MIT Practicals
Assignment 11
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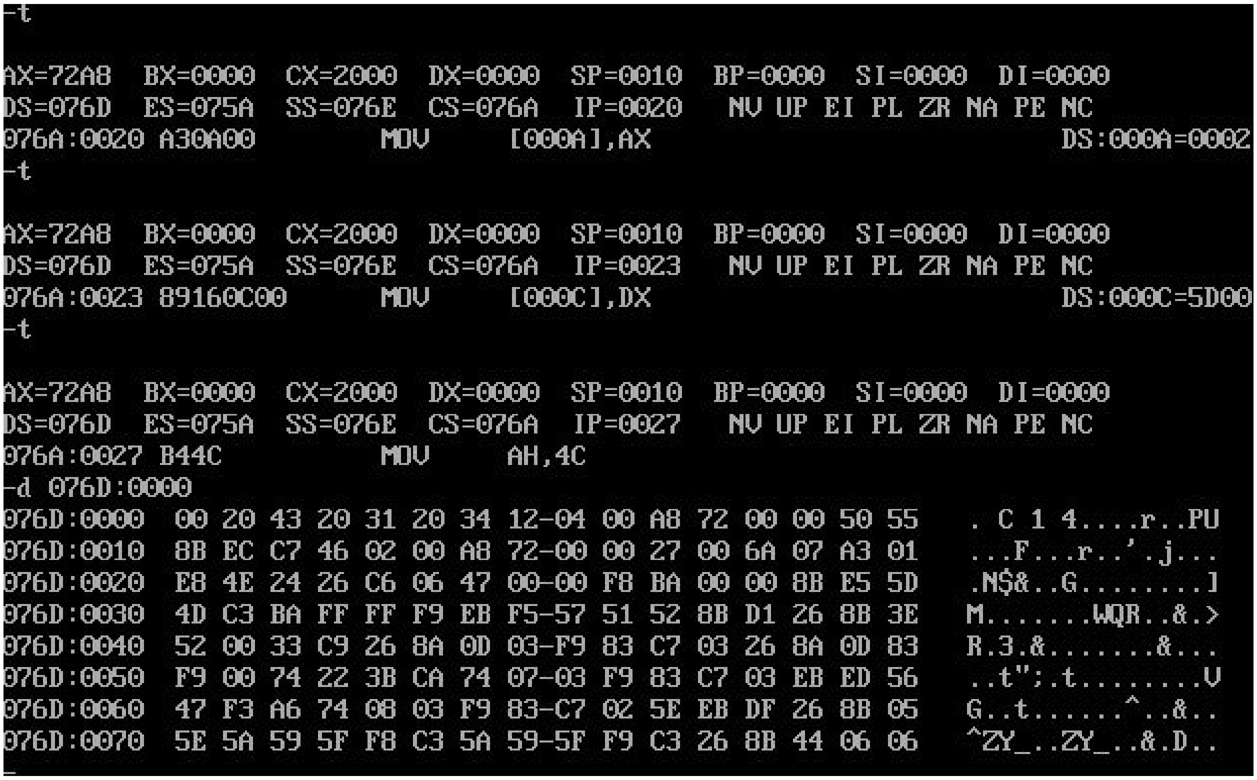
Question 1: Write ALP to ADD/SUB ‘n’ 16 bit numbers stored in consecutive memory location.

