

Assignment No. 1

Computer Organisation - CS220

1. Design a Full Subtractor architecture using AND, OR, XOR, and NOT gates. You must follow structural style coding for your design.
2. Design a 32-bit Subtractor using Full Subtractor that you have designed previously.
3. Design a 3 to 8 Opcode decoder.
4. Design a mod 10 counter.
5. Truth table of a priority encoder is shown in Table 1. Write a verilog code of a generic priority encoder that will work for input of any dimension.

Table 1: Priority Encoder Truthtable

| Input | | | | OUTPUT | | |
|-------|----|----|----|--------|----|-------|
| i3 | i2 | i1 | i0 | y2 | y1 | valid |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 1 | 0 | 0 | 1 |
| 0 | 0 | 1 | x | 0 | 1 | 1 |
| 0 | 1 | x | x | 1 | 0 | 1 |
| 1 | x | x | x | 1 | 1 | 1 |