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Comp. Eng. Depart. CSE3134

Microprocessor and Embedded Systems

Simulation with 8085 Microprocessor

Subject: **Simulator showing the number of empty spaces in the parking lot with a capacity of 15 vehicles**

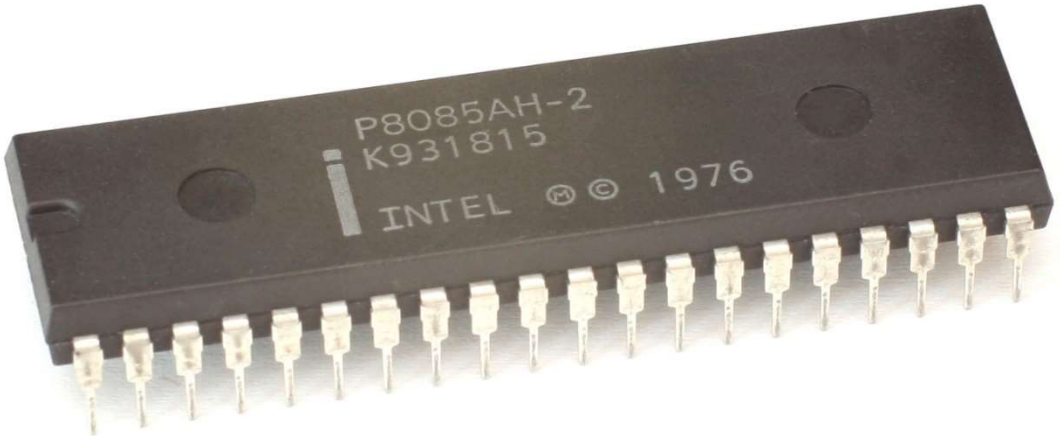

Photo0: Microprocessor 8085

Mert Dumanlı – 160315002

İbrahim Caner Kartal – 160315007

Ege Aydınoğlu - 170315021

Photo1: Microprocessor 8085 maker firm Intel's icon

What is 8085 Microprocessor?

