Introduction to Programming Tutorial/Laboratory 2

Tutorial

Attempt the following self-assessment questions from the textbook.

Quiz on Chapter 2

1. Briefly explain what is meant by the *syntax* and the *semantics* of a programming language. Give an example to illustrate the difference between a syntax error and a semantics error.

2. What does the computer do when it executes a variable declaration statement. Give an example.

3. What is a *type*, as this term relates to programming?

4. One of the primitive types in Java is **boolean**. What is the boolean type? Where are boolean values used? What are its possible values?

6. Explain what is meant by an *assignment statement*, and give an example. What are assignment statements used for?

8. What is a *literal*?

12. Integrated Development Environments such as Eclipse often use ***syntax colouring***, which assigns various colours to the characters in a program to reflect the syntax of the language. A student notices that Eclipse colours the word *String* differently from **int**, **double**, and **boolean**. The student asks why *String* should be a different colour, since all these words are names of types. What's the answer to the student's question?

Laboratory

Complete last week's laboratory, which included question 1 from chapter 2 of the book, and then attempt the following programs:

1. This exercise builds on your *HelloWorld2* and *HelloWorld3* applications from the first week's lab sheet. In *HelloWorld3* you wrote a program that displays a greeting with your name and the values of your age and your height (stored as *int* and *double* variables respectively), but as we had not covered the input methods in TextIO at that time you had to hard code these values in the source code.

   Write an application called *HelloWorld4* (you can use the *HelloWorld3* application as your starting point if you have it to hand) that takes the values (for the String variables that store your forename and surname, the int variable that stores your age, and the double variable that stores your height) from the keyboard. So your application should provide prompts that ask the user to enter their forename, surname, age and height, and after reading these, displays a greeting with this information. Update the comments at the top of the program to state what the revised program does.

2. Add a second method to the *Application* class that you created from the lab sheet last week. This method should do the opposite conversion i.e. convert a temperature in Celsius to Fahrenheit. Add code to the main method to prompt the user to enter a temperature in Celsius and then call your method to display the equivalent temperature in Fahrenheit.

   The calculation is:

   fahrenheit = 32 + (9 * celsius / 5)

   If you have time then you can try the following exercise:

3. Write a program that simulates rolling a pair of dice. You can simulate rolling one die by choosing one of the integers 1, 2, 3, 4, 5, or 6 at random. The number you pick represents the number on the die after it is rolled. As pointed out in Section 2.5 of the book, the expression

   (int)(Math.random()*6) + 1

   does the computation you need to select a random integer between 1 and 6. You can assign this value to a variable to represent one of the dice that are being rolled. Do this twice and add the results together to get the total roll. Your program should report the number showing on each die as well as the total roll. For example:

   The first die comes up 3
   The second die comes up 5
   Your total roll is 8

   (*This is exercise 2 in chapter 2 of the book*)