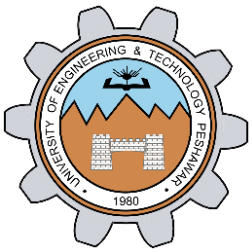
PROJECT PROPOSAL

IMPLEMENTATION OF

SAP - 1



Fall 2023

CSE-304L

Computer Organization & Architecture Lab

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Class Section: **A**

"On my honor, as student of University of Engineering and Technology, I have neither given nor received unauthorized assistance on this academic work."

Submitted to:

Dr. Bilal Habib

Friday, December 29, 2023

Department of Computer Systems Engineering

University of Engineering and Technology, Peshawar

Project Proposal: SAP-1 Implementation in Computer Organization and Architecture

Project Title: Implementation of SAP-1 Microarchitecture

Project Overview:

The objective of this project is to design and implement a Simple As Possible Computer (SAP-1) as part of the Computer Organization and Architecture course. The SAP-1 architecture provides an excellent opportunity to delve into the fundamental concepts of digital logic design, microarchitecture, and assembly language programming. By undertaking this project, we will gain practical experience in building a basic computer system from scratch, fostering a deeper understanding of the principles underlying modern computer systems.

Project Scope:

- **Microarchitecture Design:**
  - Define the microarchitecture of the SAP-1, including its registers, ALU (Arithmetic Logic Unit), control unit, and memory components.
  - Specify the instruction set architecture (ISA) for the SAP-1.
- **Digital Logic Implementation:**
  - Implement the designed microarchitecture using digital logic components such as AND gates, OR gates, flip-flops, etc.
  - Construct a detailed schematic diagram of the SAP-1.
- **Assembly Language Programming:**
  - Develop a simple assembly language for programming the SAP-1.
  - Write and test a set of basic programs to demonstrate the functionality of the implemented SAP-1.

- **Testing and Debugging:**
  - Conduct thorough testing to ensure the correct operation of the SAP-1.
  - Implement debugging mechanisms to identify and rectify errors in the design and implementation.

Deliverables/Results:

- Microarchitecture specification document.
- Schematic diagrams of the SAP-1 design.
- Digital logic implementation of the SAP-1.
- Assembly language programs demonstrating SAP-1 functionality.
- Test results and debugging reports.
- Comprehensive project report.

Resources:

- Software tools: ModelSim
- Reference materials: Designing and Implementing a SAP-1 Computer | SAP-1-Computer (karenok.github.io), GitHub - CodePurble/sap: The SAP-1 in Verilog, and now as an ASIC!

Conclusion:

By undertaking the SAP-1 implementation project, q will not only gain hands-on experience in computer organization and architecture but also deepen their understanding of the intricate workings of a simple yet powerful computer system. This project aligns with the course objectives and provides a solid foundation for future studies in advanced computer architectures.