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 E

Section 1. Microprogramming (10 points)

1. Is RISC or CISC processors needed more complex compiler? Please explain your answer. (2 points)
2. For what purposes is a pipeline used in RISC processors? (1 point)
3. Using vertical and horizontal microinstruction we can do the same actions. Why the horizontal microinstruction has more bits than vertical? (2 points)
4. Assume that the subprogram is executed by using **JSR 67A** instruction. What is in the 67C 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 second bit of the accumulator. If this bit equals 0, the control unit will jump to the address A8 in the microprogram memory. (2 points)
6. Write codes of the vertical microinstructions for Basic Computer that increments the value of the instruction pointer by one (IP = IP+1). You can use several microinstructions. (2 points)

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

1. What is an asynchronous data exchange? For what purposes is it used? (1 points)
2. What is "I/O interface"? Give an example (2 points)
3. Which interface requires less wires: duplex or semi duplex? Explain your answer. (2 points)
4. What will be subtracted from the accumulator value after SUB 82A instruction execution? The initial value of the 02A memory cell is 0005. (2 points)
5. Write a program that reads the byte from the data register of ED2 of Basic Computer, multiply by 2 and put the result into the 1A5 address in the memory. (3 points)

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

1. What is the difference of software and hardware poll during the interrupt source identification? (1 point)
2. What will be if the new interrupt request appears during interrupt processing in Basic Computer? Please describe your answer. (1 point)
3. Write the interrupt handler that reads the data from the ED3 data register, increments it by 8 and stores the result in the 006 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=56 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
add eax, 4
pop eax
```

3. What is the difference between "call" and "invoke" in FASM? Give examples. (2 points)
4. What general purpose registers in x86 processors do you know? What are they used for? (2 points)

Section 5. Operating Systems (5 points)

1. For what purpose is a command interface used? (2 point)
2. For what purpose can we use batch scripting? Explain your answer. (3 points)