1. (i) Design a Half-subtractor (HS) using Half-Adder (HA).

   (ii) Design a Full-Adder (FA) using Full-Subtractor (FS)

   You may use inverters as per your requirement.
2. Design a 1-bit comparator that takes in a bit X and a bit Y and outputs X<Y, X>Y, X=Y. Use a single 2-to-4 decoder and 1 single OR gate.
3. Design the sum output of a Full Adder using only two 4:1 multiplexers**.**
4. Design a 3-bit Binary to Gray converter using only one 3:8 decoder and one 8:3 encoder.
5. Implement the following function (SOP) using 2:4 decoders and OR gate only.

$$F(W, X, Y, Z) = \sum(1,4,7,9,10)$$

6. Implement following function using 8:1 MUX.

$$F(A, B, C, D) = \sum(0,1,2,3,4,9,13,14,15)$$