CS150 Intro to CS I

Fall 2017

Chapter 7
Two-dimensional Arrays

- Reading: pp. 418-425
- Good Problems to Work: p. 426 [7.19, 7.20, 7.21, 7.23, 7.25]

2D Arrays

- Consider double scores[3][4]

	Column 0	Column 1	Column 2	Column 3
Row 0	[0][0]	[0][1]	[0][2]	[0][3]
Row 1	[1][0]	[1][1]	[1][2]	[1][3]
Row 2	[2][0]	[2][1]	[2][2]	[2][3]

- Notice:
  1. Number of rows = 3 with subscripts going from 0 to 2
  2. Number of columns = 4 with subscripts going from 0 to 3
  3. Number of elements = 3 * 4 = 12

2D Array Initialization

- 2D arrays can be initialized just as 1D arrays

```
int values[3][2] = {{1, 2}, {3, 4}, {5, 6}};
```

- Write a program segment to find the sum of all of the values in the array

Practice

- Using the array below, print the following assuming the array already contains data:
    1. the average score for each assignment

       Assignment #1 - Average Score: xx
       Assignment #2 - Average Score: xx

```
const int NUM_OF_STUDENTS = 24;
const int NUM_OF_ASSIGNMENTS = 6;
int testScores[NUM_OF_STUDENTS][NUM_OF_ASSIGNMENTS];
```

Practice

- Using the array below, print the following assuming the array already contains data:
  1. the average score for each student

     Student #1 - Average Score: xx
     Student #2 - Average Score: xx

```
const int NUM_OF_STUDENTS = 24;
const int NUM_OF_ASSIGNMENTS = 6;
int testScores[NUM_OF_STUDENTS][NUM_OF_ASSIGNMENTS];
```

Passing 2D Arrays to Functions

- 2D arrays can be passed to functions just as 1D arrays BUT the number of columns must contain a size declarator

```
void printValues (const int values[][2],
                  int rows, int columns);
```

- Notice the array is still passed by reference but protected with `const`

Practice

- Using the array below, write function prototypes for each of the following:
    1. return the average score for a particular assignment
    2. return the average score for a particular student

```
const int NUM_OF_STUDENTS = 24;
const int NUM_OF_ASSIGNMENTS = 6;
int testScores[NUM_OF_STUDENTS][NUM_OF_ASSIGNMENTS];
```