

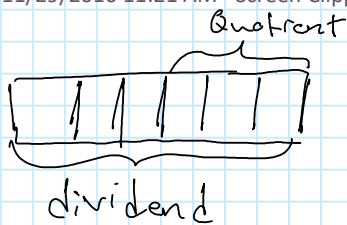
Lab 7

Tuesday, November 29, 2016 11:21 AM

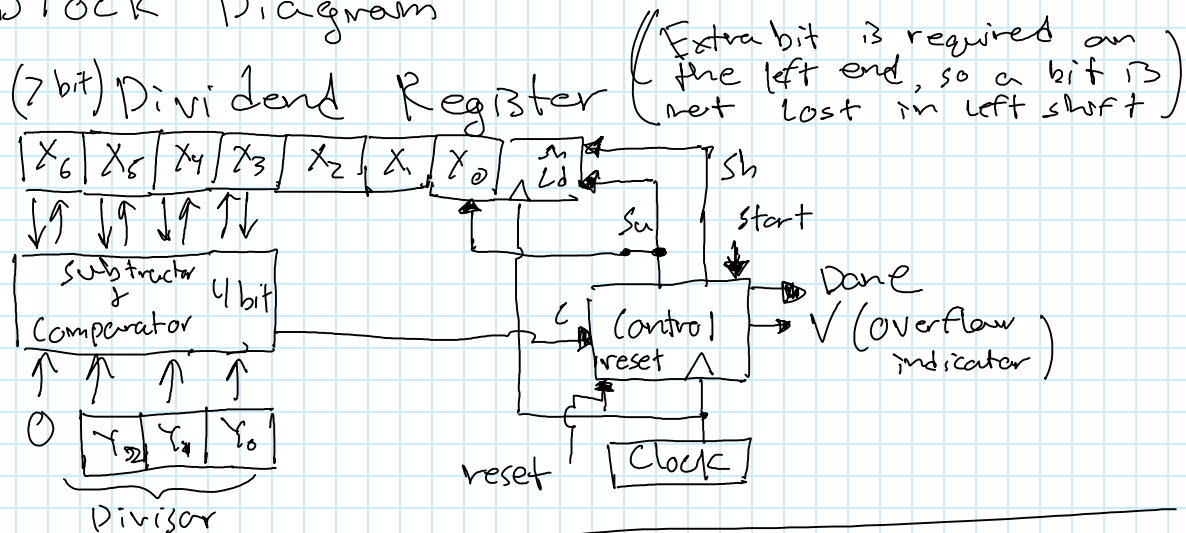
20.B

20.B: same as 20A except divide a 6 bit dividend by a 3 bit divisor to give a 3 bit quotient and 3 bit remainder. Overflow occurs when quotient requires more than 3 bits.

