3, 4, 5, 6

3

$\frac{*}{*}\left|\frac{*}{*}, R \right.$ is shorthand for $\frac{1}{1}\left|\frac{1}{1}, R\right.$
$\frac{1}{0}\left|\frac{1}{0}, R\right.$
$\frac{0}{1}\left|\frac{0}{1}, R\right.$
$\frac{0}{0}\left|\frac{0}{0}, R\right.$
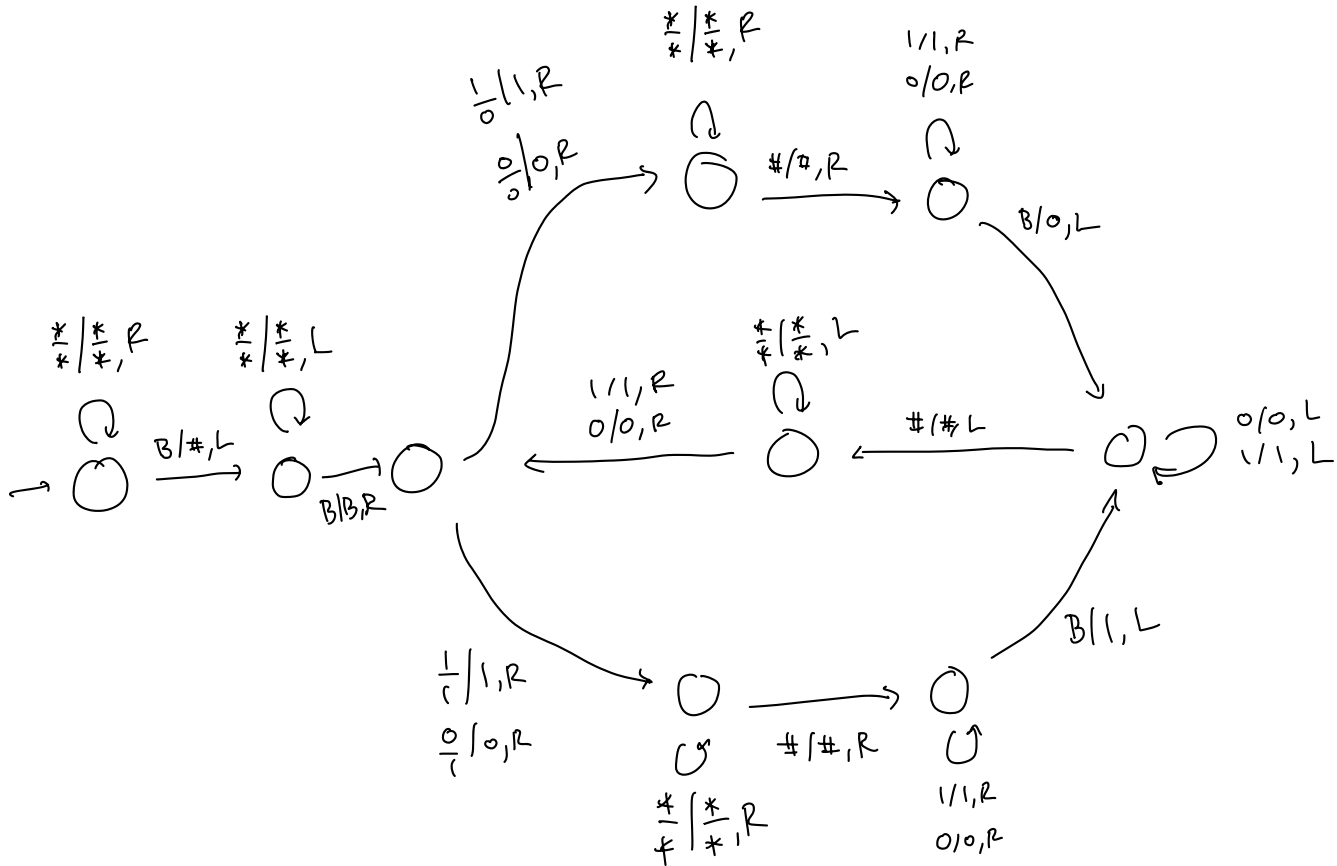
#4

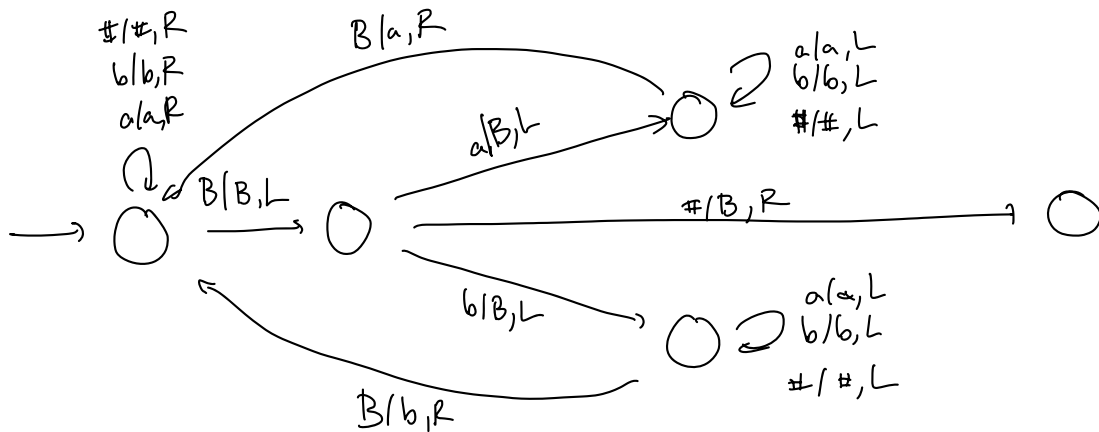First run the separated strings thru the TM
for #2 which will stack them.
Then run the TM from class to add them.

#5

For x#y, I move all the way R, then copy the last
letter of y on to the front of the string. Repeat until y
is all blank, then erase the #.
You could also move letters of x down to the end.

$\#/\#, R$
$b/b, R$
$a/a, R$

$B/a, R$

$a/a, L$
$b/b, L$
$\#/\#, L$

$B/B, L$

$a/B, L$

$\#/B, R$

$b/B, L$

$a/a, L$
$b/b, L$
$\#/\#, L$

$B/b, R$

#6

$a/B, R$

$\#/B, R$

$a/a, R$
$b/a, R$

$b/B, R$

$\#/B, R$

$a/b, R$
$b/b, R$