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School of Electronics Engineering ,VIT, Vellore

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Student Name	ARPIT PATAWAT		
Course Code	ECE3003	**Slot & Semester**	L35+L36 FALL -- 2021-22
Course Name	Microcontroller and its applications		
Program Title	TASK 2 (DATA TRANSFER PROGRAMS)		
Date of Exp.	26-08-2021	**Date of Submission**	30-08-2021
Faculty	A.Karthikeyan		

Question

1. Write a program to transfer a string of data from code space

   starting at address 200H to RAM locations starting at 40H. The data is as shown below:

   0200H:DB "REGISTER NUMBER" EX:19BEC0047

   Using the simulator, single-step through the
   program and examine the data transfer and registers.

2. Add the following subroutine to the program 1, single-step through the subroutine and examine the RAM locations. After data has been transferred from ROM space into RAM, the subroutine should copy the data from RAM locations starting at 40H to RAM locations starting at 60H.

TASK 1) -

Aim: To write an 8051 ALP to perform string data transfer from ROM location 200H to RAM location 40H using Keil software and to verify the result manually.

Tools Required: Keil Micro vision Software

Algorithm:

1.first define the string data using DB command

2.move data pointer at that location

3.assign a register variable whose value equals to number of characters in our data

4.copy the content at the address location of data pointer and save it into accumulator

5.copy the content from accumulator and save it into register pointer 40H location

6.increment the register and data pointer until each character is moved

Program:

Label	Mnemonics	Operands	addressing mode used	Machine cycle Required	Memory Byte Required	Type of Instruction	Comments	Flags getting affected by the Instruction.
	ORG	0000h					Assembler directive defining starting of programme	NONE
	MOV	A, #00H	Immediate	1	2	Data Transfer	Clear A	NONE
	MOV	DPTR, #200H	Immediate	2	3	Data Transfer	Move data pointer at the RAM 200th location	NONE
	MOV	R1, #09H	Immediate	1	2	Data Transfer	Load 9 (which is total number of characters) to R1	NONE

	MOV	R0, #40H	Immediate	1	2	Data Transfer	Load 40 to R0	NONE
LOOP	CLR	A	Immediate	1	2	Boolean	Starting of loop and clear the accumulator content	NONE
	MOVC	A, @A+DPTR	Indexed	2	1	Data Transfer	Move the content at the address location of DPTR to accumulator	PARITY= 1
	MOV	@R0, A	Indirect	1	1	Data Transfer	Mov content from accumulator to the address location of R0	NONE
	INC	DPTR	Register	2	1	Arithmetic	Increment DPTR	NONE
	INC	R0	Register	1	1	Arithmetic	Increment R0	NONE
	DJNZ	R1, LOOP	Register	2	2	Program Branching	Decrement R1 and go to LOOP until R1 is non zero	NONE
HERE	SJMP	HERE	Indexed	2	2	Program Branching	To transfer control	NONE
	ORG	200h					Defining 200^{th}	NONE

