CS367 Lecture 14

Tuesday 8 July 2014

Announcements/Reminders:

- HW4 assigned
- HW2, P1 graded. HW2 solutions link on Piazza.
- Midterm syllabus
- Late submission of HW2

Last class:

- Recursion (begin)

Today:

- Recursion (cont'd)

Recursion Recap

Definition:

Key Rules:

1.

2.

Questions to keep in mind

- How can you solve the problem in terms of smaller problems of the same kind?
- What instances of the problem can be used as base cases?
- How does the problem size decrease in each recursive call?
- As the problem size decreases will a base case be reached?

Recursion Example: n choose k

Conventional Definition:

Recursive Definition:

Implementing the recursive definition:

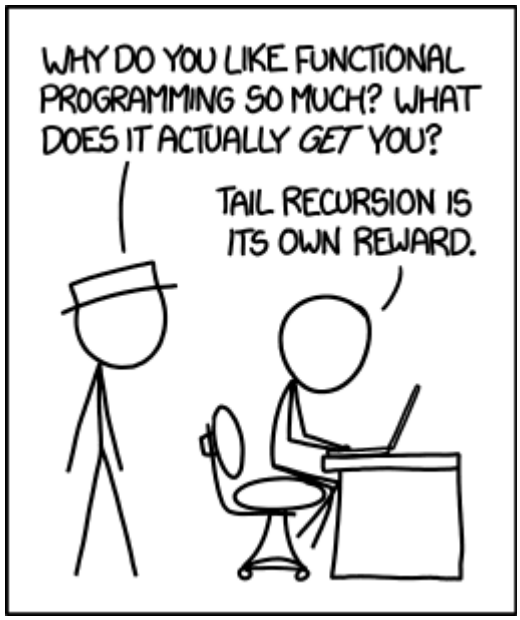
Tracing an execution tree:

Recursion Examples: Arrays and Linked Lists

```
int countEven(int[] a):
```

```
boolean isIncreasing(ListNode<Integer> head):
```

Tail Recursion



http://www.xkcd.com/1270/

Analyzing Complexity of Recursive Methods

Recursion Example: Binary Search

Recursion Example: Palindromes

Write a recursive method to determine if a given input String is a palindrome. Palindrome examples:

eye
kayak
racecar
Was it a rat I saw?
Never odd or even!
Amy, must I jujitsu my ma?
Are we not drawn onward to new era?

Assume: input String is not null, all spaces and punctuation removed, all lowercase.

Useful String methods:

```
char charAt(int index)
int length()
String substring(int begin, int end)
```