CSI 201 — Computer Science I, Fall 2005

Handout #17 - Thursday, November 3, 2005

1. Quiz on Tuesday November 8th

2. HW #8 due Tuesday, November 8th

3. Recursion Review p572

4. Stack Overflow p584

5. Recursion vs. Iteration

6. Recursive functions that return a value

7. The Power Function

8. Criteria for recursive functions that return a value p592

   (a) There is no infinite recursion

   (b) The stopping case returns the correct value for that case

   (c) For recursive cases, if all recursive calls return the correct value, then the value returned by the function is correct

9. Binary Search p 592–600

10. **Homework #8:** due Tuesday November 8. Write a recursive function to compute the factorial. $n! = n * (n - 1) * (n - 2) * ...1$. For example, 3! is 6 because $3 * 2 * 1$ is 6. Now that you have written a factorial function, implement a choose function. $C(n, r)$ is called the choose function because it computes the number of ways of choosing r things from n things. $C(5, 2)$ is 10 because given 5 items, there are 10 ways to choose 2 of those items. The formula for choose is $C(n, r) = \frac{n!}{r!*(n-r)!}$. So, $C(5, 2)$ is $\frac{5!}{2!*3!}$ or $\frac{120}{2*6}$ which is 10. Implement choose using the factorial function. Prompt the user for n and r and output the value of $C(n, r)$.

11. **Extra Credit #3:** due Thursday November 10, Write a recursive function for the Fibonacci sequence (problem 1 on page 606). They give the formula for the Fibonacci sequence as $F_{i+2} = F_i + F_{i+1}$ for $i = 0, 1, 2...$, however, The formula may also be written as $F_j = F_{j-1} + F_{j-2}$ for $j = 2, 3, 4, ...$