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 C

Section 1. Microprogramming (10 points)

1. What are the advantages of using RISC processors? (2 points)
2. What is the difference between operational and control microinstruction in Basic Computer? (1 point)
3. What is the main idea of usage microprogrammed control unit? (2 points)
4. Assume that the subprogram is executed by using **JSR 3A5** instruction. What is in the 3A5 address? (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 fourth bit of the state register. If this bit equals 0, the control unit will jump to the address E0 in the microprogram memory. (2 points)
6. Write codes of the vertical microinstructions for Basic Computer that increments the value of the accumulator by one (A = A+1). You can use several microinstructions. (2 points)

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

1. What is a "I/O Module"? For what purposes is it used? (1 points)
2. In which cases DMA is used? Give an example. (2 points)
3. Which interface requires less wires: serial or parallel? Explain your answer. (2 points)
4. What will the value be in the memory cell with the 012 address after ADD 812 instruction execution? The initial value of the 012 memory cell is 0005. (2 points)
5. Write a program that reads the byte from the data register of ED2 of Basic Computer, decrements and put the result into the 05B address in the memory. (3 points)

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

1. What are the drawbacks of interrupt driven I/O? (1 point)
2. How a processor stores a program context during interrupt processing in Basic Computer? Please describe the process. (1 point)
3. Write the interrupt handler that reads the data from the ED3 data register, increments it by 7 and stores the result in the 004 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=210 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
add eax, 2

pop eax
```

3. How to use "invoke" in FASM? Give examples of use. (2 points)
4. What types of graphics adapters do you know? (2 points)

Section 5. Operating Systems (5 points)

1. What is a punchcard? For what purpose was it used? (2 point)
2. What is the difference of Monolithic and Microkernel OS? (3 point)