

HW3: Released Tuesday, week 3 and due Thursday, week 3 (due to 4th of July on Monday)

1. List any students you discussed with on this homework assignment: _____

These should still be your own answers, but it is ok to check answers and discuss your reasoning with your classmates.

Running code snippets from the homework is ok, but please take a moment to read through the code yourself first and figure out what you think it will do—you will learn how the code works much better if you think through it first before checking, *especially* if your initial assessment was wrong.

2. For Loop Variable Scope (3 points)

Explain the difference between these 2 snippets of code.

```
for(int i = 0; i < 10; i++){  
    cout << i;  
}
```

```
int i;  
for(i = 0; i < 10; i++){  
    cout << i;  
}
```

3. Nested While Loops (4 points)

What will the following code print?

```
int x = 0;  
while(x <= 3){  
    int y = x;  
    while(y < 5){  
        cout << y << " ";  
        ++y;  
    }  
    cout << endl;  
    ++x;  
}
```

4. Global and Local Variables in Functions (4 points)

Our file is as follows:

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

int x = 0;

int square(int y){
    y *= y;
    ++x;
    return y;
}

int main(){
    int y = 10;
    int result = square(y);
    cout << y << " " << result << endl;
    cout << "Square function called " << x << " times" << endl;
    int z = 16;
    result = square(z);
    cout << z << " " << result << endl;
    cout << "Square function called " << x << " times" << endl;
    return 0;
}
```

What is printed when we compile and run this file?

5. Call-by-value vs. Call-by-reference (9 points)

Consider the following main() function.

```
int main() {  
    int x = 10, y = 20, z = 30;  
    shift(x, y, z);  
    cout << x << " " << y << " " << z << endl;  
    return 0;  
}
```

The body of the shift() function is as follows.

```
{  
    int temp;  
    temp = var1;  
    var1 = var2;  
    var2 = var3;  
    var3 = temp;  
}
```

What will this program print for each of the following function declarations for shift()? Explain why!

- a. (3 points) void shift(int var1, int var2, int &var3);
- b. (3 points) void shift(int &var1, int &var2, int var3);
- c. (3 points) void shift(int &var1, int &var2, int &var3);