

Assignment**IT2030 – Object Oriented Programming****Semester 1, 2022**

In the assignment, you are required to work on two programming problems using the Java programming language applying the Object-Oriented Concepts that you have learnt. You can use any IDE or online tool like repl or any text pad to build your solution.

You are required to work on the assignment individually and submit your solutions on or before 23rd February, 2022- 10.00 am.

Instructions on submitting the assignment:

1. Copy only the source files (file with .java extension) into a separate folder and rename it with your student id.
2. Make the folder as zip file (when archiving, give the student id as the archive folder name)
3. Upload to the course web for the relevant center link visible during the time frame.

**** Students are strictly advised to following the submission guidelines. Any student answer which is not following the correct instructions when submitting, will not be assessed.**

Please note that "Gradescope" will be used to check the plagiarism and the plagiarism benchmark will be 40%. (If the similarity report shows the code similarity percentage as 40% or above it will consider as copied.)

Question 01

Create three classes the Calculation class, Conversion class and Menu Class.

The **Conversion class** should have the following methods.

double KMToMiles(double distance)
double MilesToKM(double distance)
double FeetToMetres(double distance)
double MetresToFeet(double distance)
double KgToPounds(double weight)
double PoundsToKg(double weight)
double CelciusToFahrenheit(double temperature)
double FahrenheitToCelcius(double temperature)

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The **Calculation class** should have the following methods.

```
int SumOfSeries(int start, int end, int incr)
int SumOfArray(int data[], int size)
int ProductOfSeries(int start, int end, int incr)
int ProductOfArray(int data[], int size)
```

e.g. SumOfSeries(10,20,2) should produce the answer 90

Hint : 10+12+14+16+18+20

Similarity ProductOfSeries(100,200,50) should produce 3,000,000

Hint : 100x150x200 = 3,000,000

The **Menu class** should have the following methods.

```
void displayMainMenu()
void displayConversionSubMenu()
void displayCalculationSubMenu()
void displayConversionLengthSubmenu()
void displayConversionWeightSubmenu()
void displayConversionTemperatureSubmenu()
```

The menu class methods should display the options available under each selected menu.

e.g. The displayConversionSubMenu() method should display the following.

Conversion Sub Menu

1. Sum of Series
2. Sum of Array
3. Product of Series
4. Product of Array
0. Exit

If the user selects the sum of array option (option 2), your program should input the size of the array, get values to the array from the keyboard, create a Calculation type object and invoke the SumOfArray() method to calculate the sum of the Array element and to display it. After displaying the answer the same sub menu should be displayed. When the user selects Exit (option 0), you should exit from that sub menu.

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Question 2

You are required to develop a salary calculating application for XYZ company. Use the following set of classes, Employee, Manager, and Director.

Have the following properties in the **Employee class**

Empno, name, telephone, basicsalary, othrs, otrrate
The Methods should be:
calcNetSalary() -> à basicsalary + othrs * otrrate
displayNetSalary()

The **Manager class** should have the following properties

Empno, name, telephone, basicsalary, allowances, deductions
The Methods should be:
calcNetSalary() -> à basicsalary + allowances - deductions
displayNetSalary()

The **Director class** should have the following properties

Empno, name, telephone, basicsalary, allowances, deductions, bonus, entertainmentAllowance
The Methods should be:
calcNetSalary() -> à basicsalary + allowances – deductions + bonus + entertainmentAllowance
displayNetSalary()

Use proper object-oriented concepts and develop the three classes making use of inheritance. Implement suitable constructors and necessary methods.

In the main program Create 6 employees objects of different types and demonstrate the behaviors of the classes.