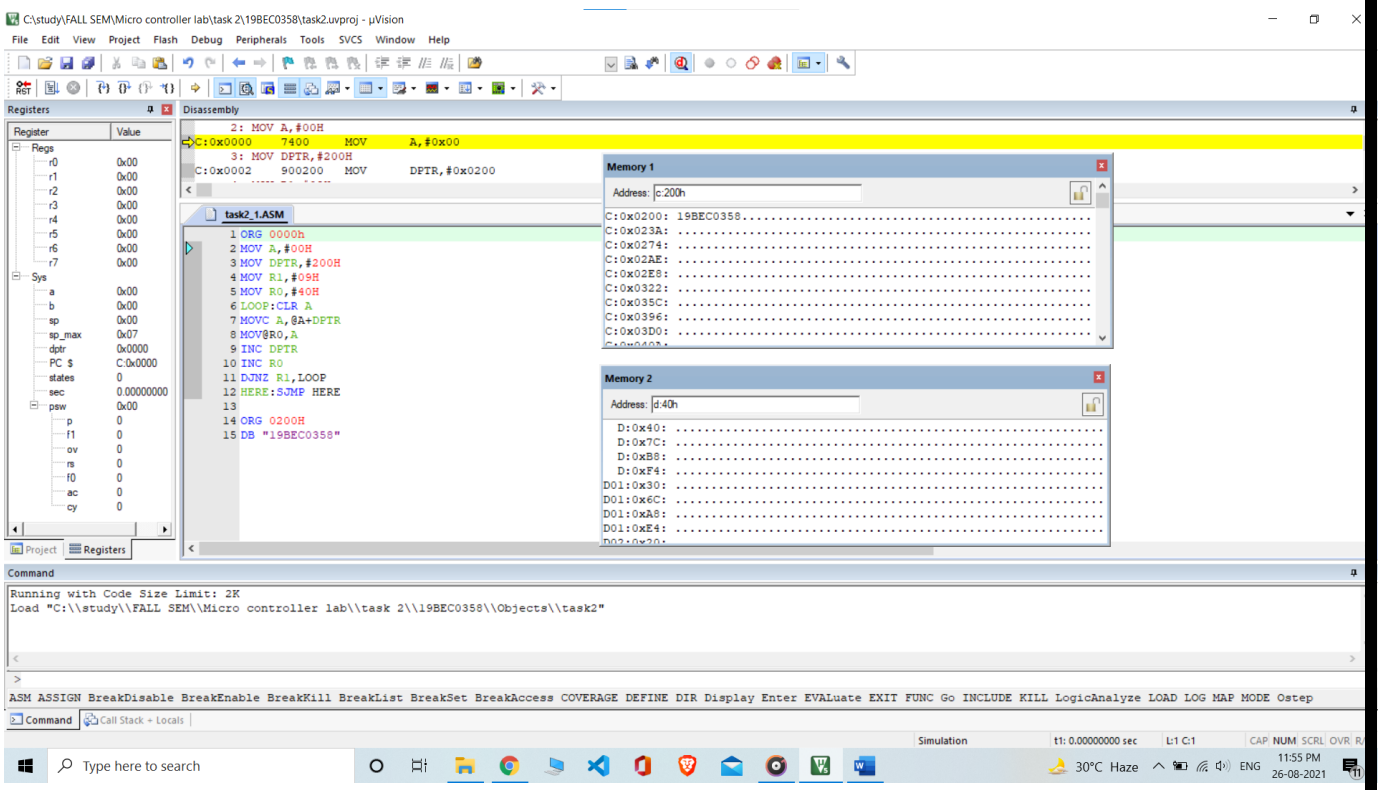
							location	
	DB	“19BEC 0358”					Defining our string data	NONE

Output: Registers containing the Result: R0 = 49, A = 38, DPTR = 209, also the address location 40H

