

CS-3813 Initial Project Proposal

#2 Project Initial Report due 20th Feb (Grade point 13)

- Abstract (150 words)
- Objectives
- Expected outcome
- who is doing what and expected hours of work

Abstract: Energy efficiency has become a deprecatory design factor in recent computer architectures, especially for mobile and embedded systems. What our study here explores is the clear comparison of the energy efficiency of the MIPS architecture vs the modern RISC architecture.

In brief, MIPS is an earlier stage implementation of the RISC methodology that mainly focusses on a load & store model, including predetermined-length instructions and a simple instruction-based execution. All these traits clearly point towards a low energy-consumption model. Despite these advantages of the MIPS architecture, using this language usually requires a lot more instructions to complete complex computations & tasks and lacks advanced power management.

Now, in contrast to that, modern RISC architectures further expand upon the original RISC principles while also embodying sophisticated techniques like dynamic voltage & frequency scaling, low-power idle states and improved compiler optimizations. These incorporations, in specific, reduce the overall energy consumption per workload significantly.

And thus, by inspecting features like instruction efficiency, power-management capabilities & architectural design choices, this paper/ study highlights how modern RISC architectures achieve higher forms of energy efficiency when compared to the earlier designed MIPS architecture despite they both sharing a common methodology.

Objectives:

1. Comparing the energy efficiency of an instruction set in traditional MIPS architecture with modern RISC architecture.
2. Comparing the energy consumption per instruction
3. Comparing the energy consumption as the number of instructions increase

Expected Outcome:

- (a) To be able to demonstrate that modern RISC architectures achieve a higher energy efficiency than traditional MIPS implementations when executing specific comparable instructions/ workloads.
- (b) the results are expected to show that modern RISC designs consume less total energy per task due to reasons as talked about earlier.
- (c) The study is also expected to find that architectural enhancements such as dynamic voltage and frequency scaling, efficient idle states, and compiler-assisted optimizations play a significant role in lowering overall energy usage in modern RISC processors

Team member duties:

1. Darin
 - Comparison of the 2 architectures based on the information and findings of teammates. Common – final report draft & creation of presentation.
2. Fady
 - Study of the modern RISC architecture & energy optimization. Common – final report draft & creation of presentation.
3. Tonye
 - Study of the MIPS architecture and the energy efficiency analysis. Common – final report draft & creation of presentation.

Expected hours of work:

<i>Month</i>	<i>Hours of Work</i>	<i>Major Task</i>
1. January	2 – 5 hrs	Brainstorming topic
2. February	4 – 7 hrs	Project interim report/ proposal
3. March	8 hrs	Final draft of the study/ paper
4. April	3 hrs	Making of Presentation

* (The time mentioned here is an average of how many hours the team has spent to accomplish each of the tasks assigned.)