

QUESTION 2: [35 Points]

For the computer organization provided in Figure 2, write the minimum set of RTL steps required to perform the following operation:

$MEM[\$02] \leftarrow MEM[\$01] - MEM[\$00]$

Determine the control signals and the number of clock cycles for the operation.
Use the ALU defined in Question 1.

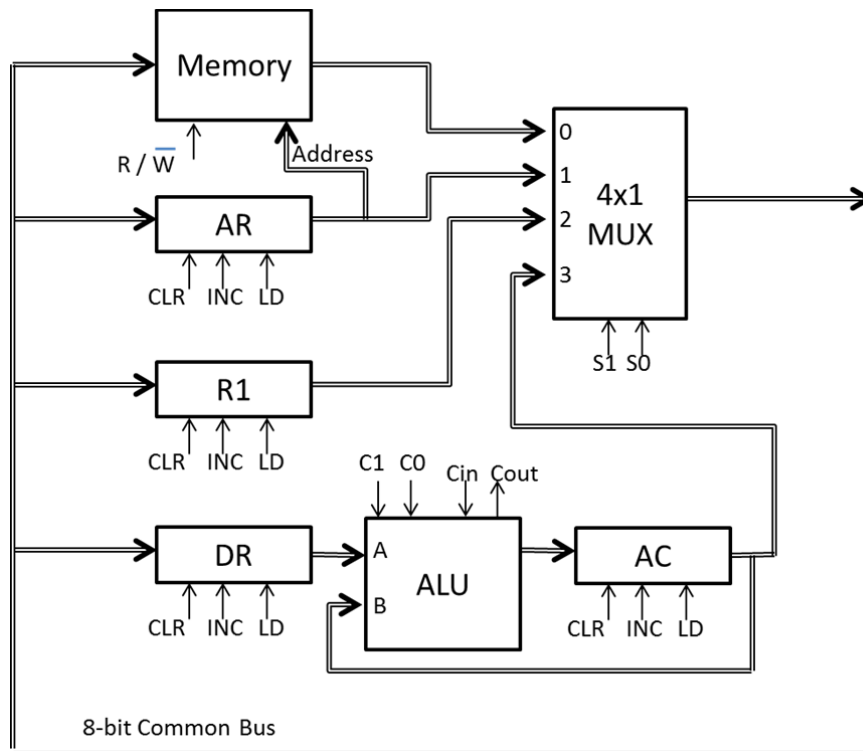


Figure 2

T0 : CLR[AR], CLR[AC] : CLR[AR]=1, CLR[AC]=1

T1: $R1 \leftarrow MEM[AR]$, INC[AR] : S1,S0=00, INC[AR]=1, LD[R1]=1, R/W'=1

T2: $DR \leftarrow MEM[AR]$, INC[AR] : S1,S0=00, INC[AR]=1, LD[DR]=1, R/W'=1

T3: $DR \leftarrow R1$, $AC \leftarrow DR + AC + Cin$: S1,S0=10, LD[DR]=1, C1,C0=00, Cin=0, LD[AC]=1

T4: $AC \leftarrow -DR + AC$: C1,C0=01, LD[AC]=1

T5: $MEM[AR] \leftarrow AC$: S1,S0 =11, R/W'=0

6 CLOCK CYCLES