CS 161
Intro to CS I
Continue 1-d Arrays, C-Strings, and Command-Line Arguments
Odds and Ends

• Demo Assignment 4
• Assignment 5 posted
• Veteran’s Day Friday (no class/office hours)
#include <iostream>
using namespace std;

int main() {
    int stack_array[10];
    int *heap_array=new int[10];

    //how do I initialize the elements in array
    stack_array[0]=10;
    heap_array[0]=100;

    //how do I print the address of the pointer to the array
    cout << &stack_array << endl;
    cout << &heap_array << endl;

    //what is the contents of the pointer, how do I print it
    cout << stack_array << endl;  //address of where array is
    cout << heap_array << endl;

    //how do I print the address of where the array begins in memory
    cout << &(stack_array[0]) << endl;  //address of where array is
    cout << &(heap_array[0]) << endl;

    //how do I print the contents of the first element in the array
    cout << *(stack_array+0) << endl;  //contents of first element
    cout << heap_array[0] << endl;  //[] is address arithmetic and deref

    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 would I do the above in a function?
• How would I create an array in a function?
```cpp
#include <iostream>
using namespace std;

//return address of array on heap
int * fun() {
    //int stack_array[10]; //never return stack address from function
    //return stack_array; //BAAAAAAAAAD!!!!
    return new int[10];
}

//pass pointer to function as reference, a is a reference to an int *
void fun(int *&a) {
    a=new int[10]; //a really refers to heap_array
}

//pass address of pointer to int, which makes int **
void fun(int **a) {
    *a=new int[10]; //dereference a to get to heap_array contents
}

int main() {
    int stack_array[10];
    int *heap_array=NULL;
```
```cpp
int main() {
    int stack_array[10];
    int *heap_array=NULL; //make pointer on stack to point to array on heap

    //heap_array=fun();  //return address on array on heap to heap_array

    //fun(heap_array);  //pass heap_array by reference

    fun(&heap_array);  //pass address of heap_array explicitly, int ** passed

cout << heap_array << endl;

    //how do I initialize the elements in array
    stack_array[0]=10;
    heap_array[0]=100;

    //how do I print the address of the pointer to the array
    cout << &stack_array << endl;
    cout << &heap_array << endl;

    //what is the contents of the pointer, how do I print it
    cout << stack_array << endl; //address of where array is
    cout << heap_array << endl;

    //how do I print the address of where the array begins in memory
   ^ [38,31] 69%
```
What are C-style strings?

• Ended by ‘\0’ character
• Need to include <cstring>

char s[5]; //can only hold 4 characters plus ‘\0’
cin >> s; //you should only enter 4 chars!!!!