Experiment 7

Name:Pratik Chavan

Div/Batch:A/A1 Roll No.07

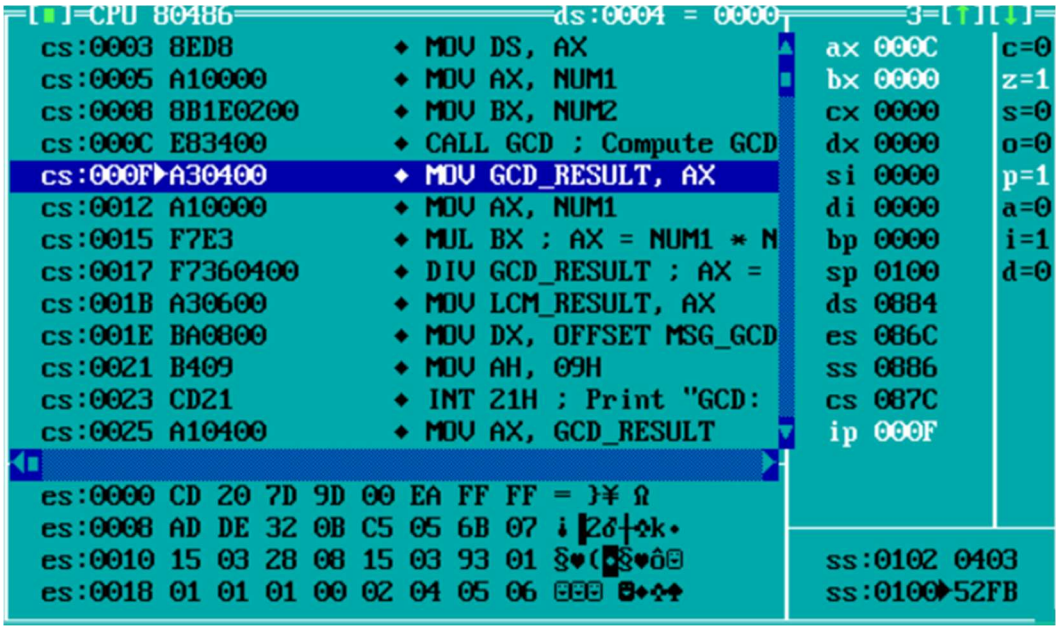
```
.MODEL SMALL
.STACK 100H
.DATA
    NUM1 DW 36       ; First number
    NUM2 DW 24       ; Second number
    GCD_RESULT DW ?   ; Store GCD result
    LCM_RESULT DW ?   ; Store LCM result
    MSG_GCD DB 'GCD: $'
    MSG_LCM DB ' LCM: $'
    NEWLINE DB 0DH, 0AH, '$'  ; New line for output formatting

.CODE
MAIN PROC
    MOV AX, @DATA
    MOV DS, AX

    MOV AX, NUM1
    MOV BX, NUM2
    CALL GCD         ; Compute GCD
    MOV GCD_RESULT, AX

    MOV AX, NUM1
    MUL BX           ; AX = NUM1 * NUM2
```

```
    DIV GCD_RESULT   ; AX = LCM (Product / GCD)
    MOV LCM_RESULT, AX

    MOV DX, OFFSET MSG_GCD
    MOV AH, 09H
    INT 21H         ; Print "GCD: "

    MOV AX, GCD_RESULT
    CALL PRINT_NUM   ; Print GCD

    MOV DX, OFFSET NEWLINE
    MOV AH, 09H
    INT 21H         ; Print new line

    MOV DX, OFFSET MSG_LCM
    MOV AH, 09H
    INT 21H         ; Print " LCM: "

    MOV AX, LCM_RESULT
    CALL PRINT_NUM   ; Print LCM

    MOV AH, 4CH
    INT 21H         ; Exit program
MAIN ENDP

; GCD Procedure (Euclidean Algorithm)
GCD PROC
    CMP BX, 0
```

```
    JE END_GCD
GCD_LOOP:
    MOV DX, 0
    DIV BX          ; AX = AX / BX, Remainder in DX
    MOV AX, BX
    MOV BX, DX
    CMP BX, 0
    JNE GCD_LOOP
END_GCD:
    RET
GCD ENDP

; Print Number Procedure
PRINT_NUM PROC
    MOV CX, 0
NEXT_DIGIT:
    MOV DX, 0
    MOV BX, 10
    DIV BX          ; AX / 10 → Quotient in AX, Remainder in DX
    PUSH DX
    INC CX
    TEST AX, AX
    JNZ NEXT_DIGIT

PRINT_LOOP:
    POP DX
    ADD DL, '0'
    MOV AH, 02H
```

```
    INT 21H

    LOOP PRINT_LOOP


    RET
PRINT_NUM ENDP


END MAIN
```

