Experiment 11: Write a program to display numbers in LED based display.

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ALPs to be completed

1. Write a program to display a number using 8086 and a virtual LED based display.

LED Display in Emulator

- A LED display is available in EMU8086 with port address 199.

- It consists of 5 LED based display which can be used to show a number (both positive and negative).

- The display number can be provided using any 8086 ALP or using a simple loop.

Display number using LED array

port 199 (2 bytes)
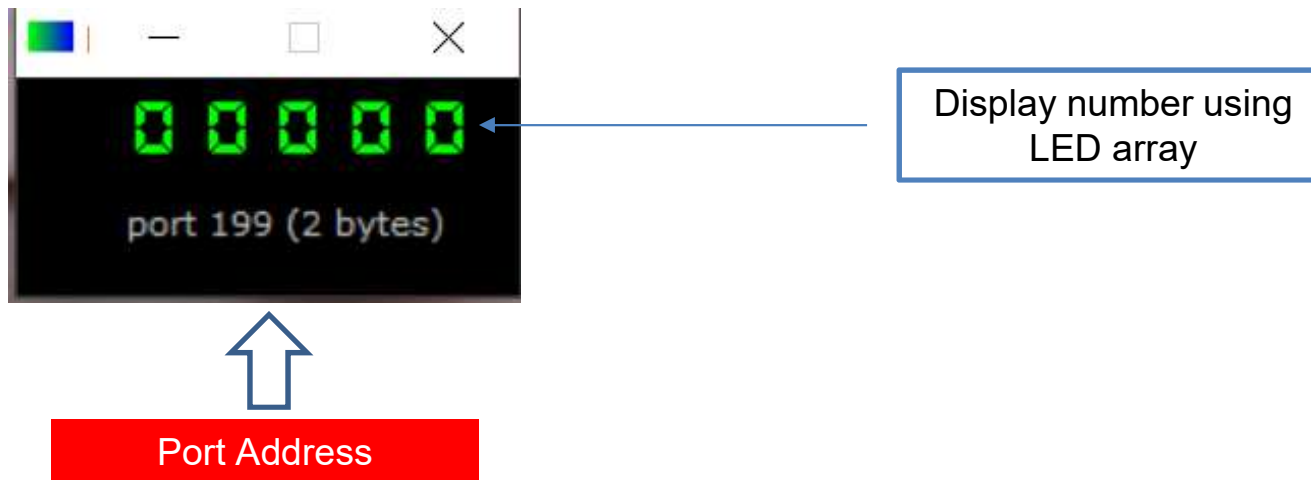
Port Address

LED Display in Emulator

- Port Address: 199

- Instruction to include LED display in emulator:
  #start=led_display.exe#

- How to load the control word in the LED system?

  Use OUT instruction. For out instruction select port 199. Use AX register to store hexadecimal word intermediately.

ALP for LED based Display

#start=led_display.exe# | Initializes the virtual LED display |

#make_bin#

name "led"

```
mov ax,0
out 199,ax
```
| Load 0 in the display |

```
mov ax, 1234
out 199, ax
```
| Store an arbitrary positive number in AX and send it IO |

```
mov ax, -5678
out 199, ax
```
| Store an arbitrary negative number in AX and send it IO |

```
; Eternal loop to write
; values to port:

mov ax, 0H
x1:
  out 199, ax
  inc ax
jmp x1

hlt
```
| Initialize AX by 0. |

| Start from 0. Each step increases one value and load the updated number in the LED display. Continue to increase the value. |

Concept of #make_bin#
A simple executable file.

You can define the values of all registers, segment and offset for memory area where this file will be loaded.

When loading "**MY.BIN**" file to emulator it will look for a "**MY.BINF**" file, and load "**MY.BIN**" file to location specified in "**MY.BINF**" file, registers are also set using information in that file.

In case the emulator is not able to find "**MY.BINF**" file, current register values are used and "**MY.BIN**" file is loaded at current **CS:IP** and the execution starts from the current value of **CS:IP**.

Bin file type is not unique to the emulator, however the directives are unique and will not work if .bin file is executed outside of the emulator because their output is stored in a separate file independently from pure binary code.

Review Questions (Assignment)

- Write an ALP which will display integer values from -5 to +5 using the virtual LED segment display. Use JL instruction for jump.