Initial Plan

Project 288 - Multi-player internet Game

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Description

For my project, I plan to implement a turn-based strategy game in which multiple players build controllable units to attack their opponents. The game will also implement an artificial player aspect allowing the game to continue playing if a user disconnects from the game or stops playing to enable it to be more resilient. To this end, units without orders or actions that an absent player would need to take will be taken over by the game to allow the game to proceed. The game itself should consist consist of various different units and actions which they can take to allow the players to develop strategies and different decisions to try and defeat their opponent. Further details on the game should be finalised by the end of Week 2.

Additionally, the game should allow a variable number of internet or local network based players up to a set maximum number and to be able to deal with each of these in the case of disconnection from the game. Furthermore, depending on the development progress of the game, the map or environment in which the controllable units can move and take actions may range in complexity from a simple two dimensional grid, to a grid with various modifiers and values for that area, up to a more dynamic complicated map constructed of geo-spatial data, affecting in which way units can move and their positions relative to each other accordingly. This may allow for players to play the game on locations they know or recognise, such as their home-town. Though this may be quite a complicated implementation so further clear decisions will have to be made on this aspect of the project during development as I learn more about its feasibility.

Overall, the aim of the project is to construct an internet-based game with multiple players playing against each other or artificial opponents in a turn-based strategy game. It is also a key aim to construct the game as professionally as possible, to a high enough level of polish and functionality that I may demonstrate it as a substantial unit of work when questioned about it in my career or at interview.

Aim and Objectives

The first objective of the project is to implement a functional and sturdy networking system to connect multiple players together over the internet or local network. This will most likely consist of:

- A client/server architecture in which the server receives updates and actions from each player, processes their outcome and broadcasts updates to all clients.
- Some form of console or chat output informing players of their connection status and that oif other players.
- Support for players joining and leaving games and the server dealing with these events appropriately.

The second objective is that of the implementation of the game:

- Controllable units which can be given orders and actions on where to move, what to do when they get there, which other units to attack etc. must be implemented. These should obviously only be controlled by their relevant controlling player.
- Some map or environment which dictates how units can more and their relative positions to each other, further affecting what actions the units can take towards each other.

- This may also extend to be more complicated than a two dimensional grid depending on the progress of other aspects of the game.
- Some form of victory condition, such as advancing towards a particular location or controlling some specific objective for the players to aim towards and give their decisions strategic value.
- Some form of turn processor to advance the game when players have completed their turns to make the game proceed.

Extended from this is the artificial player nature of the game:
- This should initially consist of "standing orders" which the units for a player possess, enabling them to function on their own for several turns without the players input. So for example, a unit may have the standing order to keep advancing towards an objective until told otherwise so they have at least a basic level of useful intelligence.
- Then at some higher level, a larger intelligence should take on the role of the player once it has been confirmed they have disconnected (e.g. after they have not been available for three turns or other criteria). This player would fully take on the strategic aspect of the game, making decisions the player would choose, such as which units to make and what actions to give them. This intelligence may have to be given some more complicated heuristics, recorded strategies or additional knowledge in development to ensure they have a variable level of success.

Work Plan

I expect to meet with my supervisor at least once a week where possible, or exchange e-mails of progress and updates in which this is not the case, to ensure a healthy level of supervision for the project.

For much of this project, rapid testing of new features will be used when new systems are added, and depending on the results of these tests during development. Stronger further decisions will be able to be made about the project before its completion. To this end, as the weeks progress, the details of implementation at this stage may become less detailed. In regards to more complex game behaviour, such as the ability for alternative maps to be used and specific heuristics for AI players to use to be more effective, these will be implemented where possible towards weeks 7 and 8 depending on the progress of the game, but for clarity's sake, these more advanced modular features of the game have been left out of the weekly plan. As making a decision on these features will be subject to development progress, a formal decision will be made on these and recorded in any plans or documentation by week 6.

The weekly plan is as follows:

Week 1:
- Meet with project supervisor.
- Explore aims and objectives.
- Complete initial plan report.

Week 2:
- Submit initial plan: 2/2/1015.
- Create UML design model for project and for inclusion in final report.
- Research Java networking and capability of dealing with geo-spatial data.
- Create mock-up of game, for documentation and point of reference.
- Write-up on game rules and nature of the game.
- Brief write-up on findings and decisions made on project.

Week 3:
- Begin coding Java networking code.
- Connect multiple players to single server.
- Test exchanging of simple messages between servers and clients.
- If progress is good, proceed to further stages of development.

Week 4:

-If networking is delayed, proceed on this until completed

-Begin implementation of game UI for clients

-Implement two dimensional basic grid

-Work on introducing contextually players into this grid.

Week 5:

-Review meeting with supervisor.

-Implement turn progression of game

-Implement broadcasting updates to all clients from servers and updating client data of game state when receiving data from server.

-Begin implementation of units for players.

Week 6:

-Implement controllable units for each player

-Work on units' movement and knowledge of other units and their positions.

-Design and add units' actions and effects of those actions at the server.

-Review progress and decide whether more complex maps will be developed.

Week 7:

-Implement unit standing orders and game intelligence.

-Implement more units and game features.

-Implement victory condition and failure states for game.

Week 8:

-Further implement more complex game mechanics such as complex dynamic mapping, advanced AI heuristics and other features.

-Review meeting with supervisor.

Week 9:

-Thorough testing of project networking and AI

-Testing of game mechanics

-Write-up and evaluation of project for final report.

-Begin final report.

Week 10:

-Continue working on final report.

Week 11:

-Finish Final Report

Week 12:

-Submit Final Report 5/5/2015

 5/5/2015