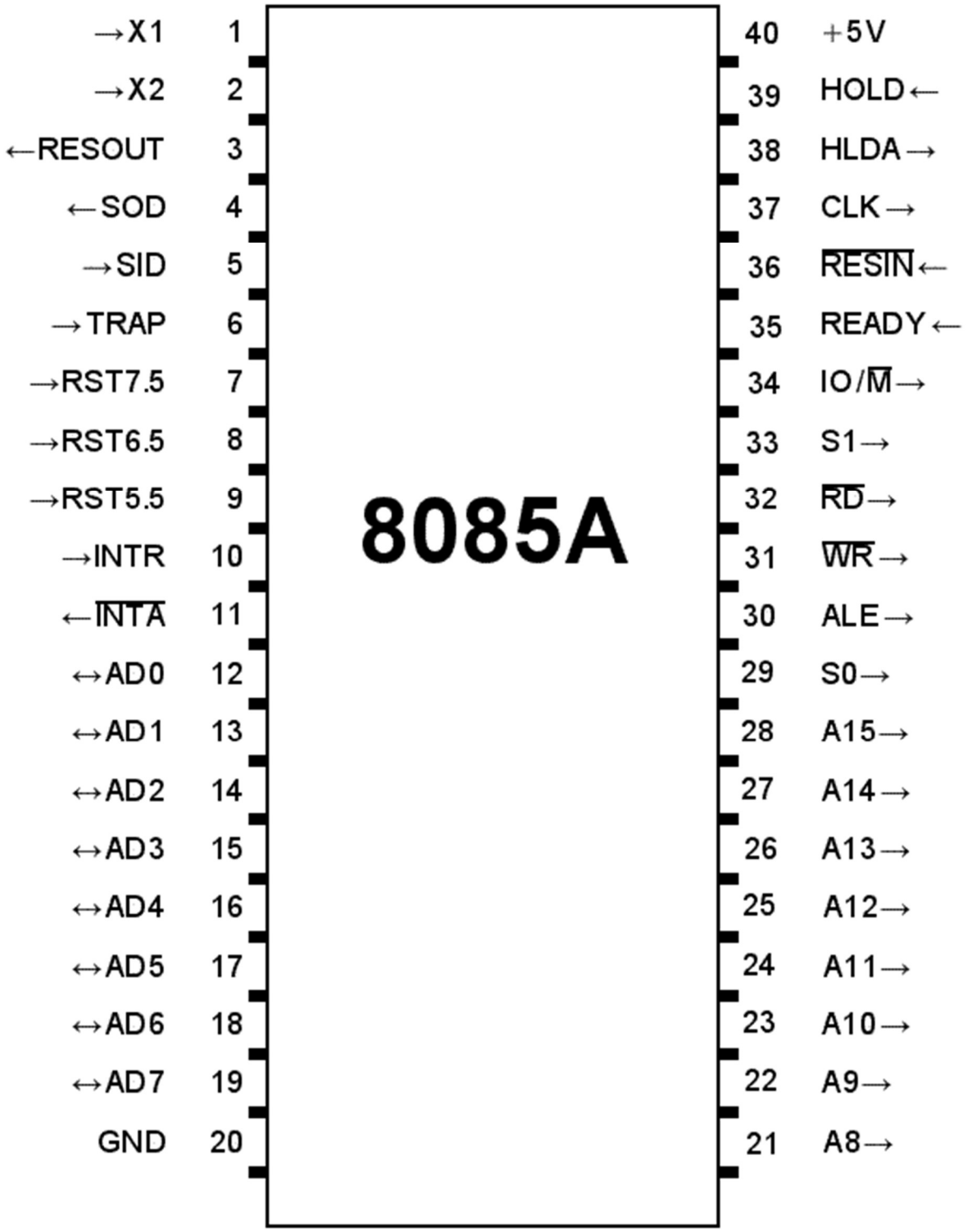

Photo2: The structure of a true 8085 microprocessor

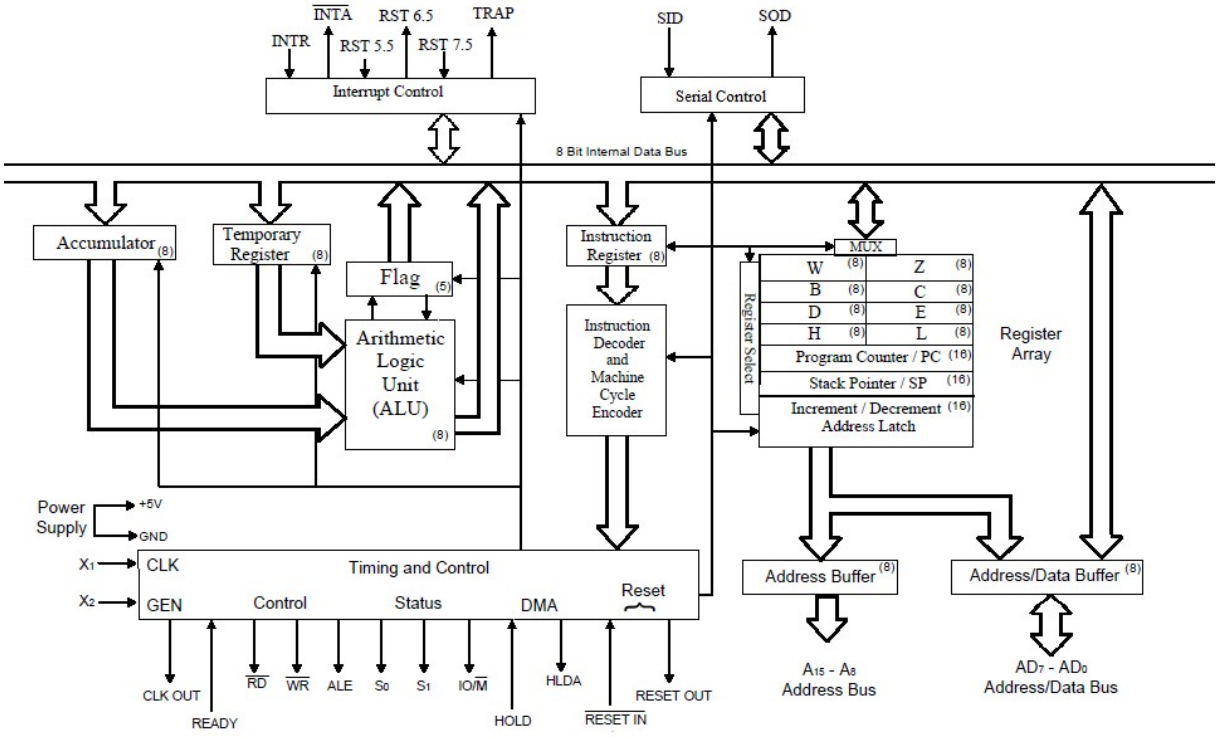

Photo3: 8085 Microprocessor Architecture

The Intel 8085 ("eighty-eighty-five") is an 8-bit microprocessor produced by Intel and introduced in March 1976. It is a software-binary compatible with the more-famous Intel 8080 with only two minor instructions added to support its added interrupt and serial input/output features. However, it requires less support circuitry, allowing simpler and less expensive microcomputer systems to be built.

