Computer Science 316

iOS App Development
Lab Assignment #3

Due: Sunday, February 6, 2022 (Before midnight)

Use Xcode to create a Playground (name it *Employees*) with the following classes as specified below:

1. Create a new class named **Employee** with the following specifications:
    Properties:
Employee Name	(String)
Employee ID	(String)
Job Title	(String)
Years of Service	(Int)

    Constructor:
    - init (Name, ID, JobTitle, YearsOfService)

    Member methods:
    - pay   // return a value of 100.00 for the next paycheck as basic reimbursement biweekly.
    - toString   // return a string representation of this employee object like the following as an example:

    > Name: Peter Long
    > ID: 112-22-3011
    > Title: Volunteer Worker
    > Years of Service: 5

    Use the following statements to see the results:

    ```
    var emp1 = Employee(name:"Peter Long", id:"112-22-3011", jobtitle:"Volunteer Worker",
                        yearsOfService:5)
    print (emp1.toString())
    print ("Reimbursement Amount: \(String(describing: formatter.string(from: emp1.pay() as
           NSNumber)!))")
    print ("Thank you for your volunteer work and time!")
    print("------------------------------------------------------")
    ```

2. Create another new class named **SalaryEmployee** which inherits from the **Employee** class with the followings:
    - Add a new property : *annualsalary* (Double)

- Add a new constructor:

  init (Name, ID, JobTitle, YearsOfService, AnnualSalary)

- Override the *pay* method to return the result of *(annualsalary/26)* as the amount for the next paycheck biweekly.
- Override the *toString* method so that it will return a string of the basic employee information plus the annual salary and the biweekly paycheck amount. For example:

```
Name:  Martin Short
ID:  116-23-6418
Title:  Manager
Years of Service:  8
Annual Salary: $78,600.00
Paycheck Amount: $3,023.08
```

Use the following statements to see the results:
```
var emp2 = SalaryEmployee(name:"Martine Short", id:"116-23-6418", jobtitle:"Manager",
                              yearsOfService:8, annualsalary: 78600.00)
print (emp2.toString())
print("---------------------------------------------------------")
```

3. Create another new class named **HourlyEmployee** which also inherits from the **Employee** class with the followings:

- Add two new properties: *hourlyrate* and *hoursworked* (Double)
- Add a new constructor:

  init (Name, ID, JobTitle, YearsOfService, HourlyRate, HoursWorked)

- Override the *pay* method to return the amount ((hourlyrate * hoursworked) if hoursworked <= 80 or (hourlyrate * 80 + hourlyrate * (hoursworked – 80) * 1.5) if hoursworked > 80) for the next paycheck biweekly.
- Override the *toString* method so that it will return a string of the basic employee information plus the hourly rate, hours worked and the paycheck amount as shown below:

```
Name:  Susan Johnston
ID:  123-32-3515
Title:  Receptionist
Years of Service:  10
Hourly Rate: $16.00
Hours Worked: 84.0
Paycheck Amount: $1,376.00
```

Use the following statements to see the results:
```
var emp3 = HourlyEmployee(name:"Susan Johnson", id:"123-32-3515", jobtitle:"Receptionist",
                              yearsOfService:10, hourlyrate: 16, hoursworked: 84)
print(emp3.toString())
print("----------------------------------------------------")

var emp4 = HourlyEmployee(name:"Paul Simon", id:"133-53-4019", jobtitle:"System Support Analyst",
                          yearsOfService:4, hourlyrate: 22.0, hoursworked: 75)
print(emp4.toString())
```

```
        print("-----------------------------------------------------")
```

