32-bit CPU Processor Design

Computer Project II

ECEN 3734

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Group #1 is

Rob Collins, Dan Dodge, Chris Something, John Fromel, Adam Tewell, Hanna Sassya

Objective

To create a Central Processing Unit (CPU) in VHDL and execute a set of instructions. The CPU has two main parts: the Arithmetic logic unit and a Control unit. The CPU will interact with the primary storage or main memory for instructions and data. The memory only holds data temporarily while the CPU is executing a program. Permanent memory or secondary storage are hard drives. The Control unit tells the circuits of the CPU to execute stored program instruction but does not execute the instructions itself. It communicates with the arithmetic logic unit and memory. The Arithmetic logic unit contains the circuits that perform all of the arithmetic logical operations. The operations of it include, addition, subtraction, multiplication and division. It also makes comparisons between different values. Registers in the arithmetic logic unit are temporary storage areas. The control unit will tell them to accept, hold and transfer data. So the CPU will work together like this. The control unit fetches instructions from the memory. It decides what to do with the instructions. It gives the arithmetic logic unit control to perform operations on the data and stores the result or memory or a register.

Part design and functions

Instructional SRAM

Control Unit

Program Counter

ALU

Registers

Data SRAM

Tasks

Task 1

Task 2

Task 3

Task 4