Universitatea Politehnica Bucuresti

Facultatea de Electronica,Telecomunicatii si Tehnologia Informatiei

PROIECT 2

Profesor coordonator:Zoican Sorin

Realizat de:

Burlacel George

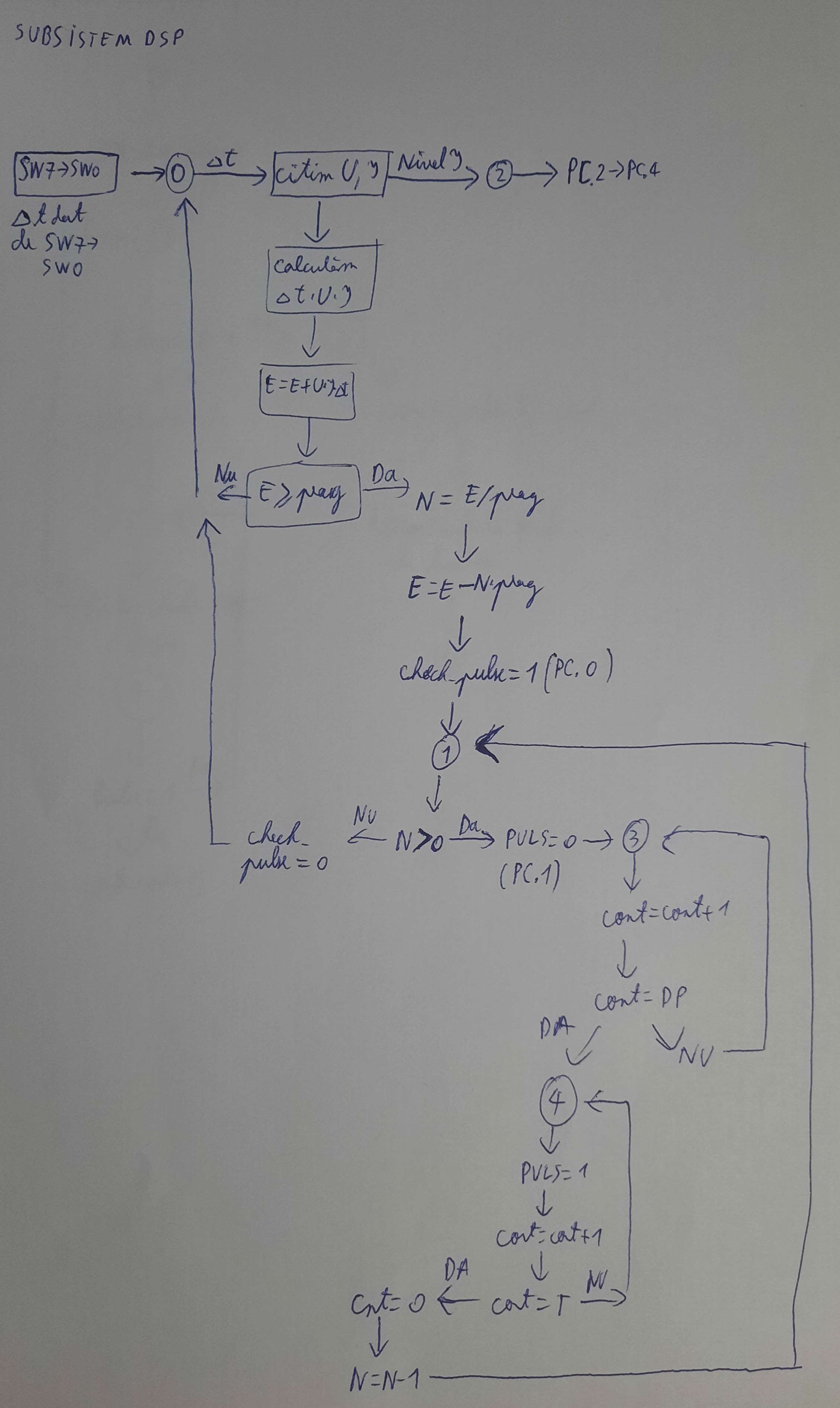
Busicescu Mihai

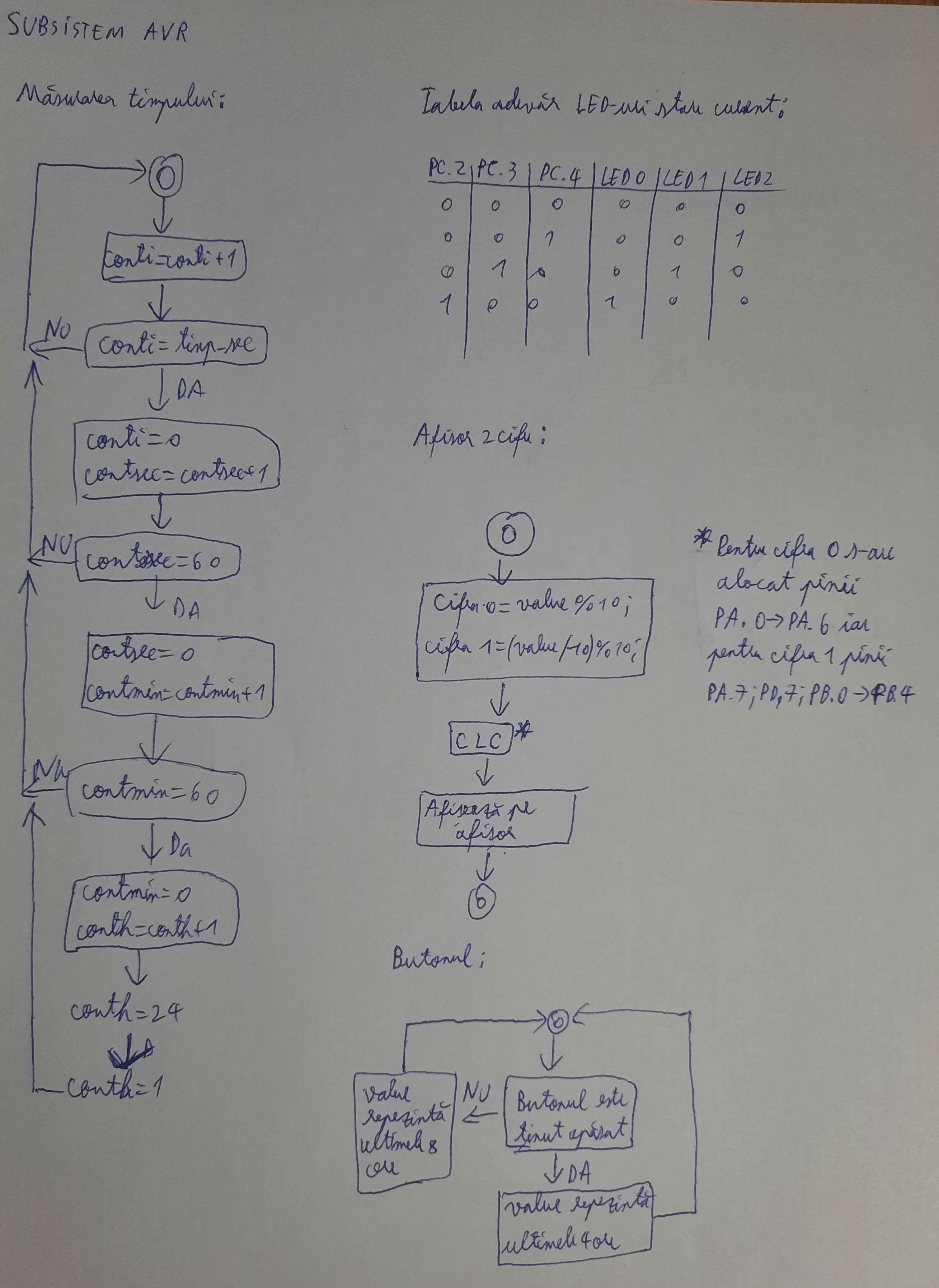
Nica Bogdan Claudiu

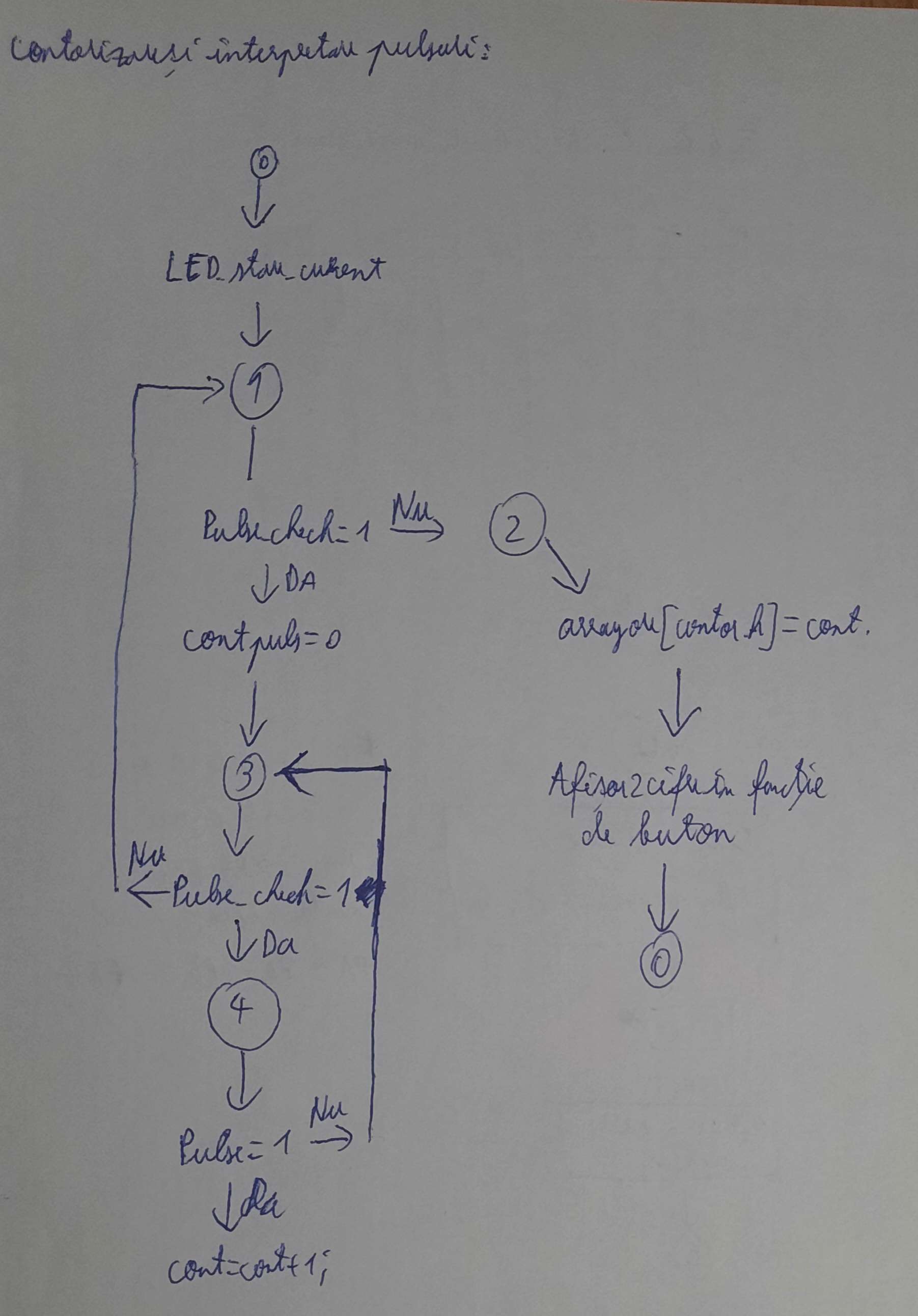
Tudoran Daniel

Grupa: 433Db

1.Organigrama:

