

# 8085 Assembly Language Programs

## (Assignment -07)

✚ Design an 8085 Assembly Language Program for the following definitions:

- A) An array of ten numbers is stored from memory location 2000H onwards. Write an 8085-assembly language program to separate out and store the EVEN and ODD numbers on new arrays from 2100H and 2200H, respectively.

**Output:**

**Registers**

A/PSW	0x 09 56
BC	0x 00 00
DE	0x 22 05
HL	0x 20 0A
SP	0x FF FF
PC	0x 08 37

**Flags**

Z	<input checked="" type="checkbox"/>
S	<input type="checkbox"/>
P	<input checked="" type="checkbox"/>
C	<input type="checkbox"/>
AC	<input checked="" type="checkbox"/>

```

main.asm
1 ;<Program title>
2
3 jmp start
4
5 ;data
6
7 ;code
8 start: nop
9
10 LXI H, 2000H
11 LXI D, 2100H
12 MVI C, 0AH
13 Part1:MOV A,M
14 ANI 01H
15 JZ Even
16 JNZ Prog
17 Even:MOV A,M
18 STAX D
19 INX D
20 Prog:INR L
21 DCR C
22

```

**Memory View** (Address: 0x 2000)

Address	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
200	02	04	00	03	05	06	06	07	01	09	00	00	00	00	00	00
201	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
202	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
203	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
204	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
205	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
206	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
207	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
208	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
209	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
20A	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
20B	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
20C	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
20D	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
20E	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
20F	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00

**Registers**

A/PSW	0x 09 56
BC	0x 00 00
DE	0x 22 05
HL	0x 20 0A
SP	0x FF FF
PC	0x 08 37

**Flags**

Z	<input checked="" type="checkbox"/>
S	<input type="checkbox"/>
P	<input checked="" type="checkbox"/>
C	<input type="checkbox"/>
AC	<input checked="" type="checkbox"/>

```


main.asm
18 STAX D
19 INX D
20 Prog:INR L
21 DCR C
22 JNZ Part1
23
24 LXI H, 2000H
25 LXI D, 2200H
26 MVI C, 0AH
27 Part2:MOV A,M
28 ANI 01H
29 JNZ Odd
30 JZ Part3
31 Odd:MOV A,M
32 STAX D
33 INX D
34 Part3:INR L
35 DCR C
36 JNZ Part2
37
38 hit

```

**Memory View** (Address: 0x 2100)

Address	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
210	02	04	00	08	06	00	00	00	00	00	00	00	00	00	00	00
211	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
212	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
213	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
214	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
215	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
216	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
217	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
218	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
219	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
21A	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
21B	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
21C	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
21D	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
21E	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
21F	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00


## Microprocessor & Interfacing

Memory View  0x 2200


	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
220	03	05	07	01	09	00	00	00	00	00	00	00	00	00	00	00
221	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
222	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
223	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
224	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
225	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
226	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
227	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
228	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
229	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
22A	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
22B	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
22C	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
22D	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
22E	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
22F	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00

**B) Write an 8085-assembly language program to count the number of bytes that are greater than 2010 and lesser than 4010 from an array of ten bytes stored on memory locations 2000H onwards. Store such numbers on memory locations 3000H onwards.**

**Output:**

Registers 

A/PSW	0x 00 56
BC	0x 00 00
DE	0x 30 06
HL	0x 20 09
SP	0x FFFF
PC	0x 08 6D

Flags 

Z	<input checked="" type="checkbox"/>
S	<input type="checkbox"/>
P	<input checked="" type="checkbox"/>
C	<input type="checkbox"/>
AC	<input checked="" type="checkbox"/>


main.asm

```

1 ;<Program title>
2
3 jmp start
4
5 ;data
6
7 ;code
8 start: nop
9 LXI H, 2000H
10 LXI D, 3000H
11 MVI C, 0AH
12
13 GREAT: MOV A, M
14 CPI 20H
15 JZ SECOND
16 JNC CHECK1
17 JMP DNEXT
18
19 SECOND: INX H
20 DCR C
21 MOV A, M

```

Load at 0x0800

Memory View  0x 2000

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
200	32	01	FE	AC	23	00	67	16	24	3C	00	00	00	00	00	00
201	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
202	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
203	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
204	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
205	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
206	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
207	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
208	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
209	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
20A	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
20B	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
20C	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
20D	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
20E	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
20F	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00

