

# Acorn Assignment Report

## Section 1 – Testing

### Q1:

- To prevent unexpected errors in code
- To streamline the testing process, i.e. not having to manually enter individual inputs into the program or function and seeing what happens
- To show you where your code can improve

### Q2:

Mocks are objects that simulate the behaviour of parts of a system, to allow the user to test a specific component. Mock testing is used to focus the testing on the component that needs to be tested and not consider the interactions that need to happen with other components in the system.

- Advantages:
  - Allows greater control in unit testing
  - Removes complex components that would be impractical to the unit test
- Disadvantages:
  - Will not show integration errors as mocks will behave as they are expected to
  - Mocks will not be changed if the unit they are mocking is changed

Mocks should be used in unit tests.

### Q3.

- Kapersky released an update to their Password Manager in 2013 that did not have proper regression testing.
- The application allowed users to store passwords under a master password and also add expiry dates to passwords (which could be set to never expire)
- Users who updated the software on Windows 7 were locked out of any passwords they set to never expire as they now had an expiry date of the year 1601

Source:

Binstock, A., 2013. *The Embarrassing Costs Of Not Testing Your Own Code*. [online] Dr. Dobb's. Available at: <<https://www.drdobbs.com/testing/the-embarrassing-costs-of-not-testing-vo/240162967>> [Accessed 26 May 2020].

## Section 2 - Solver

### Q1.

- Strengths:
  - Will find the shortest path possible on a complex maze, no unnecessary moves
  - Cannot move into an infinite loop
- Weaknesses:
  - Long run times when the end cell is far from the start
  - Will take up a lot more memory in a complex maze
- BFS should be used when there is more than one path.

### Q2.

- Strengths:
  - Will explore one possible path completely until no solution is found, then move to the next, possibly finding a solution immediately
  - Will quickly find the solution if there is only one path
- Weaknesses:
  - Much longer run times when there is a complex maze with many possible paths
  - Not guaranteed to provide the shortest solution to the maze
- You would use a DFS when there is only one direct path.

### Q3.

DFS is not guaranteed to be faster than a BFS in this case. Usually the DFS will have a shorter run time but provide a longer solution however, if the maze is simple the run time and solution should be very similar in BFS or DFS.

### Q4.

There may be a time when you have to utilise the same teleport pad to finish the maze and if there was a function that stopped the solver from re-visiting cells, this would make the solver think there was no possible path. The water/fire mechanic also prevents this function being used as stepping on either changes the layout of the maze, meaning that the solver would think it had not visited the cell, moving back to the cell that used to be water or fire, then continuing along the maze. This would add an extra 2 moves to any water or fire cell that is visited.