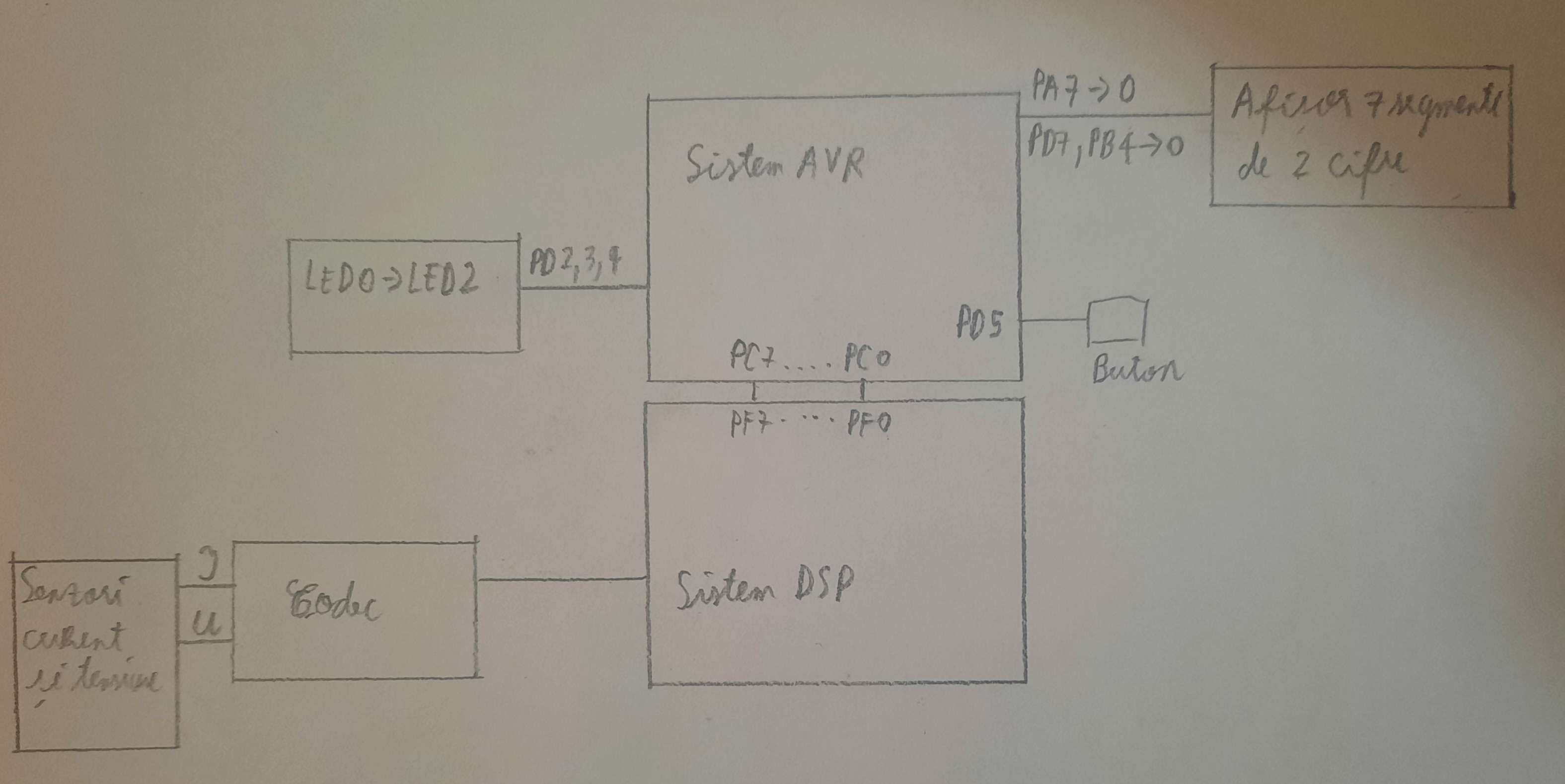




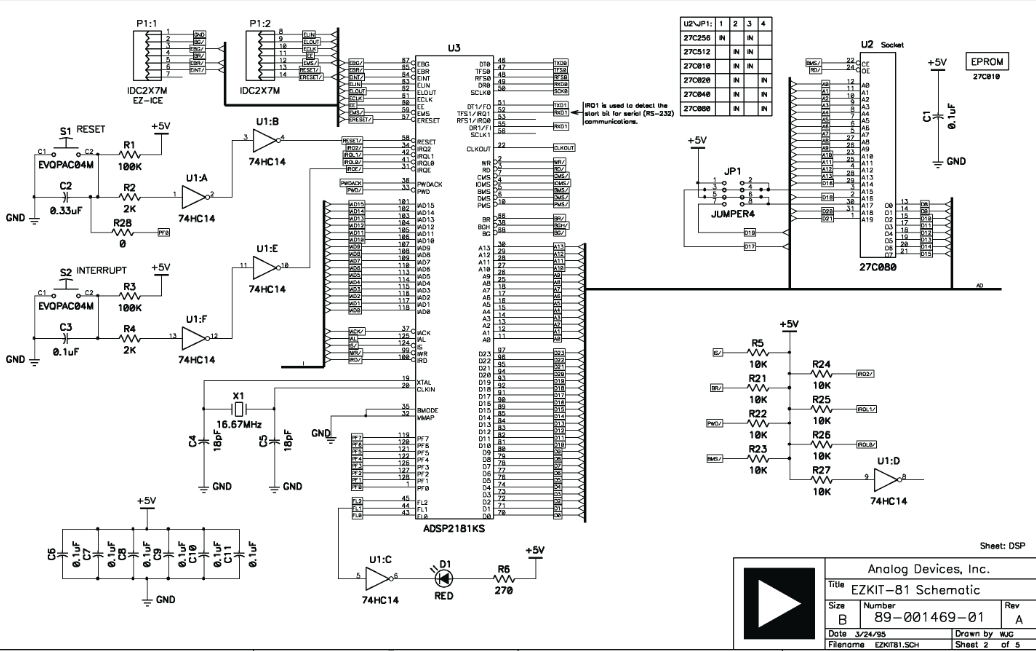


2.Hardware

Schema bloc



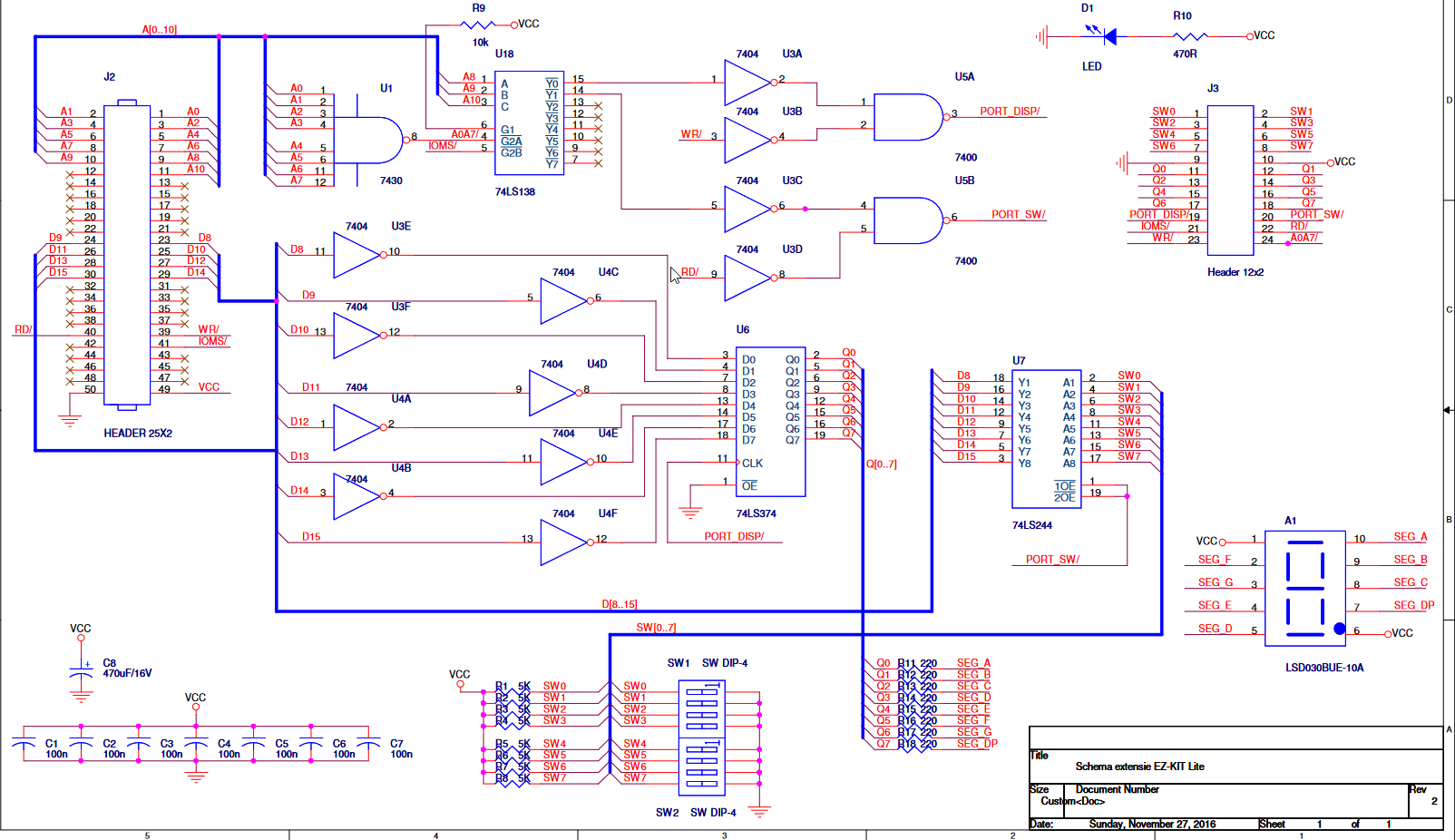
Sistemul DSP



SW1 este folosit pentru a reseta microcontrolerul, acesta muta punctul de masa in fata rezistentei R2 astfel trimite un semnal de “0” logic.  
SW2 creaza ointrerupere externa care la apasare trimite “0” logic, acesta muta punctul de masa in fata rezistentei R4.

Cristalul de cuart X1 si condensatoarele C4,C5 formeaza un oscilator de cuart.

Codec-ul este utilizat pentru a converti semnale analogice in semnale digitale, in sistemul DSP il folosim ca un convertor analog digital.