OUTPUT:



Experiment 6

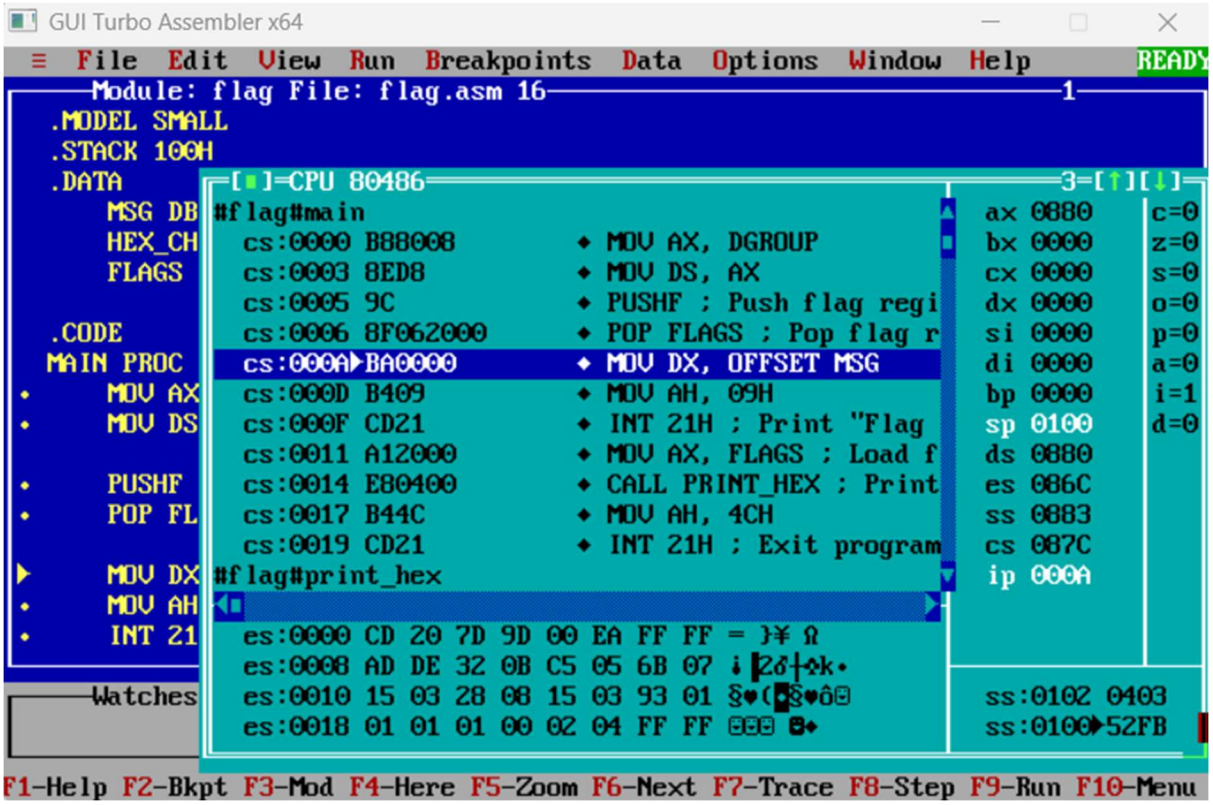
Name:Pratik Chavan

Div/Batch:A/A1 Roll No.07

```
.MODEL SMALL
.STACK 100H
.DATA
    MSG DB 'Flag Register: $'   ; Message to display
    HEX_CHARS DB '0123456789ABCDEF'  ; Lookup table for hex digits
    FLAGS DW ?   ; Variable to store flag register value

.CODE
MAIN PROC
    MOV AX, DGROUP
    MOV DS, AX

    PUSHF        ; Push flag register onto the stack
    POP FLAGS     ; Pop flag register into FLAGS variable

    MOV DX, OFFSET MSG
    MOV AH, 09H
    INT 21H       ; Print "Flag Register: "

    MOV AX, FLAGS  ; Load flag register value into AX
    CALL PRINT_HEX ; Print the flag register in hexadecimal format

    MOV AH, 4CH
```

```
    INT 21H       ; Exit program
MAIN ENDP

; --------------------------
; Print 16-bit Hex Procedure
; --------------------------
PRINT_HEX PROC
    MOV CX, 4     ; We have 4 hex digits (16-bit / 4-bit each)
    MOV BX, 12    ; Bit shift amount (12, 8, 4, 0)

HEX_LOOP:
    MOV DX, AX    ; Copy AX value
    MOV CL, BL    ; Move shift count into CL (Fix for SHR error)
    SHR DX, CL    ; Shift right to isolate one hex digit
    AND DX, 0FH   ; Mask the lower 4 bits
    MOV SI, DX    ; Move index to SI
