

# Educational consideration in theory of system design

——システム設計論における教育的考察——

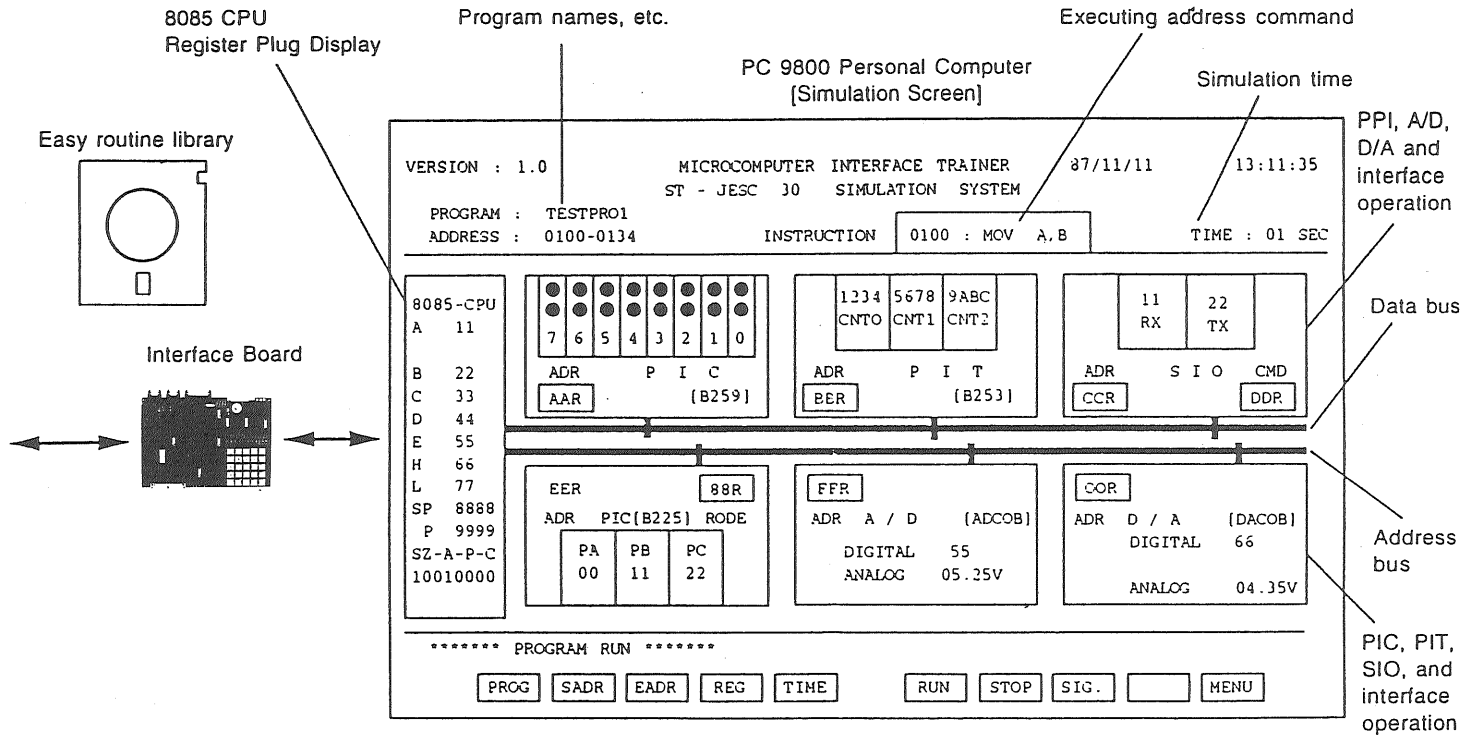
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A Microcomputer study supporting system, which satisfies the condition that systematic skill to capture hardware and software synthetically, has been developed. In this system, programming can be done without hand assembling (technical assembling is possible), and many input and output circuits are equipped. Therefore students can learn interface skills through various exercises if they study the microcomputer and its interface system in the lecture.

Learners can do microcomputer training through keyboard operation with the use of software with a training function on the personal computer screen.

Following are topics to be discussed in this paper.

