GUI Programming 2019-2020 – Year 2

Labwork 3 - Java Revision 3 (Objects):

(Worth 5% - or 50 points out of 500 points for labwork this semester)

IMPORTANT NOTES:

- **NO COPYING PERMITTED AND ZERO MARKS WILL APPLY TO COPIED WORK. FURTHER ACTION MAY BE TAKEN AGAINST STUDENTS THAT HAVE BEEN FOUND TO COPY WORK.**

- **ASSESSMENT WILL INVOLVE ONE-TO-ONE QUESTIONS ABOUT YOUR SUBMITTED WORK. USE COMMENTS IN YOUR CODE TO ENSURE YOU DON'T FORGET WHY YOU WROTE CODE YOU MAY LATER BE ASKED ABOUT.**

- **ALL WORK MUST BE SUBMITTED TO MOODLE BY DATES SPECIFIED (2 LABS SUBMISSIONS OF FIVE LABS THROUGHOUT THE SEMESTER).**

- **MANY OF THE TASKS ASSIGNED BELOW CAN BE COMPLEX AND\OR THE DESCRIPTIONS MAY REQUIRE FURTHER CLARIFICATIONS. PLEASE USE THE AVAILABLE LAB TIMES TO ASK FOR CLARIFICATIONS AND ADVICE\HINTS ON THE TASKS BELOW.**

Part 1 – Basic Object – create object (keyword *new*) (3 points)

Create a Java program called **Lab3Part1** that instantiates an object of ANY type you like.

Required activities and marking guideline:

- Create an object of ANY type (3 points)

Part 2 – Basic Objects – objects and construction (5 points)

Create a Java program called **Lab3Part2** that instantiates ANY TWO objects of your choice. One of the objects you create must take no parameters to the constructor and the other must take at least one parameter to the constructor.

Required activities and marking guideline:

- Create an object with no parameters passed to constructor (2 points)
- Create an object with at least one parameter passed (3 points)

Part 3 – A simple object with attributes (10 points)

Create a Java program called **Flower** that will model a flower. The flower should have at least TWO attributes **type** and **colour**. For every attribute in the class set an accessor (get method) and mutator (set methods). Add a constructor that is non-blank to create flower objects with the attributes set.

Required activities and marking guideline:

- Create Flower class (1 point)
- Create two attributes (minimum) with appropriate type (2 points)
- Write accessor and mutator method for each attribute (4 points)
- Write constructor that creates objects with attributes set (3 points)

Part 4 – Simple object with attributes (12 points)

Create a Java program called **Tree** that will model (create an abstraction of) a tree. The tree class must have at least THREE attributes of **type**, **height**, **age**. For every attribute in the class set an accessor (get method) and mutator (set methods). Add a constructor that is **non-blank** to create tree objects with the attributes set.

Required activities and marking guideline:

- Create Tree class (1 point)
- Create three attributes (minimum) with appropriate type (3 points)
- Write accessor and mutator method for each attribute (5 points)
- Write constructor that creates objects with attributes set (3 points)

Part 5 – Create Garden of Flowers and Trees (More Advanced) (14 points)

Create a program called **Garden** that has at least three Flower objects and three Tree objects. Re-use the classes created above! It may be a good idea to use an array of Tree and an array of Flower (what if the number of trees or flowers increases or decrease in future!). Add accessor methods and mutator methods to get and set the trees and flowers in the Garden. Create a constructor for the Garden class that takes in the flowers and trees that are in the garden.

Required activities and marking guideline:

- Create Garden class (1 point)
- Add THREE tree and THREE flower attributes to Garden (6 points)
- Write accessor and mutator methods to set tress and flowers (4 points)
- Write constructor for Garden objects with trees and flowers (3 points)

Part 6 – Create your own instance of Garden (More Advanced) (6 points)

Create a program called **XXGarden** where XX is replaced with your name, e.g., LukeGarden.java. In this program create an instance of a Garden and add three instances of Tree and three instances of Flower to your garden. Finally, print out all of the information about you garden to the default output device (the screen). Outputting your garden information includes printing all the trees and flowers in your garden and must include all of their names and other attributes [Note: You may want to go back and modify the above Garden, Tree and Flower classes to include output methods to make the output easier….but that is up to you!!!]

- Create your Garden instance adding the trees and flowers (3 points)
- Test your Garden by outputting all information (3 points)