CO2220 Laboratory 4
Graphical Object-Oriented and Internet Programming in Java

Corresponds to Vol. 1 Chapter 4, 5 and 6 (Reference Types, Object behavior and Program Development) of Study Guide.

Learning Objectives:

To understand and apply the following concepts:
- Test operator == on two string variables
- String equals() method
- Pre/Post increment/decrement

Task 1

a) Write a program named StringTest that will do the following:

- Define two string variables str1 and str2. Assign each of them to the value "Apple"
- Test the operator == on these two string variables
- Test the String **equals**() method on the strings variables

b) Add the following items to your program:

- Define two string variables str3 and str4. For each of these variable, use a new string constructor to create the string "Apple" and assign to each variable.
- Test the operator == on these two string variables
- Test the **equals**() method on the string variables

Compare and discuss the results obtained for tests in parts a and b. What did the tests tell you?

c) Using using str1 and str3, repeat the tests with the operator == and the method **equals**() as seen in Task 1 Part B. What have you learnt from it?

Lab Review

After Task 1, review and discuss the following:

- What does the == operator tells you about the literal "Apple" in part a?

- What does the == operator tells you when the strings are created with a String constructor?

HMJ Tay, SH Tian

- What does the == operator tells you when comparing a literal with a string that is constructed using a String constructor?

- From the results, should you use the equals() method or the == operator when comparing strings?

Task 2

a) Write a class name **Ant**. It has two attributes: height and age (both are integer values). Write a constructor and accessor methods for the Ant class. In addition to that, make a method called **copyme**() that will take a Ant and make a clone of it.

b) Write a program **AntApp** that will do the following:

- Create a Ant. (ant1 with height 15 and age 2)
- Create a clone, ant2 with ant1. (using copyme())
- Define a third variable, ant3 and assign ant2 object to it
- Test the == operator on these three ants

c) Add an **equals**() method to the class Ant to test if two ants are considered equal if their height and age are the same. Your method should have the signature: boolean **equals**(Object o). Repeat the tests above with the operator == and the method **equals**().

Compare and discuss the results.

Lab Review

After Task 2, review and discuss the following:

- How does the **equals**() method behave in part b? Discuss the reason.

- Has the **equals**() in part c performed as expected?

- What can you conclude from these tests with regards to comparing two objects belonging to the same class?

Task 3

a) Use the program **Ant** from Task2 for your work here.

b) Write a program named **AntApp2** that will do the following:

- Create an **Ant**, ant1 with height 15 and age 5.
- Call a static method **increaseHeight1**() that accept an **Ant** object as its argument. Within this method, increase the height by 5. Show the height of the ant1 after returning from the method.
- Call a static method **increaseHeight2**() that accepts the **height** of an **Ant** object as its argument. Within this method, increase the height by 1. Show the height of the ant1 after returning from the method.

Compare and explain the results obtained.

Lab Review

After task 3, review and discuss about the following:

- What is the input argument when **increaseHeight1**() is called?

- What is the input argument when **increaseHeight2**() is called?

- What is the difference between using **increaseHeight1**() and **increaseHeight2**()?