# Homework 2

loops, arrays, console output, random numbers, display path through 2D space

July 10, 2019

**Abstract**

The objective is to give you practice on moving an object through 2 dimensional space and showing its path.

The context of this problem is that a two dimensional metric space exists, centered on coordinates (0,0). Your code will navigate an object within this space, and show the trail it followed.

- Construct a sequence diagram for your project. You can draw it by hand and include a phone/photo, or draw it with a software tool.
- Use the test-driven development style for developing your code. Document this by taking a new screen shot of your test code every time you make a new test (See Figure 1.), and of your production code every time you extend your production code. It could be a large number of screen shots. Be sure to run your code every time you add a few lines of test or production code. (See Figures 2 and 3.) Do not allow the number of errors to get large.
- After making a 2D array, place a marker in the array. For example, at the beginning of the program, every value in the array could be zero, except

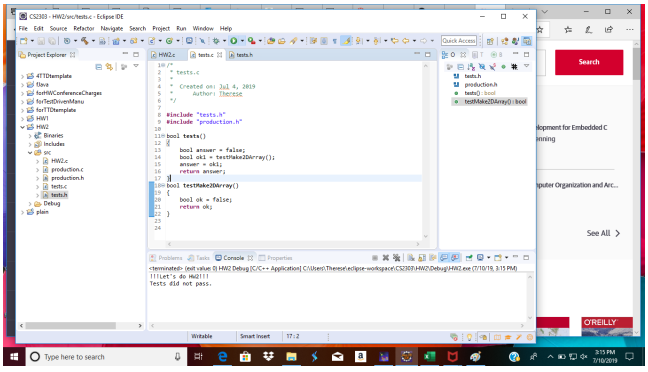

Figure 1: In the process of creating a new test.

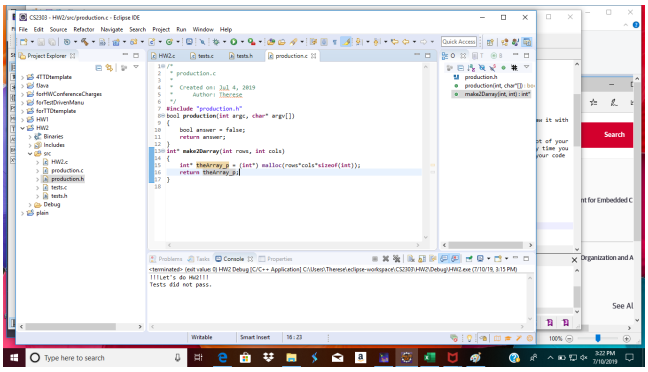

Figure 2: Starting some production code.

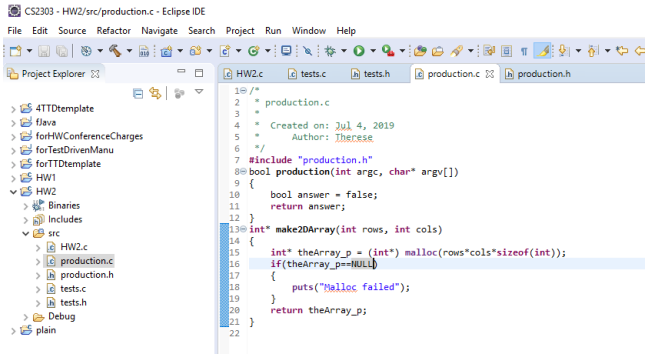


Figure 3: Adding more production code.

one that is non-zero. The location of the non-zero value is the location of the marker.

- Build tests for moving the marker. To do this, it will probably help a lot to have a function that will print the array, for example, '|' between horizontally adjacent cells, and '_' between vertically adjacent cells. Don't worry about underlining the marked location. By printing the array between moves of the marker, you should be able to see the result of your code running.
- Use a loop to move the marker multiple times. Consider having the value of the marker increase, and show as modulo 10, in the array printout.
- Use a random number generator to decide how to move the marker each iteration of the loop, for example, to choose among up, down, left and right. Be sure to stay within the array, or, e.g., jump from the left boundary to the right boundary, when moving left from the leftmost column.
- Print the path the marker takes through the space.

Things to do:

1. Either:
   (a) Make a C project from the Hello,World project.
   (b) Populate that project with tests.c, tests.h, production.c and production .h.

   or use the starter code.
2. Create the sequence diagram and include the electronic file (diagram, screenshot or photo). Make sure your name appears within the sequence diagram.
3. Place function prototypes for all of your functions from the sequence diagram into a .h file.
4. As you work on the assignment, collect a sequence of screen shots showing how your test code, and your production code are growing.
5. Be sure to build and run often; do not allow errors to build up.
6. Show the sequence of moves by listing them, and also show the final path through the 2D space.

Grading

| Criteria | Possible Poin |
|---|---|
| Project that looks like starter code | 25 |
| Sequence diagram that reflects the problem statement | 25 |
| Documentation of code development (those screenshots) that clearly follows test-driven style | 25 |
| Screenshot of path, and list of moves, that correspond | 25 |
| Total | 100 |