COSC1076 | Advanced Programming Techniques

Revision Questions | Answers | Week 01

1. The minimum program is

   ```
   int main (void) {
       return 0;
   }
   ```

2. The `main` function must return an integer value, typically 0. This value is captured by the operating system, and can be used. For the purpose of this course, we won't use non-zero return codes.
3. The standard compilation command is:

   `g++ -Wall -Werror -O`
4. The values of the variables are:

   ```
   x = 23
   y = 2.5
   z = 5
   ```

5. Things that you could consider in your answer:
   - `printf` makes it easier to control the format of output.
   - C++ style output, using the « operator is easier for chaining together multiple output statements.
   - C++ style output, using the « is written to be compatible with the C++ STL and the various forms of generic output methods, which is discussed later in the course.
6. (a) `scanf` provides codes for EOF and error messages as a return value from the function. `cin` is a class, which has methods that can be called after reading from input has been attempted.

   (b) Possible reasons may include:

      i. `cin` is designed to allow chaining of input, and to be generic with the read operator ».

      ii. The return value of `scanf` is very overloaded, with inconsistencies in what the return value means. Specifically it combined error handing with a read-count. In the event of an error it might be desirable to know the number of values that were read and if an error occurred.
7. (a) The re-written program is

   ```
   #include <iostream>

   int main (void) {
       int x = 5;
       int y = 10;
       x = x + y * 2+4;
       std::cout <<  "The value of x is "; << x << std::endl;
       return 0;
   }
   ```

   (b) The `MESSAGE` define has a semi-colon at the end, which causes an error in the output line.

   (c) There are no brackets around the define for `Z`. This potentially causes issues when evaluating the precedence order of operators.

   (d) i. If brackets are not added, the output is `The value of x is 29`

      ii. If brackets are added, the output is `The value of x is 65`
8. A class
9. C++ arrays are *unbounded*, that is, it is possible to read/write beyond the end of the array. Java always checks the bounds of the array when accessing its elements.
10. You can't. The dimensions of the arrays must be tracked manually by the programmer.
11. Function calls operate using a process called *pass-by-value*. The parameters are *copied* to the function.

12. The output is `x = 2, y = 6`
13. (a) `iostream`
    (b) `cstdio`
    (c) `string`
    (d) Strictly, `ostream`. Using `iostream` also works, because internally it includes the `ostream` header.
14. It is bad-style because it brings all entities and names into the global scope of the file, polluting it with unnecessary identifiers. This could, in general, cause compilation errors if the current file creates entities with the same name.