



**RIPHAH**  
INTERNATIONAL UNIVERSITY

# **Computer Organization & AL (Lab)**

## **Task 4**

**Name:** Abubakar Awan

**SAPID:** 54257

**Semester:** 3rd

**Q1: Write assembly code to take user input from range of 0 to 9. Your code check if the number is even or odd. If it is even, the message "the given number is even" will be displayed and in case of odd "the given number is odd" will be displayed.**

```
.MODEL SMALL
```

```
.STACK 100h
```

```
.DATA
```

```
input_prompt db 'Enter a number between 1 and 9: $' even_msg db
```

```
'The number is even. $'
```

```
odd_msg db 'The number is odd. $'
```

```
error_msg db 'Invalid input. Please enter a number between 1 and 9. $'
```

```
.CODE
```

```
MAINPROC
```

```
mov ax, @DATA
```

```
mov DS, AX
```

```
; Display message asking for input
```

```
mov AH, 09h
```

LEADX,input\_prompt int

21h

;Read a character from user mov

AH, 01h

int 21h

SUBAL,'0'

;Check if input is within valid range (1 to 9) CMP AL,

1

JL invalid\_input ;If less than 1, jump to invalid input

CMP AL, 9

JG invalid\_input ;If greater than 9, jump to invalid input

; Check if the number is even or odd mov

AH, 0 ;Clear AH for division

mov BL, 2 ;We will divide the number by 2

DIV BL

CMP AH, 0 ;Check if remainder is 0

JE even\_number ;If remainder is 0, it's even

JMP odd\_number ; If not, it's odd

even\_number:

;Display"Thenumberiseven" mov

AH, 09h

LEADX,even\_msg

int 21h

JMPend\_program

odd\_number:

;Display"Thenumberisodd"

mov AH, 09h

LEADX,odd\_msg

int 21h

JMPend\_program

invalid\_input:

;Displayerrormessage

mov AH, 09h

LEADX,error\_msg

int 21h

end\_program:

;Exitprogram

```
mov AH, 4Ch  
int  
21h  
MAINENDP  
  
END MAIN
```

**Q2: Write assembly code to display the numbers in the following pattern. Use nested loop. You can initialize value by yourself or take starting number as user input**

**1234**

**5678**

```
.MODEL SMALL  
.STACK 100h  
  
.DATA  
    newlinedb 0Dh, 0Ah, '$'  
  
.CODE  
MAINPROC  
    mov ax, @DATA  
    mov ds, ax
```

```
;Initializestartingnumber
```

```
movcx,1          ;Startwithnumber1
```

```
outer_loop:
```

```
;Innerlooptoprint4numbersinarow mov
```

```
bx, 4            ; 4 numbers per row
```

```
inner_loop:
```

```
;ConvertthenumberinCXtoASCII
```

```
mov ax, cx       ;MovecurrentnumberintoAX
```

```
add al, '0'
```

```
;Printthenumber
```

```
mov ah, 02h
```

```
movdl,al
```

```
int 21h
```

```
;Incrementthenumber
```

```
inc cx
```

```
;Decrementtheinnerloopcounter dec
```

```
bx
```

```
jnzinner_loop      ;Repeatuntil4numbersareprinted
```

```
;Printnewline
```

```
mov ah, 09h
```

```
leadx,newline
```

```
int 21h
```

```
;Decrementouterloopcounter cmp
```

```
cx, 9
```

```
jlouter_loop
```

```
;Exitprogram
```

```
mov ah, 4Ch
```

```
int 21h
```

```
MAINENDP
```

```
END MAIN
```

**Q3:Initializeanarrayofcharactersfromatoh.Thenuse conditional statement to find the character in array. If it exists display message the character is found else the character is not found.**

.MODEL SMALL

.STACK 100h

.DATA

char\_array db 'abcdefgh\$' ; Array of characters from a to h

input\_prompt db 'Enter a character to search: \$'

found\_msg db 'Character found.\$'

not\_found\_msg db 'Character not found.\$' newline

db 0Dh, 0Ah, '\$'

.CODE

MAINPROC

mov ax, @DATA

mov ds, ax

; Display the message asking for input mov

ah, 09h

leax, input\_prompt

int

; Read a single character from the user mov

ah, 01h



int21h

movbl, al ;Storetheinputcharacterin BL

leasi,char\_array

movcx,8 ;Arraylengthis8 characters

search\_loop:

mov al, [si] ;Loadthecurrentcharacterfromthearray

cmp al, bl ; Compare it with the user input

jefound ;Ifequal,jumptofoundlabel

;Movetothenextcharacterinthearray inc si

loopsearch\_loop ;Repeatuntilallcharactersarechecked

not\_found:

;Display"Characternotfound"message

mov ah, 09h

leadx,not\_found\_msg

int 21h

jmpend\_program ;Exitprogram

found:

```
;Display"Characterfound"message mov  
ah, 09h  
leadx,found_msg  
int 21h
```

end\_program:

```
;Newlineforoutputformatting mov  
ah, 09h  
leadx,newline  
int 21h
```

```
;Exitprogram  
mov ah, 4Ch  
int 21h
```

MAINENDP

END MAIN

**Q4: Write assembly code to display the following pattern. Use nested loop.**

\*

\*\*

\*\*\*

\*\*\*\*

\*\*\*\*\*

.MODEL SMALL

.STACK 100h

.DATA

stardb '\*'

newlinedb 0Dh, 0Ah, '\$'; Newline characters

.CODE

MAINPROC

mov ax, @DATA

mov ds, ax

; Outer loop for rows

```
movcx,1      ;Startfrom1star
```

```
outer_loop:
```

```
; Inner loop to print stars in each row
```

```
mov bx, cx    ;CopyrownumberttoBX
```

```
inner_loop:
```

```
;Displaythestarcharacter mov
```

```
ah, 02h
```

```
movdl,star int
```

```
21h
```

```
;DecrementBX dec
```

```
bx
```

```
jnzinner_loop ;IfBXisnotzero,printanotherstar
```

```
;Printnewlineafterfinishingarow mov
```

```
ah, 09h
```

```
leadx,newline
```

```
int21h      ;Printnew line
```

```
;IncrementCXforthenextrow
```

```
inc cx
cmpcx,6
jlouter_loop    ;Jumpbacktoouter_loopifCXislessthan6
;
Exitprogram
mov ah, 4Ch
int 21h
MAINENDP
END MAIN
```