

**HW6– Assembly Language Programming – Due date October XX** (will be declared in the class)

1. In digital signal processing, it is important to implement some fast algorithms that make initial processing of a digitized signal stream.

In this programming assignment, the students have to write a subroutine that is used in digital signal processing to make a preliminary estimation of the noise level in the signal.

*The subroutine, which counts the number of 1s in a word, must be based on an algorithm, where the passes through the loop are equal to the number of 1s. For example, if the word is 0010070F<sub>(16)</sub> your loop has to run 8 times and the count of 1s has to be 8.*

*(Hint: First significant operation in the loop should be decrement (subtract 1) the given word. What is the next? Read again about logical operations!!!).*

2. Assembly program that implements the decoding algorithm of Hamming 1-bit error\_correcting code. In the following table, the first line is a word that is encoded in Hamming code (16 information bits, parity even bits P0-P4, Pall).

1	0	0	0	1	1	0	0	0	1	1	0	1	1	0	0	1	1	1	0	1	0
21	20	19	18	17	P4	15	14	13	12	11	10	9	P3	7	6	5	P2	3	P1	P0	Pall

Write a program that follows all steps of decoding:

- Pall check (Pall calculated = or != Pall received).
- Calculating of the Correcting Code.
- Select the case: single error, double error, no errors.
- In case of single error, correct the wrong bit.

Remark: Please present:

- The project in compressed format (sent by email).
- Printout of the program.