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 A

## Section 1. Microprogramming (10 points)

1. CISC is a Complex Instruction Set Computer. What does "Complex" mean in this definition? (2 points)
2. What is the difference between using direct and indirect encoding in microinstructions? (1 point)
3. What is the difference between microinstruction and microoperation? Give an example (2 point)
4. Assume that the subprogram is executed by using **JSR 234** instruction. What is the address of the first subprogram instruction? (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 first bit of the data register. If this bit equals 0, the control unit will jump to the address 34 in the microprogram memory. (2 points)
6. Write codes of the vertical microinstructions for Basic Computer that decrements the value of the data register by one (DR = DR-1). You can use several microinstructions. (2 points)

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

1. What is the difference between I/O controller and I/O processor? (1 points)
2. In which cases programmed I/O is used? Give an example. (2 points)
3. Which interface requires less wires: simplex or duplex? Explain your answer. (2 points)
4. What will the value be in the memory cell with the 00B address after ADD 80B 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 ED2 of Basic Computer, adds it to the accumulator and put the result into the 0B5 address in the memory. (3 points)

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

1. What is the function of a daisy chain? (1 point)
2. How a processor returns from an interrupt handler in Basic Computer? Please describe the process. (1 point)
3. Write the interrup3t handler that reads the data from the ED3 data register, multiply it by 4 and stores the result in the 002 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=25 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
add eax, 3

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

3. For what purpose we can use "call" in FASM? Give an example of usage. (2 points)
4. What is a bit mask? Give an example of usage in computer graphics. (2 points)

**Section 5. Operating Systems (5 points)**

1. For what purpose is the spooling technique used? (2 point)
2. What is the difference between scripting and programming languages? Explain your answer. (3 points)