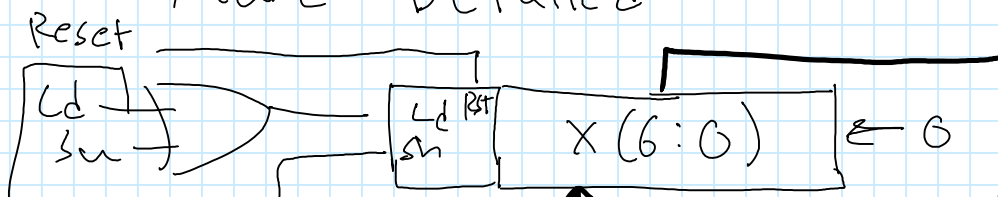
11/29/2016 11:21 AM - Screen Clipping

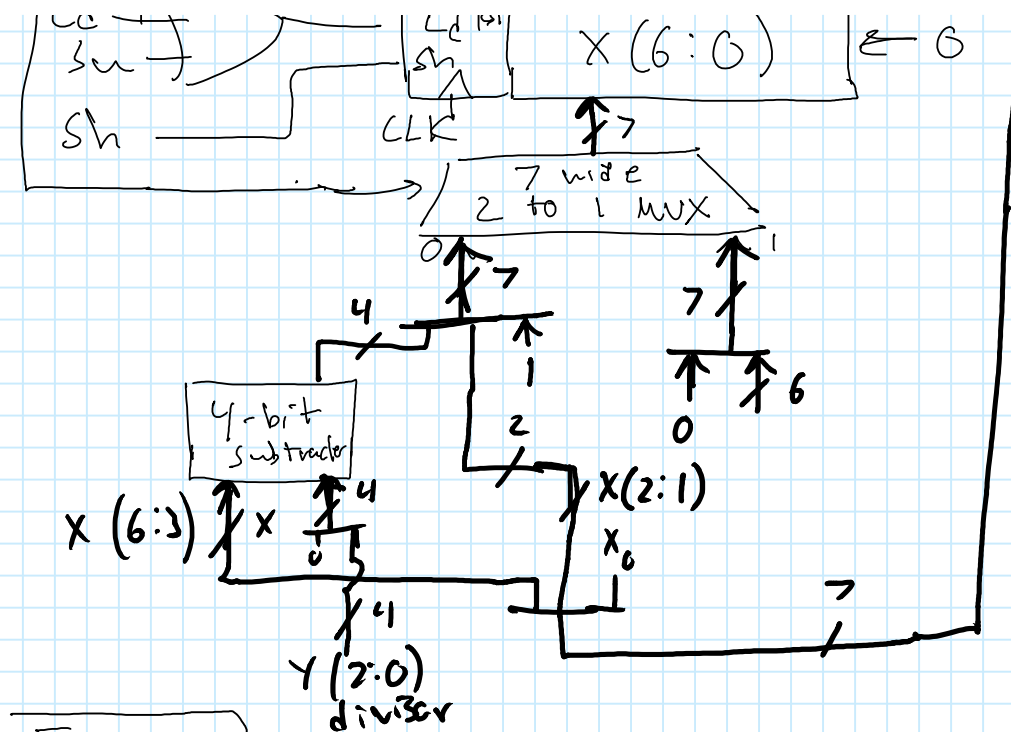


Block Diagram



More Detailed





Example

$$\begin{array}{ccccccc} & & & & & 2 & & 4 & & R \\ 0 & 0 & 0 & 1 & 0 & 0 & 0 & \div & 0 & 1 & 0 & = & 1 & 0 & 0 & + & 0 & 0 & 0 \end{array}$$

1. Check Overflow, Top 4 bits $>$ divisor?

$$\begin{array}{ccccccc} 0 & 0 & 0 & 1 & 0 & 0 & 0 \\ & & & \vdots & & & \\ 0 & 1 & 0 & & & & \end{array} \quad \text{No, } 0001 < 010$$

2. left shift & subtract

$$\begin{array}{ccccccc} 0 & 0 & 1 & 0 & 0 & 0 & 0 \\ - & 0 & 1 & 0 & & & \\ \hline 0 & 0 & 0 & 0 & & & \end{array} \quad \leftarrow \text{becomes a 1} \rightarrow \begin{array}{ccccccc} 0 & 0 & 1 & 0 & 0 & 0 & 1 \end{array}$$

3. change Quotient and replace dividend

$$\begin{array}{ccccccc} 0 & 0 & 0 & 0 & 0 & 0 & 1 \end{array}$$

0000;00:1

4. Shift, Subtract

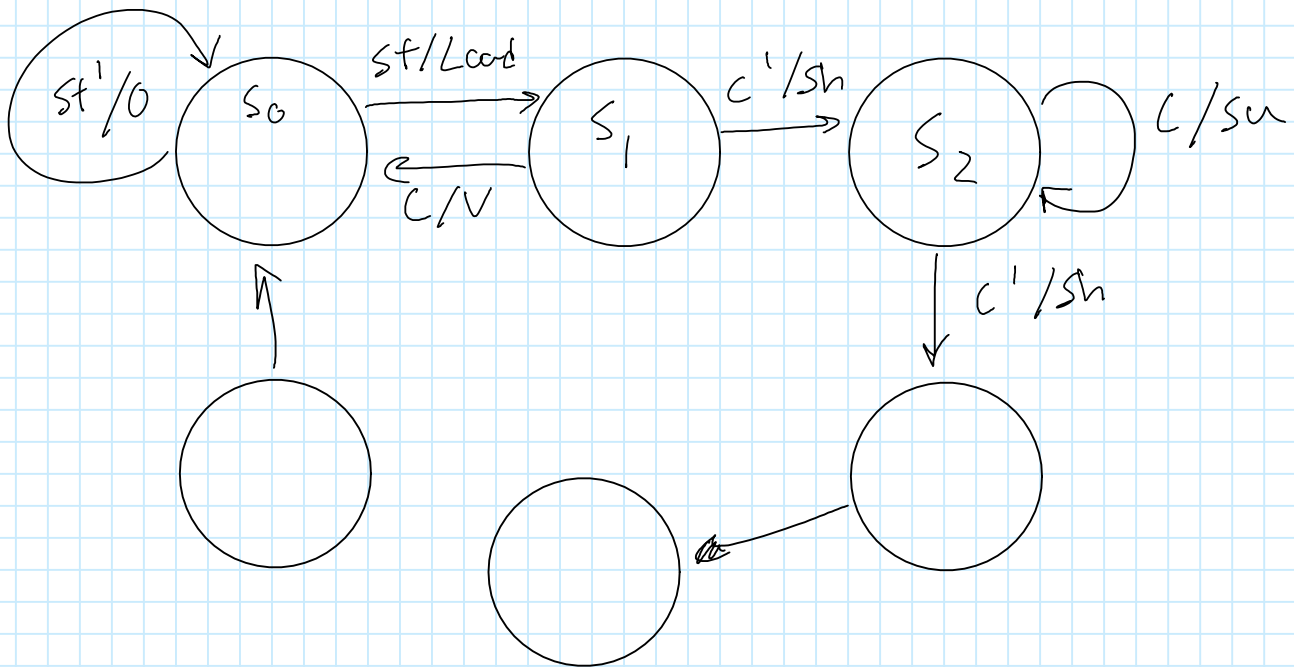
0000;01:0 } dividend < divisor
010 } ∴ shift again. Q-bit stays 0

5. Shift again

0000;100
Remainder Quotient

Done, because 3 bit Quotient, so we have to shift 3 times.

State Graph



to $(step, s_0)$.
