Day 34 Highlights

1. Reminders
   1. zyBooks chapter 10 due Monday at midnight
   2. Quiz 10 this Friday
   3. Project six is due on April 19, Friday at 5pm
2. Recursion – function calling itself as it executes, has
   1. Base case (terminates)
   2. Recursive case (recurses)

**At least one base case and at least one recursive case**

* 1. **How a recursive function is executed?**

1. Consider **Factorial** – iterative code shown at left, recursive at right

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| --- | --- |
| **int fact(int n) {**  **int answer = 1;**  **while (n > 0) {**  **answer = answer \* n;**  **n = n – 1; }**  **return answer;** | **int fact(int n) {**  **if (n == 0) return 1;**  **return n \* fact(n-1);**  **}** |

* Base case: **If n is zero, return 1**
* Recursive case: **If n is not zero, total is n \* factorial (n-1)**

1. Another example – sum the digits in a number

* Base case: **If n is zero, return 0**
* Recursive case: **If n is not zero, add last digit to the sum of remaining digits**

|  |  |
| --- | --- |
| **int sum\_digits(int n) {**  **int ans = 0;**  **while (n > 0) {**  **ans = ans + n%10;**  **n = n/10; }**  **return answer;** | **int sum\_digits(int n) {**  **if (n == 0) return 0;**  **return n%10 +**  **sum\_digits(n/10);**  **}** |

1. Have them code recursive functions for:
   1. Counting the digits in a given number
   2. Counting the number of 7’s in a given number