## Microprocessor & Interfacing

### Registers

A/PSW	0x0056
BC	0x0000
DE	0x3006
HL	0x2009
SP	0xFFFF
PC	0x086D

### Flags

Z	<input checked="" type="checkbox"/>
S	<input type="checkbox"/>
P	<input checked="" type="checkbox"/>
C	<input type="checkbox"/>
AC	<input checked="" type="checkbox"/>



Load at 0x0800

main.asm

```

19 SECOND: INX H
20 DCR C
21 MOV A, M
22 CPI 10H
23 JNZ SD
24
25 SD: JNC SE
26 JMP DNEXT
27
28 SE: JMP ADDN
29
30 CHECK1: JNZ SP
31 JMP DNEXT
32
33 ADDN: DCR C
34 JMP LESS
35
36 SP: DCR C
37 DCR C
38 JMP MD
39

```

### Memory View

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
200	32	01	FE	AC	23	00	67	16	24	3C	00	00	00	00	00	00
201	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
202	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
203	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
204	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
205	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
206	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
207	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
208	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
209	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
20A	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
20B	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
20C	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
20D	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
20E	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
20F	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00

### Registers

A/PSW	0x0056
BC	0x0000
DE	0x3006
HL	0x2009
SP	0xFFFF
PC	0x086D

### Flags

Z	<input checked="" type="checkbox"/>
S	<input type="checkbox"/>
P	<input checked="" type="checkbox"/>
C	<input type="checkbox"/>
AC	<input checked="" type="checkbox"/>



Load at 0x0800

main.asm

```

39
40 LESS: DCX H
41
42 MD: MOV A, M
43 CPI 40H
44 JC FINAL
45 JZ CHECK3
46 INX H
47 JMP NEXT
48
49 CHECK3: INX H
50 MOV A, M
51 CPI 10H
52 JC SD1
53 JMP NEXT
54
55 SD1: DCX H
56
57 FINAL: MOV A, M
58 STAX D
59 INX D
60

```

### Memory View

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
200	32	01	FE	AC	23	00	67	16	24	3C	00	00	00	00	00	00
201	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
202	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
203	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
204	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
205	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
206	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
207	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
208	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
209	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
20A	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
20B	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
20C	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
20D	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
20E	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
20F	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00

### Registers

A/PSW	0x0056
BC	0x0000
DE	0x3006
HL	0x2009
SP	0xFFFF
PC	0x086D

### Flags

Z	<input checked="" type="checkbox"/>
S	<input type="checkbox"/>
P	<input checked="" type="checkbox"/>
C	<input type="checkbox"/>
AC	<input checked="" type="checkbox"/>



Load at 0x0800

main.asm

```

59 INX D
60 INX H
61 MOV A, M
62 STAX D
63 INX D
64 JMP NEXT
65
66 DNEXT: INX H
67 DCR C
68 INX H
69 DCR C
70 JNZ GREAT
71
72 NEXT: MOV A, C
73 CPI 00H
74 JZ END
75 INX H
76 ;DCR C
77 JNZ GREAT
78
79 END: HLT

```

### Memory View

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
200	32	01	FE	AC	23	00	67	16	24	3C	00	00	00	00	00	00
201	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
202	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
203	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
204	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
205	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
206	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
207	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
208	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
209	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
20A	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
20B	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
20C	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
20D	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
20E	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
20F	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00

## Microprocessor & Interfacing

**Registers**

A/PSW	0x0056
BC	0x0000
DE	0x3006
HL	0x2009
SP	0xFFFF
PC	0x086D

**Flags**

Z	<input checked="" type="checkbox"/>
S	<input type="checkbox"/>
P	<input checked="" type="checkbox"/>
C	<input type="checkbox"/>
AC	<input checked="" type="checkbox"/>

**main.asm**

```

59 INX D
60 INX H
61 MOV A, M
62 STAX D
63 INX D
64 JMP NEXT
65
66 DNEXT: INX H
67 DCR C
68 INX H
69 DCR C
70 JNZ GREAT
71
72 NEXT: MOV A, C
73 CPI 00H
74 JZ END
75 INX H
76 ;DCR C
77 JNZ GREAT
78
79 END: HLT
  
