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:

```c
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;
}
```

```c
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:

```c
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

```c++
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