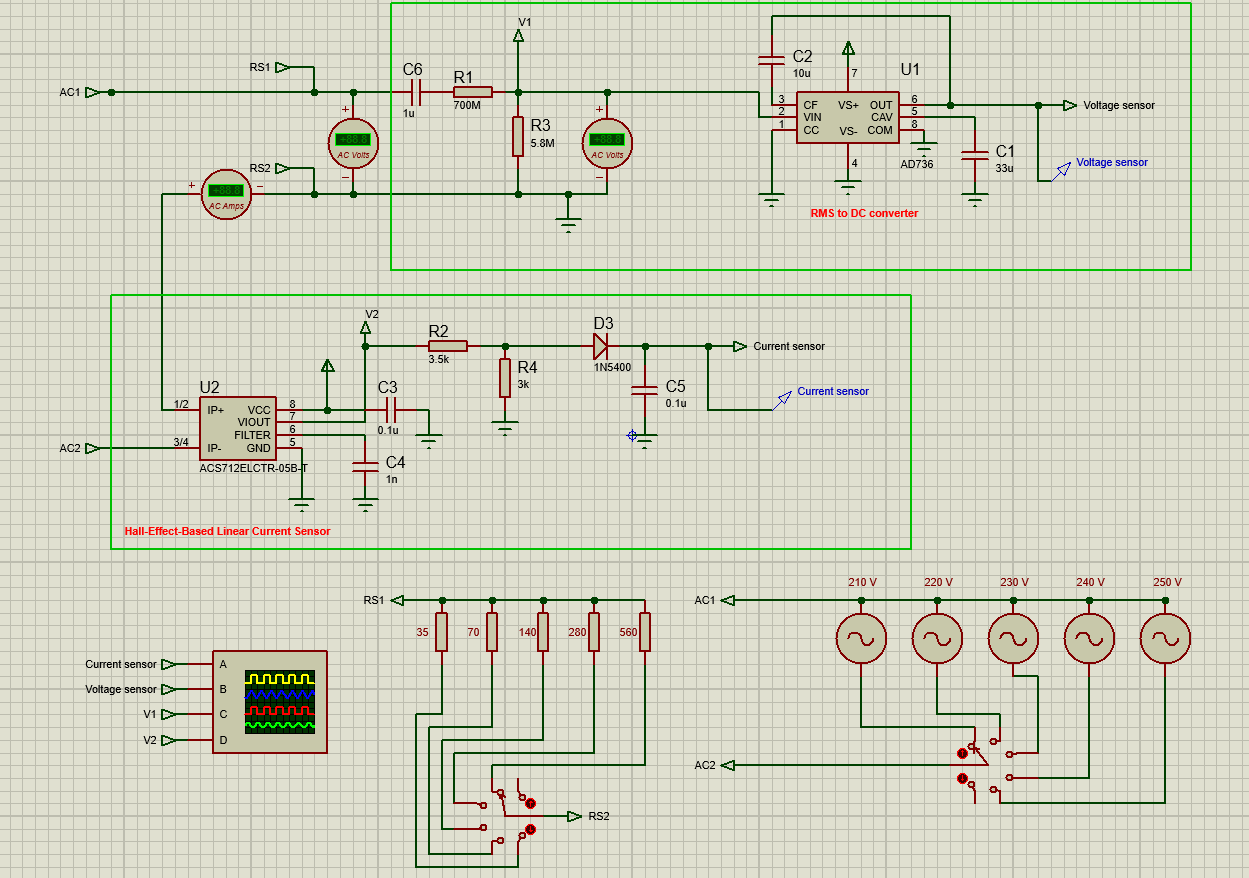
Extensia sistemului DSP ne ofera Switchurile SW7-0 si afisorul de 7 segmente pentru afisarea starii.

Senzori curent si tensiune

Senzorul de Curent conform documetatiei si schemei electrice ar avea in total la iesire 4.48 V pentru 1 A, dioda 1N5400 ne mentine un nivel de curent de maxim 3A cu o influenta mica asupra tensiunii la iesire( maxim 1 V conform documentatiei).

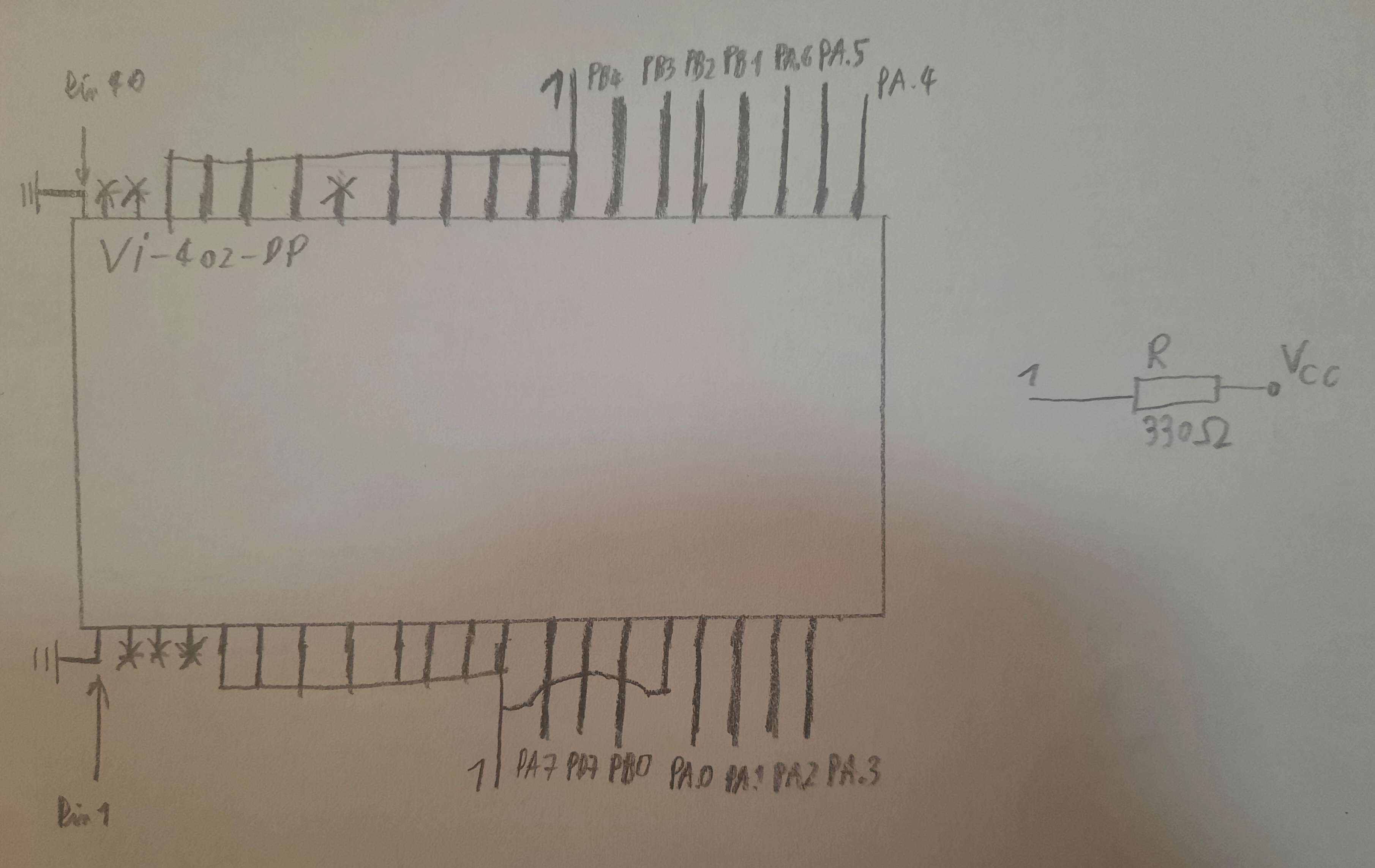
Senzorul de tensiune, conform documentatiei, face conversia de la un semnal de amplitudine

