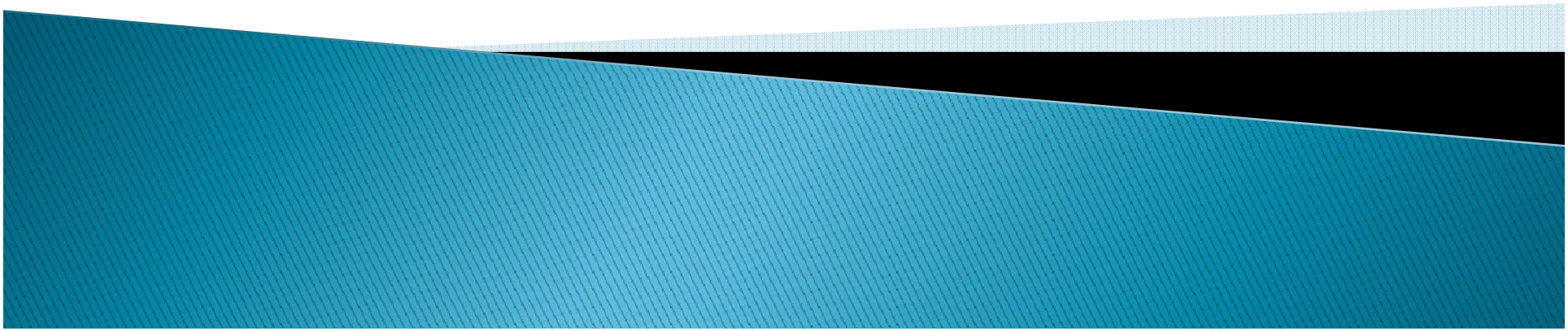
Looping Structure

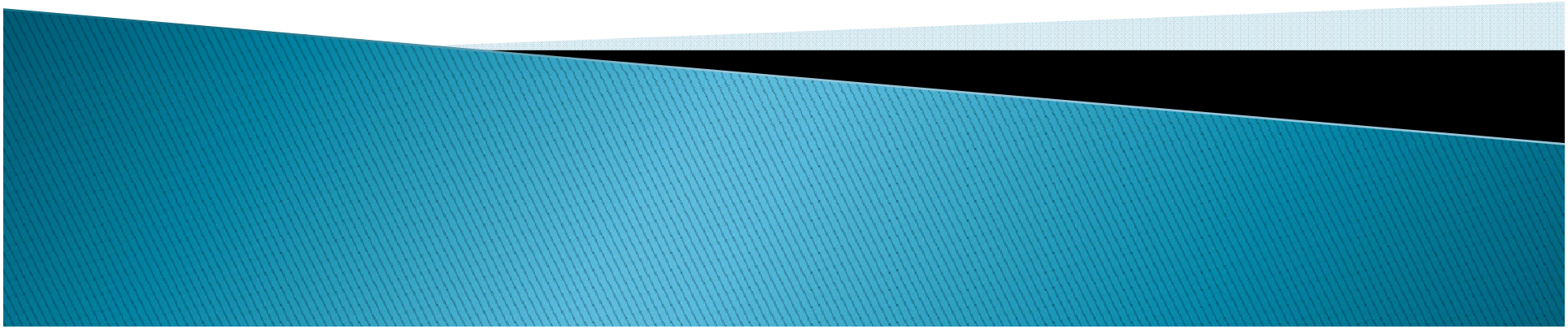
Reference: Assembly Language Programming and Organization of the IBM PC – Charles Marut – Chapter 6



Looping structure:

A loop is sequence of instructions that is repeated . The number of times to repeat may be known in advance, or it depend on condition. There are three types of loop. And they are:

1.For loop
2.While loop
3. Repeat



For loop

This is a loop structure in which the loop statements are repeated a number of times (a count controlled loop). In pseudo code,