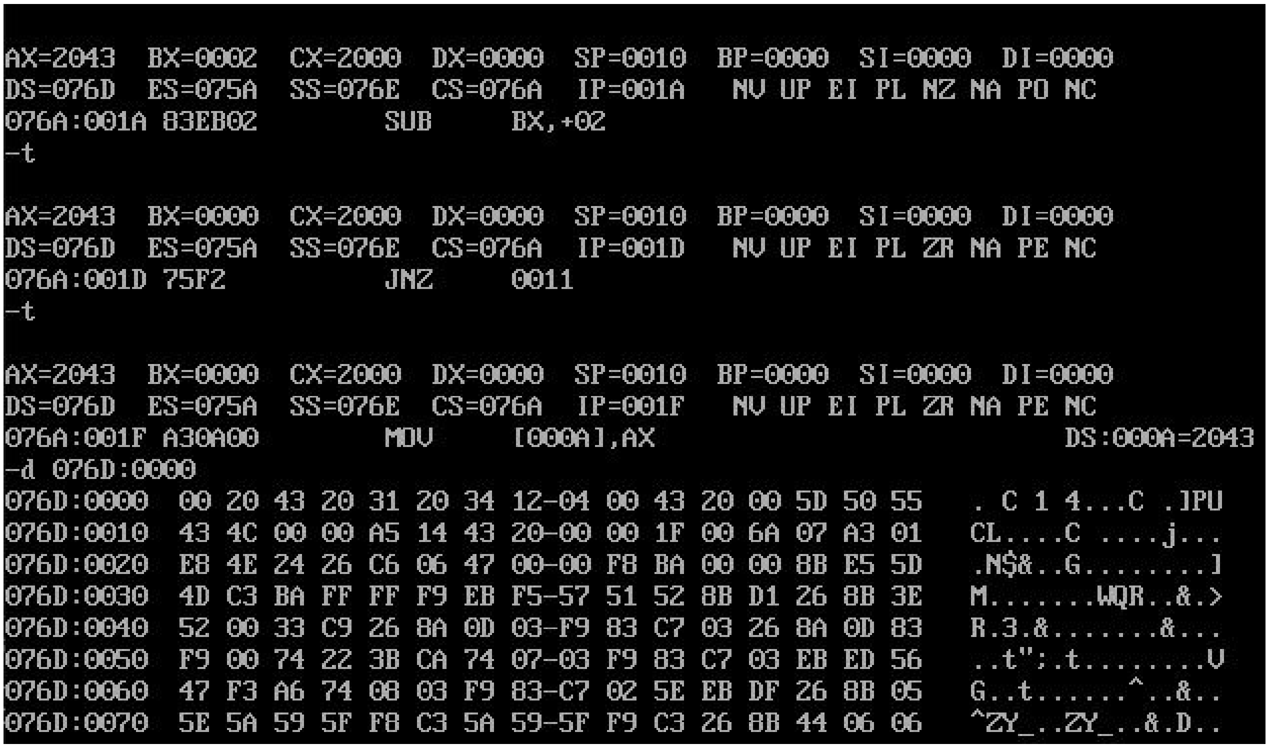
```
.model small
.stack 10H
.data
nums dw 2000h, 2043h, 2031h, 1234h
count dw 04h
res dd ?

.code
start:
mov ax,@data
mov ds,ax
mov si, offset nums
mov bx,count
add bx,bx
mov ax,0h
loop1:
mov cx,[si + bx - 2]
add ax,cx
jnc next
add dx,1h
next:
sub bx,2h
jnz loop1
mov word ptr res,ax
mov word ptr res+2,dx


mov ah,4ch
int 21h
end start
```



```
-t

AX=72A8  BX=0000  CX=2000  DX=0000  SP=0010  BP=0000  SI=0000  DI=0000
DS=076D  ES=075A  SS=076E  CS=076A  IP=0020   NV UP EI PL ZR NA PE NC
076A:0020 A30A00        MOV     [000A],AX                          DS:000A=0002
-t

AX=72A8  BX=0000  CX=2000  DX=0000  SP=0010  BP=0000  SI=0000  DI=0000
DS=076D  ES=075A  SS=076E  CS=076A  IP=0023   NV UP EI PL ZR NA PE NC
076A:0023 89160C00      MOV     [000C],DX                          DS:000C=5D00
-t

AX=72A8  BX=0000  CX=2000  DX=0000  SP=0010  BP=0000  SI=0000  DI=0000
DS=076D  ES=075A  SS=076E  CS=076A  IP=0027   NV UP EI PL ZR NA PE NC
076A:0027 B44C          MOV     AH,4C
-d 076D:0000
076D:0000  00 20 43 20 31 20 34 12-04 00 A8 72 00 00 50 55   . C 1 4....r..PU
076D:0010  8B EC C7 46 02 00 A8 72-00 00 27 00 6A 07 A3 01   ...F...r..'.j...
076D:0020  E8 4E 24 26 C6 06 47 00-00 F8 BA 00 00 8B E5 5D   .N$&..G........]
076D:0030  4D C3 BA FF FF F9 EB F5-57 51 52 8B D1 26 8B 3E   M.......WQR..&.>
076D:0040  52 00 33 C9 26 8A 0D 03-F9 83 C7 03 26 8A 0D 83   R.3.&.......&...
076D:0050  F9 00 74 22 3B CA 74 07-03 F9 83 C7 03 EB ED 56   ..t";.t........V
076D:0060  47 F3 A6 74 08 03 F9 83-C7 02 5E EB DF 26 8B 05   G..t......^..&..
076D:0070  5E 5A 59 5F F8 C3 5A 59-5F F9 C3 26 8B 44 06 06   ^ZY_..ZY_..&.D..
-
```

