Lab 3

Ex.No.3.Program to demonstrate decision making and looping operation.

3.1 Introduction:

The purpose of this experiment is to learn about the general purpose registers, instruction sets, addressing modes and logical operators of 8086 by sorting the sequence of numbers from the array stored in a memory location into ascending and descending series.

3.2 Hardware Requirement:

The 8086 Microprocessor kit, Power Supply.

3.3 Program Logic:

To arrange the given numbers in ascending and descending order, the bubble sorting method is used. Initially the first number of the series is compared with the second one. If the first number is greater than second, exchange their positions in the series otherwise leave the position unchanged. Then compare the second number in the recent form of the series with third and repeat the exchange part that you are carried out for the first and second number, and for all the remaining number of the series. Repeat this procedure for complete series (n-1) times. After n-1 iterations you will get the largest number at the end of the series. Again, start from the first number of the series. Repeat the same procedure right from the first element to the last element. After n-2 iteration you will get the second highest number at the last but one place in the series. Repeat this till the complete series is arranged in ascending order.

3.4 Program:

Introduction of general-purpose registers, logical operators, indirect addressing, and loop instructions, compare instruction, exchange instruction, increment & decrement instruction:

Ascending order:

ADDRESS	LABEL	MNEMONICS	OPCODE	COMMENTS
		MOV SI, 1200H		
		MOV CL, [SI]		
		DEC CL		
	LOOP3	MOV SI, 1200H		
		MOV CH, [SI]		
		DEC CH		
		INC SI		
	LOOP2	MOV AL, [SI]		
		INC SI		
		CMP AL, [SI]		
		JC LOOP1		

		XCHG AL, [SI]		
		XCHG [SI-1], AL		
	LOOP1	DEC CH		
		JNZ LOOP2		
		DEC CL		
		JNZ LOOP3		
		HLT		

Descending order:

ADDRESS	LABEL	MNEMONICS	OPCODE	COMMENTS
		MOV SI, 1200H		
		MOV CL, [SI]		
		DEC CL		
	LOOP3	MOV SI,1200H		
		MOV CH, [SI]		
		DEC CH		
		INC SI		
	LOOP2	MOV AL, [SI]		
		INC SI		
		CMP AL, [SI]		
		JNC LOOP1		
		XCHG AL, [SI]		
		XCHG [SI-1], AL		
	LOOP1	DEC CH		
		JNZ LOOP2		
		DEC CL		
		JNZ LOOP3		
		HLT		

3.5 Pre-Lab Questions:

1. What are the flags modified while executing XCHG instruction?
2. List the addressing modes used in this program.
3. What is the purpose of AAA instruction?
4. List the type of jump instruction that are used in this program.

3.6 Post-Lab Questions:

1. Write an ALP to sort the given array of 16-bit numbers in ascending and descending order using 8086 microprocessor.
2. Simulate the programs using emulator 8086.

Result: