COMPUTER SCIENCE DEPARTMENT - KU LEUVEN

MCS Project Part 2: Reversi Again

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1 DESIGN DECISIONS

In contrast to the previous project, the start of this project is relative simple. This was because in `Event-b` each event can be tested more separately, and let me decide event by event what should happen, what gives me a better understanding of the workings. In IDP it was not really possible to do this in the same way, as the plotter plotted a model.

Game_0 machine The difficulty I encountered here, was how to model the winner non-deterministically. I solved this using the "becomes in" action with the non-empty powerset of Colours.

Game_1 machine Just as in previous part of the assignment, I modelled the text one sentence after the other, so no special design decisions made. Just a problem I hit upon, when `CheckReachable` goes up to a border (see Figure 1), the `CheckNoValidEnd` event won't be triggered and the `Reachable` positions in that direction won't be cleared. This was because the position that I wanted to check for `CheckNoValidEnd` lies outside the board, so was never added to the `NeedsChecking` variable, and the discs in the `Reachable` set were not be cleared. It was solved by changing the guards of `CheckReachable` and `CheckNoValidEnd`. This by checking if the next position (not) exist in the set of `Neighbour`.

Refinement on the Game_1 machine I followed the advise to use two variables, one to represent the amount of black discs and one to represent the amount of white discs. And update these variables whenever a move is made. An optimisation would be to set these variables in the `Pass` event.

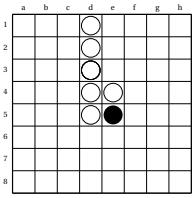

Figure 1.1: White discs up to the border.

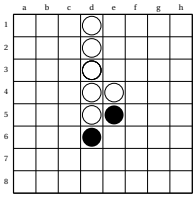

Figure 1.2: Placing black disc at position (d,6)

2 LTL/CTL STATEMENTS

LTL/CTL	Statement
CTL	EF({Winners={White}})
CTL	EF({Winners={White,Black}})
CTL	AG(e(Gameover) => AG({GameOver=TRUE}))
CTL	not(EG(GameOver=False))
LTL	({GameOver = FALSE}) W (e(Pass))
CTL	AG(e(CheckMove) => (AF(e(CheckNoValidEnd)) & AF(e(CheckReachable))))
LTL	({Board={(2,1,White)}}) U ({Captured={(2,1)}})

3 TIME SPENT ON THE PROJECT

As for the time I spend on the project, I can say it was better than for the first assignment. But still I worked some 15 hours on the project. The main reason for spending this amount of time on the project is my experience in Event-B (or in general in Logic). This in combination with the somewhat limited documentation on the system.