“Vin” la o tensiune DC de tip

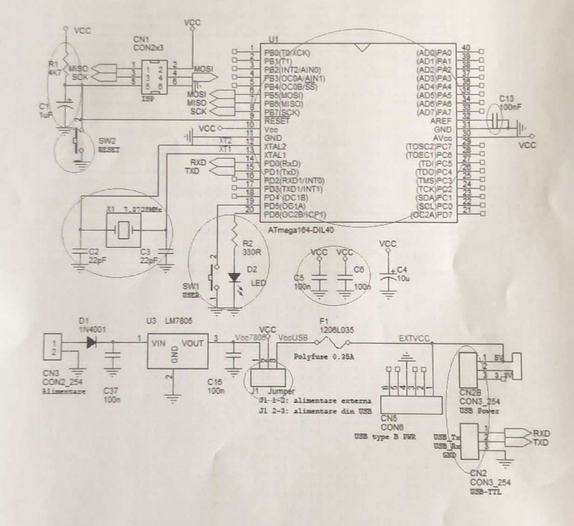


Afisorul pe 7 segmente cu 2 cifre

Cum acesta functioneaza pe logica inversa, pini pentru celelalte cifre si simboluri trebuie mentinuti pe “1” logic pentru a nu se aprinde astfel conectam pinii respectivi la Vcc printr-o rezistenta.



Sistemul AVR



* R1,C1 formeaza un circuit de power-on/reset. Prin aplicarea tensiunii de alimentare Vcc se va aplica “0” logic resetand microcontrolerul pana cand condesnatorul C1 se incarca, transmitanduse apoi “1” logic. SW2 functioneaza ca un buton de reset.
* LEDul D2 se aprinde pe “1” logic si acesta poate functiona ca un indicator power-on/power-off.
* SW1 este folosit pentru subsistemul AVR , acesta daca este tinut apasat ne va afisa ultimele 4 ore de consum iar daca nu e apasat ne va afisa ultimele 8.
* Cristalul de cuart X1 alaturi de condensatoarele C2,C3 formeaza un oscilator de cuart.
* Prin CN3 se poate realiza alimentare externa, dioda D1 este folosita pentru a proteja la alimentare inversa.
* LM7805 este un stabilizator de tensiune pentru a ne aduce tensiunea de alimentare la 5V
* Jumperul J1 poate fi pus de 2 poziti: 1-2 pentru alimentare externa prin CN3 iar 2-3 pentru alimentare externa prin USB.
* F1 este o rezistenta fuzibila folosita pentru a nu cauza daune sistemului la o supra alimentare de curent.
* Pini PC7->PC0 sunt conectati la porti PF7->0 de la DSP, pini PD2,3 si 4 sunt conencati la LED0->2, Pini PB0->4, PD7 si PA 7->0 sunt conectati la afisorul de 4 cifre.

3.Subsistemul AVR

Sub sistemul AVR proceseaza informatiile primite de la subsistemul DSP pentru: a afisa pe LEDurile LED0 → LED2 nivelul de curent consumat avand 4 stari: niciun LED aprins semnifica faptul ca nu s-a primit nimic de la DSP, LED0 aprins ne semnifica un nivel scazut de curent, LED1 un nivel mediu de consum si LED3 un nivel mare; a ne afisa pe un afisor cu sapte segmente ce ne arata doua cifre valoarea in kWh consumata in ultimele 8 ore daca nu e apasat butonul sau valoarea consumata in ultimele 4 ore daca este tinut apasat butonul.

Subsistemul AVR primeste pe PC0 un semnal de Check Pulse, care in 1 logic semnifica prezenta semnalului de intrare iar pe 0 logic absenta acestuia.Cat timp Check Pulse este in 1 logic, pe PC1 primim un numar de pulsuri de la sistemul DSP pentru a semnifica consumul de kWh unde un puls semnifica un kWh.

Contorizarea timpului se realizeaza prin timer 0 un timer de 8 biti de frecventa de 19.531 kHz, modificat prin CodeVisionAVR care are valoarea implicita de 60, 0x3C, pentru a ne oferi o perioada de 10ms la o frecventa a microcontrolerului de 20MHz, de fiecare data cand timerul ajunge la valoarea de 0xFF, 255 creaza o intrerupere si reincepe contorizarea de la valoarea de 0x3C.

Valoarea primita este salvata intr-un array de 24 de elemente corespunzator celor 24 de ore dintr-o zi.

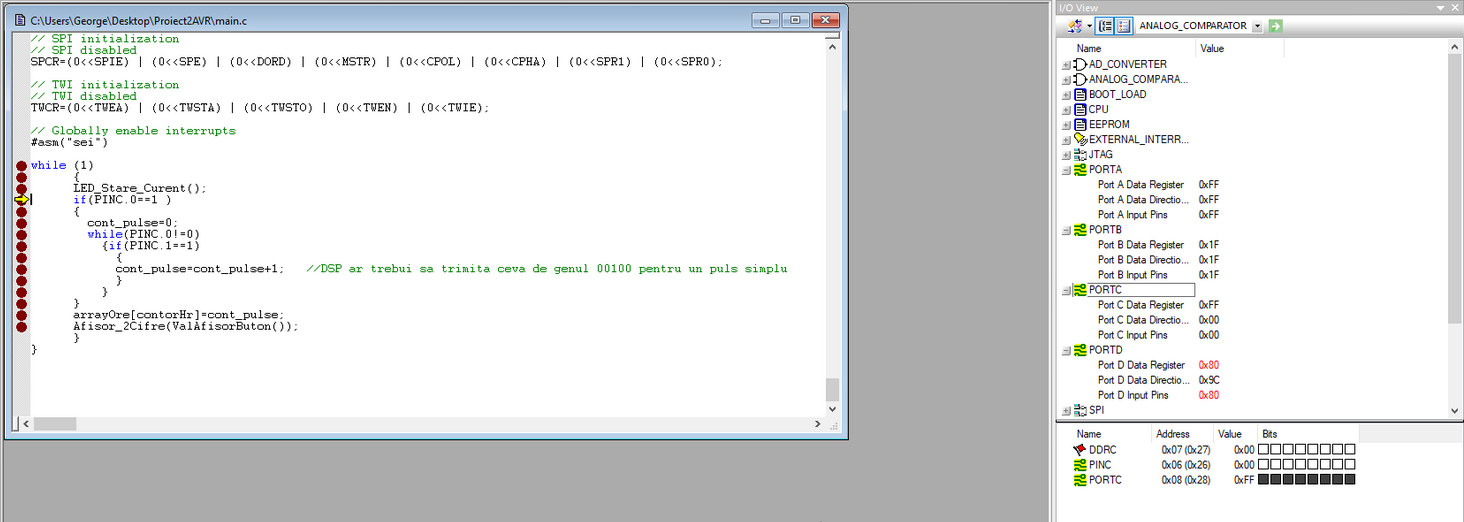
4.Subsistemul DSP

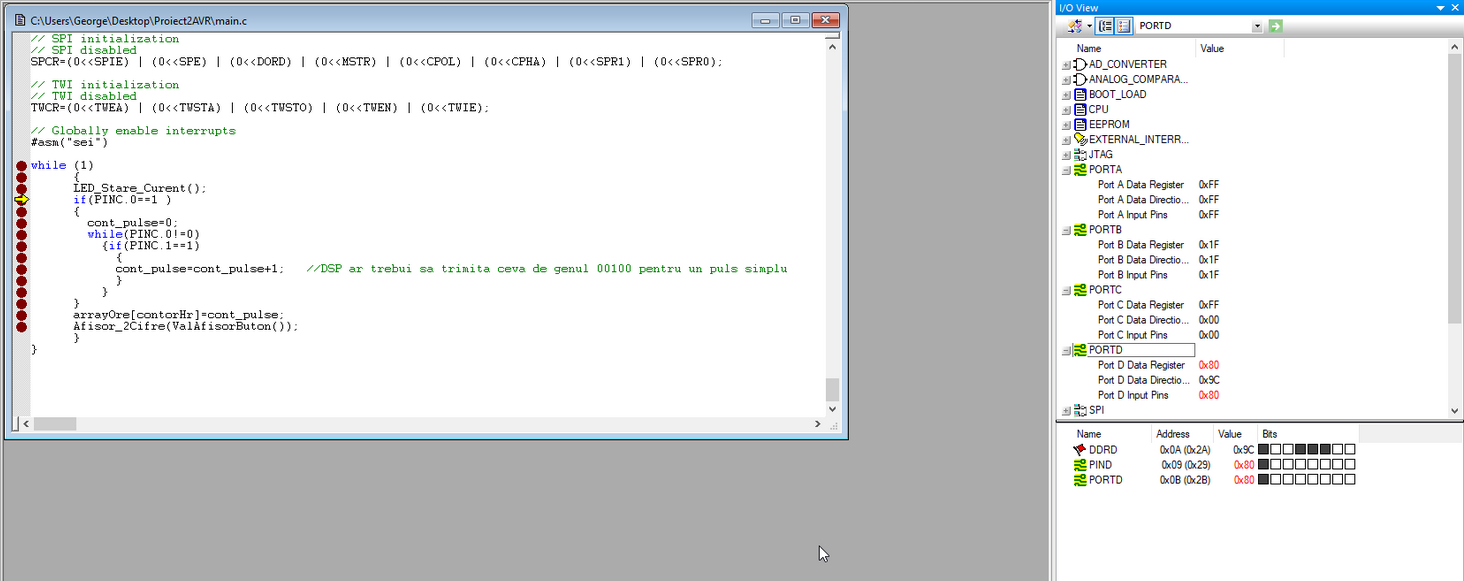
Iesirea de la Senzori este interpretata de CODEC cu timpi de esantionare determinati de SW7-0 din extensia DSP, afisorul din extensie ne afiseaza numarul corespunzator switchului indicator al duratei de esantionare. Sistemul DSP calculeaza valoarea de kWh pana atinge pragul minim de 1kWh care apoi genereaza un puls pentru fiecare 1 kWh calculat. Trimite pe PF0 valoarea “1” logic pentru a semnaliza catre AVR ca va primi pulsurile pentru afisarea consumului. Pe porti PF2,3,4 vom trimite valoarea curentului interpretata de catre DSP: 0 A trimite codul ”000”, 5mA-100mA trimite codul “001” pentru a semnifica un nivel min de consum de curent, 100mA-2A trimite cod “010” pentru a semnifica un nivel mediu de consum, iar 2A-5A trimite cod “100” pentru a semnifica un nivel mare de consum.

