Exercise #3  
Due Friday, 01/22/2016, at 11:59pm

Code Questions

1. Consider the following snippet of code:

```cpp
int a = -1, b = -1;
cout << "Enter a value for a: ";
cin >> a;
cout << "Enter a value for b: ";
cin >> b;
cout << "a= " << a << " , b= " << b << endl;
```

Here are two complete executions of the program, with user input included:

Enter a value for a: 1
Enter a value for b: 2
a=1, b=2

Enter a value for a: 2.5
Enter a value for b: a=2, b=0

Obviously, in the second case something has gone wrong! What is the cause for this unexpected behavior? What could the author or user of the code do to prevent it from happening?

2. The code below is supposed to work as an integer-only version of the pow function. The user inputs the base and exponent, and by the end of the code result should hold the value base^exponent (or, in terms of C++ function calls, pow(base, exponent);).

However, the condition of the for loop and the assignment in its body still need to be completed! What statements would you replace the question marks with to make the code work as described above? (Remember, testing or experimenting with this code using a computer is encouraged!)

```cpp
int base, exponent, result;
//Get base and exponent from user
cin >> base >> exponent;
result = 1;
for(int i = 0; ???; i++) {
    result = ???;
}
//Print result
cout << result;
```
3. What will the for loop below print out, if executed? Write a snippet of code using a while loop that will print the same output.

Can any for loop be translated into an equivalent while loop? Why or why not?

```cpp
for(int x = 10; x > 0; x = x - 2) {
    cout << x << " ";
}
```

4. For each of the following three snippets of code, answer the following questions:

- Will this code compile? If not, why not?
- If the code will compile, what will the resulting program print out when run?
- What is the scope of each variable used in the code?

a) ```cpp
int a = 0;
if (a < 3) {
    int a;
    a = 5;
}
cout << a << endl;
```  

b) ```cpp
int a = 0;
if (a < 3) {
    a = 5;
}
cout << a << endl;
```  

c) ```cpp
int a = 0;
if (a < 3) {
    int b = 10;
}
cout << b << endl;
```  

Assignment 3 Design

In assignment 3, you’re going to be writing a program that calculates the movement of a robot on a grid. For this exercise, you’re going to start thinking about the design of your solution. Write a preliminary design paragraph that answers the following questions:

- What is the purpose of the grid in the problem?
- What are the important properties of each cell in the grid?
- How are you going to represent the grid in your code? The assignment says “you can use a variable for each grid location”, so what do you think the type and meaning for those variables should be?

For take-home exercises completed in peer-led groups, each student must participate in the class discussion and write answers to each of the questions on his/her own paper to show for credit.

For take-home exercises completed on your own, turn in your work electronically using the TEACH website.