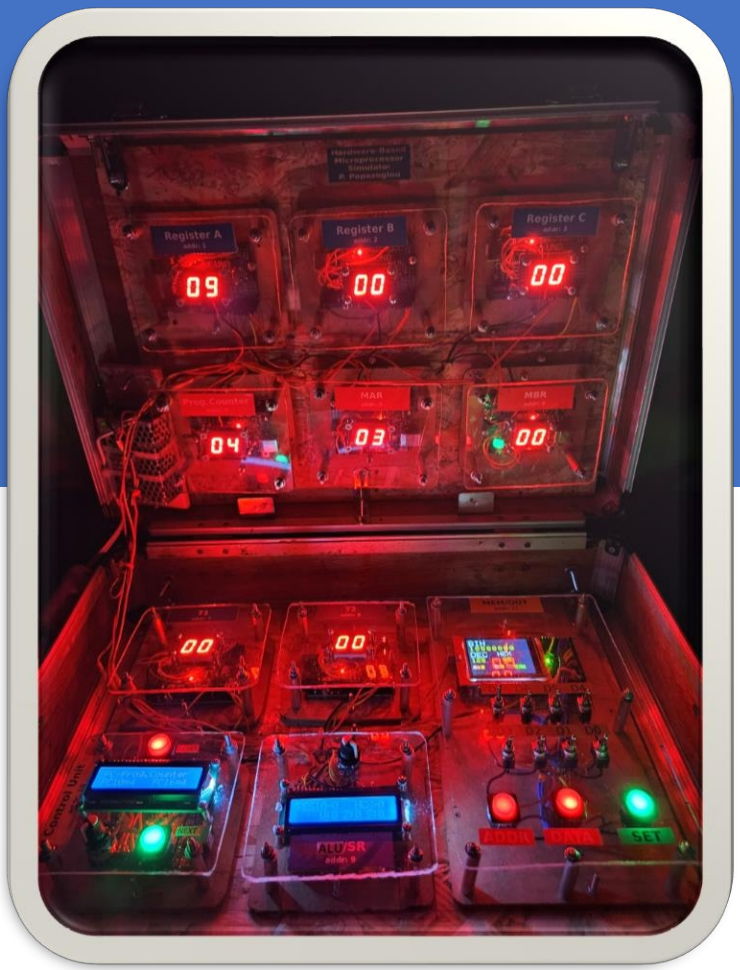
Hardware-Oriented Microprocessor Simulator (HOMS)



