COA LAB

Experiment – 3

Problem Statement: Write an assembly language program to compute factorial for a given number.

Algorithm:

Step 1: Define the Base Register Address value during the creation of the program
Step 2: Move the operand to Register R1 for which you need to find out the factorial
Step 3: Move the Register R1 value to the R0
Step 4: Move the value 1 to Register R2
Step 5: Create a label named 'factorial'
Step 6: Multiply Register R1 with register R2 and store result in R2 register
Step 7: Decrement Register R1 value
Step 8: Compare Register R1 with value 1
Step 9: If the Register R1 is greater than 1, jump to the 'factorial' label
Step 10: If the Register R1 is lower than or equal to 1, store the resultant factorial value in the memory location
Step 11: Halt the simulator

Assembly Language code:

MOV #5, R01 *;Store value of 5 in register R01*

MOV R01, R00 *;Move register R01 value to R00.*

MOV #1, R02 *;Store value of 1 in register R02*

factorial: *;Label for factorial*

MUL R01, RO2 *;Multiply registers RO1 to R02 and store the resultant value in register R02*

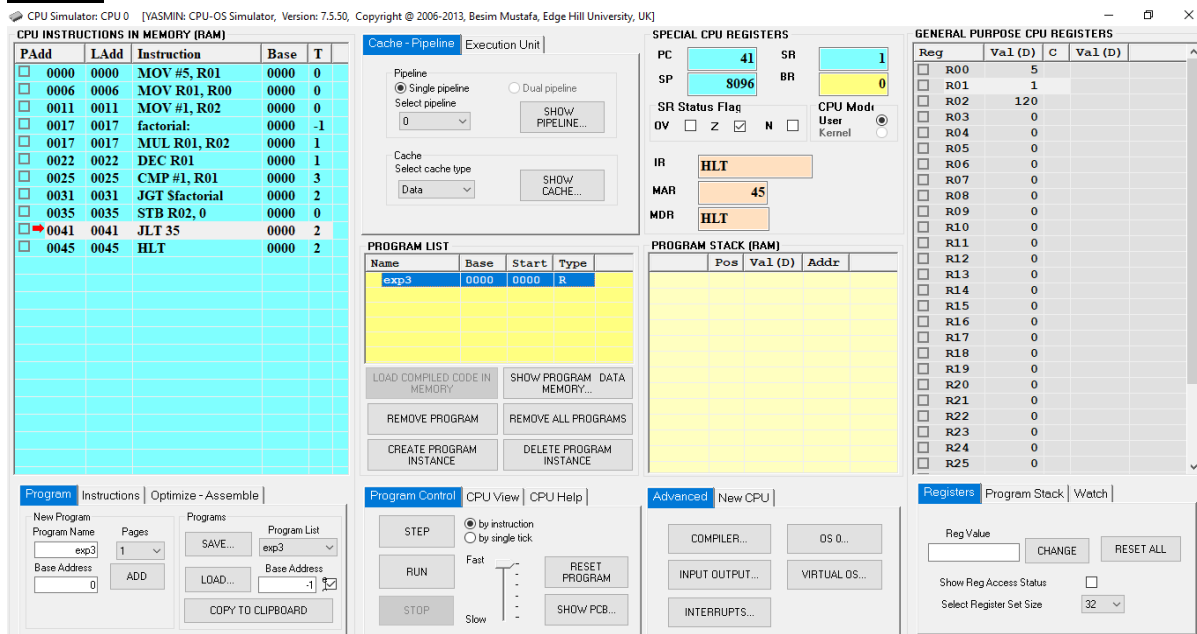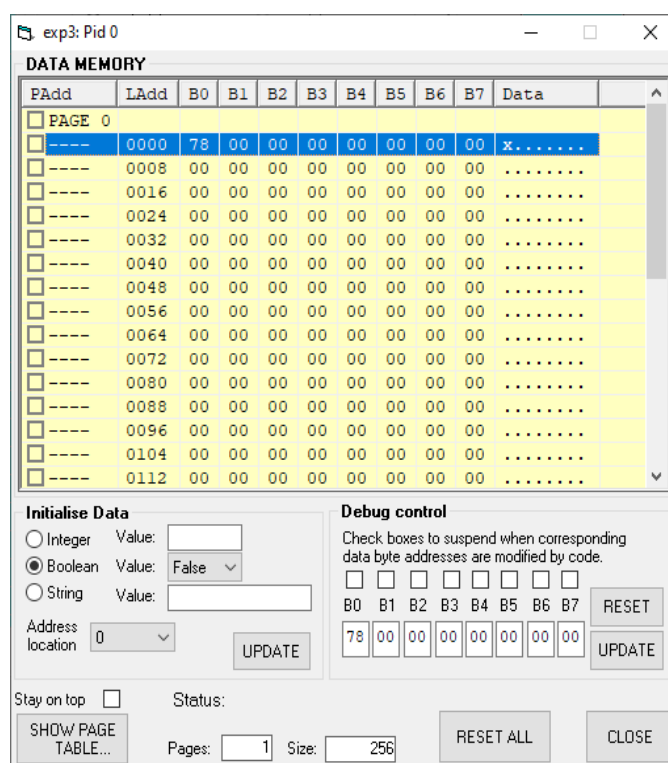**DEC R01** *;Decrement register R01 value by 1*

CMP #1, R01 *;Compare register R01 value by 1*

JGT $factorial *;If register R01 value is greater than 1, jump to the 'factorial' label*

STB R02, 0 *;Store register R02 value in memory location 0*

JLT 35 *;If register R01 value is less than or equal to 1, jump to the statement of Padd 35*

HLT *;Stop the simulator*

Result:

Fig. 1: CPU Simulator Window

Fig. 2: Data Memory Window