Simulari AVR

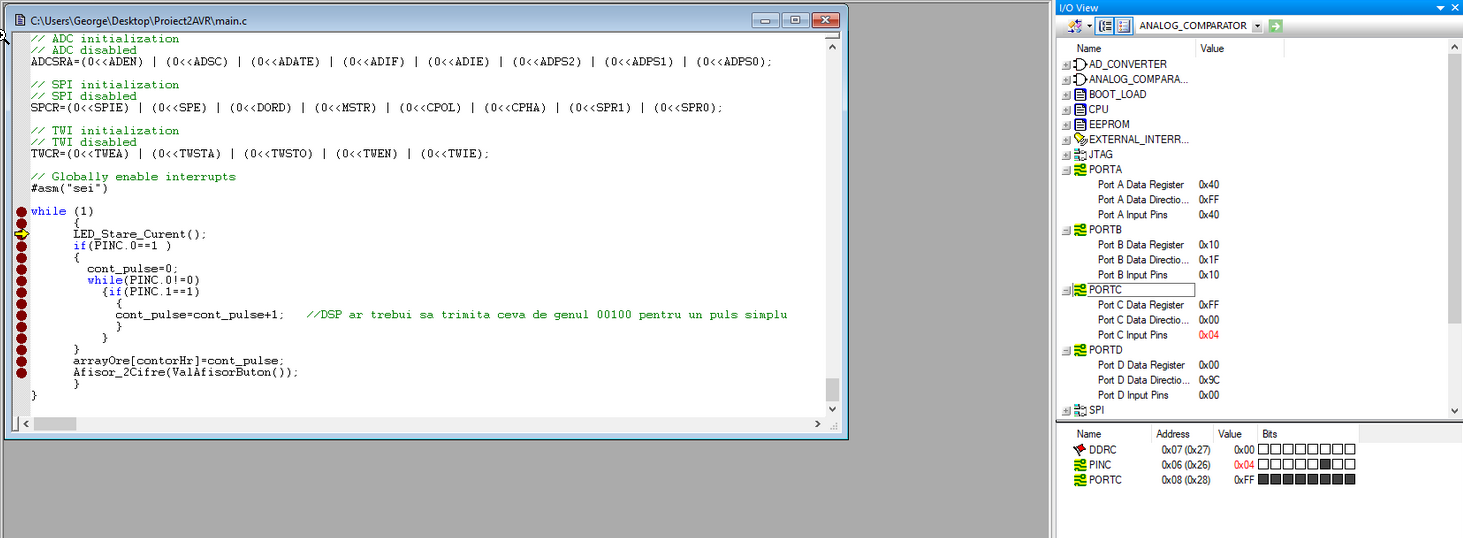
Demonstare afisor nivel curent,

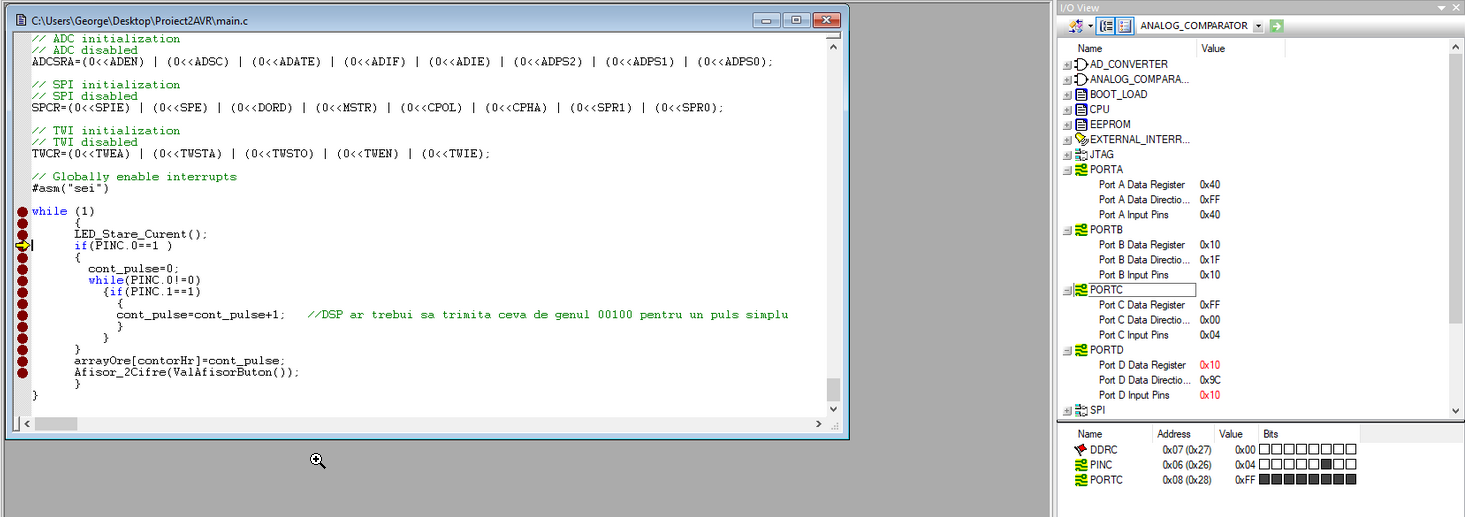
Nimic primit pe PinC0->7 PortD 4,3,2 sa fie 0



