CSE260 Lab Report-7

Experiment: Design a circuit that outputs 2's complement of a 3-bit number using encoder & decoder.

Group-1:

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Name of the experiment: Design a circuit that outputs 2's complement of a 3-bit number using encoder & decoder.

Objective:

- Draw the circuit that would act as a 2's complement of a 3-bit number using encoder and decoder. Your circuit should be able to work with encoder and decoder.
- Implement your circuit for encoder and decoder.

Required components and equipment: Trainer board, bread board, an IC-74138 decoder, wires etc.

Experimental setup: For conducting the experiment a trainer board, bread board, wires and 1 IC-74138 a decoder, 1 IC-74148 an encoder were used here. Here 16 no pin is connected to +5V or Vcc and 8 no pin to the GND position of the breadboard. Now,

at first. for the experiment:

1. The decoder part was done using IC-74138. Here, at first for input C, B & A were assumed or taken. Then we have connected them in pin no 3, 2, 1 serially. After that ~~non~~ pin no 4, 5 & 6 these pins G2A & G2B were connected ~~them in pin no 3, 2~~. along to the GND position as they were on enabled active low position. But the G1 on pin no 6 is not in active low position. Therefore, it will be connected to the Vcc point or with that position. Now, for the outputs we ~~Y0~~ Y_0, Y_1, Y_2, Y_3, Y_4, Y_5, Y_6, Y_7 all of them were used as outputs in pin no 15, 14, 13, 12, 11, 10, 9 & 7 accordingly.

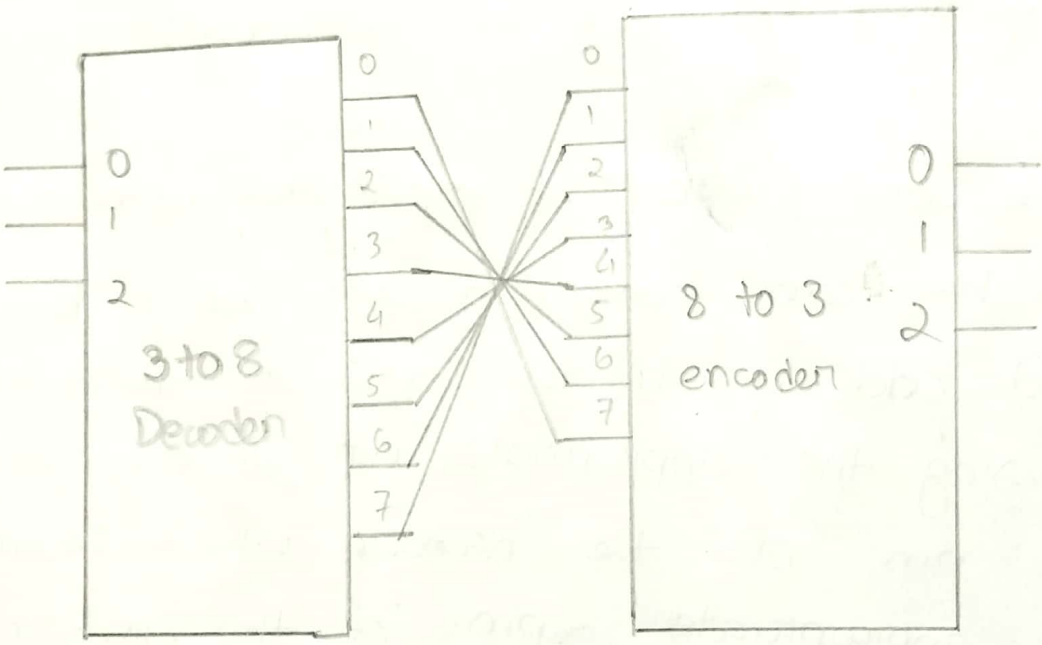
2. Secondly, the encoder part was done using IC-74148. This setup is going to be the complete reverse of the previous one. Because in this setup pin no 1, 2, 3, 4 & 5 were taken

as outputs starting from ~~A2~~ A_2, A_1, A_0. Also, pin no 10, 11, 12, & 13 were also taken as inputs. But for the pin no 14 & 15 the EO & GS position, they were taken as outputs but remained untouched.

finally our setup for both encoder and decoder are done. So, now for the experiment at first from the decoder Y_0 pin no 15 was connected to the pin no 10 of encoder. Then Y_1 pin no 14 to the pin no 4, Y_2 pin no 13 to the pin no ~~10, to the pin~~ Y_3 pin no 12 to the pin no 2, Y_4 pin no 11 to the pin no 1, Y_5 pin no 10 to the pin no 13, Y_6 pin no 9 to the pin no 12 & ~~easily~~ lastly Y_7 pin no 7 to the pin no 11 of encoder. Thus, our experimental setup is complete. It can be checked and proof via the truth table.

Results and Discussions:

a) Circuit Diagram of 1's complement of 3 bit number using Encoder and Decoder



Here, pin no. 0 of decoder goes to pin no. 7, pin no. 1 of decoder goes to pin no. 6 of encoder, pin no. 2 of decoder goes to pin no. 5 of encoder, pin no. 3 of decoder goes to pin no. 4 of encoder, pin no. 4 of decoder goes to pin no. 3 of encoder, pin no. 5 of decoder goes to pin no. 2 of encoder, pin no. 6 of decoder goes to pin no. 1 of encoder, pin no. 7 of decoder goes to pin no. 0 of encoder.

b) Yes, a code converter can be implemented with encoder and decoder. We can convert a BCD code to Excess 3 code and add it to the input of the decoder and then using the appropriate pin we can connect the output pin of the decoder which became 1 to the appropriate pin of the encoder and finally find the output.