



# INITIAL PROJECT PLAN

## CM3203

### Monopoly Simulator

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## Project Description

The aim of the project is to develop a highly extendable monopoly simulator that can be used to simulate millions of games and gather statistical data for analysis. Monopoly is a game where *“The object of the game is to become the wealthiest player through buying, renting and selling property”* (Hasbro, n.d.). Currently there is already existing in-depth statistical data on monopoly, this report discusses the probabilities of landing on each square, expected income per roll for each roll and other statistical data. (Collins, 2005). Although the data already gathered is very in-depth, my simulator will be able to look at how new and different rules can change the statistical properties of the game; this data however can be used to test the simulator is running correctly on the standard rules.

The simulator should be built on the house rules but be able to incorporate new rules with ease; rules could include the addition of chance cards, changing the cost/rent of site, changing the build rules, incorporating real life house price data and pay data to continuously modify the game and many more rules. Running the simulator millions of times should be able to test whether the game is balanced, what is the average length of the game, which colour group is most profitable, whether it is better to have 3 stations or both utilities etc. -- tens of questions about this classic game can be answered by the simulation. From all the simulations and analysis of the data I should be able to design a new version of monopoly with new and exciting rules.

## Project Aims and Objectives

### Primary Aims.

The following aims and objectives need to be completed and shown in the final report

- Develop and test Monopoly Simulator
  - Develop the representation of the board and the chance cards.
  - Develop the game's logic according to the standard rules.
  - Develop player's logic and decision making (AI)
  - Develop GUI (This will run concurrently with all the other aims above)
- Integrate instrumentation functions to be able to gather data about the game state.
- Run simulations.
- Using the data gathered from simulations analyse the results found.
- Integrate new rules (After each rule is integrated run simulations again and analyse the results.
  - More Dice/different sided dice
  - Different Jail terms
  - Different pricing
  - Time limits
  - New Chance Cards/Community Chest
  - Changes to the Build restriction rules
  - Different amounts of starting money.
- Final Report
  - Description of development and testing of simulator

- Explanation of data found from standard game
- Comparison of data between standard rules and additional rules.
- Describe a new set of rules that are fair and interesting.
- Conclusion

### Secondary Aims:

- Integrating New rules
  - Inflation/House Prices based on real world data.
  - Altering the players styles and how they play (aggressive buyers and other qualities)
  - Other Rules. (That I have not thought of during the time of the initial plan)

### Work Plan

As shown in the Gantt chart below, my work plan for the entire project can be seen, however I should point out the meetings and deliverables will be described in the list below.

- Weekly meetings every Thursday at 16:00

### Deliverables

- By the middle/end of Week 6 (Week beginning 26/02/2016) have a working simulator prototype and schedule a meeting to review the prototype.
- By the end of Week 7 (Week beginning 07/03/2016) have the statistical data for the simulations running on standard rules all analysed, and schedule a meeting to review the data.
- Before Easter, end of Week 8 (Week beginning 07/03/2016) have evidence of at least one new rule implemented, tested and gathered the statistical data for the new rule and have it analysed, then schedule a meeting to review the data.
- By week the end of Week 12 (Week beginning 11/04/2016) have all the primary aim rules and as many of the secondary aims rules, implemented, tested and gathered the statistical data and have the data analysed, also have the final report in its final draft, and schedule a meeting to review the data and the draft of the report.

Task	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12	Week 13	Week 14
Write Initial Plan	One Week													
Research		One and a Half Weeks												
Design Architecture			One and a Half Weeks											
Design Initial Prototype				Three Weeks										
Test Initial Prototype					Three Weeks									
Develop Gui					Four Weeks									
Test Gui					Four Weeks									
Implement Instrumentation Functions						One Week								
Test Instrumentation Functions							One Week							
Run Simulations							One Week							
Analyse Data From Simulations							One Week							
Implement New Rules								Two Weeks						
Test New rules									Two Weeks					
Run Simulations on each new Rule									Three Weeks					
Analyse Data From Simulations of new Rule									Three Weeks					
Write Final Report												Two Weeks		
Contingency Time														One and a Half Weeks

## References

Collins, T., 2005. *Probabilities in the game of Monopoly*. [Online]  
Available at: <http://www.tkcs-collins.com/truman/monopoly/monopoly.shtml>  
[Accessed 29 January 2016].

Hasbro, n.d. *Hasbro*. [Online]  
Available at: <http://www.hasbro.com/common/instruct/monins.pdf>  
[Accessed 29 February 2016].

