MITS4002

OBJECT-ORIENTED SOFTWARE DEVELOPMENT

Weight: 15%

Due date: Week 10

Late penalty applies on late submission, 10% per day would be deducted
0 mark for LATE Submission more than one week

You will be marked based on your submitted zipped file on Moodle. You are most welcome to check your file with your lab tutor before your submission. **No excuse will be accepted** due to file corruption, absence from lecture or lab classes where details of lab requirements may be given.
Please make sure that you attend Lecture EVERY WEEK as low attendance may result in academic penalty or failure of this unit.

Student ID:

Student full name:

This assessment item relates to the unit learning outcomes as in the unit descriptors.

This checks your understanding about object-oriented software development.

This assessment covers the following LOs.

LO1 Demonstrate understanding of classes, constructors, objects, data types and instantiation; Convert data types using wrapper methods and objects.

LO2 Independently analyse customer requirements and design object-oriented programs using scope, inheritance, and other design techniques; Create classes and objects that access variables and modifier keywords. Develop methods using parameters and return values.

LO3 Demonstrate adaptability in building control and loop structures in an object-oriented environment; Demonstrate use of user defined data structures and array manipulation.

Tank Circuit Program

Adapt your program in Part A to do the following:

Create a Component Class with variables such as Name, Description, Manufacturer, Cost, Obsolete (Y/N)

Create a Capacitor Class that inherent from the Component Class with Constructors, Accessors/Mutators (getters/setters) as appropriate. e.g. variables E, A, D, C.

Create an Inductor Class that inherent from the Component Class with Constructors, Accessors/Mutators (getters/setters) as appropriate. e.g. variables L.

The types in this program the types of components are as follows:

Name: Capacitors

Description: Store electrical charges.

Warning: Do not use electrolytic capacitors in tank circuits.

Manufacturers: Siemens

Cost: $0.50

Obsolete: No

Name: Inductors

Description: Store electrical charges.

Manufacturers: Motorola

Cost: $0.25

Obsolete: No

In a Main driver function:

Loop Creating Capacitors instants (until the user Enters “N”)

Loop Creating Inductors instants (until the user Enters “N”)

Populate an arrayList of Components (e.g. tankCircuit[]) while looping //acts like a bill of materials, all the components in the circuit.

If there are two Capacitors (assume they are connected in parallel) add them together before calculating the resonant frequency.

If there are two Inductors (assume they are connected in series) add them together before calculating.

Calculate the Tank Circuit Resonant Frequency, costs of the overall circuit and output to the screen with the description as shown in the sample run.

Here is a sample run:

Sample 1:

```
John Smith JS00001

Are you adding a capacitors? Y

Enter Capacitor Area (mm^2): 5

Enter Capacitor separated distance (mm): 0.5

Are you adding a capacitors? Y

Enter Capacitor Area (mm^2): 5

Enter Capacitor separated distance (mm): 0.5

Are you adding a capacitors? N

Are you adding an inductor? Y

Enter Inductance of the inductor (uH): 1

Are you adding an inductor? N

John Smith's LC Tank Circuit

Resonate Frequency: 11.96 MHz

Using:

  Capacitors, 8.85 pF, Store electrical charges. Warning: Do not use electrolytic
capacitors in tank circuits.
```

Capacitors, 8.85 pF, Store electrical charges. Warning: Do not use electrolytic capacitors in tank circuits.

Inductors, 1uH, Store electrical charges.

Total Cost: $1.25

Submit the following items:

1. Submit this Word document with the following:
    a. Explain your Design, Control, Flexibility, Error Control of your code (5 Marks)
    b. Copy of your code as Appendix (screenshot – includes comments in your code) (5 Marks)
    c. Screenshot of the output of your code as Appendix (3 times with expected values, 2 times with non-expected values – such as a zero as an input) (5 Marks)

Marking rubrics for MITS4002

Code	5 Marks Print Student Name and Number (1 Mark) Calculations (3 Marks) Print output with names (1 Mark)	3 Marks Calculates are incorrect.	1 Mark Not relevant. Or penalize for plagiarism.
Screenshots	5 Marks 3 Working with boundary tests 2 Errors (Common errors)	3 Marks Missing screenshots or two of the same.	1 Mark 1 or 2 screenshots. Or penalize for plagiarism.
Questions Answers	5 Marks Appropriate answer and describe the questions Q1 (1.5 Marks) Q2 (1.5 Marks) Q3 (2 Marks)	3 Marks Some questions did not answer. Some questions are incorrect or too brief.	1 Mark Limited response. Not convinced you know what is happening in the code.