Big Data Analytics
Lab

1. Show (with the use of histograms) the distribution of sample values generated using normal distribution (see `rnorm`). Is there a difference in the sample's distribution if we generate 10 numbers, 100 numbers or 1000 numbers? What is the shape of the distribution? Use the $\mu = 0$ and $\sigma = 1$.

2. Now show distribution shapes if you change the parameters μ and σ?

3. Suppose that X has normal distribution for which the mean is 1 and the variance is 4. Find the value of each of the following probabilities:

    (a) $P(X \leq 3)$

    (b) $P(X > 1.5)$

    (c) $P(X = 1)$

    (d) $P(2 < X < 5)$

    (e) $P(X \geq 0)$

    (f) $P(-1 < X < 0.5)$

    You can get most of these probabilities using R commands. However, you are only allowed to use R commands for standard normal probability distribution ($\mu = 0$, $\sigma = 1$).

4. Suppose that the measured voltage in a certain electric circuit has the normal distribution with mean 120 and standard deviation 2. If three independent measurements of the voltage are made, what is the probability that all three measurements will lie between 116 and 118?