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**Lab 7 Discussion**

1. Lab 7 Discussion – ALU Design

In the seventh lab class, we were given an in-depth introduction on what ALUs are, how they work, how they are designed, and how they are used in MIPS architecture. An ALU (arithmetic-logical unit) is a combinational circuit capable of computing a variety of arithmetic and logical functions. The ALU we designed was able to conduct arithmetic operations like subtractions, additions, multiplications and logical operations like AND, OR, XOR. XOR gate was used to execute the 2s complement method to do subtractions in the ALU. We were shown how to fully design an 1 bit ALU that can execute the aforementioned operations. We were also shown how Multiplexers and adders came in to play while designing the ALU to carry out the operations. In order to design lets say 2 bit, 4 bit or 16 bit ALU designs, we would need to make 2, 4 or 16 and so on and so forth ALU copies to successfully design. As the MIPS word is 32 bits wide we would need to make 32 1 bit ALUs. The class concluded by instructing us to submit the discussion in google classroom and the circuit files for the 1 bit and 16 bit ALU design in git.