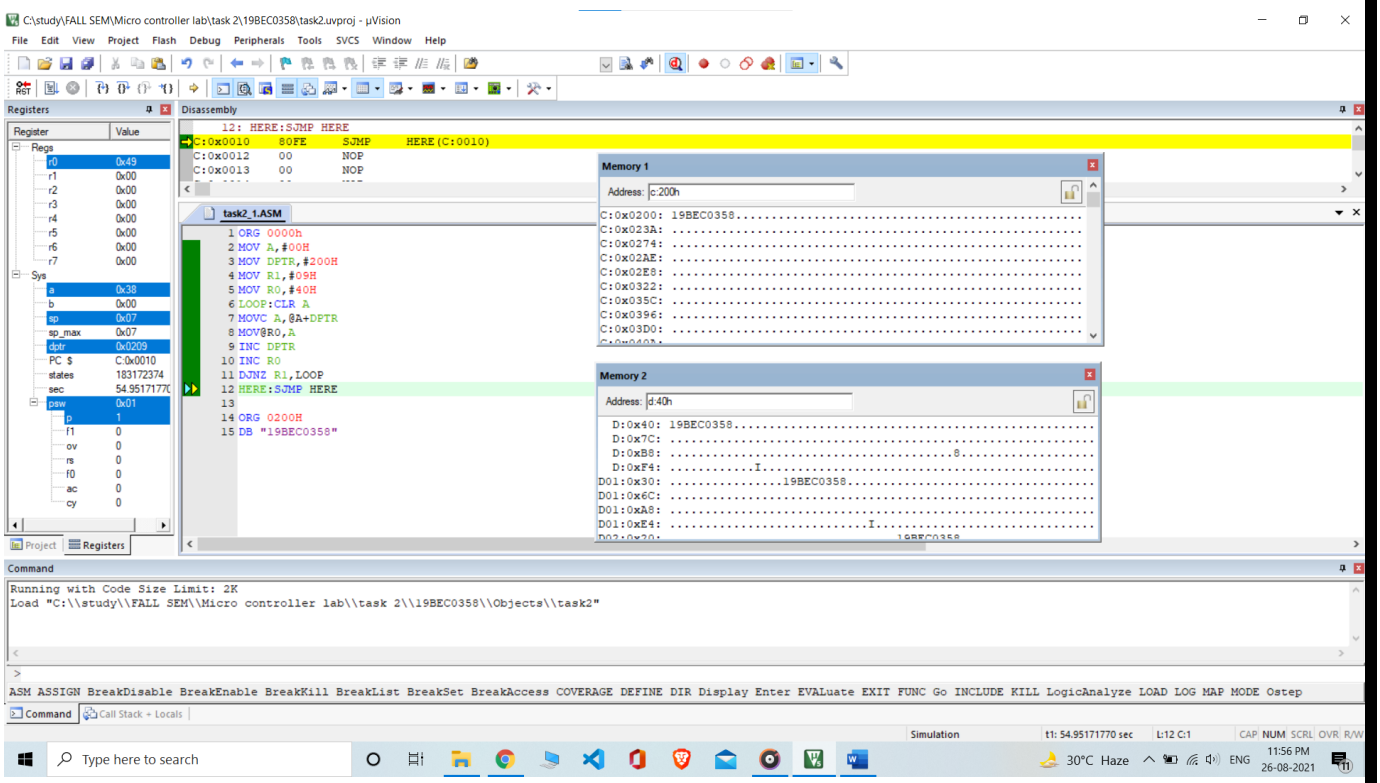
Manual Calculation: None

Results and Observations

Program and registers before execution:



Program and registers after execution: FINAL STEP



Inferences:

1. About PSW VALUES – only parity flag changes and its final value is 1

2. ABOUT THE OUTPUT VALUES IN REGISTERS – result is stored at the address of R0 and it is also incremented for each byte of data transfer, R0 = 49

Result:

The 8051 ALP to perform String data transfer is executed using Keil Software and the results are verified manually.

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TASK 2) -

Aim To write an 8051 ALP to perform string data transfer from ROM location 200H to RAM location 40H and then to location 60H using Keil software and to verify the result manually.

Tools Required: Keil Micro vision Software

Algorithm:

1.first define the string data using DB command

2.move data pointer at that location

3.assign a register variable whose value equals to number of characters in our data

4.copy the content at the address location of data pointer and save it into accumulator

5.copy the content from accumulator and save it into register pointer 40H location

6.increment the register and data pointer until each character is moved.

7. using same loop as above, copy content from 40H to 60H location.

Program:

Label	Mnemonics	Operands	addressing mode used	Machine cycle Required	Memory Byte Required	Type of Instruction	Comments	Flags getting affected by the Instruction.
	ORG	0000h					Assembler directive defining starting of programme	NONE
	MOV	DPTR, #200H	Immediate	2	3	Data Transfer	Move data pointer at the RAM 200^{th} location	NONE
	MOV	R0, #40H	Immediate	1	2	Data Transfer	Load 40 to R0	NONE
	MOV	R1, #09H	Immediate	1	2	Data Transfer	Load 9 (which is total number of characters	NONE

							) to R1	
LOOP	CLR	A	Immediate	1	2	Boolean	Starting of loop and clear the accumulator content	NONE
	MOVC	A, @A+DPTR	Indexed	2	1	Data Transfer	Move the content at the address location of DPTR to accumulator	PARITY=1
	MOV	@R0, A	Indirect	1	1	Data Transfer	Mov content from accumulator to the address location of R0	NONE
	INC	R0	Register	1	1	Arithmetic	Increment R0	NONE
	INC	DPTR	Register	2	1	Arithmetic	Increment DPTR	NONE
	DJNZ	R1, LOOP	Register	2	2	Program Branching	Decrement R1 and go to LOOP until R1 is non zero	NONE
	MOV	R0, #40H	Immediate	1	2	Data Transfer	Load 40 to R0	NONE
	MOV	R1, #60H	Immediate	1	2	Data Transfer	Load 60 to R1	NONE
	MOV	R3, #09H	Immediate	1	2	Data Transfer	Load 09 to R3	NONE

