

Assignment 1

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Simulating Data

```
set.seed(2024)
X <- rnorm( n=1000, mean=9, sd=sqrt(4)) #here a vector of the ou
round(X [1:5], 2) #now we have a possible realization of the sam
```

```
[1] 10.96  9.94  8.78  8.57 11.32
```

Mean

$$\bar{x} = \frac{1}{n} \sum_{i=1}^n x_i$$

```
myMean<- function(x){sum(x)/length(x)}
myMean(X) #run it
```

```
[1] 9.009085
```

Variance

$$S^2 = \frac{1}{n-1} \sum_{i=1}^n (x_i - \bar{x})^2$$

```
myVariance <- function(x){sum((x-myMean(x))^2)/(length(x)-1)}
myVariance(X)
```

```
[1] 3.862916
```

Range

$$\vec{r} = \begin{pmatrix} \min(x) \\ \max(x) \end{pmatrix}$$

```
myRange <- function(x){c(min(x),max(x))}
myRange(X) #run it
```

```
[1]  2.451428 15.161992
```

Compare the results:

mean 9.009085 to 9, variance 3.862916 to 4, the range is of course

random} so this realization is close to the real parameter.