IC210 – Practice Problems related to Project #3

Keep this worksheet! You instructor may ask you to bring a “best effort” solution to these problems to any EI for the project. If you don’t know where to start, review your course notes on 2D arrays and array manipulation.

Problem 1: Write a function `make2DArray()` that could be used in the following way from `main()`:

```cpp
int numRows = 10;
int numCols = 5;
myArray = makeAndFill2DArray(numRows, numCols);
cout << "Value in row 3, column 2 is: " << myArray[3][2] << endl;
```

This function should create a 2D array of integers (with the specified number of rows and columns), then initialize every cell in the array to be a random number between 0 and 19.

a. Write the prototype for this function.

b. Write the definition.

Problem 2: Print out the “recursive lava flow” example from the course calendar (a few days after the project was issued). Circle ALL recursive function calls. Put a box around the base case.
Problem 3: The function `shiftLeftFromLocation()` has the following prototype:

```c
void shiftLeftFromLocation(int *array, int size, int startIndex);
```

This function takes as input an array of integers and a size, and also a “startIndex.” The function then modifies the array in the following way:

- for every array cell that has an index LARGER than startIndex, the number in that cell is moved one cell to the left (closer to an index of zero), AND
- The last cell in the array is set to zero

So if this was the initial array (with a size of 6):

<p>| | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>27</td>
<td>38</td>
<td>112</td>
<td>200</td>
<td>350</td>
<td>412</td>
</tr>
<tr>
<td>Index 0</td>
<td>Index 1</td>
<td>Index 2</td>
<td>Index 3</td>
<td>Index 4</td>
<td>Index 5</td>
</tr>
</tbody>
</table>

... then a call to `shiftLeftFromLocation(array, size, 2)` would modify the array so it looks like this:

<p>| | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>27</td>
<td>38</td>
<td>200</td>
<td>350</td>
<td>412</td>
<td>0</td>
</tr>
<tr>
<td>Index 0</td>
<td>Index 1</td>
<td>Index 2</td>
<td>Index 3</td>
<td>Index 4</td>
<td>Index 5</td>
</tr>
</tbody>
</table>

Observe that one value (112) is lost in this process. Write the definition for this function: