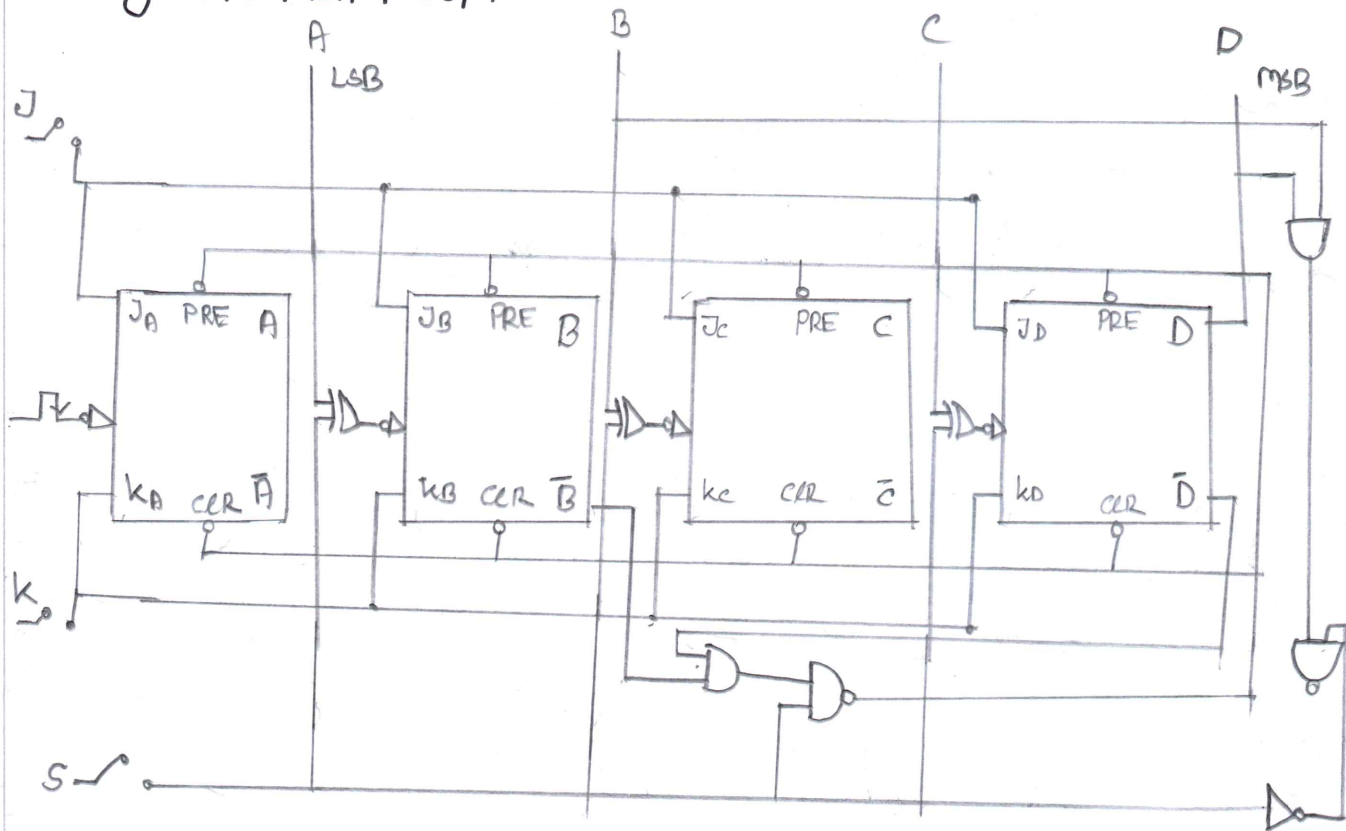


1) Design MOD 10 up/down Asynchronous Counter using JK FlipFlop.



Operation: When  $S = 0$ , For (0 to 9)

$PRE = 1, CLR = 0$

Normal clock operation ( $PRE = 1, CLR = 1$ )

For, 10

$PRE = 1, CLR = 0$

$A = B = C = D = 0$

This counts 0 to 9 so this is UP Counter

When  $S = 1$ , For

$A = B = C = D = 1$

$PRE = 0, CLR = 1$

This called Down Counter.