# CS150 Intro to CS I

## Fall 2014

# 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];
```