CSCI 103
Using Recursion to Generation Combinations and with Linked Lists

Mark Redekopp
Another Example

• If you are given the value, n, and an array with n characters could you generate all the combinations of n-bit binary?

• Do so recursively!

http://cs103.usc.edu/websheets/index.php?#bincombos
Recursion and DFS

- Recursion forms a kind of Depth-First Search

```c
void binCombos(char* data, int curr, int len)
{
    if(curr == len )
        data[curr] = '\0';
    else {
        // set to 0
        data[curr] = '0';
        // recurse
        binCombos(data, curr+1, len);
        // set to 1
        data[curr] = '1';
        // recurse
        binCombos(data, curr+1, len);
    }
}
```
Exercise

- http://cs103.usc.edu/websheets/?#basen_combos
- http://cs103.usc.edu/websheets/#zero_sum
Linked Lists and Recursion

• Consider a linked list with a head pointer
• If I gave you head->next, isn't that a "head" pointer to the n-1 other items in the list?
Let's Monkey Around

- http://cs103.usc.edu/websheets/#monkey_recurse
- http://cs103.usc.edu/websheets/#monkey_recback
- http://cs103.usc.edu/websheets/#list_max
- http://cs103.usc.edu/websheets/#monkey_reverse