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Performance Review 1 - February 15, 2012

Introduction: I have been working on the ”higher level goal system” for the project: Planning and Strategy. Originally all of the higher level goals were to be handled by a team or area called Strategy, but as development of the design ideas have progressed it has become apparent that the project needs to be forked into two areas which are described later.

Problems with evidence based design: The previous year's strategy code on the whole was not very helpful: Only two projects have high level goal planning as a separate strategic entity (having a deliberate area or class in the project design for the purpose of planning and strategy), I am disadvantaged as one is written in C++ which I can not read, and the last is 'overly complicated'; it has many different possible states for the world, which lends itself to the curse of dimensionality, and makes reading particularly difficult. However something common with all designs was the need for a Planning and Strategy 'block': a design concept I have followed.

Testing for Strategy with regards to performance and design ideas has not been possible at this stage due to the amount of time needed to design an original concept. Thus I can not provide evidence at this time that the overall concept is the 'better'.

Individual Aims: The aim has been to create some Strategic concept which can be realised in time for the Friendly Match, I have not been required in helping with passing the Milestone (as an aside: I have asked if I am needed!).

Methodology: I used UML case diagrams to create concepts so that work could be divided into classes, and that the design of Strategy as a whole could be decided and realised as a team. UML has been fundamental in designing this project: it has highlighted the requirement that there needs to be a separate code block handling Planning for example. Planning will provide; the trajectory of a moving ball, the possible movements of the opposition, angles of possible shots (including a bounce off the wall), the path the robot can take (as A* nodes), provide a few simple states to be checked in Strategy to ensure the plan still holds and lastly the function that maps from the visual data into the nodal system that A* planning requires. UML has also given insight into the design of multi-threading: Strategy will start Planning as a separate thread, decide if the newest plan is more suitable to the world state than the currently running one, create another Thread that constantly checks that the current plan is suitable, send on commands to the control interface, and provide the framework for high goal decision making.

During this design phase there has also been some investigation into methods; Using Theta* planning for example which provides a smoother path to the target, however without a Framework or Simulator existing yet it is not possible to test if Theta* is a better path finding algorithm. In lieu of this: Planning has been designed and will be developed to be flexible enough to use any path creating algorithm for future testing.

Future Design: The creation of the actual classes handling the above has already begun, so the next phase will be to build the Framework: realise the above design ideas, test them before the Friendly match and optimise our code. During this time it is hoped that we will be able to trial different path finding techniques.

Conclusion: UML design does not lend itself to testing whether it is possible to realise the design concepts and if realised code will perform as desired, it is also time consuming. The planning phase could have been faster if more time was spent on creating the classes and investigating them in practise for example: the methodology in Java Threading was not not as easy to implement in practice and has brought about changes in the UML concept. However it has been very useful for discussing with colleagues on the project and fundamental in creating an overall plan for the project. In the future there will be set deadlines on UML updates and more on progression with the code itself. Also being this high level means that it is not possible to provide evidence based design ideas, in the next week the concepts will become realised so that real comparisons of methods can take place.