Homework 5

1) Design two versions (**Version A** and **Version B** below) of the combinational circuit whose input is a 4-bit number and whose output is the 2's complement of the input number:

> **Version A)** The circuit is a simplified two-level circuit, plus inverters as needed for the input variables.

> **Version B)** The circuit is made up of four identical two-input, two-output cells, one for each bit. The cells are connected in cascade, with lines similar to a carry between them. The value applied to the rightmost carry bit is 0.

2) Design a 5-bit signed magnitude adder-subtractor (1-bit for the sign and 4-bit for the magnitude). Divide the circuit for design into: (1) sign generation and add-subtract control logic, (2) an unsigned number adder-subtractor using 2's complement of the subtrahend for subtraction, and (3) selective 2's complement result correction logic.