# Rajshahi University of Engineering & Technology

Course No.: CSE 3110
Course Title: Sessional Based on CSE 3109

Submitted To:

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Problem No: 3

Problem Description:

Write a program to insert a binary number and find out whether the number is even or odd.

Theory:

Registers used:

i) Accumulator (AX): For arithmetic and logical instructions.
ii) Base (BX): To hold the address of data. Here at most 16 bits can be given as input.
iii) Data (DX): To hold data for output.
iv) Data Segment (DS): To point data segment of the memory where the data is stored.

Instructions used:

i) MOV
ii) AND
iii) OR
iv) CMP
v) SHL
vi) TEST

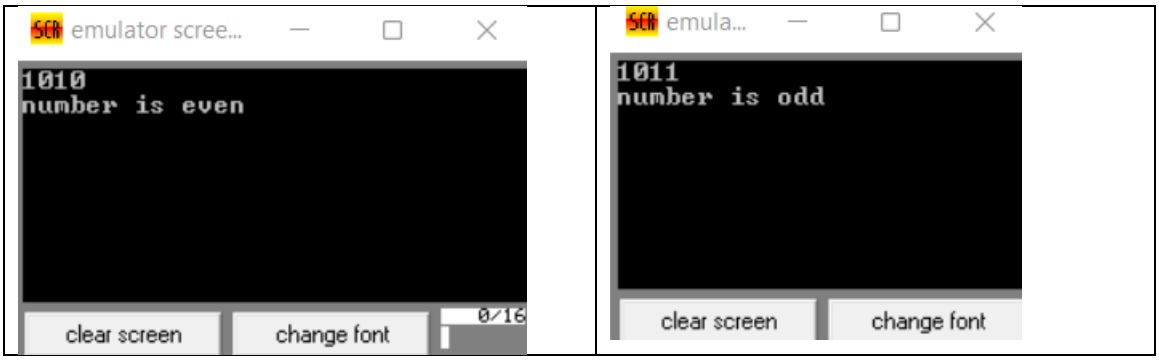
SHL means ‘Shift Left.’ This instruction shifts bits in the register to the left side one by one by inserting the same number of zeros from the right end.

## Source Code:

```
.MODEL SMALL
.STACK 100H
.CODE
.DATA

M1 DB 'Number is even', '$'
M2 DB 'Number is odd',  '$'

MAIN PROC
 MOV AX, @DATA
 MOV DS, AX

 MOV BX, 0
 MOV AH, 1
 INT 21H

INPUT:
 CMP AL, 0DH
 JE END_INPUT
 AND AL,0FH
 SHL BX, 1
 OR BL,AL
 INT 21H
 JMP INPUT
```

```
END_INPUT:
 MOV AH,2
 MOV DL,0DH
 INT 21H
 MOV DL,0AH
 INT 21H

 TEST BL,1
 JZ EVEN
 MOV DL, OFFSET M2
 MOV AH, 9
 INT 21H
 JMP FINISH

EVEN:
 MOV DL, OFFSET M1
 MOV AH, 9
 INT 21H

FINISH:
 MOV AH,4CH
 INT 21H

 MAIN ENDP
END MAIN
```

## Output:




## Discussion:

SHL was used to shift bits in the register to the left side one by one. BX was shifted left and the right most value is stored in the Carry Flag. After that TEST instruction was used to check the value of the Carry Flag to determine whether the number was even or odd