The "5" in the part number highlighted the fact that the 8085 uses a single +5-volt (V) power supply by using depletion-mode transistors, rather than requiring the +5 V, −5 V and +12 V supplies needed by the 8080. This capability matched that of the competing Z80, a popular 8080-derived CPU introduced the year before. These processors could be used in computers running the CP/M operating system.

The 8085 is supplied in a 40-pin DIP package. To maximise the functions on the available pins, the 8085 uses a multiplexed address/data (AD^0-AD^7) bus. However, an 8085 circuit requires an 8-bit address latch, so Intel manufactured several support chips with an address latch built in. These include the 8755, with an address latch, 2 KB of EPROM and 16 I/O pins, and the 8155 with 256 bytes of RAM, 22 I/O pins and a 14-bit programmable timer/counter. The multiplexed address/data bus reduced the number of PCB tracks between the 8085 and such memory and I/O chips.

Both the 8080 and the 8085 were eclipsed by the Zilog Z80 for desktop computers, which took over most of the CP/M computer market, as well as a share of the booming home-computer market in the early-to-mid-1980s.

The 8085 had a long life as a controller, no doubt thanks to its built-in serial I/O and 5 prioritized interrupts, arguably microcontroller-like features that the Z80 CPU did not have. Once designed into such products as the DECtape II controller and the VT102 video terminal in the late 1970s, the 8085 served for new production throughout the lifetime of those products. This was typically longer than the product life of desktop computers.

Our Code

(*The simulator we use is gnusim8085.*)

```
MVI B,15
LDA 0001H
DCR A
JM out
JMP IN
out: LDA 0000H
MOV C,A
SUB B
JZ FINISH
MOV A,C
INR A
STA 0000H
JMP FINISH
IN: LDA 0000H
DCR A
JM FINISH
STA 0000H
FINISH: HLT
```

Run of the code

Initially, we need to enter 0000H index numbers into memory manually as the number of free spaces in the parking lot. In our code, this number is 15.

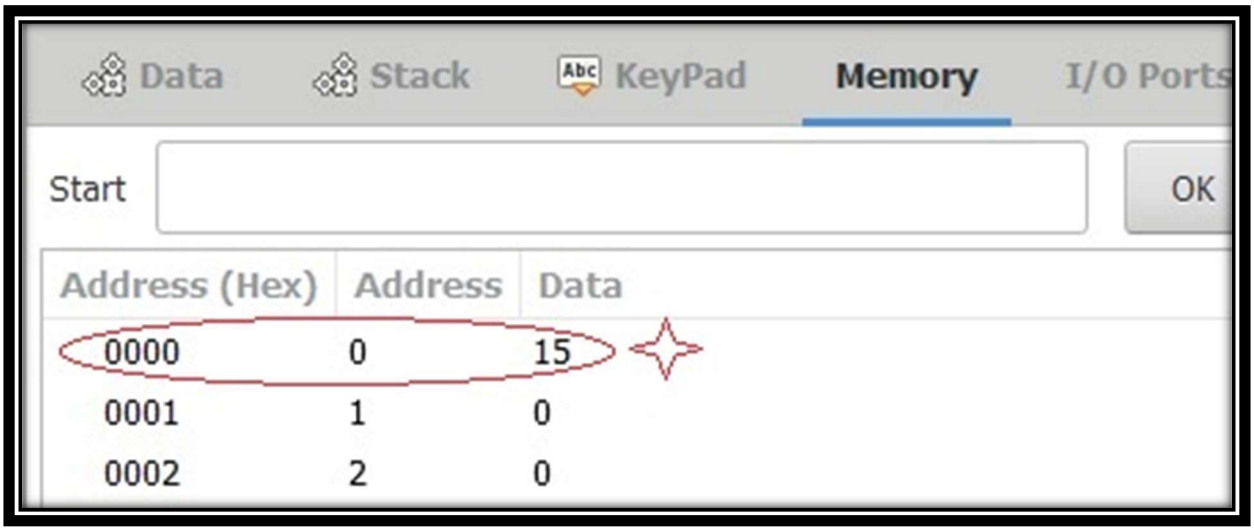

Photo4: Simulator memory screen (For enter the initial value)

We enter 0001H index numbers into memory as input of the vehicle input and output to the program.

