

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 the 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 'factorial' label
- Step 10:** If the Register R1 is lower than or equal 1, store the resultant factorial value in 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, R02 //Multiply registers R01 to R02 and store the resultant value in
register R02

DEC R01 // Decrement register R01 value by 1

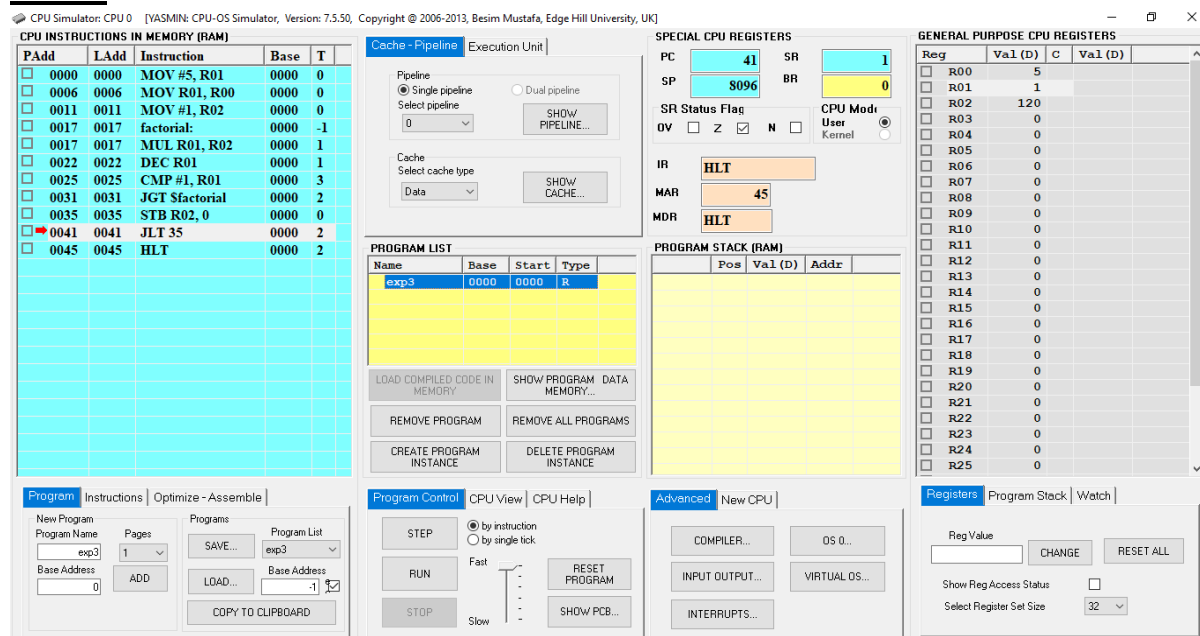
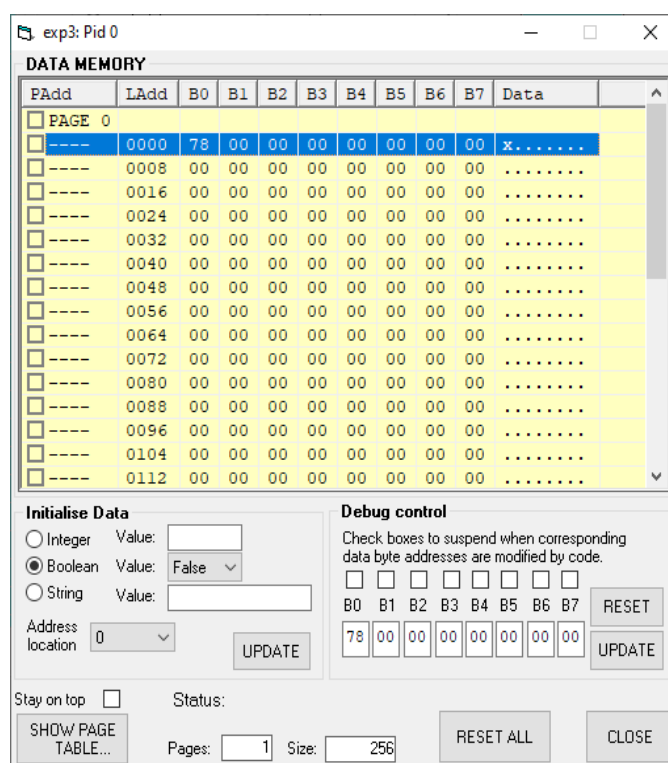
CMP #1, R01 //Compare register R01 value by 1

JGT $factorial // If register R01 value is greater than 1, jump to '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 statement of Padd 35

HLT //Stop the simulator
```

Result:**Fig. 1: CPU Simulator Window****Fig. 2: Data Memory Window**