For loop_ count times Do

Statements

END-FOR

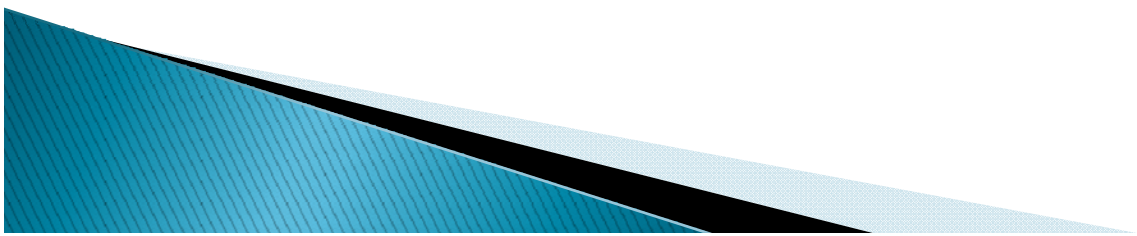
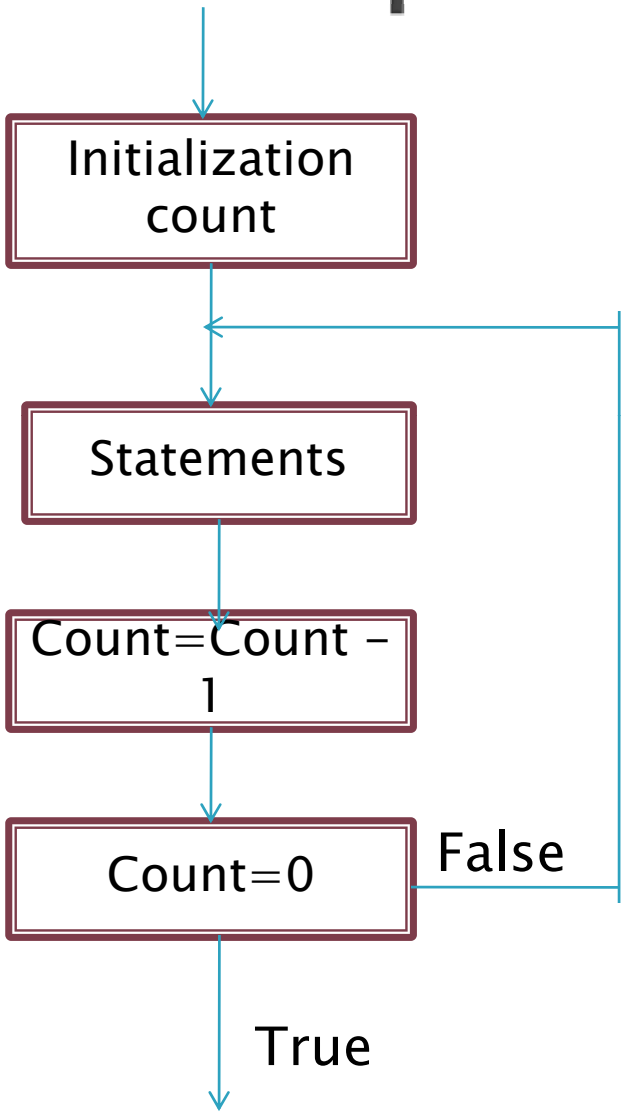


Figure of for loop



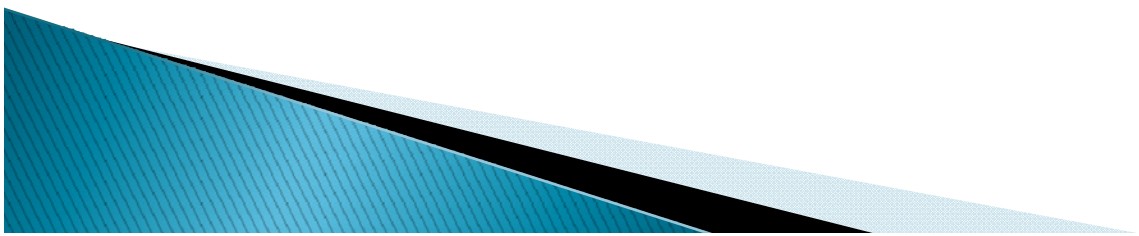
Example

* Write a count-controlled loop to display a row of 80 stars.

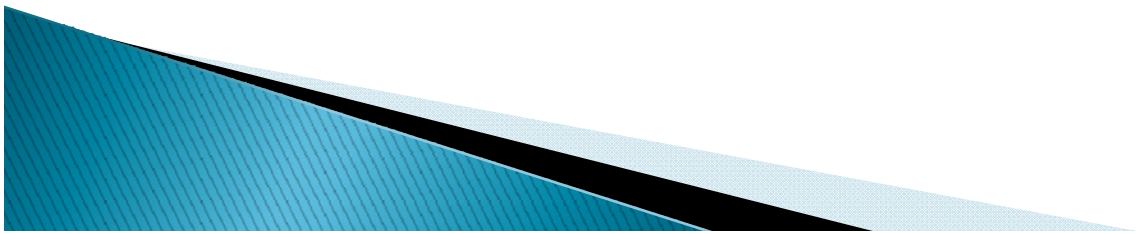
```
For 80 times Do
        display '*'
END_FOR
```

Code: -

```
        MOV    CX, 80      ;number of stars to display
        MOV    AH,2        ; display character function
        MOV    DL, '*'     ; character to display
TOP:
        INT    21h         ;display a star
        LOOP   TOP         ; repeat 80 times
```



The counter for the loop is the register CX which is initialized to loop _ count . Execution of the LOOP instruction causes CX to be decrement automatically, and if CX is not 0, control transfer s to destination_ label. Must precede the LOOP instruction by no more than 126 bytes.



