CS 161
Intro to CS I

Finish Recursion/Begin Memory Model
Odds and Ends

• Assignment 5 design due

- Sunday
```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;
}
```
int main() {
    // create an integer array with 10 elements on stack and one on the heap
    int array[10]={3}; // does not initialize all elements to 3, only 1st
    int array1[]={1,2,3,4,5,6,7,8,9,10};
    int *array_heap;
    array_heap=new int[10];

    // initialize the elements in the arrays
    for(int i=0; i<10; i++) {
        array[i]=i;
        array_heap[i]=i+1;
    }

    // print where the pointer to the array lives in memory
    cout << "stack array pointer lives: " << array << endl;
    cout << "heap array pointer lives: " << array_heap << endl;

    // print where the array begins in memory
    cout << "where stack array begins: " << array << endl;
    cout << "where stack array begins: " << &array[0] << endl;
    cout << "where heap array begins: " << array_heap << endl;
    cout << "where heap array begins: " << &array_heap[0] << endl;

    // print the contents of the 3rd element
    cout << "contents of 3rd element stack: " << array[2] << endl;
    cout << "contents of 3rd element stack: " << *(array+2) << endl;
    cout << "contents of 3rd element heap: " << *(array_heap+2) << endl;

delete [] array_heap;
}
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?
```cpp
using namespace std;

void init_arrays(int *array, int array_heap[]) {
    // initialize the elements in the arrays
    for(int i=0; i<10; i++) {
        array[i]=i;
        array_heap[i]=i+1;
    }
}

void print_pointer_addr(int (*array)[10], int **array_heap) {
    // print where the pointer to the array lives in memory
    cout << "stack array pointer lives: " << array << endl;
    cout << "heap array pointer lives: " << array_heap << endl;
}

int main() {
    // create an integer array with 10 elements on stack and one on the heap
    int array[10]={3}; // does not initialize all elements to 3, only 1st
    int array1[]={1,2,3,4,5,6,7,8,9,10};
    int *array_heap;
    array_heap=new int[10];
    init_arrays(array, array_heap);
    print_pointer_addr(&array, &array_heap);
    return 0;
}
```