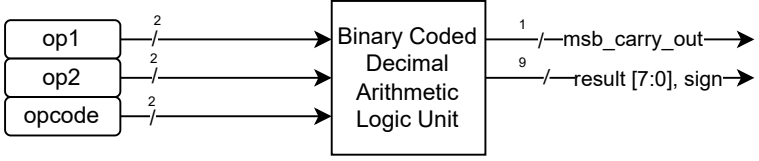
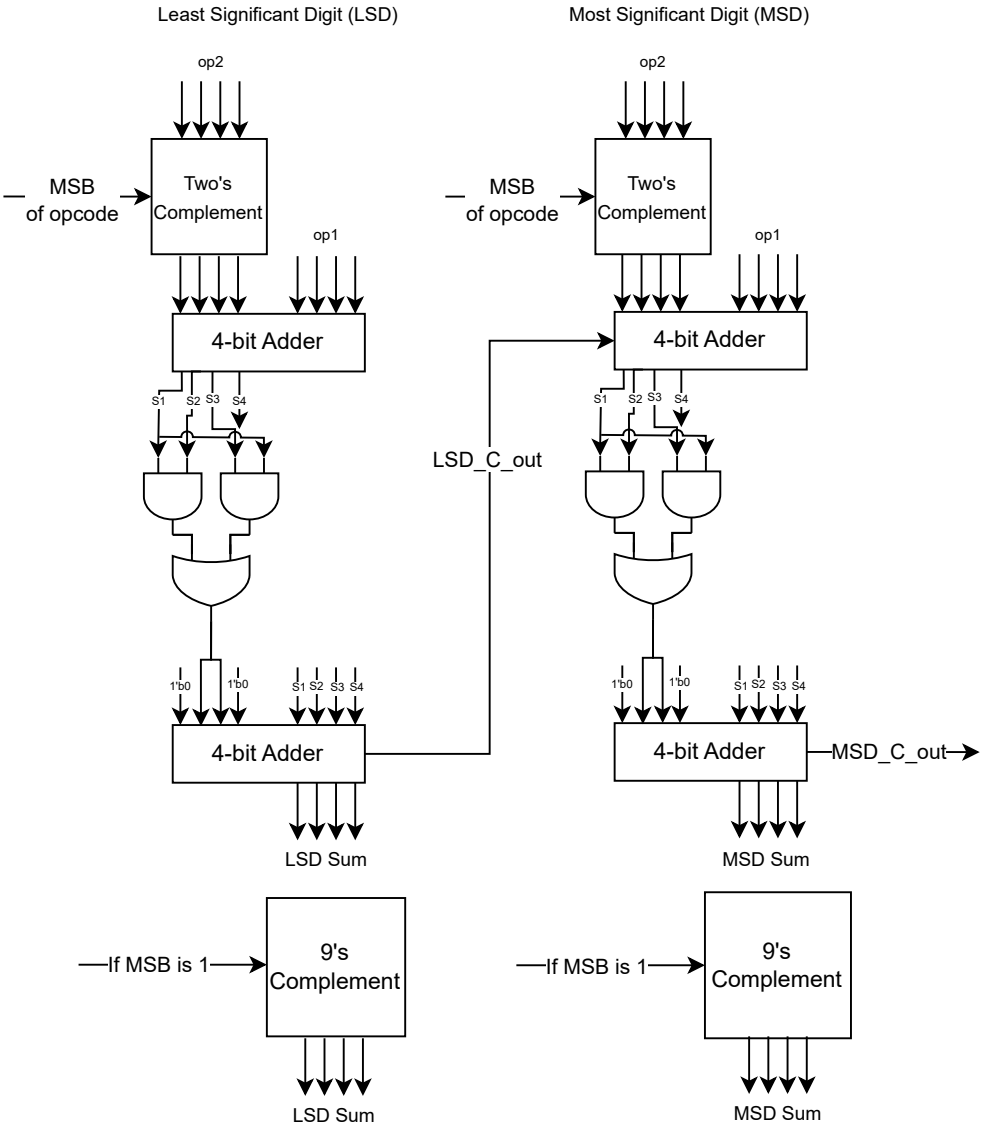
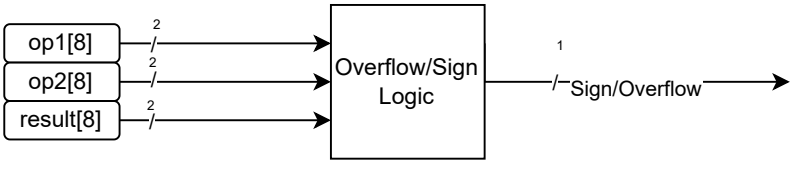


Binary Coded Decimal Arithmetic Logic Unit Sub Block



Overflow/Sign Detection



Psuedo-Code

Add:
1. C_in = 0
2. First LSD 4-bit adder: LSD_op1 | LSD_op2 = LSD_S1...LSD_S4
3. Determining if 6 needs to be added: (LSD_S1 & LSD_S2) | (LSD_S1 & LSD_S3)
4. Second LSD 4-bit adder: 4'b0000/4'b0110 | LSD_S1...LSD_S4
5. LSD Sum: is the 4-bit binary representation of the LSD
6. LSD_C_out: 0/1
7. First MSD 4-bit adder: MSD_op1 | MSD_op2 = MSD_S1...MSD_S4
8. Determining if 6 needs to be added: (MSD_S1 & MSD_S2) | (MSD_S1 & MSD_S3)
9. Second MSD 4-bit adder: 4'b0000/4'b0110 | MSD_S1...MSD_S4
10. MSD Sum: is the 4-bit binary representation of the MSD
11. MSD_C_out: flag value to show if sum exceeds the two-digit display.

Subtract
1. C_in = 1
2. Two's complement comb:

```
if (C_in) begin
        ~op2;
        op2 + 1;
end
else
        op2
```

3. Follow Add flow.1