[H0N05A] MODELLING OF COMPLEX SYSTEMS

MCS PROJECT PART 2: SAVING ARKHAM AGAIN - REPORT

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INTRODUCTION

This report describes our solution for the Arkham game in EventB. We discuss the LTL and CTL verifications, our design decisions regarding the EventB implementations and our time spent on the project.

LTL AND CTL VERIFICATIONS

1. CTL: AG ({state = player_turn} => EF {state = won})

2. CTL: AG ({state = lost} => AG AX {state = lost})

3. CTL: EG (not {state = lost} & not {state = won})

4. LTL: G (({state = player_turn} or {state = monster_turn}) W
   ({card(open_gates) >= open_to_lose} or {card(closed_gates) >= closed_to_win}))

5. CTL: AG (not ({card(open_gates) >= open_to_lose} & {card(closed_gates) >= closed_to_win}))

6. CTL: AG ({state = monster_turn} & {turn_end = FALSE} => AX {state = monster_turn}) &
   AG ({state = player_turn} & {turn_end = FALSE} => AX {state = player_turn}) &
   AG(not ({state = lost} & {state = won}))

7. CTL: AG ({state = won} & {card(closed_gates) >= card(open_gates)} or not {state = won})

8. LTL: G ({card(monsters) = 1} => {card(monsters) = 1} W [attack])

9. CTL: AG ({state = won} & {card(closed_gates) >= 2} or not{state = won})

DESIGN DECISIONS

For the most part, we followed the assignment, which was pretty straightforward, so there weren't many design decisions to make of our own. Especially the first and second exercise didn't require additional design. The phases in the fourth exercise were modeled to be similar as the states in the second exercise.

CONCLUSION

This project was quite a bit easier than the previous project, thanks to the more straightforward assignment and design of EventB. It was interesting to model elements of the previous assignment into EventB to witness the differences.

In the end it took us around **10 hours** of work to finish the entire project, including the fourth exercise.