Question 2: Write a Program to find smallest/largest number in a given array of 16 bits numbers.

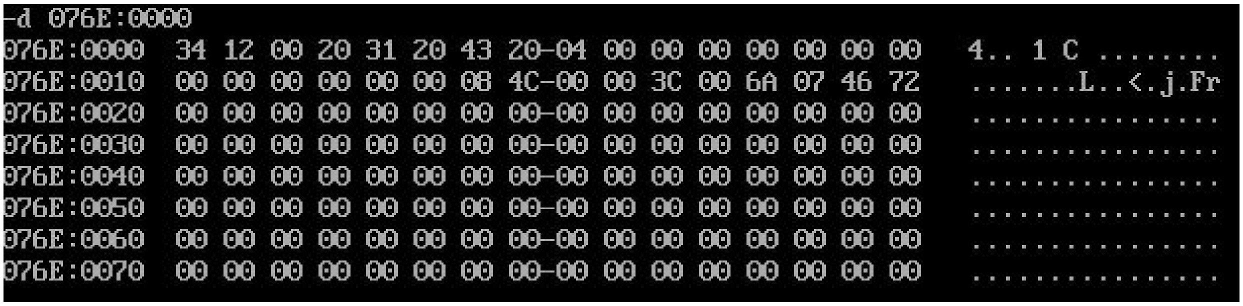
```
.model small
.stack 10H
.data
nums dw 2000h, 2043h, 2031h, 1234h
count dw 04h
res dw ?

.code
start:
mov ax,@data
mov ds,ax
mov si, offset nums
mov bx,count
add bx,bx
mov ax,0h
loop1:
mov cx,[si + bx - 2]
cmp ax,cx
jnc next
mov ax,cx
next:
sub bx,2h
jnz loop1
mov res,ax


mov ah,4ch
int 21h
end start
```



```
AX=2043  BX=0002  CX=2000  DX=0000  SP=0010  BP=0000  SI=0000  DI=0000
DS=076D  ES=075A  SS=076E  CS=076A  IP=001A   NV UP EI PL NZ NA PO NC
076A:001A 83EB02        SUB     BX,+02
-t

AX=2043  BX=0000  CX=2000  DX=0000  SP=0010  BP=0000  SI=0000  DI=0000
DS=076D  ES=075A  SS=076E  CS=076A  IP=001D   NV UP EI PL ZR NA PE NC
076A:001D 75F2          JNZ     0011
-t

AX=2043  BX=0000  CX=2000  DX=0000  SP=0010  BP=0000  SI=0000  DI=0000
DS=076D  ES=075A  SS=076E  CS=076A  IP=001F   NV UP EI PL ZR NA PE NC
076A:001F A30A00        MOV     [000A],AX                          DS:000A=2043
-d 076D:0000
076D:0000  00 20 43 20 31 20 34 12-04 00 43 20 00 5D 50 55   . C 1 4...C .]PU
076D:0010  43 4C 00 00 A5 14 43 20-00 00 1F 00 6A 07 A3 01   CL....C ....j...
076D:0020  E8 4E 24 26 C6 06 47 00-00 F8 BA 00 00 8B E5 5D   .N$&..G........]
076D:0030  4D C3 BA FF FF F9 EB F5-57 51 52 8B D1 26 8B 3E   M.......WQR..&.>
076D:0040  52 00 33 C9 26 8A 0D 03-F9 83 C7 03 26 8A 0D 83   R.3.&.......&...
076D:0050  F9 00 74 22 3B CA 74 07-03 F9 83 C7 03 EB ED 56   ..t";.t........V
076D:0060  47 F3 A6 74 08 03 F9 83-C7 02 5E EB DF 26 8B 05   G..t......^..&..
076D:0070  5E 5A 59 5F F8 C3 5A 59-5F F9 C3 26 8B 44 06 06   ^ZY_..ZY_..&.D..
```