LOOP 2	CLR	A	Immediate	1	2	Boolean	Starting of loop and clear the accumulator content	NONE
	MOV	A, @R0	Indirect	1	1	Data Transfer	Copy the content from the address location of R0 to accumulator A	PARITY =0
	MOV	@R1, A	Indirect	1	1	Data Transfer	Move content from accumulator to the address location of R1	NONE
	INC	R0	Register	1	1	Arithmetic	Increment R0	NONE
	INC	R1	Register	1	1	Arithmetic	Increment R1	NONE
	DJNZ	R3, LOOP2	Register	2	2	Program Branching	Decrement R3 and go to LOOP 2 until R3 is non zero	NONE
HERE	SJMP	HERE	Indexed	2	2	Program Branching	To transfer control	NONE
	ORG	200h					Defining 200^{th} location	NONE
	DB	“19BEC					Defining our string	NONE

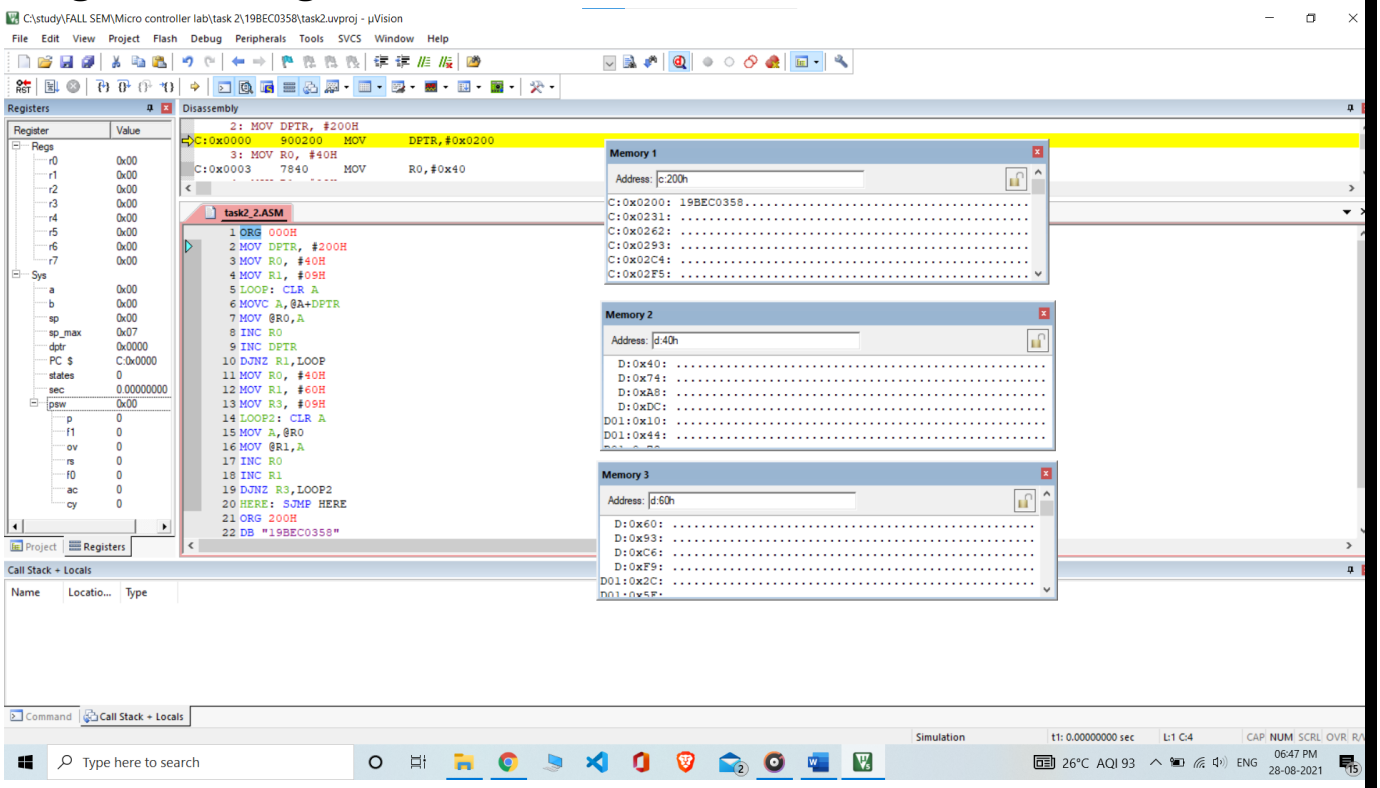
		0358”					data	

Output: Registers containing the Result: R0 = 49, R1= 69, A = 38, DPTR = 209, also, the address location 40H and 60H.

