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.

NOTE: You are permitted to discuss solutions to these practice problems, with anyone as much as you like (classmates, MGSP leaders, your instructor, or others). However, this does not change the policy regarding the actual project – you should not discuss the project itself with anyone besides your instructor, nor provide any other assistance to anyone. If you have any questions about the project itself, ask your instructor.

Problem 1 (relates to step 2): 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 (relates to step 4): 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 (relates to steps 5/6): The function `shiftLeftFromLocation()` has this 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):

<table>
<thead>
<tr>
<th>27</th>
<th>38</th>
<th>112</th>
<th>200</th>
<th>350</th>
<th>412</th>
</tr>
</thead>
<tbody>
<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:

<table>
<thead>
<tr>
<th>27</th>
<th>38</th>
<th>200</th>
<th>350</th>
<th>412</th>
<th>0</th>
</tr>
</thead>
<tbody>
<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: