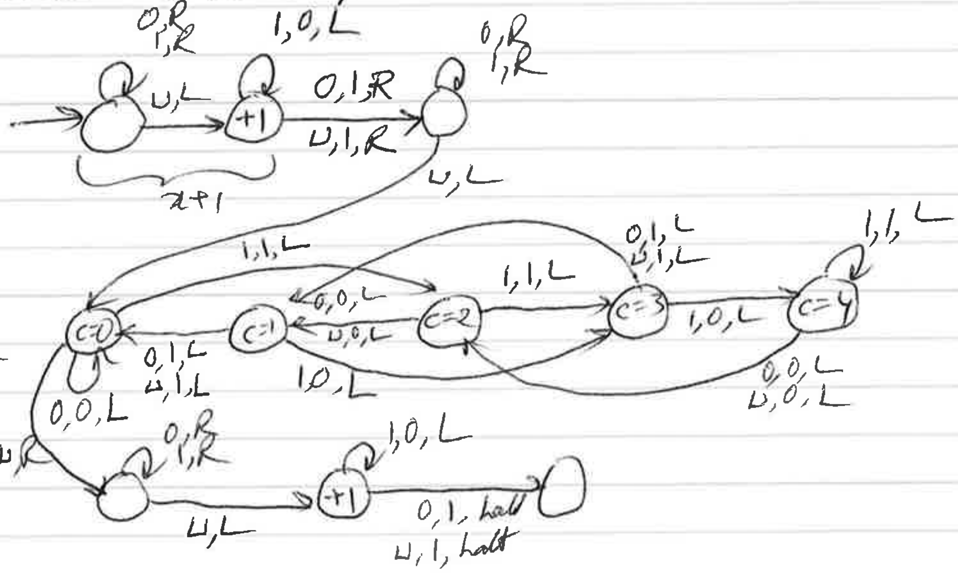
600.271 key to HW 5
sp '13

I 1) $f_1(x) = 5x + 6$

The simplest way is to multiply by 5, then add 6.

Instead, we implement $f_1(x) = 5(x+1) + 1$



5(x+1)

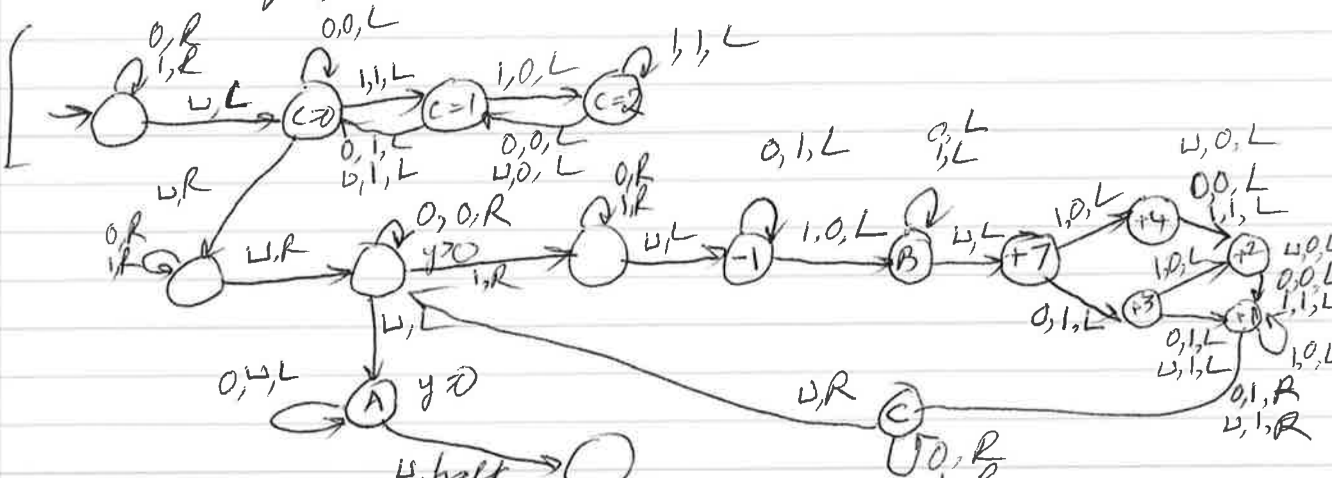
2) $f_2(x,y) = 3x + 7y$, for every $x, y \geq 0$

a) Compute $3x$

b) If $y > 0$: subtract 1 from y
add 7 to 3x area

When $y = 0$, the result is in 3x area.