Quick User Guide v1.0

Designer-Developer

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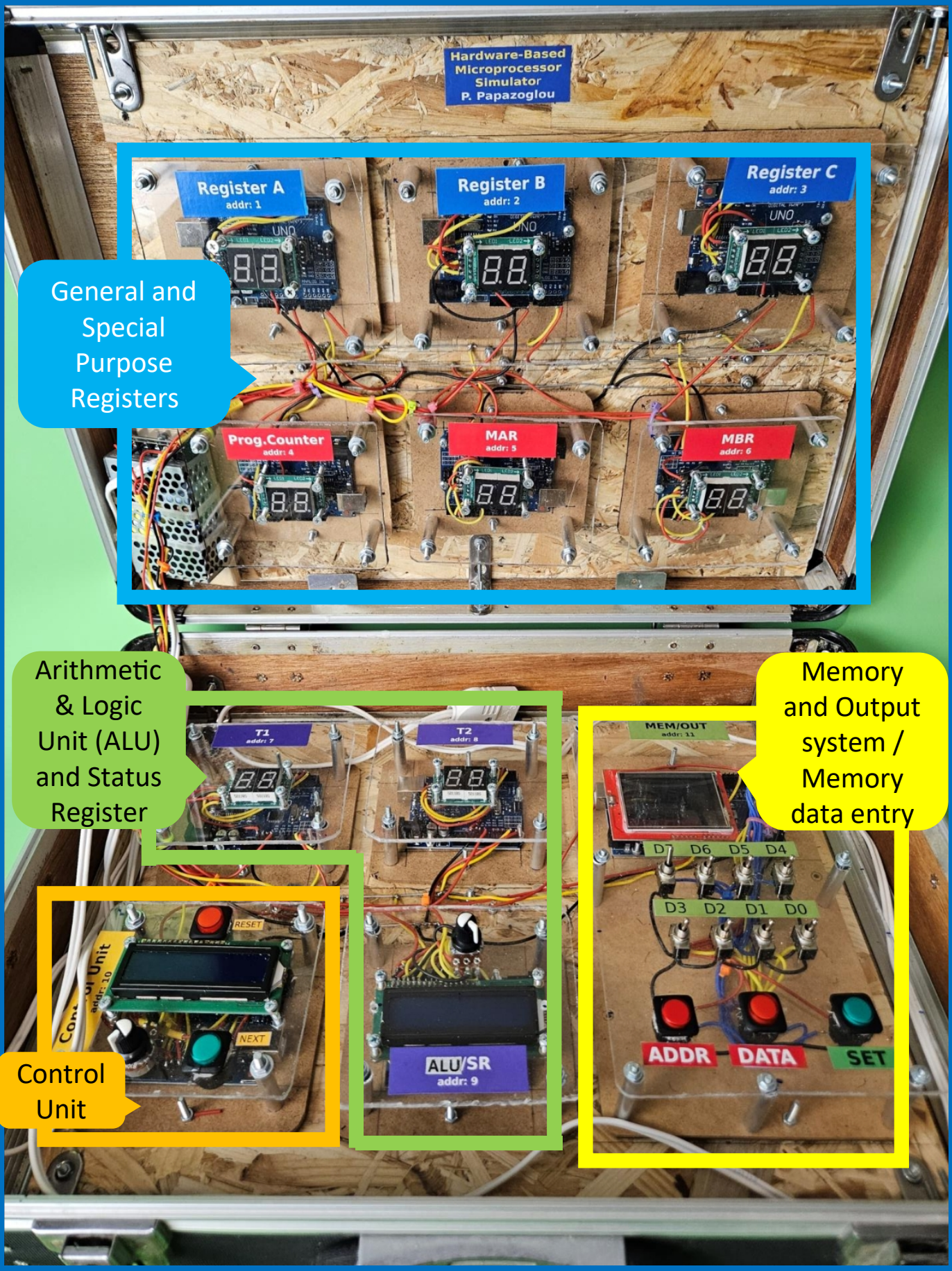
HOMS Map



