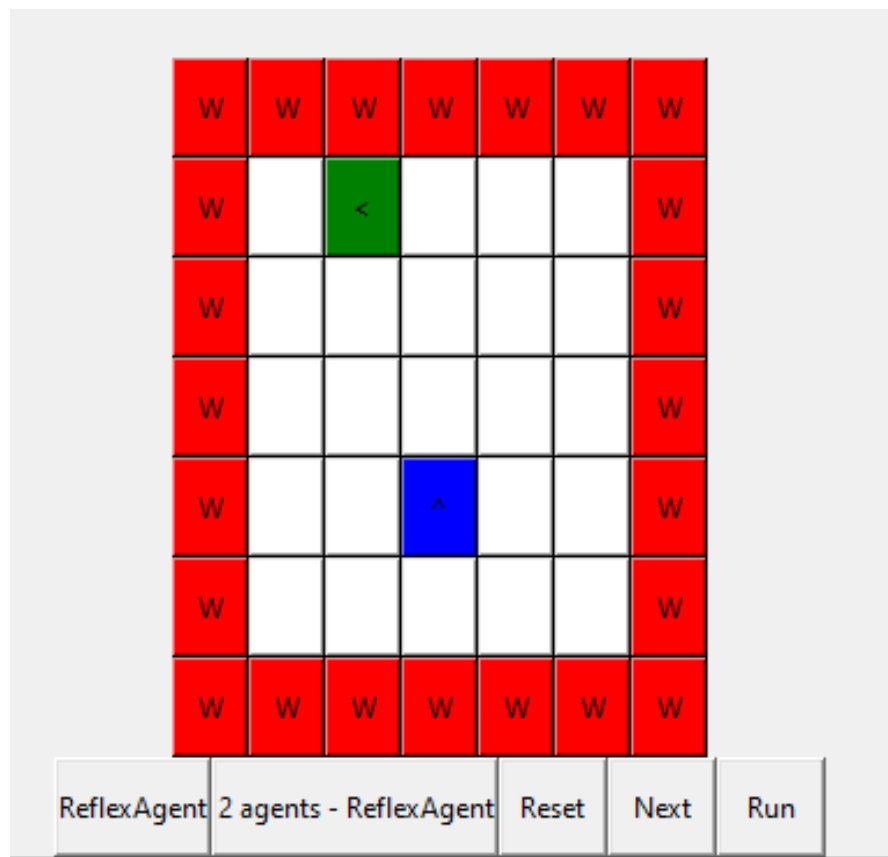


CMPT 310

Assignment 0

Reflex vs. Rule

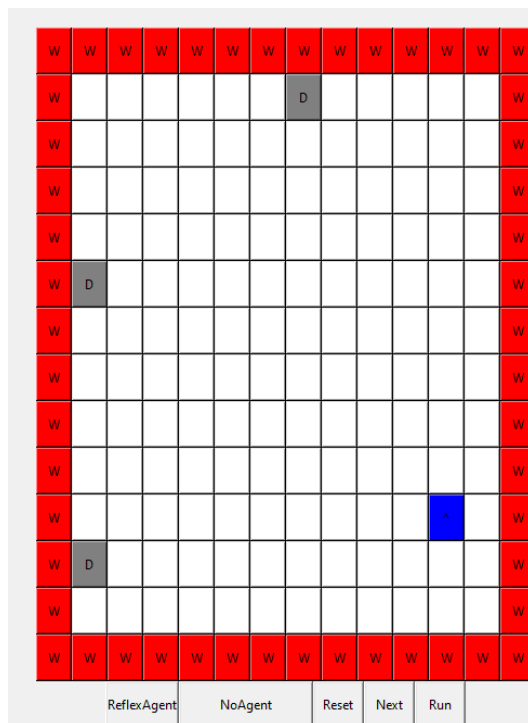


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Premise

The goal of this document is to outline the effectiveness and efficiency of implementing rule based agents, as well as reflex based agents within a agent-vacuum setting. The goal of the agents is to suck all of the dirt present in the board configuration. The board can be configured accordingly by toggling various grid button within the GUI - presenting the option to enable walls and/or dirt. Furthermore, the usage of multiple agents with proximity restrictions was explored. The blue represents the first agent, whereas the green represents the second.

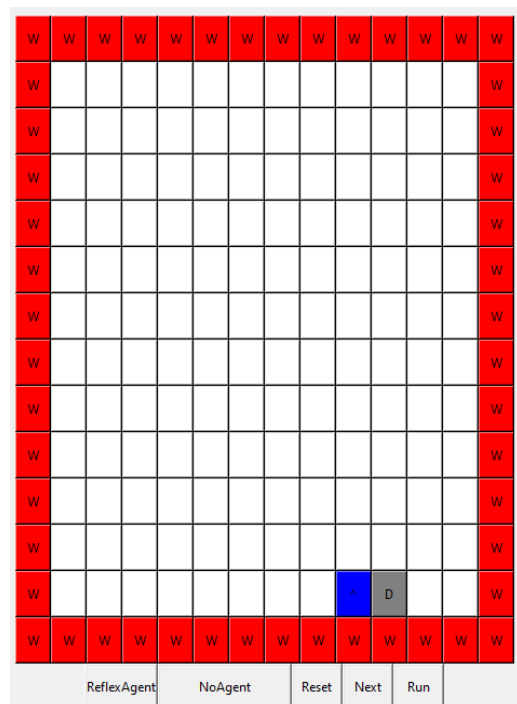
Rule vs Reflex Singular Agent (14x14)



It takes 552 steps to clean all dirt. This was done under a ReflexAgent agent.

