**Lab 6 – Integrating PCIMID with RFALUDMRF**

Let us integrate all the modules so far. Let us combine Lab 5 with Lab 4. So many signals will become "wires". If you refer to Text Figure 4.17 (p.277), we are missing some things. The modules on the top right (Shift Left 2, Add, Mux and And gate) are needed for Branch Instruction. We will NOT implement the Branch instruction yet. So we can skip them. We will tap the right set of bits from the Instruction for the Reg2Loc mux. The Sign Extend module will tap only the 9 bits of displacement (not 32 as shown).

Remember when we boot up the computer, the Register File will have all registers zeroed (semiconductor memories are volatile mostlym and they lose the values when powered down) and so we have to store (initialize) values in the Data Memory first, assuming it is a nonvolatile memory (for example, a hard drive using magnetic disk). Then we have to load them to the register file. So the first few instructions will be load instructions. We will then have a few ALU instructions and then finally some store instructions.

We can try a simple program of adding two numbers. Initialize Data memory with decimal numbers 2 and 3. Before we proceed to add, we need to bring them (load) to Register File. Then execute the add instruction. The result will go to another *register*. Then store the result in Data Memory. Display the relevant Data memory and Register File locations.

mc, s17