The String Instructions

Overview

- A memory string or string is an array of bytes or words.

- We will see instructions to:
    - Copy a string into another string
    - Search a string for a particular byte or word
    - Store characters in a string
    - Compare strings of characters alphabetically

The Direction Flag

- The direction flag (DF) is a control flag. The control flags are used to control the processor's operations.

- The direction flag (DF) determines the direction in which string operations will proceed.

- These operation are implemented using two index registers: SI and DI.

The Direction Flag

- String1 db 'abcd$'
- Offset   ASCII character

  0200h   a

  0201h   b

  0202h   c

- If DF=0, SI and DI proceed in the direction of increasing memory addresses from left to right across the string. Conversely, if DF=1, SI and DI will proceed in the direction of decreasing memory addresses from right to left.

CLD and STD

- To make DF=0, use the CLD instruction
- CLD   ; clear direction flag
- To make DF=1, use the STD instruction
- STD   ; set direction flag

Moving a String

- MOVSB
- Copies the contents of the byte addressed by DS:SI to the byte addressed by ES:DI. The contents of the source byte are unchanged.
- After the byte has been moved, both SI and DI are automatically incremented if DF=0, or decremented if DF=1.
- Permits memory to memory operation

Moving a String

.Data
String1 DB 'HELLO$'
String2 DB 5 dup (?)
.Code
MOV AX, @Data
MOV DS, AX
MOV ES, AX
LEA SI, String1
LEA DI, String2
CLD
MOVSB ;   String2
MOVSB :   String2

Before MOVSB					
	SI ↓				
String1	'H'	'E'	'L'	'L'	'O'
	DI ↓				
String2	↓				
After MOVSB					
	SI				
String1	'H'	'E'	'L'	'L'	'O'
		DI ↓			
String2	'H'				

The REP Prefix

- MOVSB moves only a single byte from the source string to the destination string. To move the entire string, first initialize CX to the number N of bytes in the source string and execute

REP MOVSB

- The REP prefix causes MOVSB to be executed N times. After each MOVSB, CX is decremented until it becomes 0.

The REP Prefix

- To copy string1 to string2 we execute:

   CLD

   LEA SI, String1

   LEA DI, String2

   MOV CX,6 ; Number of characters in String1

   REP MOVSB

Thanks……