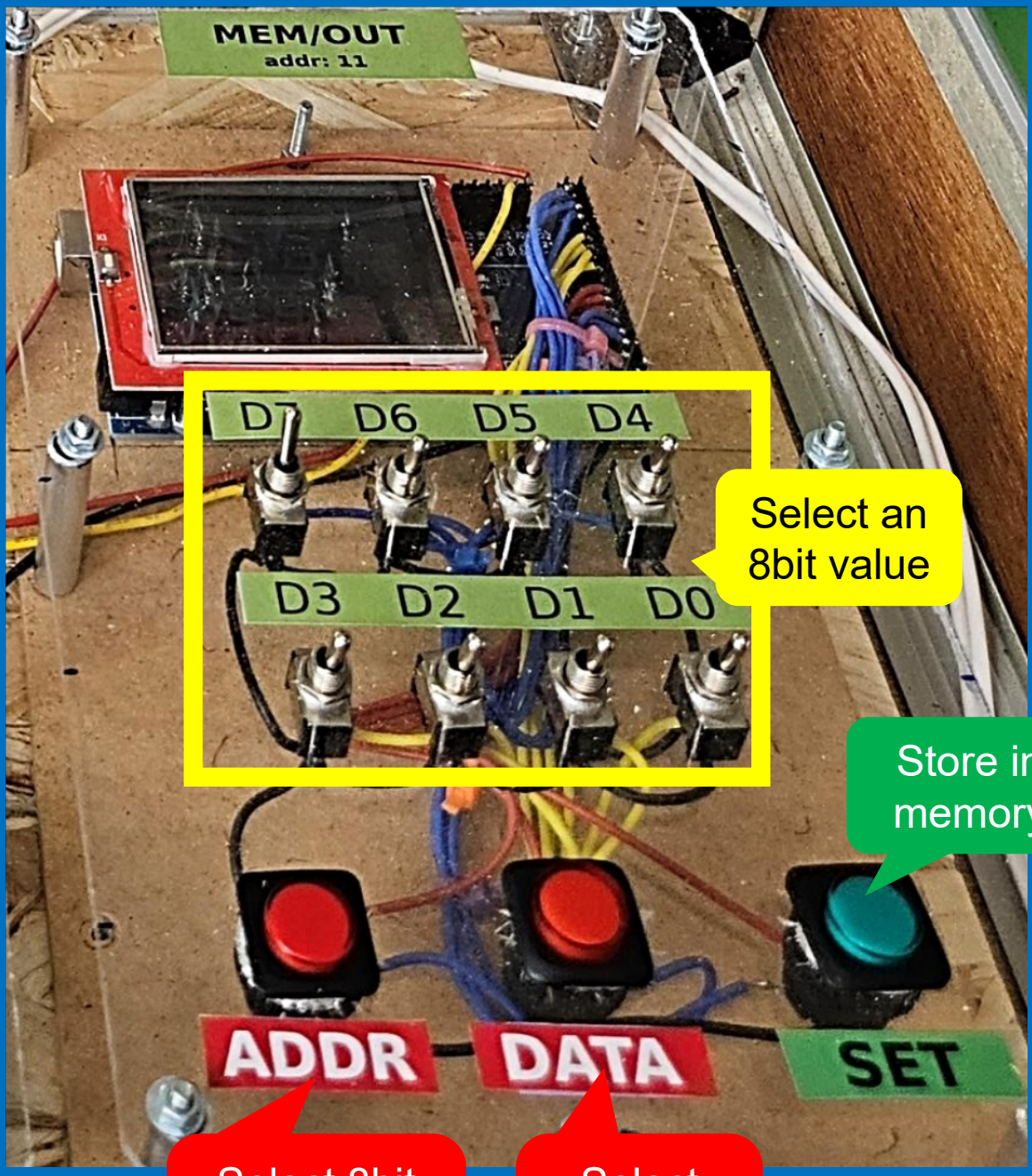
General and Special Purpose Registers

Arithmetic & Logic Unit (ALU) and Status Register

Control Unit

Memory and Output system / Memory data entry

MEMORY-OUTPUT UNIT



Storing data in memory

MEMORY-OUTPUT UNIT

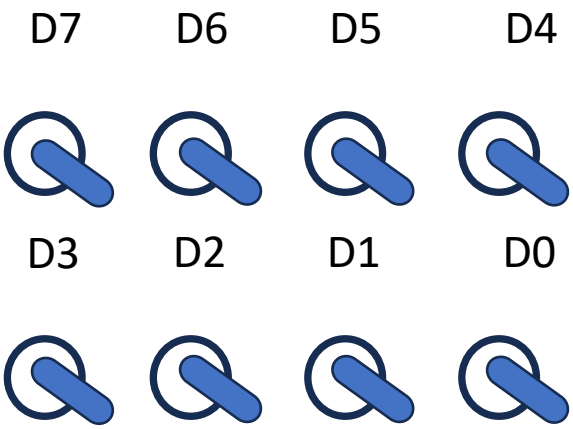
Example program

Instruction	Byte code (decimal)	Address (content) (in decimal)
LOD A,8	(dec) 04 08, (hex) 04 08	00 (04), 01 (08)
INC A	(dec) 10 00, (hex) 0A 00	02 (10), 03 (00)
STOP	(dec) 17 00, (hex) 11 00	04 (17), 05 (00)