While loop

This loop depends on a condition. In Pseudocode,

WHILE condition DO

Statements

END_WHILE

The condition is checked at the top of the loop. If true, the statements are executed; if false, the program goes on to whatever follows. It is possible that the condition will be false initially , in which case the loop body is not executed at all. The loop executes as long as the condition is true.

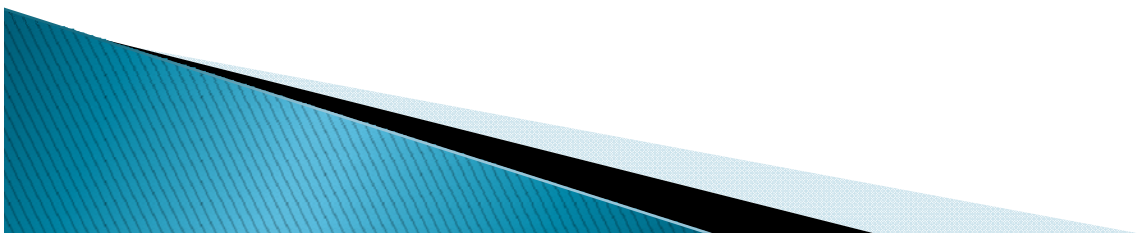
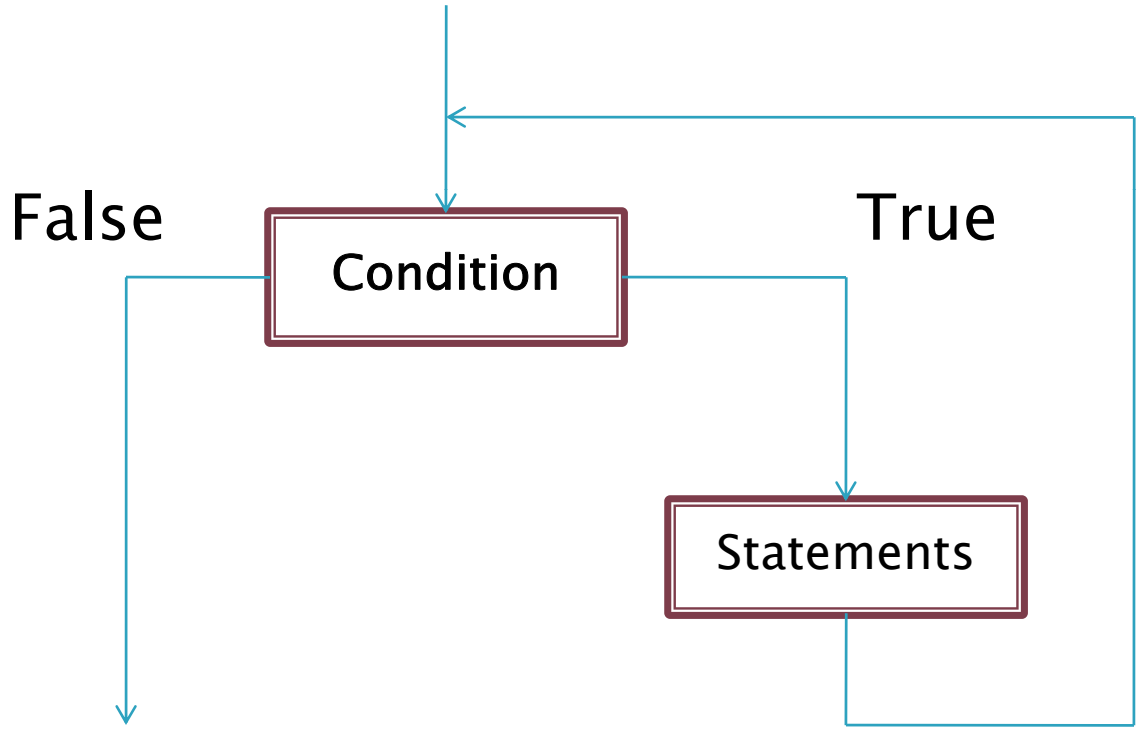


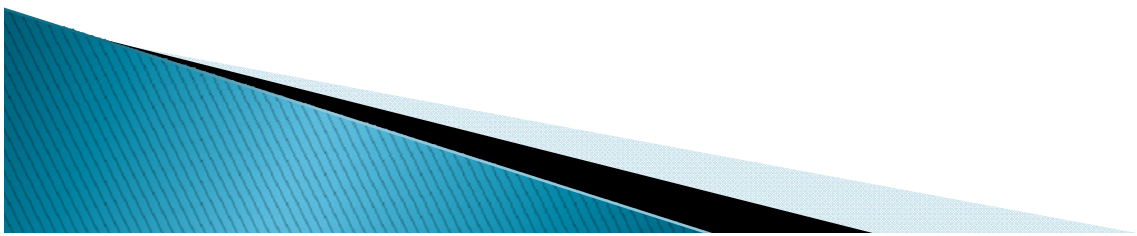
Figure of While loop:



