HDU-ITMO Joint Institute
杭州电子科技大学 圣光机联合学院

COMPUTER BASICS
FINAL TEST
2022.03.26

Variant B

Section 1. Microprogramming (10 points)

1. RISC is a Reduced Instruction Set Computer. What does "Reduced" mean in this definition? (2 points)
2. What is the difference between packed and unpacked microinstruction formats? (1 point)
3. What is the main idea of usage FSM-based control unit? (2 points)
4. Assume that the subprogram is executed by using **JSR 583** instruction. What will the return instruction be? (1 point)
5. Write the codes of the control vertical and horizontal microinstructions for Basic Computer. These codes have to be able to check the sixth bit of the accumulator. If this bit equals 1, the control unit will jump to the address 57 in the microprogram memory. (2 points)
6. Write codes of the vertical microinstructions for Basic Computer that increments the value of the instruction register by one (IR = IR+1). You can use several microinstructions. (2 points)

Section 2. I/O System Introduction (10 points)

1. What is a "Driver"? For what purposes is it used? (1 points)
2. In which cases interrupt driven I/O is used? Give an example. (2 points)
3. Which interface requires less wires: synchronous or asynchronous? Explain your answer. (2 points)
4. What will the value be in the memory cell with the 00B address after ADD 00B instruction execution? The initial value of the 00B memory cell is 0009. (2 points)
5. Write a program that reads the byte from the data register of ED3 of Basic Computer, increments and put the result into the 055 address in the memory. (3 points)

Section 3. Interrupt driven I/O (5 points)

1. What are the drawbacks of programmed I/O? (1 point)
2. How a processor jumps to an interrupt handler in Basic Computer? Please describe the process. (1 point)
3. Write the interrupt handler that reads the data from the ED2 data register, multiply it by 8 and stores the result in the 005 address in the memory. (3 points)

Section 4. Computer Graphics (10 points)

1. We have a hypothetical screen mode of 256x256 pixels. Some point has coordinates X=170 and Y =17. What is the byte address of this point in a row? What is the bit offset? What is a byte offset from the beginning of the video memory? Please explain your answer. (3 points)
2. Look at this code and say, what will be the value in EAX register. Please explain your answer. (3 points)

```
mov eax, 7
push eax
mov eax, 5
push eax
pop eax

add eax, 2
```

3. How to use "stdcall" in FASM? Give examples of usage. (2 points)
4. For what purpose is the flag register in x86 processors used for? (2 points)

Section 5. Operating Systems (5 points)

1. For what purpose is the multiprogramming technique used? (2 point)
2. What is a batch script? Give a small example. (3 point)