Question 3: Write a Program to sort 16 bits given numbers in ascending /descending order.

```
.model small
.stack 10H
.data
nums dw 2000h, 2043h, 2031h, 1234h
count dw 04h
res dw ?

.code
start:
mov ax,@data
mov ds,ax
mov bx, count
add bx,bx

mov cx,0h
loop1:
mov si,00h
loop2:
mov ax, [nums + si]
mov dx, [nums + si + 2h]
cmp ax,dx
jc next
mov [nums + si + 2],ax
mov [nums + si],dx
next:
add si,2h
mov ax,si
add ax,2h
cmp ax,bx
jnz loop2
add cx,2h
cmp cx,bx
jnz loop1



mov ah,4ch
int 21h
end start
```



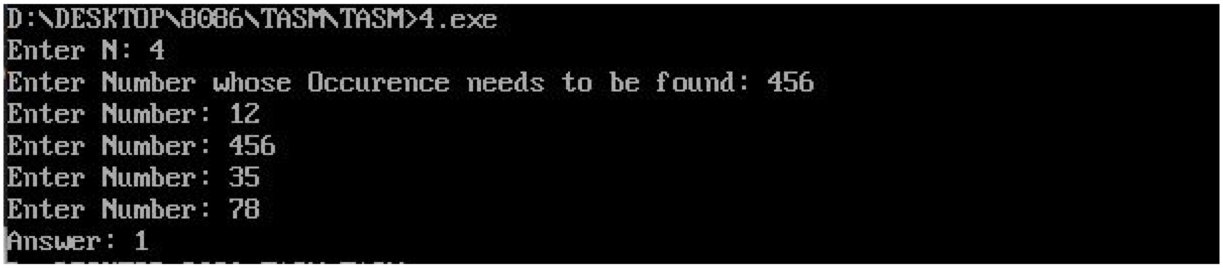
```
-d 076E:0000
076E:0000  34 12 00 20 31 20 43 20-04 00 00 00 00 00 00 00   4.. 1 C ........
076E:0010  00 00 00 00 00 00 08 4C-00 00 3C 00 6A 07 46 72   .......L..<.j.Fr
076E:0020  00 00 00 00 00 00 00 00-00 00 00 00 00 00 00 00   ................
076E:0030  00 00 00 00 00 00 00 00-00 00 00 00 00 00 00 00   ................
076E:0040  00 00 00 00 00 00 00 00-00 00 00 00 00 00 00 00   ................
076E:0050  00 00 00 00 00 00 00 00-00 00 00 00 00 00 00 00   ................
076E:0060  00 00 00 00 00 00 00 00-00 00 00 00 00 00 00 00   ................
076E:0070  00 00 00 00 00 00 00 00-00 00 00 00 00 00 00 00   ................
```

Question 4: Write a Program to find occurrences of a given number in a list of N numbers given through keyboard.

```
.model small
.stack 10H
.data

message db "Enter N: $"
n dw 0h

message1 db "Enter Number whose Occurence needs to be found: $"
num1 dw 0h

message2 db "Enter Number: $"
num2 dw ?


message3 db "Answer: $"
cnt dw 0h





print macro msg
mov dx,offset msg
mov ah, 09h
int 21h
endm

getint macro num
local loop1
local next
loop1:
mov ah,01h
int 21h

cmp al,30h
jc next

cmp al,3Ah
jnc next
```

```
mov bl,al
sub bl,30h
mov ax,num
mov cx,0ah
mul cx
add ax,bx
mov num,ax

next:
cmp al,0dh
jnz loop1

endm

printNum macro num
local repeat_loop, print_char

mov bx,0ah
mov ax, num
xor cx, cx
repeat_loop:
xor dx, dx
div bx
push dx
inc cx
test ax, ax
jnz repeat_loop
print_char:
pop dx
add dl, 30h
mov ah, 02h
int 21h
loop print_char

endm

.code
start:
mov ax,@data
mov ds,ax
```

```
print message
getint n

print message1
getint num1

mov si,n
loop3:
mov num2,0h
print message2
getint num2
mov ax, num1
mov bx,num2
cmp ax,bx
jnz next3
inc cnt
next3:
dec si
jnz loop3

print message3

printNum cnt


mov ah,4ch
int 21h
end start
```

