# Programming and Problem Solving
# Winter 2015 – CS110-001

## Quiz #3 – April 1 @ 8:30 in CL112

Name: _____

Student Number: _____

There are 10 multiple choice questions and 1 programming question in this quiz. Answer the multiple choice questions on the Scantron sheet. Answer the programming question in the space provided on the quiz. You have 50 minutes to complete the quiz.

There are 20 marks available on this quiz:

| | |
|---|---|
| Multiple choice (10): | / 10 |
| Programming (10): | / 10 |
| | / 20 |

**Multiple Choice (10 questions x 1 mark each = 10 marks. Answer on Scantron sheet)**

1. What is NOT a type of variable discussed in Chapter 6?
   A. local
   B. global
   C. static
   D. regional
   E. automatic

2. Regarding the following function header, which statement is NOT true?

```
int numb(const string& name, int n1, int& n2)
```

   A. `numb` returns an integer
   B. `numb` may modify `n2`
   C. `numb` may modify `name`
   D. `n1` is a local variable in `numb`
   E. `n2` is passed by reference

3. The following function call will be associated with which function prototype?

```
double value = compute(6.2, 3);
```

   A. error, ambiguous
   B. `double compute(double, int);`
   C. `int compute(int, int, int);`
   D. `string compute(string);`
   E. `double compute(double, double);`

4. Which is definitely not required to define and use a function in C++?

   A. function header
   B. function prototype
   C. function body
   D. function call
   E. parameter passed by reference

5. In class, we began to write a program to compute the Greatest Common Divisor of 2 numbers by writing a main function that received the user's input. In the main

function, we included a call to a gcd function that always returned the value 1 no matter which arguments were passed to it (a function like this is sometimes called a stub). What kind of implementation did we practice?

A. Bottom-up
B. Agile
C. Top-Down
D. Spiral
E. Non-hierarchical

6. What is the value `i` displayed by the `cout` statement in the following code?

```
void func()
{
     int i = 1;
     int sum = 0;
     for (int i = 0; i < 10; i++)
     {
          sum += i;
     }
     cout << i << endl;
}
```

A. 0
B. 1
C. 10
D. 45
E. 100

7. What are the values of x and y after the 3rd invocation of this function?

```
void test()
{
    static int x = 1;
    int y = 2;

    x += y;
    y += x;
}
```

A. 1 and 2
B. 3 and 5
C. 8 and 13
D. 7 and 9
E. 21 and 27

8. What are the values `numb1` and `numb2` at the end of this code snippet?

```
void swap(int number1, int number2)
{
    int temp;
    temp = number1;
    number1 = number2;
    number2 = temp * 2;
}

int main()
{
    int numb1 = 4;
    int numb2 = 2;

    swap(numb1,numb2);
```

A. 2 and 4
B. 4 and 2
C. 2 and 8
D. 4 and 4
E. 4 and 8

9. Which is NOT an advantage of the stepwise refinement approach that breaks a large problem into smaller manageable subproblems that can each be implemented using a function?

A. Simpler programs
B. Reusable code
C. Easier to maintain higher complexity of large problem
D. Easier to develop, debug, and test
E. Easier to work in teams

10. Which of the following declarations is legal?

A. `void defarg(int x = 0, int y = -1, int z = 2);`
B. `void defarg(int x = 0, int y, int z);`
C. `void defarg(int x, int y = -1, int z);`
D. `void defarg(int x = 0, int y = -1, int z);`
E. `void defarg(int x = 0, int y, int z = 2);`

**Programming Question (6 marks):**

A simple form of encryption is called a Caesar cipher (because it was used by Julius Caesar!). It encodes letters using a single key. For example, if the string "Hello" is input and the key is 4, the encrypted string would be "Lipps" (because 'H' + 4 = 'L', etc.). Write a function, called `cipher` (prototype follows), that implements a variation of a Caesar cipher, as follows:

- encrypt only alphabetic characters (remember the `isalpha` function)
- transform lower case letters to uppercase before converting (remember the `toupper` function, which returns the uppercase version of the character if it exists)
- ensure that all alphabetic characters are encrypted as uppercase letters
- return the count of lowercase letters converted by the function

Fill in the missing line of the main function below (write it in the box):

```
#include <iostream>
#include <string>
using namespace std;

int cipher(string& instr, int key);

int main()
{
    cout << "String?: " << endl;
    string instr;
    cout << "Key?: " << endl;
    int key;
    int lower = cipher(instr,key);
    cout << "Encrypted: " << instr << " - " lower << endl;
```

```
    cout << "Unencrypted: " << instr << " - " lower << endl;
    return 0;
}
```

CS 110-01 Quiz #3: 1 April 2015

Name: _____ Student Number: _____