STAT40780 Data Programming with C (online)

Lab Sheet 2 (Solutions)

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Summer 2015

This week's lab requires you to write and spot errors in some basic C++ functions. You are not required to compile any code this week. Have fun!

1 Write a cube function in C++

Open a new C++ script file in RStudio (File − > New file − > C++ file). Write a C++ function that returns the cube of its input argument. The function should accept (and return) a real number argument.

Hint: while R provides the ^ operator for exponentiation (e.g. 2 ^ 3 returns 8), this is not available in C++.

SOLUTION

A possible solution

```
1
2 double cube( double x )
3 {
4  return( x * x * x );
5 }
```

2 Identify the errors in this C++ function

The below C++ function is supposed to:

1. consist of a single function, main()
2. create a variable y that can store a real number value
3. initialize y to the value 12.2
4. create a new variable x and assign it twice the value of y
5. output the value x

However, the sleepy programmer who wrote this made lots of errors. Identify the errors and write an error-free version of this program.

Program with errors

```
1  #include <iostream>;
2
3
4  int main()
5  {
6   int y = 12.2;
7
8   x = y * 2;
9   cout <<  "The value of x is" <<  x
10
11 };
```

SOLUTION

Errors:

1. Line 1: Remove semi-colon at end of line
2. Line 2 and Line 9: Either, add the statement `using std::cout;` on Line 2 to allow you to use the alias `cout` on Line 9 OR change `cout` to `std::cout` on Line 9
3. Line 6: Since `y` should store a real number value, it should be declared to be of type `double`, instead of type `int`
4. Line 8: `x` has not been declared before use. Declare `x` as a variable of type `double`
5. Line 9: Add a semi-colon at end of line
6. Line 10: The return type of the `main()` function has been specified as `int`. Therefore, the function needs to return an integer value. Add the statement `return 0;` to Line 10.

7. Line 11: Remove semi-colon after curly bracket because function definitions do not end with a semi-colon

Error-free version

```
1  #include <iostream>
2  using std::cout;
3
4  int main()
5  {
6   double y = 12.2; //declare and initialize y
7   double x; //declare x
8   x = y * 2;
9   cout <<  "The value of x is" << x;
10  return 0;
11 }
```