Memory

ADDR	DATA
0	4
1	8
2	10
3	0
4	17
5	0

STEP 1 – Set all switches down

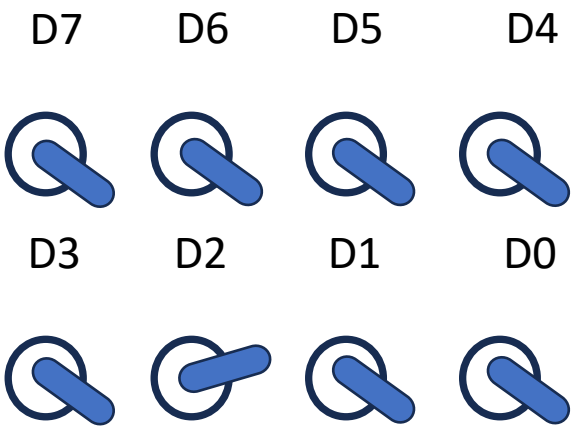


STEP 2 – Press ADDR button

ADDR

Set 0 as address

STEP 3 – Set switches for number 4

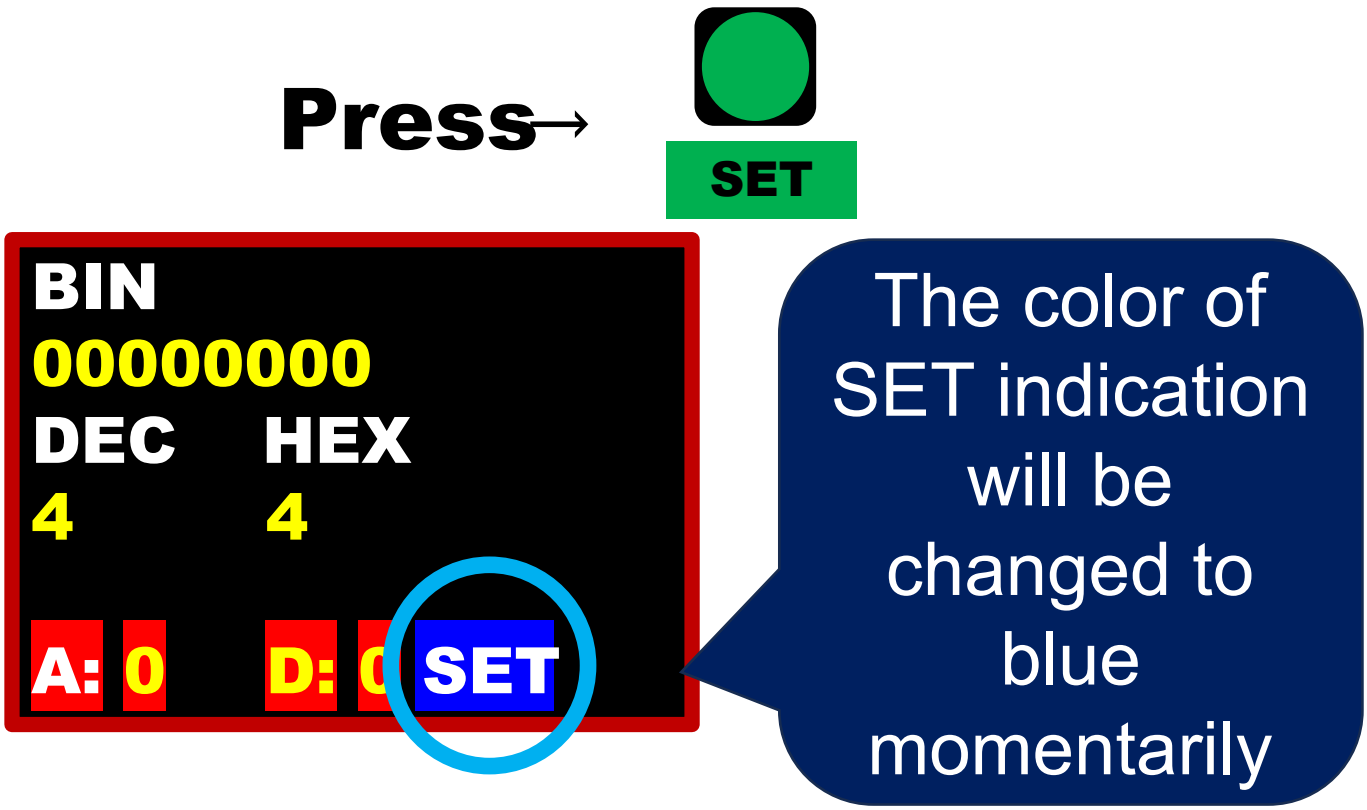


Number 4 is displayed on screen

STEP 4 – Press DATA button

Set 4 as data

STEP 5 – Store data in memory



Procedure to store bytes in memory

1. Set switches in the binary representation of the desired ADDRESS (confirm value on screen)

2. Press **ADDR** button to set the above value as ADDRES (field A: on screen)

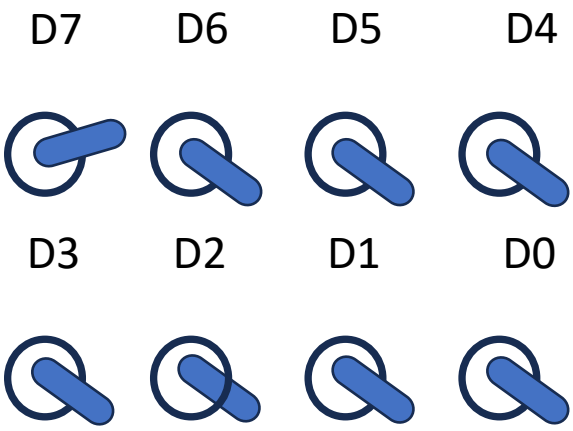
3. Set switches in the binary representation of the desired DATA (confirm value on screen) – byte that will be stored in the above ADDRESS

4. Press **DATA** button to set the above value as DATA (field D: on screen)

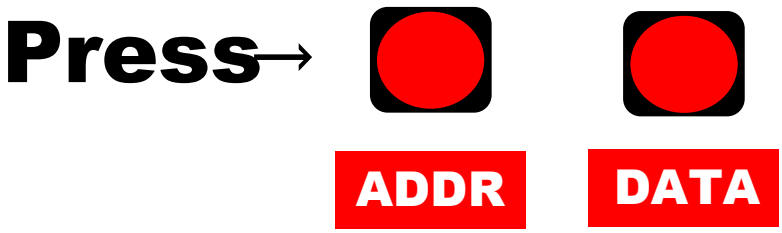
5. Press SET button to store DATA in the desired ADDRESS – Confirm the momentarily color change of the button SET

Display memory contents (1)

Change switches position
for forming the number 128



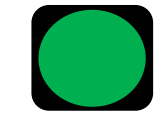
Press successive the
buttons:



Confirm
values on
screen

Display memory contents (2)

Press→



SET

