

Class 22

Arrays as Function Parameters

(Modified from Rebecca Schley's class)

Arrays as function parameters

- Arrays can be used as input data for functions
- To call a function with an array as an argument:
 - Supply array name (or 2D array name) as input
 - Important: **Input array will be treated as call by reference.**
 - Any changes made to the array in the function are permanent

- Examples:

```
int main() {  
    int x[8] = {3,1,4,1,5,9,2,6}; // has average 3.875  
    peaks(x, 8); // prints 4 5 9 6  
    return 0;  
}
```

```
int main() {  
    int x[3][3] = {{3,1,4},{1,5,9}, {2,6,5}};  
    cout << maxIndex(x, 3, 3) << endl; // prints 1  
                                         // because the entry 9 is in row 1  
    return 0;  
}
```

Arrays as function parameters

- Set up an array parameter in the title line
 - For 1D, give an array declaration, **leaving capacity empty**
 - For 2D array, **leave row count empty but supply column count**
 - Will also need to include int parameters for capacity:
 - Count of rows
 - Count of columns

- Example:

```
void maxIndex(int first[][4], int second[], int r, int c) {  
    for (int i = 0; i < c; i++) {  
        second[i] = 0;  
        for (int j = 0; j < r; j++)  
            if (first[j][i] > first[second[i]][i])  
                second[i] = j;  
    }  
}
```

Example 1

- Write a function that fills a 1D array with random integers between 1 and 100
- Plan:
 - Declare int array inside main
 - Pass array to function
 - What is the title line for the function?
 - Inside function, populate array with random ints between 1 and 100
- How would you change the code to work with a 2D array?

Example 2

```
int main(){  
    int data[5] = {3, 1, 4, 1, 5};  
    int ans = maxElement(data, 5);  
    cout << ans << endl;  
    return 0;  
}
```

Code for maxElement function needs:

1. Title line
2. Code block

How would the code change to process a 2D array?

Example 3

- Write a function that checks if all integers in a 1D array are odd
- Plan:
 - Declare int array inside main
 - Pass array to function from example 1 to populate with ints
 - What is the title line for the function we need to write?
 - Inside function, how do we process array?
 - Return false if even number is encountered, otherwise return true

Example 4

- Write a function that returns the sum of a specific column of a 2D array of ints
- Plan:
 - Declare int array inside main
 - Pass array to function from example 1 to populate with ints
 - What is the title line for the function we need to write? What parameters do we need?
 - Inside function, how do we process array? How do we process a specific column?

Example 5

- mySwap + addNum
- Understand when we need to add & for the reference parameter

Example 6

- Write a **recursive** function called total to add up all the elements in an array