1. Outline of the software trainer of the microcomputer interface.
  2. Construction of the software trainer of the microcomputer interface.
  3. Construction and operation method of the simulation system in the software trainer.
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1. As we see in the outline of the software trainer of the microcomputer interface (Fig. 1, next page), this software trainer basically does the following :
    - 1.1 It connects the microcomputer interface trainer to a PC 9801 personal computer.
    - 1.2 It executes the programs designed by learners.
    - 1.3 It enables the learners to learn the operations of a standard interface of the microcomputer, such as
      - PIC : Interrupt controller 8259 Compatible
      - PPI : Programable Peripheral Interface 8255 compatible
      - SIO : serial I/O controller
      - PIT : timer/counter 8253 compatible



- PROG** Assign programs to simulate
- SADR** Specify starting address
- EADR** Specify ending address
- REG** Change number of register
- TIME** Specify simulating time
- RUN** Start simulation
- STOP** Stop simulation
- SIG.** Data I/O, timing, reference
- MENU** Explanation of operation, etc.

Fig. 1 Outline of the microcomputer interface trainer.

My Teacher Series My Interface	Type	
	A	B
Interface System	●	●
Easy Routine Library	●	●
Interface Board	●	—
Accessory	●	—
Manual (text)	●	●

Chart 1 System construction in the software trainer

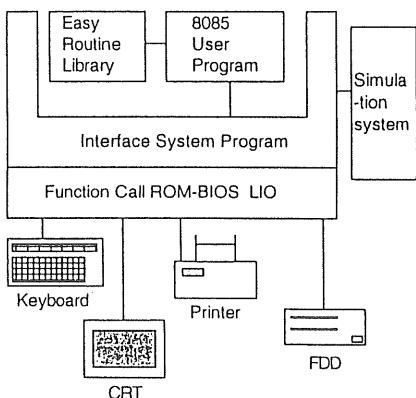


Figure 2 Construction of the simulation system in the software trainer.

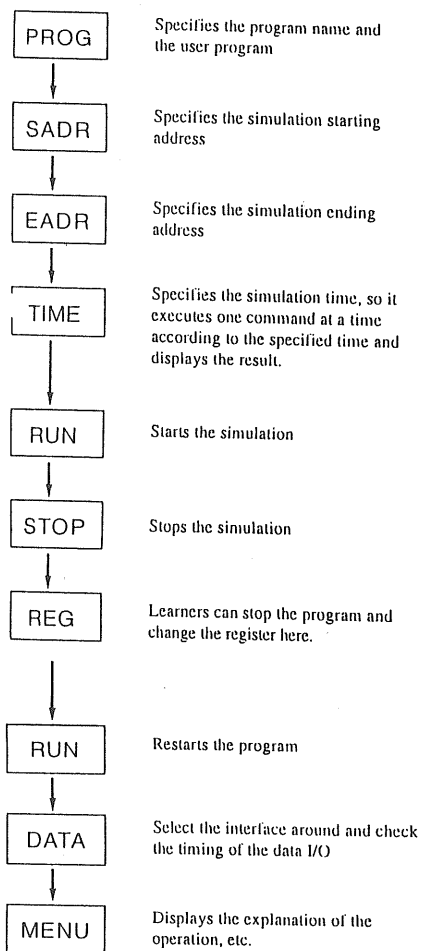


Fig. 2 Construction of the simulation system in the software trainer.

A/D : A/D converter

D/A : D/A converter

2. Construction of the software trainer of the microcomputer interface.

Construction of the software trainer of the microcomputer interface is shown in Chart 1

3. Construction and operation method of the simulation system in this software trainer.

The construction of the simulation system in this software trainer is shown in Figure 2

Operational procedures : please refer to Figure 1 (Outline of the software trainer of the Microcomputer Interface) and Figure 2 (Construction of the Simu-

lation system in the software Trainer).

- 3.1 Specify one user program to be simulated in the inter-hexa-format.
- 3.2 If the user, in the 8085 environment, does not have enough time to design a program from the beginning, he can easily create it using the "Easy Routine."
- 3.3 If learners want to install the programs they designed in this system, they specify the name of the simulation user program through the keyboard to store it in the memory. In this case, they can specify the starting and ending addresses of the user program.
- 3.4 Following is an example of the operational procedure to execute the user program.

If the students do not use the microcomputer interface trainer, they can input the data through the keyboard.

4. We would like to make the microcomputer interface trainer more friendly, easier for learners to understand, and to develop a learning system which is not only for a certain group of people.