ECE220 Computer Systems and Programming

Lab 6

1 After this week's lectures, you should be able to...

1. Create, read and perform I/O on strings(a.k.a. character arrays).

2. Understand how multi-dimensional arrays are laid out in memory.

3. Explain the implications of pointer array duality(reiterated from last week to emphasize importance).

2 After today's lab, you should be able to...

1. Map the coordinates of a matrix in 2-D into indices in its 1-D array representation.

2. Perform matrix multiplication on two matrices represented by 1-D arrays.

3 Exercises

1. In this week's lab and MP, we will represent matrices(2-D) using 1-D arrays in row-major order. This means that elements in the same row are stored contiguously in memory. Given an MxN matrix stored in a 1-D array named **game_board** in row-major order. How would you access the element at row i and column j? If we store the same matrix in column-major order, how would you access the element at row i and column j?

2. A portion of this week's MP requires making copies of an array. There are two ways to copy an array: **shallow copying** and **deep copying**. A **shallow copy** of an array is a copy of the pointer that points to the first element of the array. Elements in the original array are not copied. This means that modifications to the copy will also be seen by the original array. A **deep copy** of an array means that every single element of the array is copied and stored in a memory location different from the original. Given an array and its length, create a shallow copy and a deep copy of this array.

```
void copy_array(int* original, int num_elements){
  // TODO: create a shallow copy of original



  //TODO: create a deep copy of original





}
```