Lab 4

2. The Sub signal goes into the Cin of the adder because without the carry in the adder just inverts the bits. When you connect the carry in it adds 1 to the flipped bits and completes the two's complement representation.

A	B	Sub	Sum
k	j	0	If sum>15: (k+j)-32 If sum<-16: (k+j)+32 Else: (k+j)
k	j	1	If sum>15: (k-j)-32 If sum<-16: (k-j)+32 Else: (k-j)

Sign A	Sign B	Sign Sum	Ovfl
0	0	1	1
1	1	0	1

Questions:

1. The Xor gate inverts the data from the second multiplexer when the subtracter switch is on, so that subtraction can be done.

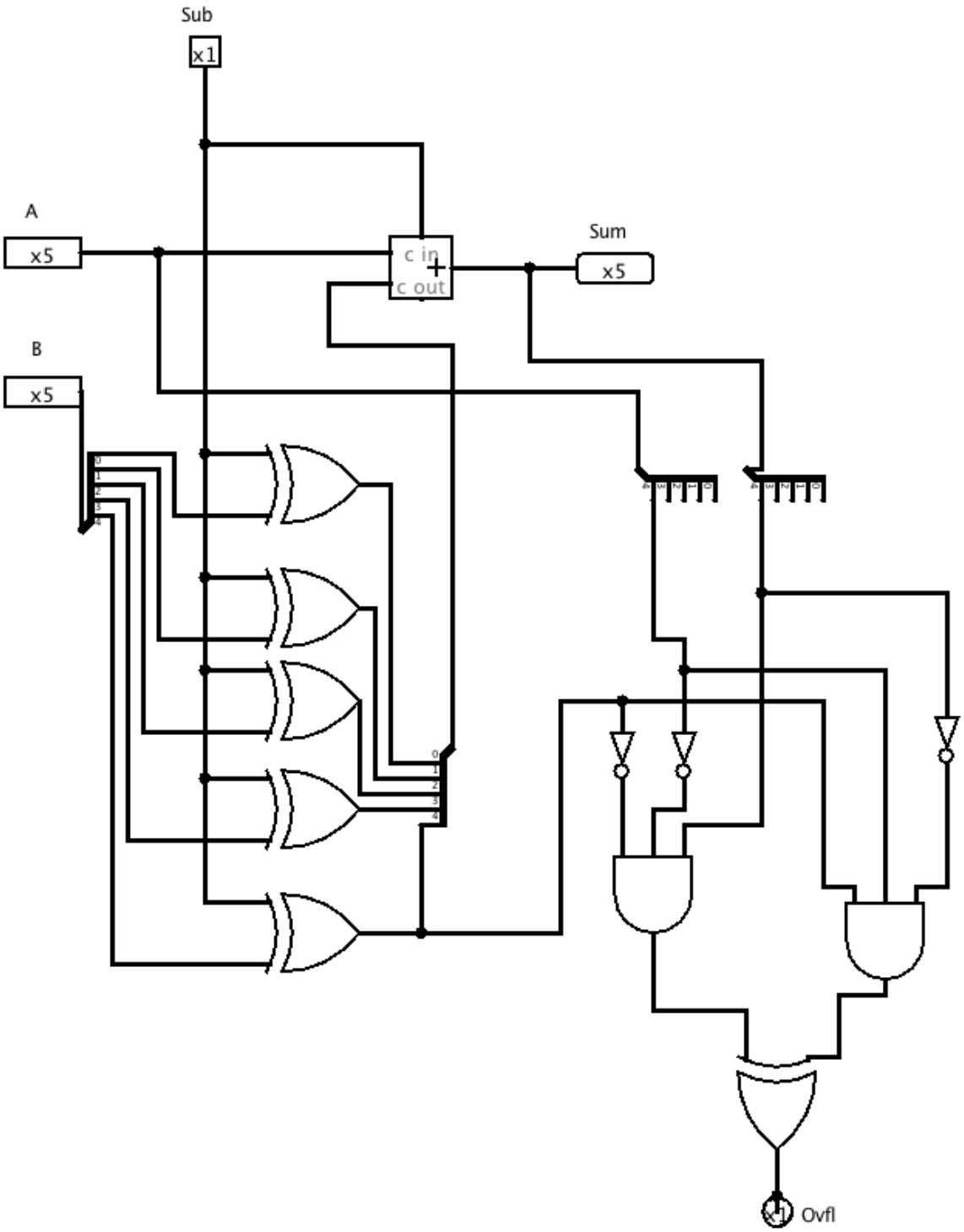
2. The splitter simply converts the 1 bit into 5 bits of the same bit in order to comply with the 5 bit Xor gate that takes 5 bits from the second multiplexer.

3. There are two 2 bit control pins and one 1 bit control pin. So there are 5 control bits.

4. The circuit can perform two operations: Subtraction and Addition.

5. The circuit can Add or Subtract any combination of two of the 4 inputs. So, it can perform A-D, or D+C, or C-B, or B+D and so on.

Adder-Subtracter



Two-Port Adder