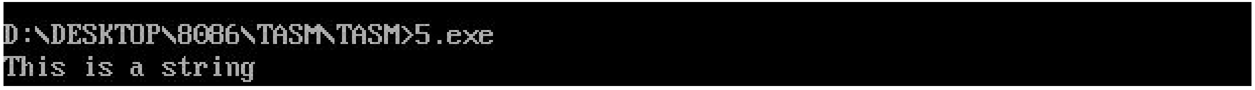


```
D:\DESKTOP\8086\TASM\TASM>4.exe
Enter N: 4
Enter Number whose Occurence needs to be found: 456
Enter Number: 12
Enter Number: 456
Enter Number: 35
Enter Number: 78
Answer: 1
```

Question 5: Write a Program to move a string from source to destination.

```
.model small
.stack 10H
.data
src db "This is a string$"
s equ $-src
dest db s dup ('$')

.code
start:
mov ax,@data
mov ds,ax

mov si, 0

call copyStr

mov ah, 09h
lea dx, dest
int 21h

mov ah, 04ch
int 21h

copyStr proc

mov bx, 0

compute:

mov bl, src [si]


mov dest[si], bl


inc si

cmp src[si], '$'
je return
jmp compute
```

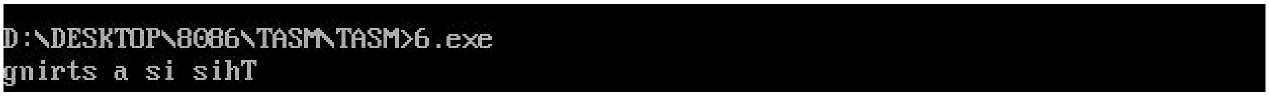
```
return:

mov dest[si], '$'
ret

copyStr endp


mov ah,4ch
int 21h
end start
```



```
D:\DESKTOP\8086\TASM\TASM>5.exe
This is a string
```

Question 6: Write a Program to reverse a given string.

```
.model small
.stack 10H
.data
src db "This is a string$"
s equ $-src
dest db s dup ('$')

.code
start:
mov ax,@data
mov ds,ax

mov si, 0h
mov ax,s
sub ax,1h

loop1:
mov bl,src[si]
push bx
inc si
cmp si,ax
jnz loop1

mov si,0h
loop2:
pop bx
mov dest[si],bl
inc si
cmp si,ax
jnz loop2



mov dx, offset dest
mov ah,09h
int 21h

mov ah,4ch
int 21h
end start
```

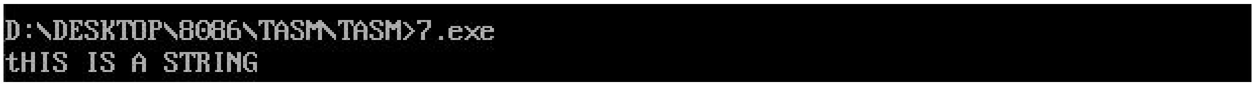


```
D:\DESKTOP\8086\TASM\TASM>6.exe
gnirts a si sihT
```

Question 7: Write a Program to perform case conversion (U to L, L to U) for a given string.

```
.model small
.stack 10H
.data
src db "This is a string$"

.code
start:
mov ax,@data
mov ds,ax

mov si, 0

loop1:

mov al, src[si]
cmp al,97
jc continue
cmp al,122
jnc continue
sub al,20h
mov src[si],al
jmp continue3

continue:
cmp al,65
jc continue2
cmp al,90
jnc continue2
add al,20h
mov src[si],al
jmp continue3

continue2:
cmp src[si],'$'
jz exit
continue3:
inc si
jmp loop1

exit:
```

```
mov dx, offset src
mov ah,09h
int 21h


mov ah,4ch
int 21h
end start
```

