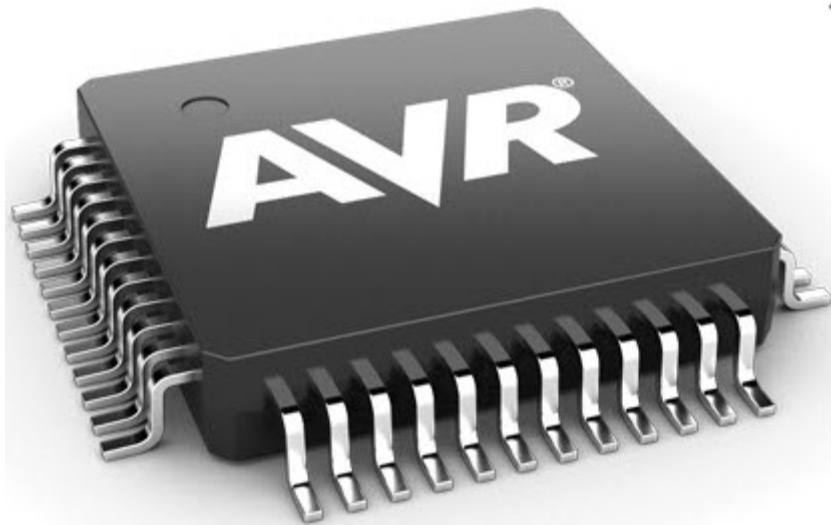


Microprocesoare si Microcontrolere

TEMA



Popa Nicolae Dănuț

Grupa 5402

19.10.2017

Problema 1 - C

```
1  #include <htc.h>
2
3  /*
4      Enunt: sa se implementeze un program C care sa calculeze catul si restul
5      impartirii numarului x la numarul y prin scaderi repetate.
6  */
7
8  void main(void)
9  {
10     unsigned char x, y, rest, cat;
11     x = 20;
12     y = 3;
13
14     cat = 0;
15
16     while(x >= y)
17     {
18         cat ++;
19         x -= y;
20     }
21     rest = x;
22
23     asm("NOP"); // use asm instruction
24 }
```

Problema 2 - C

```
1  #include <htc.h>
2
3  /*
4   Enunt: Sa se scrie un program C care sa calculeaza suma 1 + 2 + 3 + ... + n,
5   unde n este un numar predefinit.
6   */
7
8  void main(void)
9  {
10     unsigned char n, sum;
11
12     n = 7;
13     sum = 0;
14
15     for(char c = 0; c <= n; c++)
16     {
17         sum += c;
18     }
19
20     asm("NOP"); // use asm instruction
21 }
```

Problema 1 – ASM

```
1  #include p16f84.inc
2
3  ; Enunt: sa se implementeze un program ASM care sa calculeze catul si restul
4  ; impartirii numarului x la numarul y prin scaderi repetate.
5  ; ScorpionIPX
6
7  ;assign memory for variables
8  x equ 0x20
9  y equ 0x21
10 cat equ 0x22
11 rest equ 0x23
12
13 main:
14
15     ; assign values to variables
16
17     MOVLW D'20'; W <- 20 - accumulator gets value 20
18     MOVWF x;n <- W, - x gets accumulator's value
19
20     MOVLW D'3'; W <- 0 - accumulator gets value 0
21     MOVWF y;y <- W - y gets accumulator's value
22
23     MOVLW D'0'; W <- 0 - accumulator gets value 0
24     MOVWF cat;cat <- W - cat gets accumulator's value
25
26     MOVLW D'0'; W <- 0 - accumulator gets value 0
27     MOVWF rest;rest <- W - rest gets accumulator's value
28
29     NOP;
30
31     ;if (x - y >= 0) => carry = 1
32
33     calculate:
34
35         MOVF y, 0; load coef into accumulator
36         SUBWF x, 0; x = x - y
37         NOP;
38         BTFSS STATUS, C;check if carry; C = 0, position of carry flag bit
39         GOTO end_calculate; if (x - y >= 0), results are not calculated
40         NOP;
41
42
43         INCF cat; increment cat's value
44         MOVWF x; x = x - y
45
46         NOP;
47         GOTO calculate
48
49     end_calculate:
50         MOVF x, 0;
51         MOVWF rest;
52         NOP
53     end
```

Problema 2 – ASM

```
1  #include p16f84.inc
2
3  ; Enunt: Sa se scrie un program ASM care sa calculeaza suma 1 + 2 + 3 + ... + n,
4  ; unde n este un numar predefinit.
5  ; ScorpionIPX
6
7  ;assign memory for variables
8  n equ 0x20; last coef to be added
9  s equ 0x21; calculated sum
10 c equ 0x22; coef to be added
11
12 main:
13     ; assign values to variables
14     MOVLW D'5'; W <- 9 - acumulator gets value 9
15     MOVWF n;n <- W, - x gets acumulator value
16
17     MOVLW D'0'; W <- 0 - acumulator gets value 0
18     MOVWF s;s <- W - c gets acumulator value
19
20     ;MOVLW D'0'; W <- 0 - acumulator gets value 0
21     MOVWF c;c <- W - c gets acumulator value
22     NOP;
23
24
25     ;if (n - c >= 0) => carry = 1
26     DECF n; decrement n for easier implementation
27     calculate_sum:
28         MOVF c, 0; load coef into acumulator
29         SUBWF n, 0; W = n - c
30         BTFSS STATUS, C;check if carry; C = 0, position of carry flag bit
31         GOTO end_calculate_sum; if (n - c >= 0), sum is not calclated
32         INCF c; increment coeficient
33         NOP;
34         MOVF c, 0; load coef into acumulator
35         NOP;
36         ADDWF s, 1; add acumulator to sum's value
37         GOTO calculate_sum
38         NOP;
39
40     end_calculate_sum:
41         NOP
42     end
```