



# **Ahsanullah University of Science & Technology**

## **Department of Computer Science & Engineering**

**Course No : CSE2214**  
**Course Title : Assembly Language Programming Sessional**  
**Assignment No : 09**

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**Section : A**

**Question 1: Write a program that lets the user enter time in seconds, up to 65535 and outputs the time as hours, minutes, and seconds.**

**Solution:**

```
.MODEL SMALL
```

```
.STACK 64
```

```
.DATA
```

```
M1 DB 0AH,0DH,'THE time in hh:mm:ss is $'
```

```
M2 DB 0AH,0DH,'Enter time in seconds from 0-65535 : $'
```

```
.CODE
```

```
MAIN PROC
```

```
    MOV AX,@DATA
```

```
    MOV DS,AX
```

```
    CALL INDEC
```

```
    MOV DX,0
```

```
    MOV BX,3600
```

```
    DIV BX
```

```
    PUSH AX
```

```
    PUSH DX
```

```
    MOV AH,9
```

```
    LEA DX,M1
```

```
    INT 21H
```

```
    POP DX
```

```
    POP AX ;AX has hours
```

```
    CALL OUTDEC
```

```
    PUSH DX
```

```
    MOV AH,2
```

```
    MOV DL,':'
```

```
    INT 21H
```

```
    POP AX
```

```
MOV BX,60
MOV DX,0
DIV BX
```

```
CALL OUTDEC ;AX has mins
PUSH DX
```

```
MOV AH,2
MOV DL,':'
INT 21H
POP AX
```

```
CALL OUTDEC ;AX has sec
;-----
MOV AH,4CH
INT 21H
```

```
MAIN ENDP
```

```
INDEC PROC
```

```
PUSH BX
PUSH CX
PUSH DX
```

```
BEGIN:
MOV AH,9
LEA DX,M2
INT 21H
```

```
XOR BX,BX ;total=0
```

```
XOR CX,CX
```

```
MOV AH,1
INT 21H
```

```
REPEAT2:
```

```
CMP AL,'0'  
JNGE NOT_DIGIT  
CMP AL,'9'  
JNLE NOT_DIGIT
```

```
AND AX,000FH ; ascii to binary  
PUSH AX
```

```
MOV AX,10 ;total=totalx10+digit  
MUL BX  
POP BX  
ADD BX,AX
```

```
MOV AH,1  
INT 21H
```

```
CMP AL,0DH
```

```
JNE REPEAT2
```

```
MOV AX,BX
```

```
EXIT:  
POP DX  
POP CX  
POP BX  
RET
```

```
NOT_DIGIT:  
MOV AH,2  
MOV DL,0DH  
INT 21H  
MOV DL,0AH  
INT 21H  
JMP BEGIN
```

```
RET  
INDEC ENDP
```

OUTDEC PROC

PUSH AX

PUSH BX

PUSH CX

PUSH DX

END\_IF1:

XOR CX,CX

MOV BX,10D

REPEAT1:

XOR DX,DX

DIV BX

PUSH DX

INC CX

CMP AX,0

JNE REPEAT1

MOV AH,2

PRINT\_LOOP:

POP DX

OR DL,30H

INT 21H

LOOP PRINT\_LOOP

POP DX

POP CX

POP BX

POP AX

RET

OUTDEC ENDP

END MAIN

**Question 2: Write a program to find the greatest common divisor (GCD) of two integers M and N, according to the following algorithm:**

- Divide M by N, getting quotient Q and remainder R.
- If  $R = 0$  then stop. N is the GCD of M and N.
- If  $R \neq 0$  replace M by N, N by R, and repeat step 1

**Solution:**

```
.MODEL SMALL
```

```
.DATA
```

```
M1 DB 0AH,0DH,'ENTER M : $'
```

```
M2 DB 0AH,0DH,'ENTER N : $'
```

```
M3 DB 0AH,0DH,'GCD IS : $'
```

```
.CODE
```

```
MAIN PROC
```

```
    MOV AX,@DATA
```

```
    MOV DS,AX
```

```
    MOV AH,9
```

```
    LEA DX,M1
```

```
    INT 21H
```

```
    CALL INDEC
```

```
    PUSH AX
```

MOV AH,9

LEA DX,M2

INT 21H

CALL INDEC

PUSH AX

POP BX

POP AX

L1:

MOV DX,0

DIV BX

CMP DX,0

JE GCD\_FOUND

MOV AX,BX

MOV BX,DX

JMP L1

GCD\_FOUND:

MOV AH,9

LEA DX,M3

INT 21H

MOV AX,BX

CALL OUTDEC

MOV AH,4CH

INT 21H

MAIN ENDP

INDEC PROC

PUSH BX

PUSH CX

PUSH DX

BEGIN:

XOR BX,BX

XOR CX,CX

MOV AH,1

INT 21H

CMP AL,'-'

JE MINUS

CMP AL,'+'

JE PLUS

JMP REPEAT2



MINUS:

MOV CX,1

PLUS:

INT 21H

REPEAT2:

CMP AL,'0'

JNGE NOT\_DIGIT

CMP AL,'9'

JNLE NOT\_DIGIT

AND AX,000FH

PUSH AX

MOV AX,10

MUL BX

POP BX

ADD BX,AX

MOV AH,1

INT 21H

CMP AL,0DH

JNE REPEAT2

MOV AX,BX

EXIT:

POP DX

POP CX

POP BX

RET

NOT\_DIGIT:

MOV AH,2

MOV DL,0DH

INT 21H

MOV DL,0AH

INT 21H

JMP BEGIN

RET

INDEC ENDP

OUTDEC PROC

PUSH AX

PUSH BX

PUSH CX

PUSH DX

XOR CX,CX

MOV BX,10D

REPEAT1:

XOR DX,DX

DIV BX

PUSH DX

INC CX

OR AX,AX

JNE REPEAT1

MOV AH,2

PRINT\_LOOP:

POP DX

OR DL,30H

INT 21H

LOOP PRINT\_LOOP

POP DX

POP CX

POP BX

POP AX

RET

OUTDEC ENDP

END MAIN