

**MIS 6382**  
**Object Oriented Programming in Python**  
**Spring 2021**  
**Homework Four**

The following guidelines should be followed and will be used to grade your homework:

- The code for each question should be implemented using Jupiter notebooks.
- This is an individual homework assignment; no group submissions will be accepted.
- You don't need to handle exceptions in this homework.
- Testing samples shown in the question serve as the bottom line for debugging purpose, i.e. your code should work for all testing samples. You can definitely endeavor to handle more exceptions, but as long as your code is not too specific, is logically right, and works for testing samples, it will be considered as right.
- **All the code should be included in one single Jupyter Notebook file (.ipynb) and submitted to eLearning. Use the code mode rather than the markdown mode so the notebook can run directly (feel free to leave the results/outputs there).** The file should be named using your name and the chars "hw4", e.g. firstname\_lastname\_hw4. You will be penalized 15% of the grade if your submission does not follow these requirements.
- You will get zero points if your program has syntax errors.

**In this assignment you will create the classes as described.**

- Create a base class Employee that has the following attributes:
  - Employee's name (string)
  - Employee's address (string)
  - Vehicle data (Vehicle object).
- The child classes FullTimeEmployee, HourlyEmployee and Consultant that inherit from Employee have the following additional properties
  - FullTimeEmployee – salary (float).
  - HourlyEmployee - hoursWorked (int) and hourlyRate (float).
  - Consultant – hoursWorked (int) and ProjectType (valid values are 1, 2, and 3).
- All these classes have the `__init__` method as well as the **get** and **set** methods. In addition, they have a `get_compensation()` method as described below.
- Compensation for each employee type is to be computed as follows:
  - FullTimeEmployee: Compensation is salary minus taxes and taxes are calculated based on the tax rate in the table below. Please notice that this format calculates the annual compensation and what this function needs to return is the weekly compensation (assuming there are 52 weeks per year).

Salary	TaxRate
\$45,000 or less	18%
> \$45,000 and <= \$82,000	18% for the first 45000, 28% for the rest
> \$ 82,000	18% for the first 45000, 28% for the amount between 45000 and 82000, and 33% for the rest

For example, someone whose salary is \$123,000 will pay 18% on the first 45,000, 28% on the next (82,000 – 45,000) and 33% on the remaining (123,000 – 82,000)

- HourlyEmployee: Compensation is hoursWorked times hourlyRate for the first 40 hours. For hours in excess of 40 hours the hourly rate is 1.8 times the regular hourly rate. The sum of the two is weekly compensation.

For example, someone whose hourlyRate is \$12.50 and who has worked 48 hours will earn  $40 * \$12.5 + 8 * \$12.5 * 1.8$ .

- Consultant: Compensation is HourlyRate times the hours worked (this is weekly compensation). HourlyRate for Consultants is computed based on the ProjectType as given in the table below:

• Project Type	• HourlyRate
• 1	• \$55.00
• 2	• \$70.00
• 3	• \$85.00

- The Vehicle class is as described below: It has four instance variables – make (string), model (string), year of manufacture (int) and mileage (int). It should have a constructor (**\_\_init\_\_**) method which accepts values for all of the instance variables. You should use **aggregation** to include a Vehicle object to your Employee data.

- **Now write a program to do the following tasks:**

1. Create the following objects and print their information out.

Name	Class	Address	Vehicle (Make, Model, Year, Mileage)	Salary Information
Amy	Full	100 W Campbell Road, Richardson, Texas, 75080	Honda Civic 2014 50000	60000
Bob	Full	200 W Campbell Road, Richardson, Texas, 75080	Toyota Camry 2010 60000	80000
Evan	Full	300 W Campbell Road, Richardson, Texas, 75080	BMW X3 2016 30000	120000
Grace	Hourly	400 W Campbell Road, Richardson, Texas, 75080	Kia Rio 2005 150000	Hours=50 Rate=20
James	Hourly	500 W Campbell Road, Richardson, Texas, 75080	Mazda Mazda3 2010 80000	Hours=35 Rate=25
Luna	Hourly	600 W Campbell Road, Richardson, Texas, 75080	Nissan Sentra 2005 160000	Hours=20 Rate=15
Michael	Consultant	700 W Campbell Road, Richardson, Texas, 75080	Ford Ranger 2011 80000	Hours=40 Type=1
Tom	Consultant	800 W Campbell Road, Richardson, Texas, 75080	Mercedes- Benz GLE350 2018 30000	Hours=50 Type=2
Zoey	Consultant	900 W Campbell Road, Richardson, Texas, 75080	Tesla Model3 2018 15000	Hours=30 Type=3

## Example output:

Details of this Full Time Employee are:

Employee Name: Amy; Employee Address: 100 W Campbell Road, Richardson, Texas, 75080  
Make: Honda; Model: Civic; Year of Manufacture: 2014; Mileage: 50000  
Salary: 60000.00

Details of this Full Time Employee are:

Employee Name: Bob; Employee Address: 200 W Campbell Road, Richardson, Texas, 75080  
Make: Toyota; Model: Camry; Year of Manufacture: 2010; Mileage: 60000  
Salary: 80000.00

Details of this Full Time Employee are:

Employee Name: Evan; Employee Address: 300 W Campbell Road, Richardson, Texas, 75080  
Make: BMW; Model: X3; Year of Manufacture: 2016; Mileage: 30000  
Salary: 120000.00

Details of this Hourly Employee are:

Employee Name: Grace; Employee Address: 400 W Campbell Road, Richardson, Texas, 75080  
Make: Kia; Model: Rio; Year of Manufacture: 2005; Mileage: 150000  
Hours Worked: 50; Hourly Rate: 20

Details of this Hourly Employee are:

Employee Name: James; Employee Address: 500 W Campbell Road, Richardson, Texas, 75080  
Make: Mazda; Model: Mazda3; Year of Manufacture: 2010; Mileage: 80000  
Hours Worked: 35; Hourly Rate: 25

Details of this Hourly Employee are:

Employee Name: Luna; Employee Address: 600 W Campbell Road, Richardson, Texas, 75080  
Make: Nissan; Model: Sentra; Year of Manufacture: 2005; Mileage: 160000  
Hours Worked: 20; Hourly Rate: 15

Details of this Consultant are:

Employee Name: Michael; Employee Address: 700 W Campbell Road, Richardson, Texas, 75080  
Make: Ford; Model: Ranger; Year of Manufacture: 2011; Mileage: 80000  
Hours Worked: 40; Project Type: 1

Details of this Consultant are:

Employee Name: Tom; Employee Address: 800 W Campbell Road, Richardson, Texas, 75080  
Make: Mercedes-Benz; Model: GLE350; Year of Manufacture: 2018; Mileage: 30000  
Hours Worked: 50; Project Type: 2

Details of this Consultant are:

Employee Name: Zoey; Employee Address: 900 W Campbell Road, Richardson, Texas, 75080  
Make: Tesla; Model: Model3; Year of Manufacture: 2018; Mileage: 15000  
Hours Worked: 30; Project Type: 3

**2. Print out the following information:**

- (1) Who has/have the highest weekly compensation;
- (2) What the mean weekly compensation is;
- (3) Who has/have the newest vehicle;
- (4) What the mean vehicle mileage is.

Example output:

```
The people who have the highest weekly compensation $3500 are(is): ['Tom']
The mean weekly compensation of all objects is: 1600.90
The people who have the newest vehicle are(is): ['Tom', 'Zoey']
The mean mileage of all vehicles is: 72777.78
```