Laboratory Work 1

1. Write a MATLAB program that will add all the numbers corresponding to the even indices of an array. For instance, if the array x was $x = [1, 3, 5, 10]$, then it should return $13\ (=\ 3 + 10)$. Use that program to find the sum of all even integers from 1 to 1000. Write your program so that it is flexible. That is, you should be able to invoke your program from the command window as follows:

   $y = addeven(x)$

where x is the input vector, and y is the sum of all the numbers corresponding to the even indices of x.

2. Can you explain what the following program does:

```
L=length(x);
for i=1:L
        if x(i) < 0
                x(i)=-1;
        end

end
```

Can you rewrite this program without using for loops?

3. Write a program to compute the variance of an array x.The variance σ is defined to be:

   $\sigma\ = \frac{1}{N}\sum_1^N (x_i\ -\ \bar{x})^2$

where $\bar{x}$ is the average of the array x. For x, use all the integers from 1 to 1000.

4. Write a program that implements the following hard-limiting function:

$$f(x) = \begin{cases} 0{,}2 & x \geq 0{,}2 \\ -0{,}2 & x < 0{,}2 \end{cases}$$

For x, use 1000 random numbers generated using the function $rand$.