University of Stirling

Computing Science and Mathematics

CSCU9A2   **Tutorial 1**   **Spring 2017**

(for week starting 30 January)

1. Why are compilers necessary? In what ways does a compiler for Java differ from a compiler for other high-level languages? Why? What is meant by the term "Java Virtual Machine"?

2. Why do we need *variables* in Java programs? What is the significance of *declarations of variables* in a program? Having to declare variables might seem irritating (and some languages do not require declarations), but it allows the compiler to help us avoid certain mistakes: what kinds of mistakes?

3. In Java, what would be the values of the following expressions, and *how are they calculated*?
    (Read about expression evaluation in Horstmann, from p41, if you are not sure of the rules)

    ```
    9 / 4
    9 % 4
    9 / 4.0
    2 * 5 / 2
    5 / 2 * 2
    2 * (5 / 2)
    2 * (5 / 2.0)
    3 * 5 - 2 * 2 - 4
    3 * (5 - 2) * 2 - 4
    ```

4. Consider the following method definitions from a Java application:

    ```
    public static void r()
    {
        System.out.println("*");
    }

    public static void s()
    {
        r();
        System.out.println("**");
        r();
    }
    ```

    Note: the body of method s contains two calls of method r.

    What is displayed on the screen, **and more importantly why**, when the following main method is invoked at program launch?

    ```
    public static void main(String[] args)
    {
        r();
        s();
        r();
    }
    ```

    [It is OK to find out what this draws by typing it in and running it — but you still need an *explanation*!]

SBJ January 2017