IMPERIAL COLLEGE of ENGINEERING

(Affiliated by Rajshahi University Code: 385)

Department of CSE

Report no - 3

Course Title: Computer Peripherals and Interfacing lab

Course Code: CSE4142

Submitted by,

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Part: 4, Semester: Odd

Question:

Use 8086 Interfacing Trainer in Kit mode to display digits 1, 2 and 3 on a 7-Segment LED with a delay 5 seconds between each display. The output will be continued until the system is reset.

Date: 15-September-2023
Day: Friday

Submitted to,

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Adjunct Lecturer, CSE

Title:

Use 8086 Interfacing Trainer in Kit mode to display digits 1, 2 and 3 on a 7-Segment LED with a delay 5 seconds between each display. The output will be continued until the system is reset.

Objective:

The objective of this lab experiment is to use the 8086 Interfacing Trainer in Kit mode to display the digits '1', '2', and '3' on a 7-Segment LED with a 5-second delay between each display. The output should continue indefinitely until the system is reset.

Theory:

This experiment utilizes the 8086 Interfacing Trainer in Kit mode to display the numeric digits '1,' '2,' and '3' on a 7-Segment LED display. The 8086 microprocessor, a 16-bit Intel processor, forms the core of this operation, managing the control of the 7-Segment LED. The 7-Segment LED display is comprised of seven individual LED segments, which can be selectively activated to display numerical digits. The primary aim is to sequentially display these digits, '1,' '2,' and '3,' with a 5-second delay between each display, establishing a continuous output loop. This experiment serves as a practical illustration of fundamental microprocessor programming principles, interfacing techniques for output devices, precise timing control, and the application of the 8086 Interfacing Trainer for visual output on the 7-Segment LED.

Requirements:

- 8086 Interfacing Trainer in Kit mode.
- Provided 8086 assembly code.
- Emu8086

Procedure:

Initialization: Set up the 8086 Interfacing Trainer in Kit mode, ensuring it's ready for operation. Load the provided 8086 assembly code into the trainer's memory.

Main Loop (continue): The program enters a main loop to manage the display of digits and the delay between displays. Initialize the CX register to 2, which controls the number of iterations through the loop.

Digit Display (display):

Display the digit '1' on the 7-Segment LED:

- Load the binary value 00000110b into AL to activate the appropriate LED segments.
- Output AL to the port address specified in DX, which controls the first Seven Segment Display.
- Implement a 5-second delay using the 8086's timing capabilities (INT 15h).
- Reset the CX register to its original value and reset the port address for the 7-Segment LED display.
- Repeat the above steps for displaying '2' and '3' with their respective binary values, introducing a 5-second delay between each display.

Looping (LOOP display): Utilize the LOOP instruction to repeat the digit display process, as long as CX is not zero. This ensures that the digits '1,' '2,' and '3' are displayed continuously with the specified delay.

Continue (JMP continue): After displaying '3,' jump back to the beginning of the main loop (continue) to repeat the digit sequence indefinitely.

Completion: Upon manual reset or system reset, the program terminates

Code:

```
DSEG    SEGMENT 'DATA'
DSEG    ENDS
SSEG    SEGMENT STACK   'STACK'
      DW      100h    DUP(?)
SSEG    ENDS
CSEG    SEGMENT 'CODE'
START   PROC    FAR

; Store return address to OS:
   PUSH    DS
   MOV     AX, 0
   PUSH    AX
; set segment registers:
   MOV     AX, DSEG
   MOV     DS, AX
   MOV     ES, AX
   MOV DX, 2030h; first Seven Segment Display

continue:
          MOV CX, 2

display:
          ;1
          MOV AL,00000110b
          out dx,al

   mov bx,cx
   mov CX,004Ch
   mov DX,4B40h
   mov ah,86h
   int 15h
   mov cx,bx
   MOV DX, 2030h
```

```
;2
   MOV AL,01011011b
   out dx,al

   mov bx,cx
   mov CX,004Ch
   mov DX,4B40h
   mov ah,86h
   int 15h
   mov cx,bx
   MOV DX, 2030h

   ;3
   MOV AL,01001111b
         out dx,al

   mov bx,cx
   mov CX,004Ch
   mov DX,4B40h
   mov ah,86h
   int 15h
   mov cx,bx
   MOV DX, 2030h

         LOOP display
         JMP continue

; return to operating system:
   RET
START   ENDP

CSEG    ENDS

END    START
END    START    ; set entry point.
```

Result:

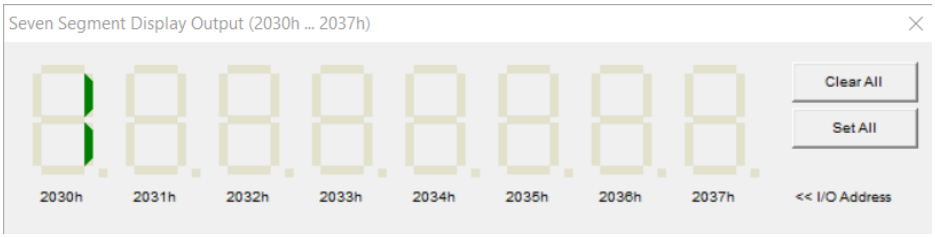

Figure1: Display 1 for 5 seconds

Figure2: Display 2 for 5 seconds

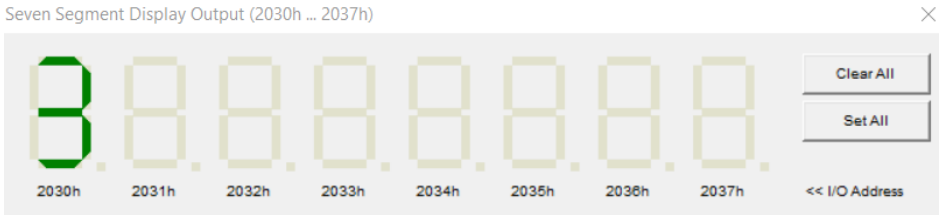

Figure3: Display 3 for 5 seconds

Conclusion:

we successfully utilized the 8086 Interfacing Trainer in Kit mode to display the numeric digits '1,' '2,' and '3' on a 7-Segment LED display. The program incorporated precise timing control to introduce a 5-second delay between digit displays, resulting in a continuous and dynamic output. This experiment demonstrated the practical application of microprocessor programming techniques, interfacing with output devices, and the use of the 8086 Interfacing Trainer for real-time visual output. The continuous display of digits on the 7-Segment LED showcases the effectiveness of the 8086 microprocessor in controlling hardware interfaces.