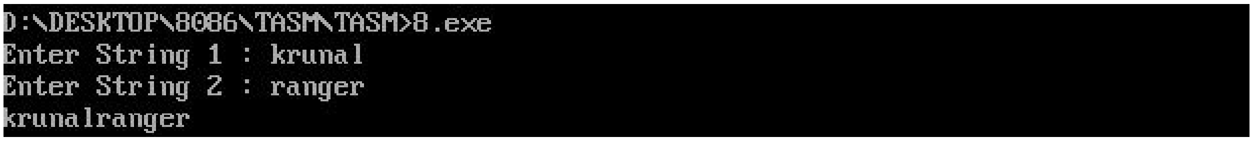


```
D:\DESKTOP\8086\TASM\TASM>7.exe
tHIS IS A STRING
```

Question 8: Write a Program to merge two strings entered through keyboard.

```
.model small
.stack 10H
.data
src db 100  dup('$')
message1 db "Enter String 1 : $"
message2 db "Enter String 2 : $"

print macro msg
mov dx,offset msg
mov ah,09h
int 21h
endm



.code
start:
mov ax,@data
mov ds,ax

mov si, 0h

print message1
loop1:
mov ah,01h
int 21h
cmp al,0dh
jz exit1
mov src[si],al
inc si
jmp loop1

exit1:
print message2
loop2:
mov ah,01h
int 21h
cmp al,0dh
jz exit2
mov src[si],al
inc si
```

```
jmp loop2

exit2:
print src


mov ah,4ch
int 21h
end start
```

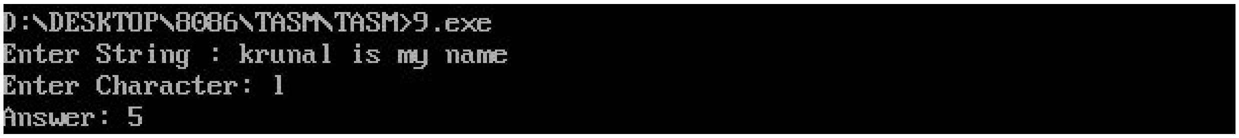


```
D:\DESKTOP\8086\TASM\TASM>8.exe
Enter String 1 : krunal
Enter String 2 : ranger
krunalranger
```

Question 9: Write a Program to search a character in a given string.

```
.model small
.stack 10H
.data
src db 100  dup('$')
message1 db "Enter String : $"
message2 db "Enter Character: $"
message3 db 10,"Answer: $"
message4 db 10,"No character position found! $"

print macro msg
mov dx,offset msg
mov ah,09h
int 21h
endm

printNum macro num
local repeat_loop, print_char

mov bx,0ah
mov ax, num
xor cx, cx
repeat_loop:
xor dx, dx
div bx
push dx
inc cx
test ax, ax
jnz repeat_loop
print_char:
pop dx
add dl, 30h
mov ah, 02h
int 21h
loop print_char

endm



.code
start:
```

```
mov ax,@data
mov ds,ax

mov si, 0h

print message1
loop1:
mov ah,01h
int 21h
cmp al,0dh
jz exit1
mov src[si],al
inc si
jmp loop1

exit1:
print message2
mov ah,01h
int 21h
mov bl,al

mov si,0h
loop2:
cmp src[si],bl
jz exit2
cmp src[si],0dh
jz exit3
inc si
jmp loop2

exit2:
print message3
printNum si
jmp exit4

exit3:
print message4

exit4:
mov ah,4ch
int 21h
end start
```

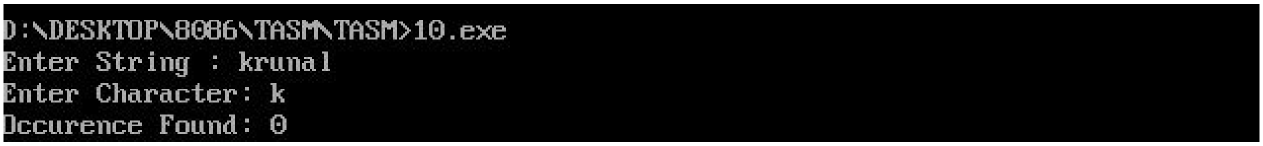


```
D:\DESKTOP\8086\TASM\TASM>9.exe
Enter String : krunal is my name
Enter Character: l
Answer: 5
```