4. Create another new class named **Executive** which inherits from the **SalaryEmployee** class with the followings:
   - Add a new property: *bonus* (Double)
   - Override the constructor and initialize bonus to 0:
     init (Name, ID, JobTitle, YearsOfService, AnnualSalary)
   - Override the pay() method to return the sum of the bonus and the biweekly paycheck amount
   - Override the *toString* method so that it will return a string of the basic SalaryEmployee information plus the biweekly paycheck amount and bonus awarded. For example:

```
Name:  Steve Job
ID:  111-22-3333
Title:  CEO
Years of Service:  25
Annual Salary: $1,000,000.00
Paycheck Amount: $38,461.54
Bonus Awarded:  $0.00
Name:  Steve Job
ID:  111-22-3333
Title:  CEO
Years of Service:  25
Annual Salary: $1,000,000.00
Paycheck Amount: $39,615.38
Bonus Awarded:  $1,153.85
```

```
var emp5 = Executive(name: "Steve Job", id: "111-22-3333", jobtitle: "CEO", yearsOfService: 25,
                    annualsalary: 1000000.0)
print (emp5.toString())
print ("\n-----------------------------------------------")
print ("3% bonus to be awarded for this paycheck:\n")
emp5.bonus = emp5.pay() * 0.03
print (emp5.toString())
emp5.bonus = 0.0
print ("-----------------------------------------------------")
```

5. Use Employee type as a Polymorphic reference, and use an array to store all five Employee objects (i.e. emp1, emp2, emp3, emp4, and emp5). Then use a for-loop to print out the exact information of these Employee objects as we just did earlier. See the outputs below:

printing all employees using an array!

Name: Peter Long
ID: 112-22-3011
Title: Volunteer Worker
Years Of Service: 5

Reimbursement Amount: $100.00
Thank you for your volunteer work and time!

Name: Martin Short
ID: 116-23-6418
Title: Manager
Years Of Service: 8
Annual Salary: $78,600.00
Paycheck Amount: $3,023.08

Name: Susan Johnson
ID: 123-32-3515
Title: Receptionist
Years Of Service: 10
Hourly Rate: $16.00
Hours Worked: 84.0
Paycheck Amount: $1,376.00

Name: Paul Simon
ID: 133-53-4019
Title: System Support Analyst
Years Of Service: 4
Hourly Rate: $22.00
Hours Worked: 75.0
Paycheck Amount: $1,650.00

3% bonus is to be awarded for current paycheck!
Name: Steve Job
ID: 111-22-3333
Title: CEO
Years Of Service: 25
Annual Salary: $1,000,000.00
Paycheck Amount: $39,615.38
Bonus Awarded: $1,153.85
----

6. Now use a Dictionary to hold all five employees using "ID" as the key. Then use a for-loop to iterate through the dictionary and print out each Employee object with the exact details as in step 5. See the outputs below:

    printing all employees using a Dictionary!

    Name: Peter Long
    ID: 112-22-3011
    Title: Volunteer Worker
    Years Of Service: 5
    Reimbursement Amount: $100.00
    Thank you for your volunteer work and time!

Name: Martin Short
ID: 116-23-6418
Title: Manager
Years Of Service: 8
Annual Salary: $78,600.00
Paycheck Amount: $3,023.08

Name: Susan Johnson
ID: 123-32-3515
Title: Receptionist
Years Of Service: 10
Hourly Rate: $16.00
Hours Worked: 84.0
Paycheck Amount: $1,376.00

Name: Paul Simon
ID: 133-53-4019
Title: System Support Analyst
Years Of Service: 4
Hourly Rate: $22.00
Hours Worked: 75.0
Paycheck Amount: $1,650.00

3% bonus is to be awarded for current paycheck!
Name: Steve Job
ID: 111-22-3333
Title: CEO
Years Of Service: 25
Annual Salary: $1,000,000.00
Paycheck Amount: $$39,615.38
Bonus Awarded: $1,153.85
----

7. Copy your Employees playground file into a different folder and rename it as Employees2. Then implement the **CustomStringConvertible** protocol by defining **description** property in Employee class. Override the **description** property in the other classes. Remove the toString method from all classes. Print each Employee object directly without calling the toString() method. You should get the same exact results as you get from Employees playground file.

Submitting your work:

When you're done, please copy both of your Employees and Employees2 playground files into **Lab3** folder. Then compress **Lab3** folder and submit it via Lab 3 link on our Moodle course page by *Sunday, February 6 , 2022 (before midnight).*