COMP3006 Research project plan

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Project goal

To better understand the Fast multipole method and the Particle mesh ewald method, and to examine which algorithm is preferable in which circumstance. Additionally, the problem of implementing these algorithms in a high level language like Java will be examined.

Research plan by week

- Week 1
  - Find a supervisor and topic
  - Research topic
- Week 2
  - Read and understand the Rokhlin-Greengard paper on the Fast Multipole method
  - Read other papers on the Particle Mesh Ewald method.
- Week 3
  - Write and practice presentation on my topic
  - Start writing Report
- Week 4
  - Give presentation
  - Write report introduction
- Week 5
  - Organise plan for the remaining time
- Week 6
  - Framework / GUI created
  - Basic algorithm implemented
- Week 7
  - Begin implementation of the Particle mesh-ewald method
- Break
  - Finish implementation of the Particle mesh-ewald method
  - Implement the Fast multipole method
  - Bug test and verify the two method's

- Week 8
  - Improve the implementation's efficiencies
  - Analyse the efficiencies (Include in report)
- Week 9
  - Prepare report
  - Prepare final presentation
- Week 10
  - Finish preparing report
- Week 10
  - Finish preparing presentation
- Week 11
  - Give presentation
- Week 12
  - Submit report

Deliverables

- Artefact: a piece of software, written in java, that implements the Fast multipole method and the Particle Mesh Ewald method for the n-body problem.
- Report: a report detailing the comparison between these two algorithm's running times, and the interesting parts of their implementations
- Presentation: a presentation will be given on the contents of my report and the creation of the artefact.