Question 10: Write a Program to find occurrences of a given character in a given string through keyboard.

```
.model small
.stack 10H
.data
src db 200  dup('$')
message1 db "Enter String : $"
message2 db "Enter Character: $"
message3 db 10,"Occurence Found: $"
message4 db 10,"No character position found! $"
base_10 dw 000dh

print macro msg
mov dx,offset msg
mov ah,09h
int 21h
endm

printNum macro num
local repeat_loop, print_char

mov ax, num
xor cx, cx
repeat_loop:
xor dx, dx
div base_10
push dx
inc cx
test ax, ax
jnz repeat_loop
print_char:
pop dx
add dl, 30h
mov ah, 02h
int 21h
loop print_char

endm
```

```
.code
start:
mov ax,@data
mov ds,ax

mov si, 0h

print message1
loop1:
mov ah,01h
int 21h
cmp al,0dh
jz exit1
mov src[si],al
inc si
jmp loop1

exit1:
print message2
mov ah,01h
int 21h
mov bl,al

mov si,0h
loop2:
cmp src[si],bl
jnz exit2
print message3
printNum si

exit2:
cmp src[si],0dh
jz exit3
inc si
jmp loop2


exit3:
mov ah,4ch
int 21h
end start
```



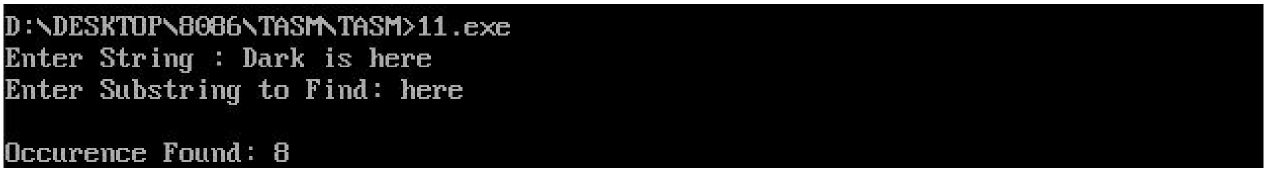
```
D:\DESKTOP\8086\TASM\TASM>10.exe
Enter String : krunal
Enter Character: k
Occurence Found: 0
```

Question 11: Program to check whether given substring exists in a main string or not?

```
.model small
.stack 10H
.data
s1 db 200  dup('$')
s2 db 200 dup('$')
message1 db "Enter String : $"
message2 db "Enter Substring to Find: $"
message3 db 10,"Occurence Found: $"
message4 db 10,"No Occurence Found! $"

base_10 dw 000dh

print macro msg
mov dx,offset msg
mov ah,09h
int 21h
endm

printNum macro num
local repeat_loop, print_char

mov ax, num
xor cx, cx
repeat_loop:
xor dx, dx
div base_10
push dx
inc cx
test ax, ax
jnz repeat_loop
print_char:
pop dx
add dl, 30h
mov ah, 02h
int 21h
loop print_char

endm
```

```
.code
start:
mov ax,@data
mov ds,ax

mov si, 0h

print message1
loop1:
mov ah,01h
int 21h
cmp al,0dh
jz exit1
mov s1[si],al
inc si
jmp loop1

exit1:
print message2
mov si,0h
loop2:
mov ah,01h
int 21h
cmp al,0dh
jz exit2
mov s2[si],al
inc si
jmp loop2

exit2:
mov bx,0h

loopA:
mov si,bx
mov di,0h

loopB:
mov al,s1[si]
mov cl,s2[di]
cmp al,cl
```

```
jnz exit3
cmp cl,24h
jnz continue
print message3
printNum bx
jmp done

continue:
inc si
inc di
jmp loopB

exit3:
cmp al,24h
jz notfound
inc bx
jmp loopA

notfound:
print message4


done:
mov ah,4ch
int 21h
end start
```



```
D:\DESKTOP\8086\TASM\TASM>11.exe
Enter String : Dark is here
Enter Substring to Find: here

Occurence Found: 8
```