Homework 15 (The Last One) (10 Points)

1.) Determine what will be printed in the following program. Describe the recursive process that leads to this sequence of numbers.

```
void recursion(int n) {
	if (n == 0)
		return;
	cout << n << " ";
	recursion(n - 1);
}

int main()
{
	recursion(5);
	cout << endl;
	return 0;
}
```

2.) Modify the snippet in problem 1 so that the numbers are printed in ascending order instead of descending order without modifying the line recursion(n - 1);. In other words, modify the code to print “1 2 3 4 5”.

3.) Modify the snippet in problem 2 so that the numbers are printed in descending order, and then ascending. Do this In other words, modify the code to print “5 4 3 2 1 1 2 3 4 5”. Achieve this without modifying the line recursion(n - 1);.

4.) Below is a code snippet which adds several nodes to a linked list in the main function. Use **recursion** to complete the printList function, which shall print the data for each node in the list starting with the first and ending with the last. If you have done this correctly, the console should output "You understand C++ recursion". *No points will be awarded if you use loops to complete the exercise.*

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

struct Node {
    string data;
    Node *next;
};

Node* addNode(Node *head, string data) {
    Node* tmp = new Node;
    tmp->data = data;
    tmp->next = head;
    return tmp;
}

// Finish this function as a recursive function
void printList(Node *head) {
}

int main()
{
    Node *head = nullptr;
    head = addNode(head, " recursion.");
    head = addNode(head, " C++");
    head = addNode(head, " understand");
    head = addNode(head, "You");
    printList(head);
    return 0;
}
```

5.) Below is a code snippet which calls the function *revString*. Using recursion, complete the *revString* function so that it ultimately returns the string in reverse. Therefore, in the example given the output should be "olleh". The parameter *str*, is the input string, and the parameter *pos* is the current position within the string. *No points will be awarded if you use loops to complete the exercise.*

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

string revString(string str, int pos) {
}

int main()
{
	string input = "hello";
	string output = revString(input, 0);
	cout << output << endl;
	return 0;
}
```