**Searching and Sorting in Arrays**

**Searching**

**Linear Search**

.model small

.386

.data

ARRAY DW 20 DUP (?)

DATA1 dw 0000H

success db 10,13,"Element is present in the array $"

fail db 10,13,"Element is not present in the arary $"

msg db 10,13,"Enter the size of the array :: $"

msg2 db 10,13,"Enter the array :: $"

msg3 db 10,13,"Enter the element to be searched :: $"

.code

.startup

MOV AH,09

MOV DX,OFFSET msg

INT 21H

MOV AH,01

INT 21H

SUB AL,30H

MOV AH,0

MOV CX,AX

MOV DATA1,AX

MOV AH,09

MOV DX,OFFSET msg2

INT 21H

MOV AH,0

MOV SI, 0

MOV BX, OFFSET ARRAY

L1: MOV DL, 0AH ; jump onto next line

MOV AH, 02H

INT 21H

MOV DX, SI ; input element of the array

MOV AH, 01H

INT 21H

SUB AL,30H

;MOV SI, DX

MOV [BX + SI], AX

INC SI

LOOP L1

MOV CX,DATA1

MOV AH,09

MOV DX,OFFSET msg3

INT 21H

MOV AH,01 ; Enter element to be searched

INT 21H

SUB AL,30H

MOV SI, 0

MOV BX, OFFSET ARRAY

L2: CMP [BX + SI], AL ; linear search loop

JZ L3 ; jump if element is found

INC SI

LOOP L2

MOV AH, 09H

MOV DX,OFFSET fail ; if the element is not found

INT 21H

MOV AH, 4CH ; to forcefully terminate the program

INT 21H

L3: MOV AH, 09H

MOV DX,OFFSET success ; if the element is found

INT 21H

MOV AH, 4CH

INT 21H

.EXIT

END

**Binary Search**

.model small

.386

.data

ARRAY DW 20 DUP (?)

DATA1 dw 0000H

DATA2 dw 0000H

success db 10,13,"Element is present in the array $"

fail db 10,13,"Element is not present in the arary $"

msg db 10,13,"Enter the size of the array :: $"

msg2 db 10,13,"Enter the array :: $"

msg3 db 10,13,"Enter the element to be searched :: $"

.code

.startup

MOV AH,09

MOV DX,OFFSET msg

INT 21H

MOV AH,01

INT 21H

SUB AL,30H

MOV AH,0

MOV CX,AX

MOV DATA1,AX

MOV AH,09

MOV DX,OFFSET msg2

INT 21H

MOV AH,0

MOV SI, 0

MOV BX, OFFSET ARRAY

L1: MOV DL, 0AH ; jump onto next line

MOV AH, 02H

INT 21H

MOV DX, SI ; input element of the array

MOV AH, 01H

INT 21H

SUB AL,30H

MOV SI, DX

MOV [BX + SI], AX

INC SI

LOOP L1

MOV AH,09

MOV DX,OFFSET msg3

INT 21H

MOV AH,01 ; Enter element to be searched

INT 21H

SUB AL,30H

MOV DATA2,AX

MOV CX,DATA1

MOV SI,0

MOV DI, DATA1

MOV BP, 0

MOV BX, OFFSET ARRAY

MOV AX, DATA1

L2: MOV SI, DI

ADD SI, BP

MOV AX, SI

MOV DL, 2

DIV DL

MOV AH,0

MOV DX,0

MOV SI,AX

MOV DX,DATA2

CMP [BX + SI],DL

JZ L3

CALL L4

LOOP L2

MOV AH, 09H

MOV DX,OFFSET fail ; if the element is not found

INT 21H

MOV AH, 4CH ; to forcefully terminate the program

INT 21H

L3: MOV AH, 09H

MOV DX,OFFSET success ; if the element is found

INT 21H

MOV AH, 4CH

INT 21H

L4 PROC NEAR

CMP [BX+SI], DL

JL L6

MOV DI, SI

RET

L6: MOV BP,SI

RET

L4 ENDP

.EXIT

END