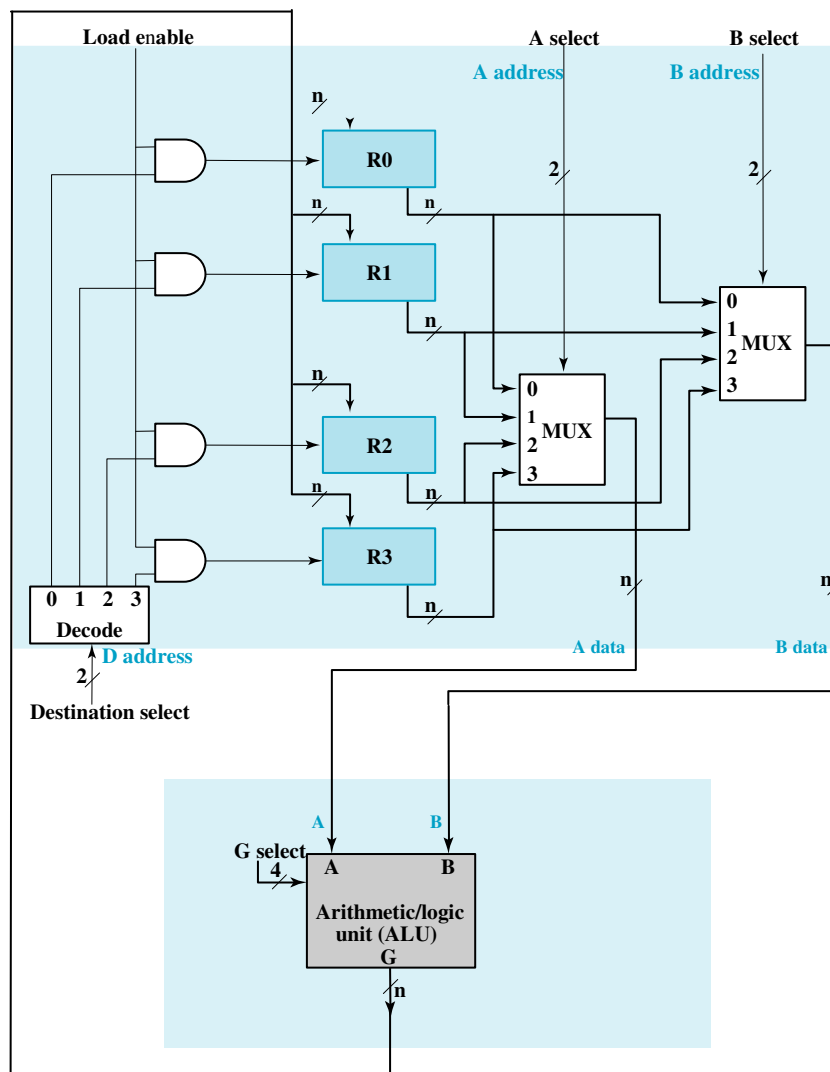


Computer Engineering 315L
 Digital System Design Lab
Lab 6
Option B
Simple Computer with Datapath

The datapath and control unit are the two parts of the processor, or CPU, of a computer. In addition to the registers, the datapath contains the digital logic that implements the various microoperations. A simple bus-based datapath with four registers is shown in the figure below.



Implement this datapath using a breadboard and prototype IC's. You only need to use the 4-bit ALU, 2 4-bit registers, Decoder(s) and Multiplexer(s) if needed. You will manually

simulate the single-cycle computer for the following sequence of instructions with proper documentation of the results:

$R0 \leftarrow A + B$

$R1 \leftarrow A \wedge B$

$R0 \leftarrow R1 - R0$

Final Report, using the same format of previous lab reports, is to include at a minimum the following:

- Table of results including all control/select signals for each microoperation.
- A diagram of your datapath with the ALU, *D* flip-flops, decoder(s) and multiplexer(s).

In addition to completing the final report, you need to demonstrate the microoperations to the instructor.