

Question 1

```
[org 0x0100]
    jmp start

data:    dw      60, 40, 50, 22, 5
data2:   db      3, 4, 1, 9, 6

swapflag: db      0

swap:
    cmp     dx, 1
    jne     14
    mov     ax, [bx+si]
    xchg    ax, [bx+si+2]
    mov     [bx+si], ax
    jmp     14a
14:
    mov     al, [bx+si]
    xchg    al, [bx+si+1]
    mov     [bx+si], al
14a:
    ret
bubblesort:
    push    ax
    push    cx
    push    si
    push    dx

    dec     cx
    cmp     dx, 1
    jne     mainloop
    shl     cx, 1

mainloop:
    mov     si, 0
    mov     byte [swapflag], 0

innerloop:
    cmp     dx, 1
    jne     11
    mov     ax, [bx+si]
    cmp     ax, [bx+si+2]
    jmp     11a
11:
    mov     al, [bx+si]
    cmp     al, [bx+si+1]
11a:
    jbe     noswap

    call    swap
    mov     byte[swapflag], 1

noswap:
    cmp     dx, 1
    jne     12
    add     si, 1
12:
    add     si, 1
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        cmp     si, cx
        jne     innerloop

        cmp     byte [swapflag], 0
        je      done
        cmp     dx, 1
        jne     l3
        sub     cx, 1
l3:      sub     cx, 1
        jnz     mainloop

done:    pop     dx
        pop     si
        pop     cx
        pop     ax

        ret

start:   mov     bx, data
        mov     cx, 5
        mov     dx, 1
        call    bubblesort

        mov     bx, data2
        mov     cx, 5
        mov     dx, 0
        call    bubblesort

        mov     ax, 0x4c00
        int     0x21

```

Question 2
[org 0x0100]

```

        jmp     start
fib:     push    bp
        mov     bp, sp
        sub     sp, 4
        mov     word [bp-2], di;      value of x
        cmp     word [bp-2], 1
        jne     l1
        mov     ax, word [bp-2]
        jmp     l2
l1:      cmp     word [bp-2], 0
        jne     l3
        mov     ax, word [bp-2]
        jmp     l2
l3:      mov     ax, word [bp-2]
        sub     ax, 1
        mov     di, ax
        call    fib
        mov     word [bp-4], ax
        mov     ax, word [bp-2]

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        sub    ax, 2
        mov    di, ax
        call   fib
12:      add    ax, word [bp-4]

        mov    sp, bp
        pop    bp
        ret

start:
        mov    di, 0
        call   fib

        mov    di, 1
        call   fib

        mov    di, 2
        call   fib

        mov    di, 3
        call   fib

        mov    di, 4
        call   fib

        mov    di, 5
        call   fib

        mov    di, 6
        call   fib

        mov    di, 7
        call   fib

        mov    di, 8
        call   fib

        mov    di, 9
        call   fib

        mov    di, 10
        call   fib

        mov    ax, 0x4c00
        int    0x21

```