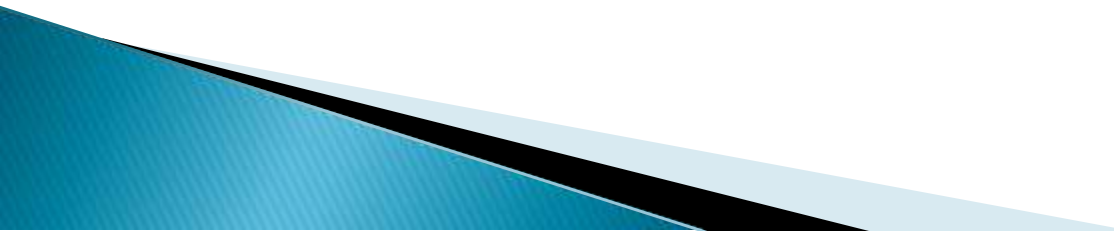



# ***Computer Organization and Assembly Language***

## ***Loops and Arrays***

# Loops in Assembly language




# Loop

- ▶ Loop is the process of repetition of the certain steps until the given condition becomes false.
  - ▶ They remain continue until the condition remains satisfied.
  - ▶ There are three types of loops in C++ or java. These are:
    - while loop,
    - Do while loop
    - For loop.
- 

# LOOP instruction

- ▶ Loop decrease CX, jump to *label* if CX not zero.
- ▶ It must have a label for jumping
- ▶ Algorithm:
  - $CX = CX - 1$
  - if  $CX \neq 0$  then
    - jump
  - else
    - no jump, continue

# Loop Example

- ▶ include 'emu8086.inc'
  - ▶ ORG 100h
  - ▶ MOV CX, 5
  - ▶ label1:
  - ▶ PRINTN 'loop!'
  - ▶ LOOP label1
  - ▶ RET
- 

# Arrays

# Arrays

- ▶ Arrays can be seen as chains of variables.
- ▶ Each character is presented as an ASCII code value (0..255).
- ▶ Here are some array definition examples:
  - arr DB 48, 65, 6,7
  - arr1 DB 'Hello'
  - arr2 db 23h,45h,56h
- ▶ Or
  - arr dw 260,270,280

# Arrays....

- ▶ You can access the value of any element in array using square brackets, for example:
  - `MOV AL, a[3]`
- ▶ You can also use any of the memory index registers **BX, SI, DI, BP**,
- ▶ for example:
  - `MOV SI, 3`
  - `MOV AL, a[SI]`.



# DUP operator

- ▶ If you need to declare a large array you can use **DUP** operator.
- ▶ The syntax for **DUP**:
  - *number* **DUP** ( *value(s)* )
  - **number** - number of duplicate to make (any constant value).
  - **value** - expression that DUP will duplicate.
- ▶ for example:
- ▶ arr DB 5 **DUP**(9)
- ▶ is an alternative way of declaring:
- ▶ c DB 9, 9, 9, 9, 9

# Array Example 1

accessing an array

- ▶ Include 'emu8086.inc'
- ▶ org 100h
  
- ▶ mov dl,arr[1]
- ▶ mov ah,2
- ▶ int 21h
- ▶ Ret
- ▶ arr db 65,66,78

# Array Example 2

## Printing complete array

- ▶ org 100h
  
- ▶ mov cx,8
- ▶ mov bp,0
  - label:
    - mov dl,arr[bp]
    - mov ah,2
    - int 21h
    - inc bp
  - loop label
  
- ▶ ret
- ▶ arr db 'pakistan'