    MOV DL, [HEX_CHARS + SI] ; Convert to ASCII hex character
    MOV AH, 02H
    INT 21H       ; Print the hex digit
    SUB BX, 4     ; Move to the next hex digit
    LOOP HEX_LOOP ; Repeat until all digits are printed

    RET
PRINT_HEX ENDP

END MAIN
```

OUTPUT:


GUI Turbo Assembler x64
File Edit View Run Breakpoints Data Options Window Help
READY
Module: flag File: flag.asm 16
.MODEL SMALL
.STACK 100H
.DATA
MSG DB
HEX_CH
FLAGS
.CODE
MAIN PROC
MOV AX
MOV DS
PUSHF
POP FL
MOV DX
MOV AH
INT 21
Watches
CPU 80486
#flag#main
cs:0000 B88008 MOV AX, DGROUP
cs:0003 8ED8 MOV DS, AX
cs:0005 9C PUSHF ; Push flag regi
cs:0006 8F062000 POP FLAGS ; Pop flag r
cs:000A BA0000 MOV DX, OFFSET MSG
cs:000D B409 MOV AH, 09H
cs:000F CD21 INT 21H ; Print "Flag
cs:0011 A12000 MOV AX, FLAGS ; Load f
cs:0014 E80400 CALL PRINT_HEX ; Print
cs:0017 B44C MOV AH, 4CH
cs:0019 CD21 INT 21H ; Exit program
#flag#print_hex
es:0000 CD 20 7D 9D 00 EA FF FF
es:0008 AD DE 32 0B C5 05 6B 07
es:0010 15 03 28 08 15 03 93 01
es:0018 01 01 01 00 02 04 FF FF
ax 0880
bx 0000
cx 0000
dx 0000
si 0000
di 0000
bp 0000
sp 0100
ds 0880
es 086C
ss 0883
cs 087C
ip 000A
c=0
z=0
s=0
o=0
p=0
a=0
i=1
d=0
ss:0102 0403
ss:0100 52FB
F1-Help F2-Bkpt F3-Mod F4-Here F5-Zoom F6-Next F7-Trace F8-Step F9-Run F10-Menu