```

**Memory View** (Address: 0x3000)

Address	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
300	32	01	23	00	24	3C	00	00	00	00	00	00	00	00	00	00
301	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
302	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
303	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
304	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
305	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
306	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
307	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
308	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
309	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
30A	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
30B	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
30C	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
30D	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
30E	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
30F	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00

C) The following block of data is stored in the memory locations from 2050H to 2055H. Write an 8085 Assembly language program to Transfer the data to the locations 2080H to 2085H in the reverse order. DATA(H) 25, A5, 4F, E3, AF, F1

**Output:**

**Registers**

A/PSW	0x2556
BC	0x0000
DE	0x2086
HL	0x204F
SP	0xFFFF
PC	0x0815

**Flags**

Z	<input checked="" type="checkbox"/>
S	<input type="checkbox"/>
P	<input checked="" type="checkbox"/>
C	<input type="checkbox"/>
AC	<input checked="" type="checkbox"/>

**main.asm**

```

1 ;<Program title>
2
3 jmp start
4
5 ;data
6
7 ;code
8 start: nop
9
10 LXI H, 2055H
11 LXI D, 2080H
12 MVI C, 06H
13 Main:MOV A,M
14 STAX D
15 INX D
16 DCX H
17 DCR C
18 JNZ Main
19
20 hlt
  
```

**Memory View** (Address: 0x2055)

Address	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
200	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
201	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
202	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
203	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
204	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
205	25	A5	4F	E3	AF	F1	00	00	00	00	00	00	00	00	00	00
206	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
207	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
208	F1	AF	E3	4F	A5	25	00	00	00	00	00	00	00	00	00	00
209	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
20A	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
20B	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
20C	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
20D	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
20E	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
20F	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00

Start Address at: 0x1100

D) An array of ten data bytes is stored on memory locations 2100H onwards. Write an 8085-assembly language program to find the largest number and store it on memory location 2200H.

**Output:**

**Registers**

A/PSW	0x FE 57
BC	0x FE 00
DE	0x 00 00
HL	0x 21 0A
SP	0x FF FF
PC	0x 08 1E

**Flags**

Z	<input checked="" type="checkbox"/>
S	<input type="checkbox"/>
P	<input checked="" type="checkbox"/>
C	<input checked="" type="checkbox"/>
AC	<input checked="" type="checkbox"/>

**main.asm**

```

5 ;data
6
7 ;code
8 start: nop
9
10 LXI H, 2100H
11 MVI C, 09H
12 MOV B,M
13 INX H
14 Main:MOV A,M
15     CMP B
16     JNC Part1
17     JC Part2
18 Part1:MOV B,A
19 Part2:INX H
20     DCR C
21     JNZ Main
22 MOV A,B
23 STA 2200H
24
25 hlt

```

**Memory View** (Address: 0x 2100)

Address	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
210	34	12	FE	45	65	26	78	43	88	09	00	00	00	00	00	00
211	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
212	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
213	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
214	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
215	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
216	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
217	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
218	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
219	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
21A	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
21B	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
21C	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
21D	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
21E	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
21F	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00

**Registers**

A/PSW	0x FE 57
BC	0x FE 00
DE	0x 00 00
HL	0x 21 0A
SP	0x FF FF
PC	0x 08 1E

**Flags**

Z	<input checked="" type="checkbox"/>
S	<input type="checkbox"/>
P	<input checked="" type="checkbox"/>
C	<input checked="" type="checkbox"/>
AC	<input checked="" type="checkbox"/>

**main.asm**

```

5 ;data
6
7 ;code
8 start: nop
9
10 LXI H, 2100H
11 MVI C, 09H
12 MOV B,M
13 INX H
14 Main:MOV A,M
15     CMP B
16     JNC Part1
17     JC Part2
18 Part1:MOV B,A
19 Part2:INX H
20     DCR C
21     JNZ Main
22 MOV A,B
23 STA 2200H
24
25 hlt

```

**Memory View** (Address: 0x 2200)

Address	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
220	FE	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
221	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
222	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
223	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
224	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
225	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
226	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
227	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
228	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
229	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
22A	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
22B	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
22C	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
22D	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
22E	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
22F	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00