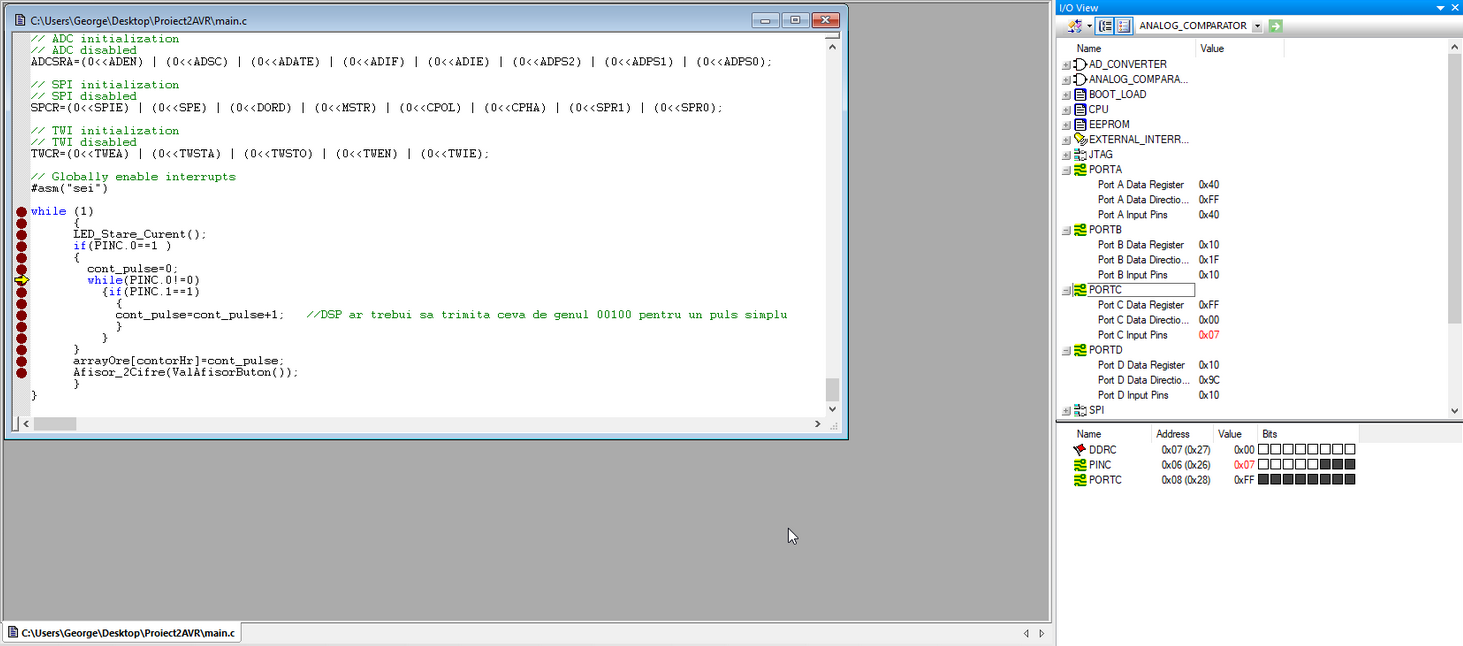


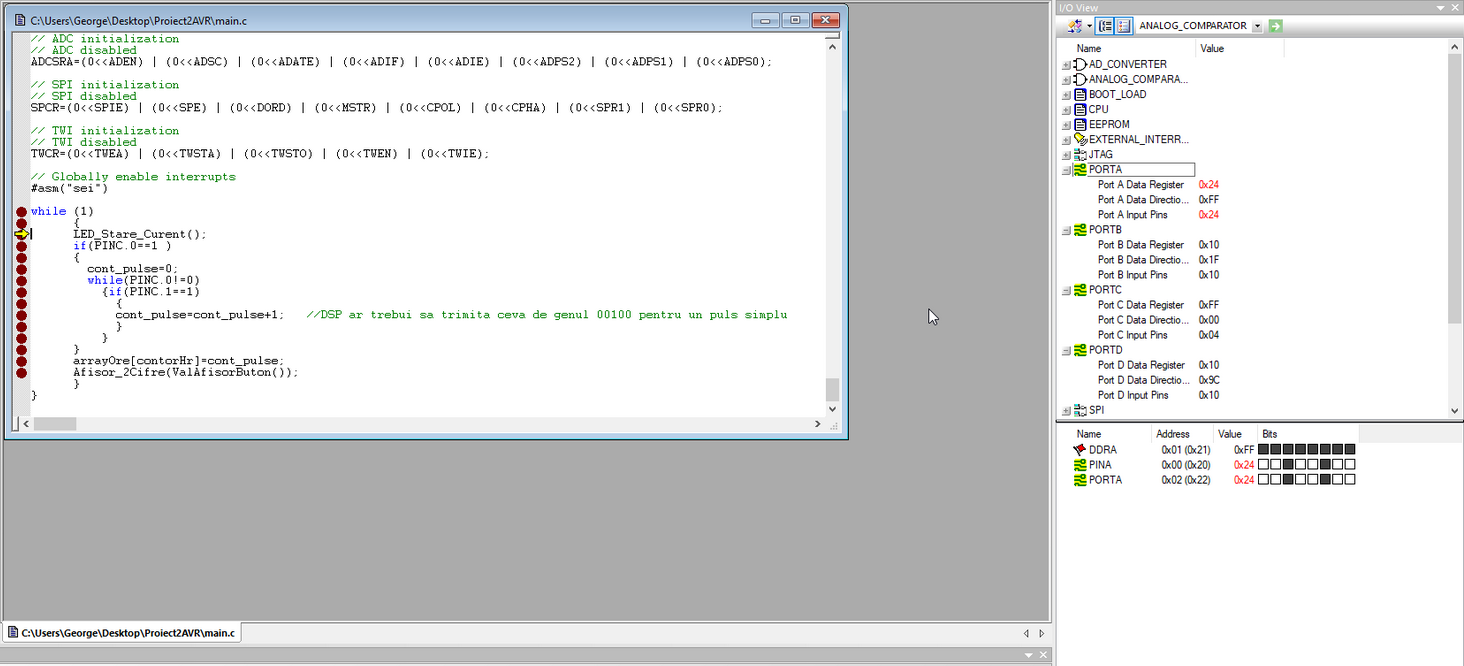
PinC2 devine “1” logic nivelul o sa fie PortD 4 =1 PortD.3,2 sa fie 0





Demonstrare afisor 7 segmente;

Se primeste PinC0, PinC2 “1” logic, se trimit impulsuri pe Pinc1, PortA0->6 iau valorile corespunzatoare functiei 



5.Cod AVR

|  |
| --- |
| #include <io.h> |
|  |

|  |
| --- |
|  |
|  |

|  |
| --- |
|  |

|  |
| --- |
| char arrayOre[24]={0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0}; |
|  |

|  |
| --- |
| char contorIn=0; |
| //initializare a variabilelor / contorului de timp |

|  |
| --- |
| char contorSec=0; |
|  |

|  |
| --- |
| char contorMin=0; |
|  |

|  |
| --- |
| char contorHr=1; |
|  |

|  |
| --- |
| char val\_afisor; |
|  |

|  |
| --- |
| char cont\_pulse=0; |
|  |

|  |
| --- |
| // Timer 0 overflow interrupt service routine |
|  |

|  |
| --- |
| interrupt [TIM0\_OVF] void timer0\_ovf\_isr(void) |
|  |

|  |
| --- |
| { |
|  |

|  |
| --- |
| // Reinitialize Timer 0 value |
|  |

|  |
| --- |
| TCNT0=0x3C; //acesta este valoarea timerului pentru a obtine o perioada de 10ms. |
|  |

|  |
| --- |
|  |

|  |
| --- |
|  |
|  |

|  |
| --- |
|  |

|  |
| --- |
| contorIn=contorIn+1; |
|  |

|  |
| --- |
| if(contorIn%100==0){ |
|  |

|  |
| --- |
|  |

|  |
| --- |
| contorSec=contorSec+1; |
|  |

|  |
| --- |
| contorIn=0; |
|  |

|  |
| --- |
| } |
|  |

|  |
| --- |
| if(contorSec%60==0){ |
|  |

|  |
| --- |
| contorMin=contorMin+1; |
|  |

|  |
| --- |
| contorSec=0; |
|  |

|  |
| --- |
| } |
|  |

|  |
| --- |
| if(contorMin%60==0){ |
|  |

|  |
| --- |
| contorHr=contorHr+1; |
|  |

|  |
| --- |
| contorMin=0; |
|  |

|  |
| --- |
| } |
|  |

|  |
| --- |
|  |
|  |

|  |
| --- |
| if(contorHr%24==0){ |
|  |

|  |
| --- |
| contorHr=1; |
|  |

|  |
| --- |
| } |
| // functie de contorizare a timpului |

|  |
| --- |
| } |
|  |

|  |
| --- |
| void LED\_Stare\_Curent(void) |
|  |

|  |
| --- |
| { |
|  |

|  |
| --- |
| if(PINC.2==1){ |
|  |

|  |
| --- |
| PORTD.4=1; // reprezinta o valoare scazuta 10mA-1.5ish A |
|  |

|  |
| --- |
| PORTD.3=0; |
|  |

|  |
| --- |
| PORTD.2=0; |
|  |

|  |
| --- |
| }else if(PINC.3==1){ |
|  |

|  |
| --- |
| PORTD.4=0; |
|  |

|  |
| --- |
| PORTD.3=1; // reprezinta o valoare medie 1.501 A -3.5 A |
|  |

|  |
| --- |
| PORTD.2=0; |
|  |

|  |
| --- |
| }else if(PINC.4==1){ |
|  |

|  |
| --- |
| PORTD.4=0; |
|  |

|  |
| --- |
| PORTD.3=0; |
|  |

|  |
| --- |
| PORTD.2=1; // reprezinta o valoare mare 3.501 A- 5A |
|  |

|  |
| --- |
|  |
|  |

|  |
| --- |
| } |
|  |

|  |
| --- |
| else { |
|  |

|  |
| --- |
| PORTD.4=0; |
|  |

|  |
| --- |
| PORTD.3=0; |
|  |

|  |
| --- |
| PORTD.2=0;// nu ne afiseaza niciun led |
|  |

|  |
| --- |
| } |

|  |
| --- |
| //aceasta functie preia valoarea trimisa de dsp( valorile sunt intre anumite nivele  // De curent primite de la DSP) |
|  |

}

|  |
| --- |
| void Afisor\_2Cifre(char value){ |
|  |

|  |
| --- |
| //luam PORTA complet, PortD7,portB 0->4 14 biti pentur 2 cifre 7 biti din port A o sai setezi pentru prima cifra restul cifra 2 |
|  |

