Core Objectives

1. **An algorithm to generate the maze**
   1. This will be Prim’s algorithm for maze generation
   2. Other algorithms were considered but this was decided upon based on my coding skills and also its simplicity.
   3. It was also recommended by my end-user (interview on page 13-15).
2. **Maths questions that can be stored in an array**
   1. These will be based on the topics that the end-user gives (interview on page 13-15)
   2. These will be stored in a file then loaded into an array when the game runs
   3. This is an important aspect of the game as it adds creativity to the concept of the game and can also be used to improve a user’s maths skills
   4. It also makes the project unique as not many maze games incorporate the element of having maths questions that the user can answer.
3. **Ability to move character around using keyboard**
   1. This is a key idea as many of the best games use arrow keys to move around a character - without this the game wouldn’t be able to function
   2. Alternate key binds such as WASD could be added as well.
4. **Can select answers to maths questions**
   1. If the user wouldn’t be able to answer the maths questions then the game wouldn’t be able to function
   2. There will be a choice of 4 answers and each answer will have its own area on the screen that you can click.
5. **Interactive GUI**
   1. It is essential for the user to have a fun time while playing the game and a command-line interface wouldn’t suit this
   2. 2 possible graphic interface modules I could use are Pygame and Tkinter
   3. I will be using a combination of these 2 as it is easier to incorporate buttons on Tkinter but it is easier to generate a maze with a character that can traverse through it in Pygame.
6. **Scoring system**
   1. How this will be decided is a big decision in how the game will keep score
   2. Merge sort algorithm will be run on the array to sort out the high scores in descending order
   3. Score will be added based on questions answered correctly and also a bonus will be added on at the end based on how many moves were made - more points for less moves.
7. **File handling to store high scores**
   1. A file will be used to store the high scores of players who have beaten the game before
   2. The file will be opened in append mode and your score added to the document when you finish a level/beat the game
   3. Dictionaries will also be used to store the high scores in run time with them (dictionaries) allowing for an ability to sort the data.
8. **Limited number of moves**
   1. You will start of with up to 3 moves at the start of the game
   2. Moves will be used to move the player one block at a time
   3. The user will not be able to move if they have 0 moves left and a question will display thereafter for a chance to gain moves
   4. This is so the user cannot complete the maze without answering at least one maths question.
9. **Moves given after answering question correct**
   1. One move will be given if the question is not answered correctly and three moves will be given if the question is answered correctly.
10. **Set amount of lives**
    1. There will be a certain amount of lives based on the difficulty (of questions) selected by the user at the start of the game
    2. There will be 3 lives on easy, 5 on medium and 7 on hard
    3. Lives will be lost if the user crashes into a wall 5 times or answers a question wrong (as decided by end-user - interview on page 13-15)
    4. The game will end when the user loses all lives.
11. **Ability to undo moves**
    1. A stack will be used to store up to 5 previous moves that the user has done.
    2. A button will be able to be clicked to go back a move.
12. **Ability to save and load games**
    1. This will be useful as the user will then be able to close the game and pick back up from where they left off.
13. **Able to select difficulty of maths questions**
    1. This will be a menu choice at the start of the game and allow the user to choose how hard they want the maths questions to be
    2. If the user chooses harder questions, then more lives will be given.
14. **Hints given with correct solution**
    1. The user will have an option to buy a hint
    2. This will then show them part of the correct solution to the maze
    3. Recursive solving will be used to find the correct path and store it in an array.

Advanced Objectives

1. **Aesthetics of maze and player**
   1. The aesthetics of the maze and player will not matter as much until the concept of the game, maze generation, scoring system etc are considered and completed.
   2. The images used for the project will need to be small and will be decided depending on the theme of the overall game (decided by the end-user - interview on page 13-15).
2. **Background**
   1. This will also depend on the theme of the overall game.
   2. There is most likely a chance that there will be a background
   3. Having a background is necessary to appeal to the aesthetics of the project
   4. If there are multiple levels, each level will have a different background
   5. However, whether the background is moving or not will depend on time constraints.
3. **A loading screen**
   1. This will include a loading bar using a unicode character similar to “⫿”
   2. It will also include text that says “Game Loading…”
   3. Finally it will include text that says “Game loaded - click anywhere to exit” which is displayed after a few seconds
   4. You will be able to click off the loading screen when this text appears.
4. **Multiple levels increasing in difficulty**
   1. If there is time, multiple levels will be considered with the size of the maze increasing with difficulty of each level.
5. **Theme of levels**
   1. Each level could have its own slightly different theme.
6. **Personalised settings**
   1. These could be accessibility settings and other options which would allow the user to customise their game experience.
7. **Different game modes**
   1. There could be a time trial mode as well as a classic mode where instead of having a limited amount of moves, the user has a limited amount of time in which to complete the maze and answering questions correctly gives the user more time to complete the maze.
   2. There could also be a mode that only focuses on answering questions (an arcade mode) and doesn’t give bonus points for completing the maze in a small amount of moves.

This objective outlines . This objective has also been met. This can be evidenced from Technical Solution [Pages ] and also from the showcase video in the testing section [Page ]. Next time, .