Evaluation

# Objective Analysis

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| Objective Reference  (See Analysis Section Objectives) | Met? | Comments | Testing Reference  (See Testing Section) |
| 1.1 – 1.8 | All met except 1.6 | 1.6 could not be met as there was not enough time to create a full GUI which extends to every part of the game. | 1.1, 1.2 and 1.5 |
| 2.1 – 2.6 | All met |  | 2.1 – 2.3 |
| 3.1 – 3.5 | All met |  | 1.3 and 1.6 |
| 4.1 – 4.4 | All met |  | 1.4 and 1.7 |
| 5.1 – 5.4 | All met | Only Objective 5.4 can be tested directly, Test references for which can be found to the right.  Objective 5.1 – 5.3 can be tested indirectly throughout the Testing section. | Objective 5.4:  4.2 and 5.2  Objectives 5.1-5.3:  Tests 4.1 – 4.9.3 and  Tests 5.1 – 5.9 and  Tests 6.1 – 6.3 |
| 6.1 – 6.3 | All met |  | 6.1 – 6.3 and  1.7 |
| 7.1 – 7.2 | All met |  | 5.5 and 5.9 |
| 8.1 – 8.2 | All met |  | 4.9.1 – 4.9.3 and  4.4 |
| 9.1 – 9.4 | All met | 9.1 cannot be tested directly but can be tested indirectly and is tested indirectly throughout the testing video. | 4.4-4.5 and  5.4-5.5 |
| 10.1 – 10.5 | All met | 10.5 is tested indirectly throughout the testing video. | 5.1 and 5.3 and  5.7 and 4.1 and 4.3 and 4.7 |
| 11.1 – 11.4 | All met |  | 5.6.1 – 5.6.3 and  4.6.1 – 4.6.3 |
| 12.1 – 12.4 | All met | A global grid draw cannot be realistically tested for in AI mode since it would be extremely improbable and unrealistic, especially since AI moves are not controlled by the player. However, drawing is tested in the local multiplayer game mode, and since both modes use the same game system, global grid drawing must work in both cases. | 5.8 - 5.9 and  4.8.1 – 4.8.2 and  4.9.1 – 4.9.3 |
| 13.1 – 13.2 | All met |  | 4.9.1 – 4.9.3 and  5.9 |
| 14.1 – 14.7 | All met |  | 3.1 – 3.4 |
| 15 - 22 | All met | None of these objectives can be tested for directly but all are tested for indirectly throughout the Human vs AI mode parts of the testing video, since the AI would not work had these objectives not been implemented. | 6.1 – 6.3 and all human vs AI mode gameplay parts of testing video. |

# End-User Feedback:

## How easy is the application to use?

“I found it very easy to use. I have never played a game of Ultimate Tic Tac Toe, and after reading the well written instructions, I understood how to play the game.  
Every option in the game was numbered, so I found it very easy to navigate.

The move coordinate inputting system which uses the key-pad was very intuitive, and made it so I did not have to think at all about how to input the move, and only about which move to input.

The game saves after every turn, which is extremely helpful since it means that if I close it by accident and lose my progress, I can simply load the saved game.

The game displays the previous move after every turn, which makes it very easy to figure out what the last move was in case you lost track.

My only annoyance is that during the gameplay the way to exit is by inputting ‘000’ but this is only mentioned in the instructions, not at the start of games, so if a player forgets, it can become frustrating.”

## Does the application fulfil the objectives, as shown in the table?

“After having read the table, and the objectives it refers to, I agree with the table that all objectives are met apart from the creation of a GUI. The game is also quite challenging and especially fun when played with AI at hard difficulty.”

## Any criticisms?

“My only criticisms are the lack of a GUI, which would be far more pleasing to look at, and the lack of a clear message at the start of every game explaining that ‘000’ must be used to exit the game.

Apart from these, I found the application to be very satisfactory for its purpose. I found no errors or bugs while running the application.”

## Any improvements or extensions?

“I would suggest creating a GUI, which will be a lot more pleasing to look at and interact with. I would also suggest putting an explanation at the start of every game that ‘000’ must be used to exit the game. Apart from these, I would like to be able to play with other players around the world in an online multiplayer option. I would also like to be able to run the application without having to download python.”

# Analysis of end-user feedback

The feedback has shown that despite being in a text based UI format, this application is extremely easy to use, and that the input methods are intuitive, easy, and well thought out. I am happy to see that the user found the gameplay fun and challenging, and that everything worked without any bugs or errors. This feedback has given me confidence that this application has fulfilled all the objectives apart from objective 1.6, which is to build a GUI.

The end user has also pointed out a small flaw in not including a clear explanation at the start of every game on how to exit the game, and has pointed out that a GUI would be much more pleasing to look at and interact with. The end user also said that they would like to see an online multiplayer option to the game, and the ability to run the game without python. These ideas and extensions are discussed below.

# Possible extensions

If I had the ability to start my program all over again, I would include the following changes:

Firstly, I would create a GUI, as my end user suggested, instead of a text-based interface, with colours, music etc. As this would increase the appeal of my program and make it more enjoyable to interact with. I would do this using a python library called PyQt which can be used to create GUIs fairly easily. I would then colour the different player symbols with contrasting colours and highlight the last move symbol so it is very easy to see. I would also highlight the local grids the current player is allowed to play in so there is no confusion.

In order to make my program executable without having to download python, I could use a python library to convert the python file into a windows .exe file, which can then be run.

Secondly, I would include more difficulty modes for my AI, which I had planned to do from the start, but I had found that if I increased the number of iterations too much to make the AI more difficult, the AI would take too long to make a turn. This means if I want to include more difficulties, I would have to rework core aspects of my AI code to make it more efficient and produce results in a smaller amount of time.

Adding more difficult AI modes makes the game more challenging and fun.

As my end user also suggested, I would like to have an online multiplayer game option, which would require the use of networking, and programming a server client system. This would make my game more fun since it would mean you would not be dependant on playing local multiplayer with humans in the same area as you- you would be able to play with players around the world as well as against AI.

An extension to this idea that I have thought of is incorporating a player rank, which would be accessible from the application in the main menu. I would then match up the online multiplayer players against each other based on their ranks, and reward them if they win by giving them higher ranks on the player rank page. This would make the game more competitive, challenging and therefore more fun.

Lastly, as my end user suggested for the text based version, I would explicitly state that ‘000’ is used to exit the game at the start of every game to ensure there is no confusion.