CS 161
Intro to CS I

Finish Recursion/Begin Memory Model
Odds and Ends

• Assignment 5 design due
```cpp
#include <iostream>
using namespace std;

int main() {
    // create an integer array with 10 elements on stack and one on the heap

    // initialize the elements in the arrays

    // print where the pointer to the array lives in memory

    // print where the array begins in memory

    // print the contents of the 3rd element

    return 0;
```

Passing a 1-D Array (Static/Dynamic)

int main() {
    int array[5];
    ...
    pass_1darray(array);
    ...
}

void pass_1darray(int *a) {
    cout << "Array at zero: " << a[0] << endl;
}

OR

void pass_1darray(int a[]) {
    cout << "Array at zero: " << a[0] << endl;
}
Class Exercise

• How do I initialize an array in a function?
• How can I print the contents of the array in a function?
• How about printing the address of the pointer to the array and the address of where the array begins in a function?

• How would I create an array in a function?
What are C-style strings?

- Ended by ‘\0’ character
- Need to include <cstring>
C-Style Strings Demo...
Multidimensional Arrays

• data_type array_name[rows][cols];
  – int array[2][3];
  – int array[4][2][3];
  – int array[2][4][2][3];

• What are examples of these?
  – 2-D – Matrices, Spreadsheet, Minesweeper, Battleship, etc.
  – 3-D – Multiple Spreadsheets, (x, y, z) system
  – 4-D – (x, y, z, time) system
Initializing 2-D Arrays

- **Declaration:** int array[2][3] = {{0,0,0},{0,0,0}};
- **Individual elements:** array[0][0]=0; array[0][1]=0; array[0][2]=0; array[1][0]=0; array[1][1]=0; array[1][2]=0;
- **Loop:**
  ```
  for(i = 0; i < 2; i++)
      for(j = 0; j < 3; j++)
          array[i][j]=0;
  ```
- **Why do we need multiple brackets?**
Reading/Printing 2-D Arrays

• Reading Array Values
  for(i = 0; i < 2; i++)
    for(j = 0; j < 3; j++) {
      cout << “Enter a value for “ << i << “, “
           << j << “: “;
      cin >> array[i][j];
    }

• Printing Array Values
  for(i = 0; i < 2; i++)
    for(j = 0; j < 3; j++)
      cout << “Array: “ << array[i][j] << endl;