07.07.2019. Архитектура рачунара

4.

```
      LD #0
      ST i       // row
      ST j       // column
      ST cnt     // num of received, used for compare with SIZE
      ST allCnt  // num of all received
      ST sem     // for PER1 and DMA
      LD BUFFER
      ST pBUFF
      LD N
      MUL N
      ST allElements   // num of elements in matrix
      LD #8001h  // start PER0
      OUT FF00h

wait0: IN FF01h
        AND #1h
        JZ wait0

      IN FF02h
      ST elem
      INC allCnt
      CMP allElements
      JE end     // if last element is received jmp to the end
      LD i
      CMP j
      JGE wait0  // skip element, element is not under \
      LD elem
      ST (pBUFF)
      INC pBUFF
      INC cnt

      LD cnt
      CMP SIZE
      JNE skip
      LD SIZE
      PUSH       // push size
      LD BUFFER
      ST pBUFF   // reset pBUFF
      PUSH       // push addres of buffer
      LD #0
      ST cnt     // reset cnt
      call sendBuffer
      POP
      POP
```

```
skip: INC j
     LD j
     CMP N
     JNE wait0
     INC i      // increment row
     LD #0
     ST j       // reset column
     JMP wait0

end: LD cnt     // if buffer does not empty, start last transfer
     CMP #0
     JE endProg
     PUSH
     LD BUFFER
     PUSH
     CALL sendBuffer
     POP
     POP
endProg: HALT
////////////////////////////////////////////////////////////////////
sendBuffer:
     LD BP                                       // stack:
     PUSH                                             cnt +3
                                                      buffer +2
                                                      retPC +1
                                                      BP +0
     LD [BP+3]  // start DMA
     OUT FF24h
     LD [BP+2]
     OUT FF23h
     LD #8002h
     OUT FF20h
     LD #8000h  // start PER1
     OUT FF10h

     wait1: LD sem // synchronous
             CMP #1
             JNZ wait1
     RTS
//////////////////////////////////////////////////////////////////////
Pr. rut. DMA
     PUSH
     LD #1
     ST sem
     DEC
     OUT FF10h
     OUT FF20h
     RTI
```