ADDR	DATA	ADDR	DATA
0	4	11	0
1	8	12	0
2	10	13	0
3	0	14	0
4	17	15	0
5	0	16	0
6	0	17	0
7	0	18	0
8	0	19	0
9	0	20	0
10	0	21	0

EXIT

Press SET button to exit

* The above data represent the bytes of the example program

How to avoid manual data entry

- The data entry in memory is painful especially when the program has many bytes
- The program can be stored automatically in memory, avoiding the manual procedure
- For automatic data entry, the needed program bytes have to be inserted directly into the memory/output unit source code
- Insert program bytes by declaring an array of bytes:

byte prog[]={4, 8, 10, 0, 6, 0, 14, 0, 17, 0};

Demo program		
Instruction	Byte code (decimal)	Address (content) (in decimal)
LOD A,8	(dec) **04 08**, (hex) 04 08	00 (04), 01 (08)
INC A	(dec) **10 00**, (hex) 0A 00	02 (10), 03 (00)
MOV B,A	(dec) **06 00**, (hex) 06 00	04 (06), 05 (00)
ADD A,B	(dec) **14 00**, (hex) 0E 00	06 (14), 07 (00)
STOP	(dec) **17 00**, (hex) 11 00	08 (17), 09 (00)

Create a new function for storing bytes from the **prog[]** array to memory array (**mem[]**). This function has to be inserted at the beginning of the **setup()** section.

```
void set_prog()
{
  for(int i=0;i<10;i++) mem[i]=prog[i];
}
```