

## 1. Primitive Data Types

(a) Describe what is meant by variable *declaration* and *assignment* with reference to Java's primitive data types. Give valid examples of variable declaration and valid examples of variable assignment. [4]

(b) Provide answers to the questions given below.

- i. Is **String** one of Java's eight primitive data types? If it is not, state why this is the case.
- ii. Is it possible to convert a numeric value to another numeric type? What are the benefits of doing so, and should the programmer be aware of any potential pitfalls?
- iii. When a variable is declared, what initial value does it contain?

[6]

- (c)
- i. Write a short program that, given an 8-bit binary number (stored in an array), converts this number to an unsigned, positive, base-10 integer value. Given the input 00001111 your code should return 15; given the input 10101010 your code should return the value 170.
  - ii. Modify your code so that it also outputs the unsigned, positive, base-10 integer value represented by flipping the bits. In the case of the input 00001111, as well as outputting 15, your code should also output 240 (i.e. the value of 11110000).
  - iii. Describe how you would modify your code so that the most significant bit (in the input) was to act as a sign bit; that is, the left-most bit determines whether the number is positive (when it is 0) or negative (when it is 1).

[10]