**Final Project Report - Computer Architecture**

**Names of team members:**

Mohit Palliyil Sathyaseelan

Haritha Vipinakumar

Srajana Chandrashekhar

**Project title:**

Benchmark performance comparison of In-order and Out-of-order CPU using ARM8 system in Gem5

**Project description:**

(Type 4 project)

**Reference :**

[**https://ieeexplore.ieee.org/document/8391354**](https://ieeexplore.ieee.org/document/8391354) **(Main reference)**

[**https://github.com/sportokalidis/arm-gem5-intro**](https://github.com/sportokalidis/arm-gem5-intro)

[**https://courses.cs.washington.edu/courses/csep548/06au/lectures/introOOO.pdf**](https://courses.cs.washington.edu/courses/csep548/06au/lectures/introOOO.pdf)

We will be implementing In-order and out-of-order CPU in ARM. For the project, we aim to follow the guide and study of the configuration files in both the CPUs. A detailed review of the performance parameters will be obtained from the test benchmarks. We intend to use benchmarks like **bubblesort, FloatMM, qsort, matmatrix multiplication and bitcount** to see the overall performance of the system. For the final conclusion we will be stating which CPU performs better with **four performance metrics** (total consumed energy, throughput, average cycles per instruction, k2 cache miss rate).

**Work distribution:**

Mohit : Build ARM architecture on gem5 using In-order CPUs and Out-of-order CPUs. Understand and evaluate parameters amongst both the CPUs

Haritha : Evaluate and compile the benchmarks. Evaluate whether the benchmarks can be executed with ARM architecture  
  
Srajana : Evaluate overall performance of In-order and Out-of-order CPU; establish relation between the four performance metrics.

**Proposed schedule:**

Proposal submission - 11/04/2022

Progress slides - 11/22/2022

Final review - 12/12/2022 - 12/16/2022

*Week 1(31st Oct - 4th Nov)*

* Review of CA projects and research paper
* Project topic selection

*Week 2(7th Nov - 11th Nov)*

* Review of ARM architecture
* Build and Review of In-order and Out-of-Order CPU
* Get codes for benchmarks

*Week 3(14th Nov - 18th Nov)*

* Prepare project progress slides
* Evaluating the parameters on ARM
* Evaluating benchmarks and reviewing the code

*Week 4(21st Nov - 25th Nov)*

* Execute benchmarks on in-order and out-of-order CPU

*Week 5(28th Nov - 2nd Dec)*

* Debug and get performance metric results
* Look for scope of extending the work

*Week 6(5th Dec - 9th Dec)*

* Project report

**Date for final review: 12th-16th Dec**