**Test Plan**

This plan outlines how we accomplished functional testing (black box testing) and complete branch coverage testing (white box testing).

Black box testing is a technique that examines the functionality of an application without peering into its internal structures or workings. It is essentially where the programmer knows the inputs and expected outputs but doesn’t know how the program reaches the expected outputs. The benefits of blackbox testing are that they are conducted from the user’s perspective so they find errors that might not be found by the programmer while writing the code. Our black box testing mainly consisted of error handling, returning the accurate ladders or not returning ladders at all.

For error handling, we tested null inputs, non-five-letter words, words that are not found in the dictionary, inputs that do not contain two words, inputs that contain other random characters that are not letters, inputs without a space separating the two words, inputs where the starting and the ending word are the same and a plethora of other possibilities.

We also tested the test cases that were provided in the pdf file in addition to other test cases that we found online to make sure that the ladder worked appropriately. We also tested some words that we knew do not have a ladder to make sure that the program returned that there was no possible ladder.

White box testing evaluates the code and the internal structure of the program unlike black box testing. We were specifically asked to account for complete branch coverage testing which essentially evaluates the IF statements and whether they work properly. So essentially, it is the tester’s job to ensure that both the decision branches are accounted for and we need to validate that each branch is executed at least once. In the case of an IF statement, the tester will ensure that both the true condition and the false condition are executed properly. So essentially, each line of code must be executed at least once during the testing phase.

The white box testing was conducted while using similar test cases as the ones mentioned for black box testing above. We looked through the code to find all of the error exceptions and all the different lines of code to ensure that the testing would cover all the lines of code and that every single case would be tested.

For example, since we knew that we wanted to accuratel test the validate ladder code, we purposely created a ladder that was not accurate and tested it with the validate ladder method. This test was not done with the test cases file but within the driver program itself. This resulted in printing a statement like “this ladder is invalid” on the command prompt, which shows that this method worked well for us.