Project Plan

# Abstract

The initial goal of this project was to create an AI that can play a game of 2048. After talking to the project supervisor this vision developed into one where the AI can be applied to different sizes of the 2048 grid, a much less researched area. I already had an interest in both the game 2048, as well as solving single-player problems using AI. The randomness in the game, after each move, makes the problem a more interesting challenge. Research has extensively covered solving a traditional 2048 game, which leads me to the idea of seeing how different-sized boards, and possibly rectangular boards affect strategies.

# Timeline

## Term 1

* Week 1: Reading through previous papers on Expectimax and 2048
* Week 2 - 3: Implement a decision tree data structure capable of running the Expectimax algorithm.
* Week 4 – 5: Implement a resizable 2048 game with a simple user interface.
* Week 6 - 8: Generate a depth-limited decision tree from any 2048 game.
* Week 9: Implement simple heuristics to attempt to solve the specific-sized game.
* Week 10 – 11:Finish off, and prepare for the Interim report and presentation.

## Term 2

* Week 1 - 3: Generalize my heuristics to solve a greater variety of problems.
* Week 3 – 5: Optimisations to the algorithm that allows control of performance vs efficacy independent of the grid size.
* Week 6-7: Implement a user-friendly interface.
* Week 8-9 : Collect Statistics on how the project is performing across a variety of problems and configurations.
* Week 10 – 11 Finalise final report.

# Risk Assessment

* I may fail to get the Expectimax algorithm working in time. To mitigate this risk, I will be creating a proof-of-concept program early on, if I am unable to complete this I will try a simpler algorithm which only models one move.
* There is a risk that my code will not work on larger 2048 games because the decision tree will grow too quickly. To mitigate this risk I can place a node limit on the tree instead of a depth limit, meaning that the size of the tree is limited more on larger problems.
* There is a risk that I will have some difficulty adapting the heuristics to different sizes of 2048. If these heuristics can not be adapted I will create heuristics designed for a more limited range of grids that are only used when appropriate.

# References

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