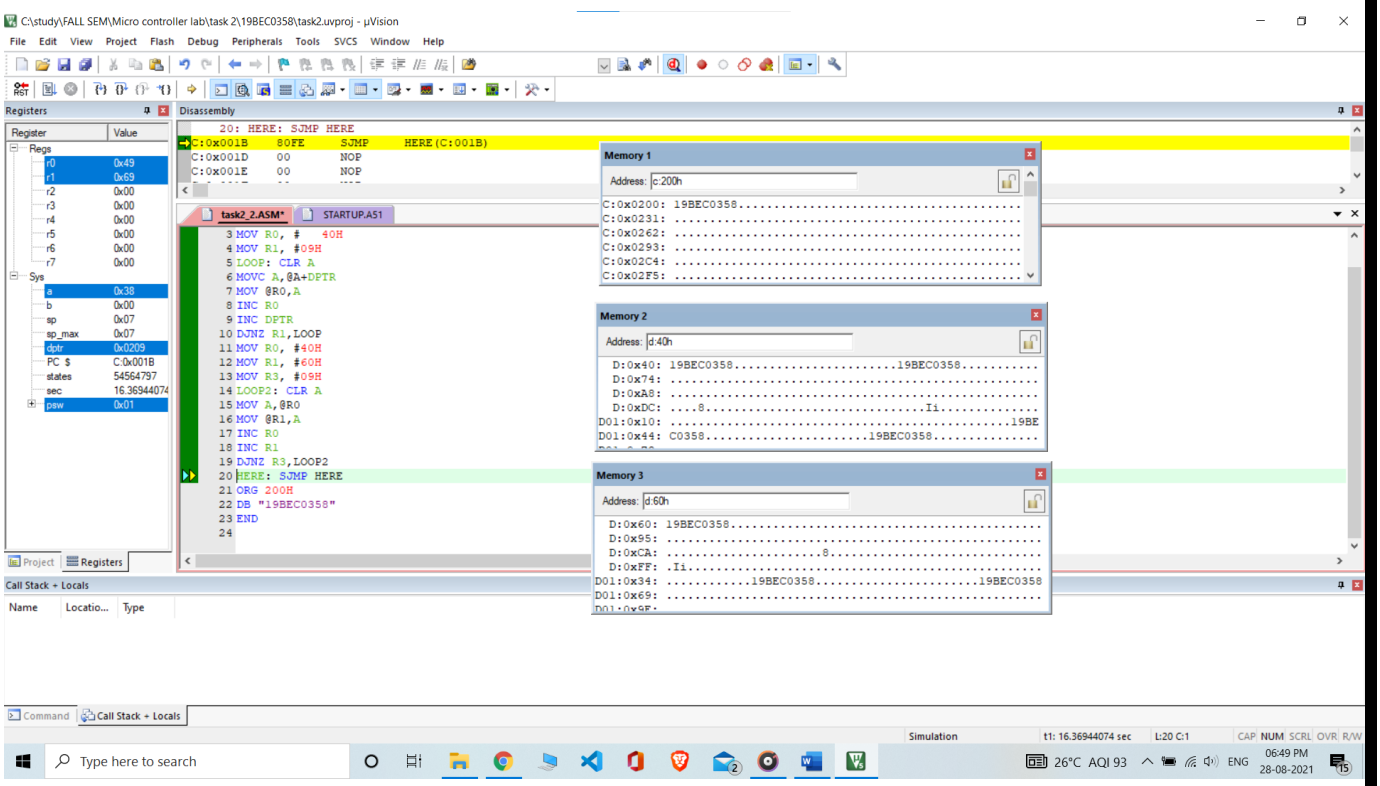
Manual Calculation: None

Results and Observations

Program and registers before execution:



Program and registers after execution: FINAL STEP



Inferences:

1. About PSW VALUES – only parity flag changes and its final value is 1

2. ABOUT THE OUTPUT VALUES IN REGISTERS – result is stored at the address of R0, R1 and these also incremented for each byte of data transfer, R0 = 49, R1 =69

Result:

The 8051 ALP to perform String data transfer is executed using Keil Software and the results are verified manually.

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