3x



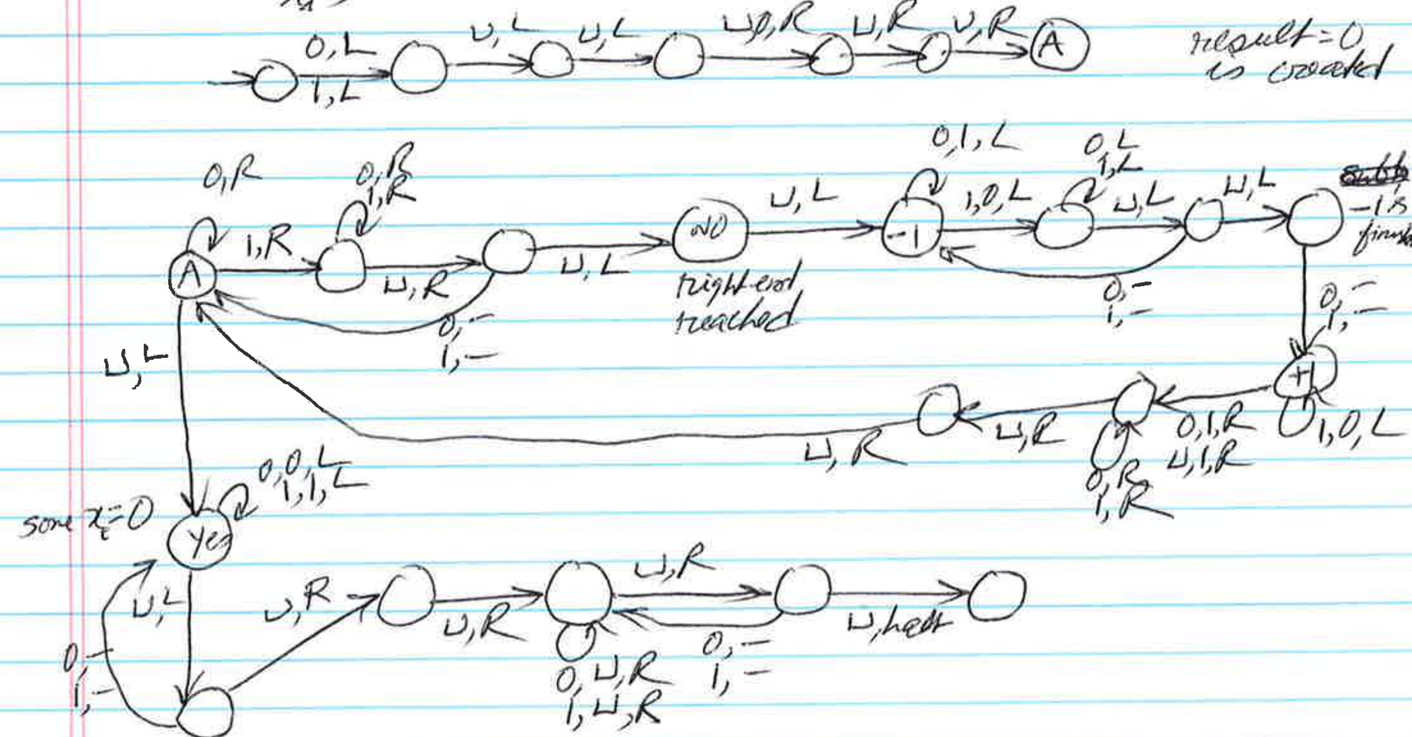
If you are multiplying y by 7, you first need to shift y to the right by 3 positions.

II Out of laziness, I am implementing a simple algorithm suggested by one of the students in the class. I want to emphasize that any algorithm can be implemented.

Given $x_1 \sqcup x_2 \sqcup \dots \sqcup x_m$ first transform it to

$\overbrace{0}^{\text{result}} \sqcup \sqcup x_1 \sqcup x_2 \sqcup \dots \sqcup x_m$.

Then repeatedly subtract 1 from each x_i & add 1 to result until one of the x_i's becomes 0. Then the result contains the min value. Then erase the x_i's.



This doesn't require that all the input numbers have the same number of bits.