Example

*Write some code to count the number of characters in an input line.

```
Code:    MOV    DX, 0        ; DX count characters
         MOV    AH, 1        ; prepare to read
         INT    21H          ; character in AL
WHILE_:
         CMP    AL,0DH             ;CR?
         JE     END_WHILE          ; yes , exit
         INC    DX                  ; not  CR, increment count
         INT    21H                 ; read a character
         JMP    WHILE _             ; loop back
END _WHILE:
```



Repeat loop

Another loop is the REPEAT LOOP. In a REPEAT……..UNTIL loop, the statement are executed, and then the condition is checked. If true, the loop terminates; if false, control branches to the top of the loop.

In pseudocode,

REPEAT
statement
UNTIL condition

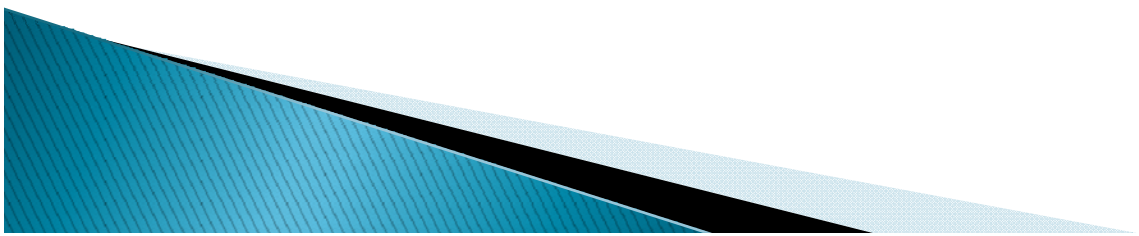
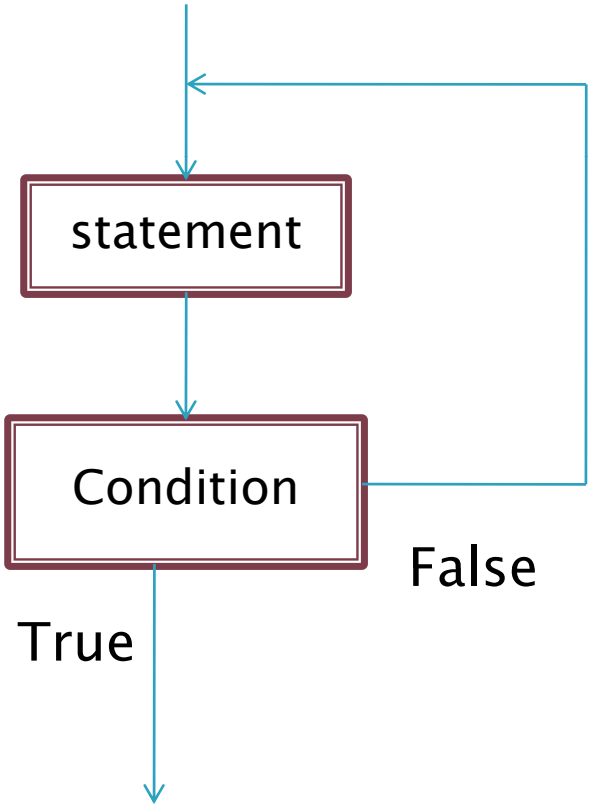


Figure of REPEAT LOOP:



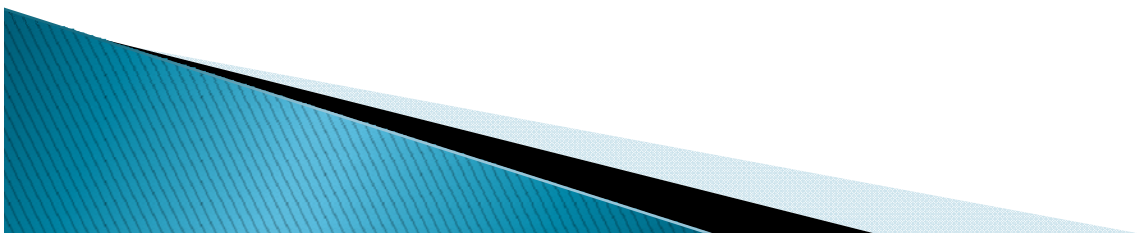
Example

*Write some code to read characters until a blank is read.

Code:

```
            MOV    AH,1          ; prepare to  read

REPEAT:
             INT   21H            ;char in AL
;until
            CMP   AL,   ‘   ‘     ; a blank?
            JNE    REPEAT        ; no keep reading
```



Thanks to all