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It takes 734 steps to clean all dirt. This was done under a RuleAgent agent.
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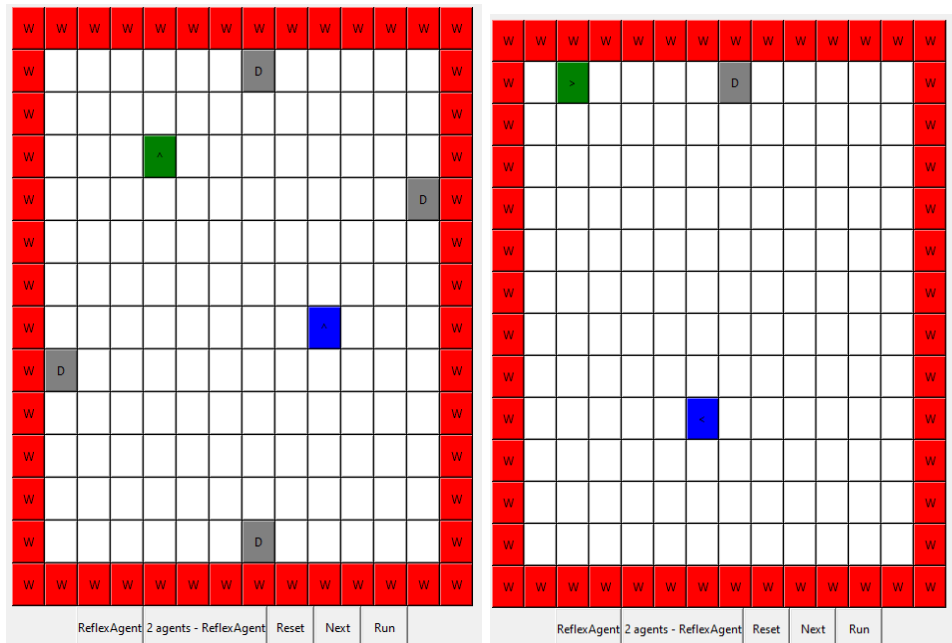
It takes 2 steps to clean all dirt. This was done under a RuleAgent agent.



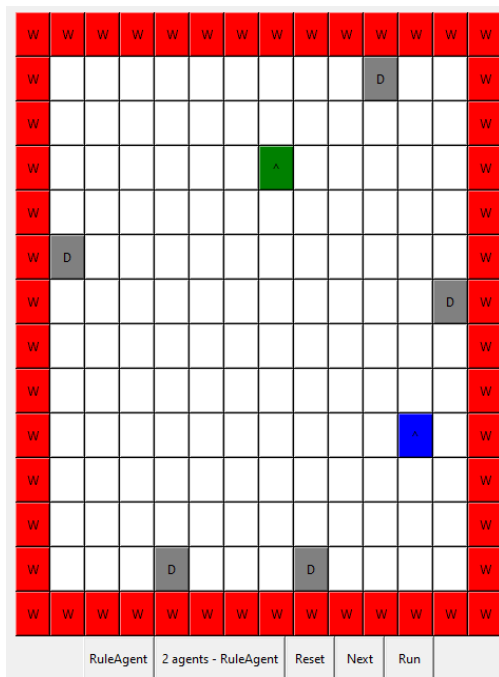
It takes 242 steps to clean all dirt. This was done under a ReflexAgent agent.

As illustrated in the images, the difference between rule based and reflex based with a singular agent doesn't really have noticeable effects when dirt spots are far away from initial location. However if dirt is nearby, the number of steps is significantly reduced. This is because a rule based program behaves as a reflex, except it has the extra foresight to scan nearby tiles 1 tile away for dirt. This allows it to pick things up immediately, thereby saving extra "costs" for runtime. As a result, this makes rule based agents more effective.

Rule vs Reflex Multiple Agent (14x14)



After 999 step limit for reflex...



It takes 311 steps to clean all dirt. This was done under a RuleAgent agent.

As illustrated in the images, this time around multiple agents are used. Furthermore, these agents have their own operating proximities which are

the top half and bottom half. As a result of this, it's essentially like a divide and conquer approach. In this instance, rule based agents are significantly better than reflex, since the board is segmented for two agents to scan. Despite there being more dirt spots in a relatively same distance from the agents, the rule based approach required $\frac{1}{3}$ the steps. This makes rule based agents once again superior.

Conclusion

Despite there being tests and results to show that rule is better than reflex, the comparison of performance and efficiency can be measured better. In order to really be conclusive, a greater sample size of tests needs to be performed, with the number of steps taken into account. Furthermore, the tests should contain the same configurations or positions, walls, and dirt in order to eliminate the possibility of variance of board configurations. Implementing these suggestions will provide more conclusive results for analysis.