

```
-x:int = 0
-y:int = 0
```
```
+Point(x:int,y:int)
+getX():int
+setX(x:int):void
+getY():int
+setY(y:int):void
+setXY(x:int,y:int):void
+getMagnitude(): int

+print():void
```

(x,y)

```
                    Time
 -hour:int    = 0
 -minute:int  = 0
 -second:int  = 0

 +Time(h:int, m:int, s:int)
 +getHour():int
 +getMinute():int
 +getSecond():int
 +setHour(h:int):void
 +setMinute(m:int):void
 +setSecond(s:int):void
 +setTime(h:int, m:int, s:int)          hh:mm:ss
 +print():void  -------------------   (e.g., 00:01:59)
 +nextSecond():void
```

3. A teacher issues three tests to a class of 5 students. The grades on these tests are integers in the range 0 to 100. Develop a system which should contain following functions to help teacher in finding

   - Average of each test
   - Average of the whole class
   - Average of a student (using roll number)
   - Score of a student in a test
   - Which student obtained highest marks in a test
   - Which student obtained lowest marks in any specific test
   - Which student has collective highest marks?
   - Which student has collective lowest marks?
   - Which student has highest average?
   - Which student has lowest average?

   Teacher should also be able to update marks of a student.

   You have to use 2d array for this problem.