

CS 161

Intro to CS I

Finish Recursion/Begin Memory Model



Odds and Ends

- Assignment 5 design due

```
1 #include <iostream>
2
3 using namespace std;
4
5 int main() {
6     //create an integer array with 10 elements on stack and one on the heap
7
8
9
10    //initializethe elements in the arrays
11
12
13
14    //print where the pointer to the array lives in memory
15
16
17
18    //print where the array begins in memory
19
20
21
22    //print the contents of the 3rd element
23
24
25
26    return 0;
27 }
```



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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?



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What are C-style strings?

- Ended by '\0' character
- Need to include `<cstring>`

C-Style Strings Demo...



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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;
```