- *Entering 1 means vehicle entry. (The number of empty parking spaces is decreasing.)*
- *Entering 0 means vehicle exit. (The number of empty parking spaces is increasing.)*

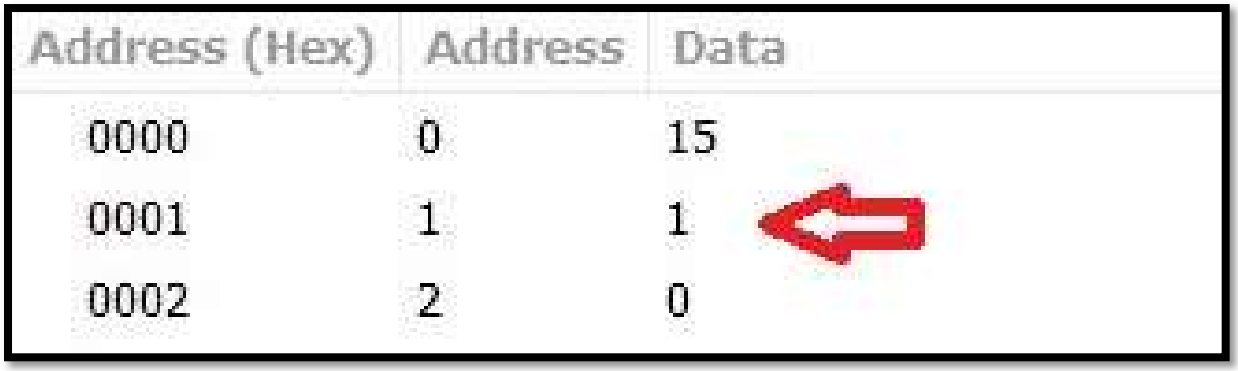

Photo5: Simulator memory screen (For indicate the situation)

Writing the Code and Explanation of the Code

Lines

1)MVI B,15

2)LDA 0001H

3)DCR A

4)JM out

5)JMP IN

6)out: LDA 0000H

7)MOV C,A

8)SUB B

9)JZ FINISH

10)MOV A,C

11)INR A

12)STA 0000H

13)JMP FINISH

14)IN: LDA 0000H

15)DCR A

16)JM FINISH

17)STA 0000H

18)FINISH: HLT

Explanation

1); Top Limit (backed up for comparison)

2); Entrance of Input (0-1)

3); Decrement

4); Exit of vehicle

5); Enter of vehicle

6); Taking the number of vehicles as input

7); Accumulator back-up

8); Looking at the difference

9); If there is no difference, the program will jump to FINISH line

10); If there is difference (from 15), restore data to the accumulator

11); If all conditions confirmed; vehicle exit is confirmed and the number of parking spaces is increasing.

12); Backing up result

13); Since there is only one operation per unit period, the end is reached.

14); Taking the number of vehicles as input

15); If all conditions confirmed; vehicle enter is confirmed and the number of parking spaces is decreasing.

16); There is no vehicle in the parking lot, so vehicle exit cannot be done logically.

17); Backing up result

18); END

References

- *https://en.wikipedia.org/wiki/Intel_8085*
- *https://electronicslesson.com/microprocessor/8085-microprocessor-architecture/*
- *https://www.youtube.com/watch?v=5puDuMhaRjM*

Resources of the course

- ✓ *Mohamed Ali Mazidi, Janice Gillispie Mazidi, Rolin McKinlay, "The 8051 Microcontroller and Embedded Systems: Using Assembly and C"*

- ✓ *Programming and Interfacing the 8051 Microcontroller by SencerYeralan, Ashutosh Ahluwalia*

- ✓ *The 8051 Microcontroller by by I. Scott MacKenzie*

- ✓ *Programming & Customizing the 8051 Microcontroller by Michael Predko*

- ✓ *Microprocessor 8085: Architecture, Programming and Interfacing, Ajay Wadhwa*

- ✓ *https://teams.microsoft.com/_#/school/files/Genel?threadId=19%3A6488a7537cb64688abc10419a2cff509%40thread.tacv2&replyChainId=1589792955447&ctx=channel&context=Lab2&rootfolder=%252Fsites%252FCSE3401.1-MICROPROCESSOR_AND_EMBEDDED_SYSTEMS%252FShared%2520Documents%252FGeneral%252FLab%2520Materials%252FLab2*
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