|  |
| --- |
| //tine minte afisorul este pe logica inversa |
|  |

|  |
| --- |
| cifra0=value%10; |
| // prima cifra |

|  |
| --- |
| cifra1=(value/10)%10; |
| //a doua cifra |
|  |

|  |
| --- |
| if(cifra0==0) |
|  |

|  |
| --- |
| { |
|  |

|  |
| --- |
| PORTA.0=0; //pin 17 4E |
|  |

|  |
| --- |
| PORTA.1=0; //pin 18 4D |
|  |

|  |
| --- |
| PORTA.2=0; //pin 19 4C |
|  |

|  |
| --- |
| PORTA.3=0; //pin 20 4B |
|  |

|  |
| --- |
| PORTA.4=0; //pin 20 4A |
|  |

|  |
| --- |
| PORTA.5=0; //pin 20 4F |
|  |

|  |
| --- |
| PORTA.6=1; //pin 20 4G |
|  |

|  |
| --- |
| } |
|  |

|  |
| --- |
| else if(cifra0==1) |
|  |

|  |
| --- |
| { |
|  |

|  |
| --- |
| PORTA.0=1; //pin 17 4E |
|  |

|  |
| --- |
| PORTA.1=1; //pin 18 4D |
|  |

|  |
| --- |
| PORTA.2=0; //pin 19 4C |
|  |

|  |
| --- |
| PORTA.3=0; //pin 20 4B |
|  |

|  |
| --- |
| PORTA.4=1; //pin 20 4A |
|  |

|  |
| --- |
| PORTA.5=1; //pin 20 4F |
|  |

|  |
| --- |
| PORTA.6=1; //pin 20 4G |
|  |

|  |
| --- |
| } |
|  |

|  |
| --- |
| else if(cifra0==2) |
|  |

|  |
| --- |
| {PORTA.0=0; //pin 17 4E |
|  |

|  |
| --- |
| PORTA.1=0; //pin 18 4D |
|  |

|  |
| --- |
| PORTA.2=1; //pin 19 4C |
|  |

|  |
| --- |
| PORTA.3=0; //pin 20 4B |
|  |

|  |
| --- |
| PORTA.4=0; //pin 20 4A |
|  |

|  |
| --- |
| PORTA.5=1; //pin 20 4F |
|  |

|  |
| --- |
| PORTA.6=0; //pin 20 4G |
|  |

|  |
| --- |
| } |
|  |

|  |
| --- |
| else if(cifra0==3) |
|  |

|  |
| --- |
| {PORTA.0=1; //pin 17 4E |
|  |

|  |
| --- |
| PORTA.1=0; //pin 18 4D |
|  |

|  |
| --- |
| PORTA.2=0; //pin 19 4C |
|  |

|  |
| --- |
| PORTA.3=0; //pin 20 4B |
|  |

|  |
| --- |
| PORTA.4=0; //pin 20 4A |
|  |

|  |
| --- |
| PORTA.5=1; //pin 20 4F |
|  |

|  |
| --- |
| PORTA.6=0; //pin 20 4G |
|  |

|  |
| --- |
| } |
|  |

|  |
| --- |
| else if(cifra0==4) |
|  |

|  |
| --- |
| {PORTA.0=1; //pin 17 4E |
|  |

|  |
| --- |
| PORTA.1=1; //pin 18 4D |
|  |

|  |
| --- |
| PORTA.2=0; //pin 19 4C |
|  |

|  |
| --- |
| PORTA.3=0; //pin 20 4B |
|  |

|  |
| --- |
| PORTA.4=1; //pin 20 4A |
|  |

|  |
| --- |
| PORTA.5=0; //pin 20 4F |
|  |

|  |
| --- |
| PORTA.6=0; //pin 20 4G |
|  |

|  |
| --- |
| } |
|  |

|  |
| --- |
| else if(cifra0==5) |
|  |

|  |
| --- |
| {PORTA.0=1; //pin 17 4E |
|  |

|  |
| --- |
| PORTA.1=0; //pin 18 4D |
|  |

|  |
| --- |
| PORTA.2=0; //pin 19 4C |
|  |

|  |
| --- |
| PORTA.3=1; //pin 20 4B |
|  |

|  |
| --- |
| PORTA.4=0; //pin 20 4A |
|  |

|  |
| --- |
| PORTA.5=0; //pin 20 4F |
|  |

|  |
| --- |
| PORTA.6=0; //pin 20 4G |
|  |

|  |
| --- |
| } |
|  |

|  |
| --- |
| else if(cifra0==6) |
|  |

|  |
| --- |
| {PORTA.0=0; //pin 17 4E |
|  |

|  |
| --- |
| PORTA.1=0; //pin 18 4D |
|  |

|  |
| --- |
| PORTA.2=0; //pin 19 4C |
|  |

|  |
| --- |
| PORTA.3=1; //pin 20 4B |
|  |

|  |
| --- |
| PORTA.4=0; //pin 20 4A |
|  |

|  |
| --- |
| PORTA.5=0; //pin 20 4F |
|  |

|  |
| --- |
| PORTA.6=0; //pin 20 4G |
|  |

|  |
| --- |
| } |
|  |

|  |
| --- |
| else if(cifra0==7) |
|  |

|  |
| --- |
| {PORTA.0=1; //pin 17 4E |
|  |

|  |
| --- |
| PORTA.1=1; //pin 18 4D |
|  |

|  |
| --- |
| PORTA.2=0; //pin 19 4C |
|  |

|  |
| --- |
| PORTA.3=0; //pin 20 4B |
|  |

|  |
| --- |
| PORTA.4=0; //pin 20 4A |
|  |

|  |
| --- |
| PORTA.5=1; //pin 20 4F |
|  |

|  |
| --- |
| PORTA.6=1; //pin 20 4G |
|  |

|  |
| --- |
| } |
|  |

|  |
| --- |
| else if(cifra0==8) |
|  |

|  |
| --- |
| {PORTA.0=0; //pin 17 4E |
|  |

|  |
| --- |
| PORTA.1=0; //pin 18 4D |
|  |

|  |
| --- |
| PORTA.2=0; //pin 19 4C |
|  |

|  |
| --- |
| PORTA.3=0; //pin 20 4B |
|  |

|  |
| --- |
| PORTA.4=0; //pin 20 4A |
|  |

|  |
| --- |
| PORTA.5=0; //pin 20 4F |
|  |

|  |
| --- |
| PORTA.6=0; //pin 20 4G |
|  |

|  |
| --- |
| } |
|  |

|  |
| --- |
| else if(cifra0==9) |
|  |

|  |
| --- |
| {PORTA.0=1; //pin 17 4E |
|  |

|  |
| --- |
| PORTA.1=0; //pin 18 4D |
|  |

|  |
| --- |
| PORTA.2=0; //pin 19 4C |
|  |

|  |
| --- |
| PORTA.3=0; //pin 20 4B |
|  |

|  |
| --- |
| PORTA.4=0; //pin 20 4A |
|  |

|  |
| --- |
| PORTA.5=0; //pin 20 4F |
|  |

|  |
| --- |
| PORTA.6=0; //pin 20 4G |
|  |

|  |
| --- |
| } |
|  |

|  |
| --- |
| if(cifra1==0) |
|  |

|  |
| --- |
| { |
|  |

|  |
| --- |
| PORTA.7=0; // pin 13 3E |
|  |

|  |
| --- |
| PORTD.7=0; // pin 14 3D |
|  |

|  |
| --- |
| PORTB.0=0; // pin 15 3C |
|  |

|  |
| --- |
| PORTB.1=0; // pin 24 3B |
|  |

|  |
| --- |
| PORTB.2=0; // pin 25 3A |
|  |

|  |
| --- |
| PORTB.3=0; // pin 26 3F |
|  |

|  |
| --- |
| PORTB.4=1; // pin 27 3G |
|  |

|  |
| --- |
| } |
|  |

|  |
| --- |
| else if(cifra1==1) |
|  |

|  |
| --- |
| { |
|  |

|  |
| --- |
| PORTA.7=1; // pin 13 3E |
|  |

|  |
| --- |
| PORTD.7=1; // pin 14 3D |
|  |

|  |
| --- |
| PORTB.0=0; // pin 15 3C |
|  |

|  |
| --- |
| PORTB.1=0; // pin 24 3B |
|  |

|  |
| --- |
| PORTB.2=1; // pin 25 3A |
|  |

|  |
| --- |
| PORTB.3=1; // pin 26 3F |
|  |

|  |
| --- |
| PORTB.4=1; // pin 27 3G |
|  |

|  |
| --- |
| } |
|  |

|  |
| --- |
| else if(cifra1==2) |
|  |

|  |
| --- |
| { |
|  |

|  |
| --- |
| PORTA.7=0; // pin 13 3E |
|  |

|  |
| --- |
| PORTD.7=0; // pin 14 3D |
|  |

|  |
| --- |
| PORTB.0=1; // pin 15 3C |
|  |

|  |
| --- |
| PORTB.1=0; // pin 24 3B |
|  |

|  |
| --- |
| PORTB.2=0; // pin 25 3A |
|  |

|  |
| --- |
| PORTB.3=1; // pin 26 3F |
|  |

|  |
| --- |
| PORTB.4=0; // pin 27 3G |
|  |

|  |
| --- |
| } |
|  |

|  |
| --- |
| else if(cifra1==3) |
|  |

|  |
| --- |
| { |
|  |

|  |
| --- |
| PORTA.7=1; // pin 13 3E |
|  |

|  |
| --- |
| PORTD.7=0; // pin 14 3D |
|  |

|  |
| --- |
| PORTB.0=0; // pin 15 3C |
|  |

|  |
| --- |
| PORTB.1=0; // pin 24 3B |
|  |

|  |
| --- |
| PORTB.2=0; // pin 25 3A |
|  |

|  |
| --- |
| PORTB.3=1; // pin 26 3F |
|  |

|  |
| --- |
| PORTB.4=0; // pin 27 3G |
|  |

|  |
| --- |
| } |
|  |

|  |
| --- |
| else if(cifra1==4) |
|  |

|  |
| --- |
| { |
|  |

|  |
| --- |
| PORTA.7=1; // pin 13 3E |
|  |

|  |
| --- |
| PORTD.7=1; // pin 14 3D |
|  |

|  |
| --- |
| PORTB.0=0; // pin 15 3C |
|  |

|  |
| --- |
| PORTB.1=0; // pin 24 3B |
|  |

|  |
| --- |
| PORTB.2=1; // pin 25 3A |
|  |

|  |
| --- |
| PORTB.3=0; // pin 26 3F |
|  |

|  |
| --- |
| PORTB.4=0; // pin 27 3G |
|  |

|  |
| --- |
| } |
|  |

|  |
| --- |
| else if(cifra1==5) |
|  |

|  |
| --- |
| { |
|  |

|  |
| --- |
| PORTA.7=1; // pin 13 3E |
|  |

|  |
| --- |
| PORTD.7=0; // pin 14 3D |
|  |

|  |
| --- |
| PORTB.0=0; // pin 15 3C |
|  |

|  |
| --- |
| PORTB.1=1; // pin 24 3B |
|  |

|  |
| --- |
| PORTB.2=0; // pin 25 3A |
|  |

|  |
| --- |
| PORTB.3=0; // pin 26 3F |
|  |

|  |
| --- |
| PORTB.4=0; // pin 27 3G |
|  |

|  |
| --- |
| } |
|  |

|  |
| --- |
| else if(cifra1==6) |
|  |

|  |
| --- |
| { |
|  |

|  |
| --- |
| PORTA.7=0; // pin 13 3E |
|  |

|  |
| --- |
| PORTD.7=0; // pin 14 3D |
|  |

|  |
| --- |
