**ICS 410 – 7A Recursion**

**Application 1**

1. **What are the criteria for a recursive solution?**

A recursive solution must have a way of reducing the problem to smaller elements. It also must have a base case which is a way of identifying the endpoint of the solution. Finally, there has to be a way of getting the larger result from the elements.

1. **Think of another everyday example. NOT mentioned on this assignment or during the lesson!**

Another everyday example of recursion are Russian dolls. If you want to paint each Russian doll, you can’t paint the biggest one because then you won’t be able to open it up to get to the second Russian doll. Thus, you have to open up the largest Russian doll, the doll inside that doll, the doll inside the second doll, and so on until you get to the doll that can’t be opened up (the base case). Then you could start moving back up and paint the smallest one, put it back into the second smallest, and so on.

1. **Give two specific problems associated with recursion, and two reasons for using recursion.**

A problem of recursion is that it takes up a lot of stack space so it isn’t very useful when a program is small. Another problem is that it’s hard to trace through since you have to go through each round. This can make it hard to debug code. A reason to use recursion is that it reduces unnecessary calling of functions. Another reason to use recursion is that programmers can solve problems in an easy way even if its problem is very big.

1. **What does an iterative solution mean?**

An iterative solution is used to describe a solution that runs through a sequence of instructions (code) multiple times.