Assignment 11

1. **Lecture 2**. Create a class “signal” that has 3 parameters (type, mean and standard deviation):

```
type={‘sin’, ‘noise’} # 10 Hz sinusoid and Gaussian noise
mean=0                # mean value of the signal
std=1                 # standard deviation of the signal
```

and 3 functions:

```
time_plot()           # plot signal in time domain
hist_plot()           # plot histogram of the signal
freq_plot()           # plot amplitude spectrum of the signal
```

Create two objects as sig_1 = signal(‘sin’, 0, 1) and sig_2 = signal(‘noise’, 1, 3).
Plot the signals using time_plot(), hist_plot() and freq_plot().
Relevant information can be found in the Lecture 2 and this book, “Lecture_02/materials/L02_thinkpython2.pdf”,

2. **Lecture 6**. Add two new methods to the class “signal”:

```
window(shape, length)  # shape={‘square’, ‘gaussian’, ‘exponential’}, length=10
convolve()             # convolution with the window (in frequency domain via fft)
```

Create an object as sig_0 = signal(‘noise’, 0, 1), generate 3 different windows (i.e., square, Gaussian and exponential) as sig_0.window(shape,length) and convolve the signal with these windows as sig_0.convolve(). Plot the results.

3. Write a report about the tasks (6 pages) including figures.

Save the report to a file (A11_your_surname.pdf) and send it together with your Python script (A11_your_surname.py) to this email, alexander.zhigalov@aalto.fi. The deadline is November 30, 14:00.