| PORTB.0=0; // pin 15 3C |
|  |

|  |
| --- |
| PORTB.1=1; // pin 24 3B |
|  |

|  |
| --- |
| PORTB.2=0; // pin 25 3A |
|  |

|  |
| --- |
| PORTB.3=0; // pin 26 3F |
|  |

|  |
| --- |
| PORTB.4=0; // pin 27 3G |
|  |

|  |
| --- |
| } |
|  |

|  |
| --- |
| else if(cifra1==7) |
|  |

|  |
| --- |
| { |
|  |

|  |
| --- |
| PORTA.7=1; // pin 13 3E |
|  |

|  |
| --- |
| PORTD.7=1; // pin 14 3D |
|  |

|  |
| --- |
| PORTB.0=0; // pin 15 3C |
|  |

|  |
| --- |
| PORTB.1=0; // pin 24 3B |
|  |

|  |
| --- |
| PORTB.2=0; // pin 25 3A |
|  |

|  |
| --- |
| PORTB.3=1; // pin 26 3F |
|  |

|  |
| --- |
| PORTB.4=1; // pin 27 3G |
|  |

|  |
| --- |
| } |
|  |

|  |
| --- |
| else if(cifra1==8) |
|  |

|  |
| --- |
| { |
|  |

|  |
| --- |
| PORTA.7=1; // pin 13 3E |
|  |

|  |
| --- |
| PORTD.7=1; // pin 14 3D |
|  |

|  |
| --- |
| PORTB.0=1; // pin 15 3C |
|  |

|  |
| --- |
| PORTB.1=1; // pin 24 3B |
|  |

|  |
| --- |
| PORTB.2=1; // pin 25 3A |
|  |

|  |
| --- |
| PORTB.3=1; // pin 26 3F |
|  |

|  |
| --- |
| PORTB.4=1; // pin 27 3G |
|  |

|  |
| --- |
| } |
|  |

|  |
| --- |
| else if(cifra1==9) |
|  |

|  |
| --- |
| { |
|  |

|  |
| --- |
| PORTA.7=1; // pin 13 3E |
|  |

|  |
| --- |
| PORTD.7=0; // pin 14 3D |
|  |

|  |
| --- |
| PORTB.0=0; // pin 15 3C |
|  |

|  |
| --- |
| PORTB.1=0; // pin 24 3B |
|  |

|  |
| --- |
| PORTB.2=0; // pin 25 3A |
|  |

|  |
| --- |
| PORTB.3=0; // pin 26 3F |
|  |

|  |
| --- |
| PORTB.4=0; // pin 27 3G |
|  |

|  |
| --- |
| } |
|  |

}

|  |
| --- |
| char ValAfisorButon(void){ |
|  |

|  |  |
| --- | --- |
| char SUMA; | |
|  |

|  |
| --- |
| char buffer\_calc; |
|  |

|  |
| --- |
| char i; |
|  |

|  |
| --- |
| if(PIND.5==0)//buton apasat butonul este portD5, cu portD6 allways on pentru LED |
|  |

|  |
| --- |
| { |
|  |

|  |
| --- |
| SUMA=0; |
|  |

|  |
| --- |
| if(contorHr>8) |
|  |

|  |
| --- |
| { buffer\_calc=contorHr-8; |
|  |

|  |
| --- |
| for(i=buffer\_calc;i<=contorHr;i++) |
|  |

|  |
| --- |
| { SUMA=SUMA+arrayOre[i]; |
|  |

|  |
| --- |
| } |
| // ne vefica daca ora e mai mare sau nu de 8 ore si retureneaza valoarea de pe ultimele 8 ore |

|  |
| --- |
| } |
|  |

|  |
| --- |
| else{ |
|  |

|  |
| --- |
| buffer\_calc=8-contorHr; |
|  |

|  |
| --- |
| for(i=24-buffer\_calc;i<=24;i++) |
|  |

|  |
| --- |
| { SUMA=SUMA+arrayOre[i]; |
|  |

|  |
| --- |
| } |
|  |

|  |
| --- |
| for(i=1;i<=contorHr;i++){ |
|  |

|  |
| --- |
| SUMA=SUMA+arrayOre[i];} |
|  |

|  |
| --- |
| } |
|  |

|  |
| --- |
| return val\_afisor=SUMA; |
|  |

|  |
| --- |
| //sfarsitul functiei de 8 de ore |
|  |

|  |
| --- |
| } |
|  |

|  |
| --- |
| else |
|  |

|  |
| --- |
| {SUMA=0; |
|  |

|  |
| --- |
|  |
|  |

|  |
| --- |
| if(contorHr>4) |
|  |

|  |
| --- |
| { |
|  |

|  |
| --- |
| buffer\_calc=contorHr-4; |
|  |

|  |
| --- |
| for(i=buffer\_calc;i<=contorHr;i++) |
|  |

|  |
| --- |
| { |
|  |

|  |
| --- |
| SUMA=SUMA+arrayOre[i]; |
|  |

|  |
| --- |
| } |
|  |

|  |
| --- |
| } |
|  |

|  |
| --- |
| else { |
|  |

|  |
| --- |
| buffer\_calc=4-contorHr; |
|  |

|  |
| --- |
| for(i=24-buffer\_calc;i<=24;i++) |
|  |

|  |
| --- |
| { |
|  |

|  |
| --- |
| SUMA=SUMA+arrayOre[i]; |
|  |

|  |
| --- |
| } |
|  |

|  |
| --- |
| for(i=1;i<=contorHr;i++) |
|  |

|  |
| --- |
| { |
|  |

|  |
| --- |
| SUMA=SUMA+arrayOre[i]; |
|  |

|  |
| --- |
| } |
|  |

|  |
| --- |
| // ar trebui sa ne arate consumul de kWh pentru ultimele 4 ore cat timp apasam |
|  |

|  |
| --- |
| } |
|  |

|  |
| --- |
| return val\_afisor=SUMA; |
|  |

|  |
| --- |
| } |
|  |

}

|  |
| --- |
| PIND.6=1;// port mereu pe “1’ logic pentru LEDul conectat la aesta |
|  |

|  |
| --- |
| while (1) |
|  |

|  |
| --- |
| { |
|  |

|  |
| --- |
| LED\_Stare\_Curent(); |
| //Citeste starea curentului |

|  |
| --- |
| if(PINC.0==1 ) |
| //PC.0 este pentru puls\_check |

|  |
| --- |
| { |
|  |

|  |
| --- |
| cont\_pulse=0; |
| //initializam contorul de pulsuri la 0 mereu cand prmim un pulse check nou |

|  |
| --- |
| while(PINC.0!=0) |
| // cat timp primim pulsecheck se contorizeaza impulsurile primite |

|  |
| --- |
| {if(PINC.1==1) |
| //PC.1 este pinul |

//pe care primim pulsurile

|  |
| --- |
| { |
|  |

|  |
| --- |
| cont\_pulse=cont\_pulse+1; |
|  |

|  |
| --- |
| } |
|  |

|  |
| --- |
| } |
|  |

|  |
| --- |
| } |
|  |

|  |
| --- |
| arrayOre[contorHr]=cont\_pulse; //introducem in array cate pulsuri s-au numarat |
|  |

|  |
| --- |
| Afisor\_2Cifre(ValAfisorButon()); |
| //afisarea consumului in ultimele 8/4 ore in functie de buton |

|  |
| --- |
| } |
|  |

}

6.Cod DSP

|  |
| --- |
| .section/dm data1; |
|  |

|  |
| --- |
| // intrari |
|  |

|  |
| --- |
| .var E; |
|  |

|  |
| --- |
| .var U; |
|  |

|  |
| --- |
| .var I; |
|  |

|  |
| --- |
| .var P; |
|  |

|  |
| --- |
| .var A; |
|  |

|  |
| --- |
| .var timp; |
|  |

|  |
| --- |
| .var prag; |
|  |

|  |
| --- |
| .var N; |
|  |

|  |
| --- |
|  |
|  |

|  |
| --- |
|  |
|  |

|  |
| --- |
| .var output[1000]; |
|  |

|  |
| --- |
|  |
|  |

|  |
| --- |
| .section/pm IVreset; |
|  |

|  |
| --- |
|  |
|  |

|  |
| --- |
| jump start;nop;nop;nop; |
|  |

|  |
| --- |
| rti;nop;nop;nop; |
|  |

|  |
| --- |
| rti;nop;nop;nop; |
|  |

|  |
| --- |
| rti;nop;nop;nop; |
|  |

|  |
| --- |
| rti;nop;nop;nop; |
|  |

|  |
| --- |
| rti;nop;nop;nop; |
|  |

|  |
| --- |
| rti;nop;nop;nop; |
|  |

|  |
| --- |
|  |
|  |

|  |
| --- |
| .section/pm program; |
|  |

|  |
| --- |
|  |
|  |

|  |
| --- |
| calcul: |
|  |

|  |
| --- |
| MR = 0 //registrul de rezultat = 0 |
|  |

|  |
| --- |
| MX0=DM(U); //in registrul x este incarcata valoarea tensiunii |
|  |

|  |
| --- |
| MY0=DM(I); //in registrul y este incarcata valoarea curentului |
|  |

|  |
| --- |
| MR=MX0\*MY0; //in registrul de rezultat este calculata puterea |
|  |

|  |
| --- |
| DM(P)=MR; //valoarea puterii este incarcata in memorie |
|  |

|  |
| --- |
| MX0=DM(timp); //reg x ia valoarea timpului |
|  |

|  |
| --- |
| MY0=DM(P); //reg y ia valoarea puterii |
|  |

|  |
| --- |
| MR=MR+MX0\*MY0; //calculul energiei (suma de produse) |
|  |

|  |
| --- |
|  |
|  |

|  |
| --- |
| DM(E)=MR; //valoarea energiei este incarcata in memorie |
|  |

|  |
| --- |
| MX0=DM(E); //in reg x se incarca valoarea energiei |
|  |

|  |
| --- |
| MY0=DM(prag); //in y este incarcata valoarea pragului |
|  |

|  |
| --- |
| MR=DIVS MX0, MY0; //in reg de rezultat o sa apara numarul N de impulsuri |
|  |

|  |
| --- |
| //care trebuie generate dupa impartirea energiei la pragul de 1KWh |
|  |

|  |
| --- |
| //(3 KWh/1 KWh => 3 impulsuri) |
|  |

|  |
| --- |
| DM(N)=MR; //numarul de impulsuri salvat in memorie |
|  |

|  |
| --- |
| // daca N > 0 atunci se genereaza un puls |
|  |

|  |
| --- |
|  |
|  |

|  |
| --- |
|  |
|  |

|  |
| --- |
|  |
|  |

stop: jump stop;