Experiment 3

Name:Pratik Chavan

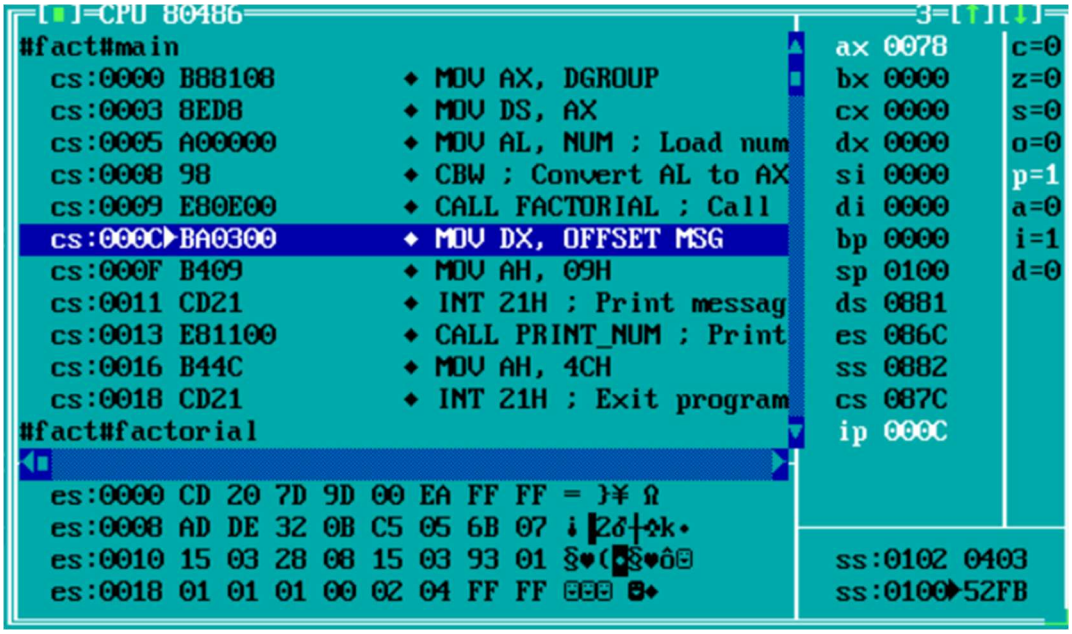
Div/Batch:A/A1 Roll No.07

```
.MODEL SMALL
.STACK 100H
.DATA
    NUM DB 5        ; Number for factorial (change this value as needed)
    FACT DW 1       ; Variable to store factorial result
    MSG DB 'Factorial: $'  ; Message to display before result

.CODE
MAIN PROC
    MOV AX, @DATA
    MOV DS, AX

    MOV AL, NUM     ; Load number in AL
    CBW             ; Convert AL to AX (sign-extend)
    CALL FACTORIAL  ; Call factorial procedure

    MOV DX, OFFSET MSG
    MOV AH, 09H
    INT 21H         ; Print message

    CALL PRINT_NUM  ; Print the factorial result

    MOV AH, 4CH
```

```
    INT 21H         ; Exit program
MAIN ENDP

; Factorial Procedure
FACTORIAL PROC
    MOV CX, AX      ; Move number to CX for loop counter
    MOV AX, 1       ; Initialize AX = 1 (Factorial starts at 1)

FACTORIAL_LOOP:
    MUL CX          ; AX = AX * CX
    LOOP FACTORIAL_LOOP

    MOV FACT, AX    ; Store the result in FACT
    RET
FACTORIAL ENDP

; Print Number Procedure
PRINT_NUM PROC
    MOV AX, FACT    ; Load factorial result
    MOV CX, 0       ; Clear CX (digit counter)

NEXT_DIGIT:
    MOV DX, 0
    MOV BX, 10
    DIV BX          ; AX / 10 → Quotient in AX, Remainder in DX
    PUSH DX         ; Push remainder (digit) onto stack
    INC CX          ; Increment digit counter
    TEST AX, AX     ; Check if AX is zero
```

```
    JNZ NEXT_DIGIT   ; If not, continue extracting digits

PRINT_LOOP:
    POP DX          ; Get digit from stack
    ADD DL, '0'     ; Convert to ASCII
    MOV AH, 02H
    INT 21H         ; Print digit
    LOOP PRINT_LOOP  ; Repeat for remaining digits

    RET
PRINT_NUM ENDP

END MAIN
```

OUTPUT:



Experiment 3

Name:Pratik Chavan

Div/Batch:A/A1 Roll No.07

```
.MODEL SMALL
.STACK 100H
.DATA
    ARRAY DB 10, 25, 15, 40, 5, 30, 50, 20
    LEN EQU $ - ARRAY
    MIN DB 0
    MAX DB 0

.CODE
MAIN PROC
    MOV AX, @DATA
    MOV DS, AX

    MOV SI, 0
    MOV AL, ARRAY[SI]
    MOV MIN, AL
    MOV MAX, AL

FIND_MIN_MAX:
    MOV AL, ARRAY[SI]
    CMP AL, MAX
    JG UPDATE_MAX
    CMP AL, MIN
```

JL UPDATE_MIN

JMP NEXT_ELEMENT

UPDATE_MAX:

MOV MAX, AL

JMP NEXT_ELEMENT

UPDATE_MIN:

MOV MIN, AL

NEXT_ELEMENT:

INC SI

CMP SI, LEN

JL FIND_MIN_MAX

MOV AX, 4C00H

INT 21H

MAIN ENDP

END MAIN

OUTPUT: