Vizsga

Először a megadott kódba behelyettesítem a neptun kódom:

```
x="ILVIYV";
z=charToRaw(iconv(x, "latin1", "UTF-8"))
for (i in 1:6) v=paste("0x",z,sep="")
e=strtoi(v)
ax=e[1];ay=e[2];az=e[3];av=e[4];ss=sum(strtoi(v))+24
cat("ax=",ax,"\n")
cat("ay=",ay,"\n")
cat("az=",az,"\n")
cat("av=",av,"\n")
cat("ss=",ss,"\n")
ar=c( "FB","AAPL","AMZN","GOOG","NFLX","TSLA")
ai=ss-6*floor(ss/6)
ev=2022-(ss-10*floor(ss/10))
cat("ev=",ev,"\n")
cat("reszveny=",ar[ai+1],"\n")
```

Output:

```
> x="ILVIYV";

> z=charToRaw(iconv(x, "latin1", "UTF-8"))

> for (i in 1:6) v=paste("0x",z,sep="")

> e=strtoi(v)

> ax=e[1];ay=e[2];az=e[3];av=e[4];ss=sum(strtoi(v))+24

> cat("ax=",ax,"\n")

ax= 73

> cat("ay=",ay,"\n")

ay= 76

> cat("az=",az,"\n")

az= 86

> cat("av=",av,"\n")

av= 73

> cat("ss=",ss,"\n")

ss= 507

> ar=c( "FB","AAPL","AMZN","GOOG","NFLX","TSLA")

> ai=ss-6*floor(ss/6)

> ev=2022-(ss-10*floor(ss/10))

> cat("ev=",ev,"\n")
```

ev= 2015

> cat("reszveny=",ar[ai+1],"\n")

reszveny= GOOG

1.feladat:

```
A, lefuttatom a megadott kódot: set.seed(ss)
                               nx=700
                               v=matrix(c(ax,abs(ax-ay),abs(ax-ay),ay),2)
                               w=chol(v)
                               z1=sqrt(-2*log(runif(nx)))*sin(runif(nx)*2*pi)
                               z2=sqrt(-2*log(runif(nx)))*cos(runif(nx)*2*pi)
                               zm=matrix(c(z1,z2),ncol=2)
                     zn=5*zm%*%w
```

Ez létrehoz egy 700 elemű mintarealizációt.

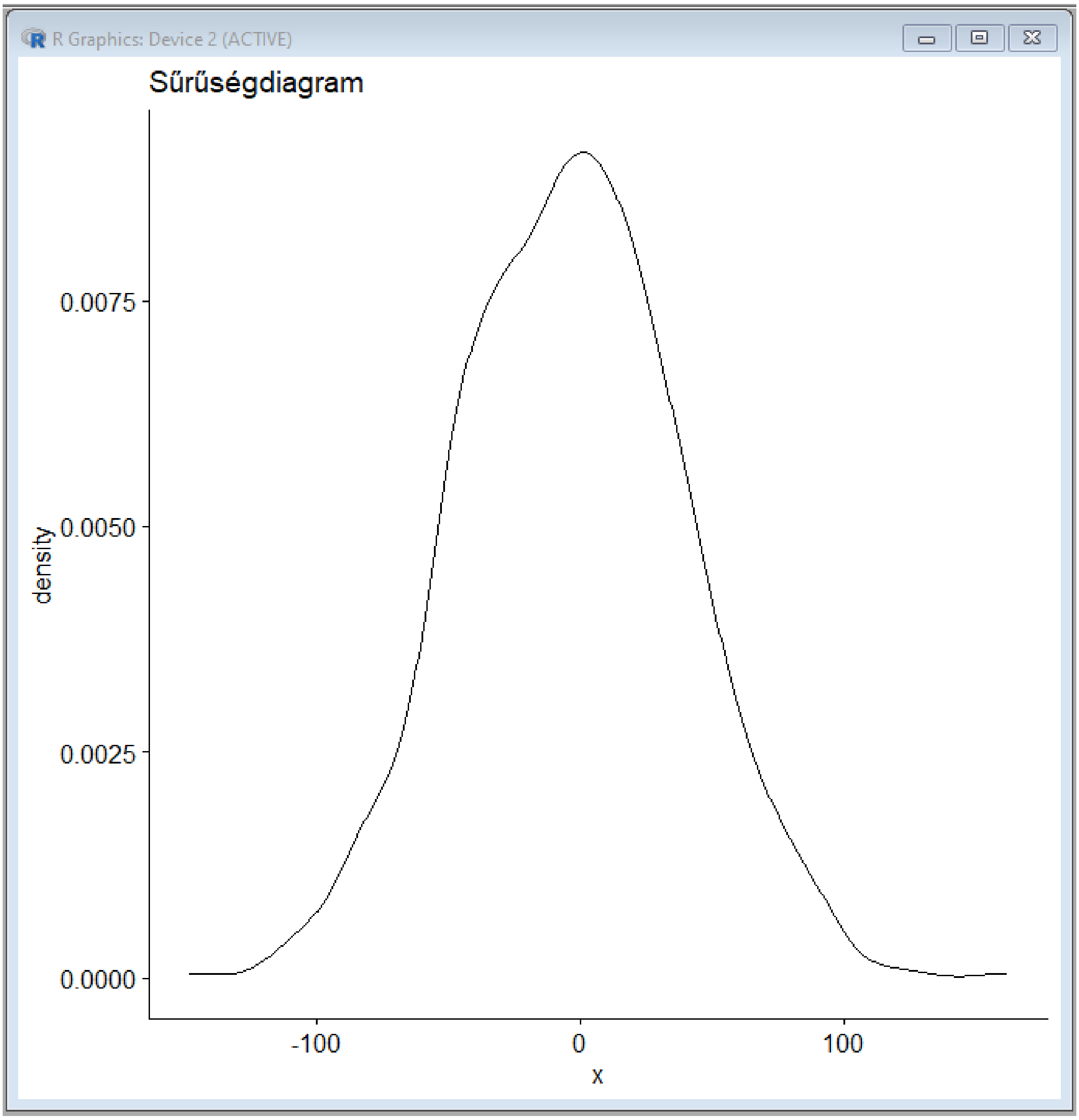
Általános statisztikai elemzés:

```
> summary(zn)
    V1              V2
 Min.   :-148.229   Min.   :-147.5833
 1st Qu.: -32.333   1st Qu.: -27.6211
 Median :  -3.215   Median :   0.2496
 Mean   :  -3.202   Mean   :   1.4671
 3rd Qu.:  24.781   3rd Qu.:  29.0700
 Max.   : 162.210   Max.   : 168.8026
```

Eloszlás vizsgálat (kell a ggpubr csomag)

>library(ggpubr)

>ggdensity(zn[,1], main="Sűrűségdiagram")



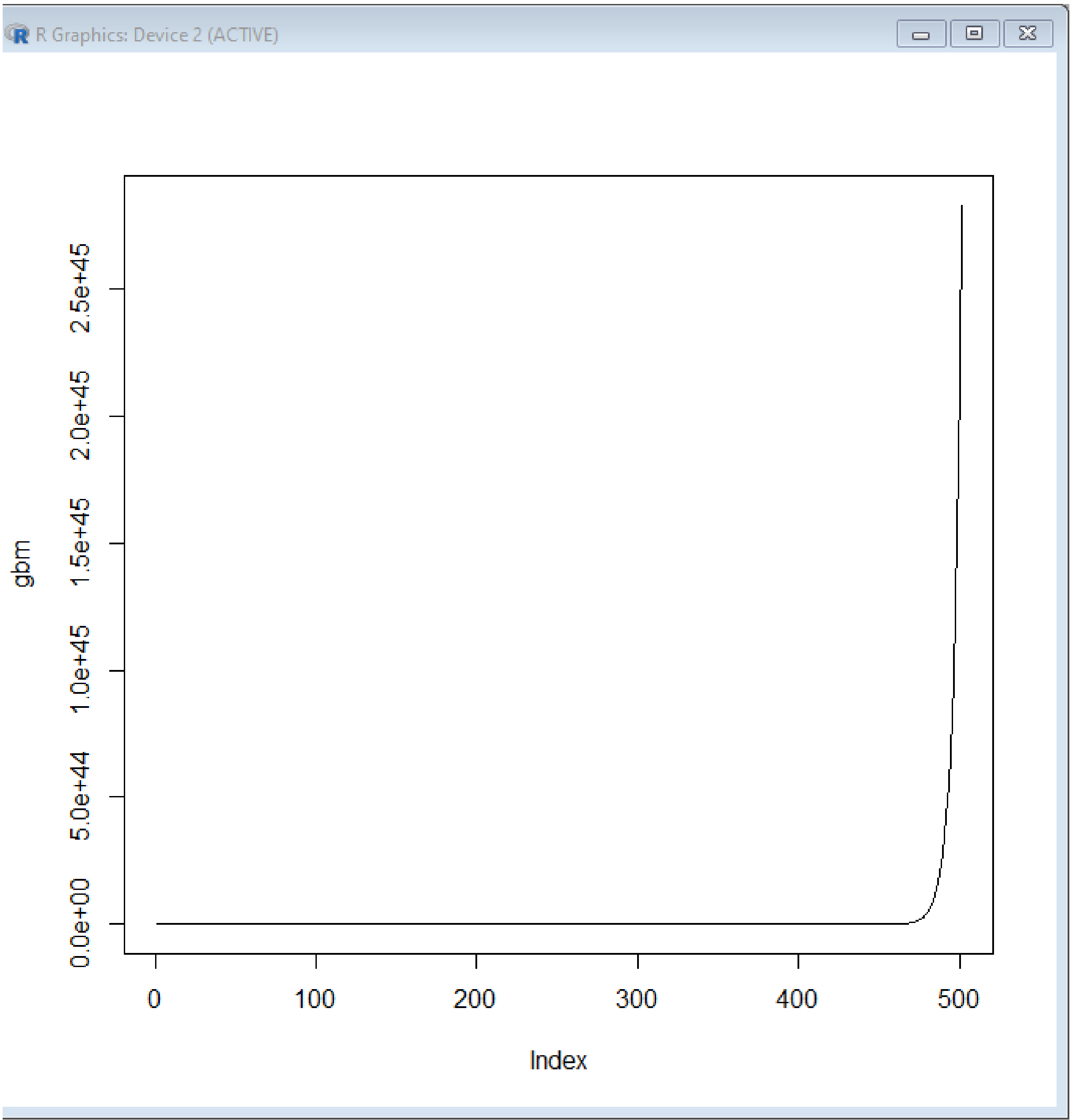
Függetlenség:

```
> cor(zn)
           [,1]       [,2]
[1,] 1.00000000 0.07308446
[2,] 0.07308446 1.00000000
```

3.feladat:

```
> library(LSMRealOptions)
```

```
> set.seed(ss+27)
> n <- 1
> t <- 500/365
> mu= ax
> sigma=(ax+az)/(ax+ay+az)
> S0 <- 100
> dt <- 1/365
> gbm <- GBM_simulate(n, t, mu, sigma, S0, dt);
> plot(gbm, type='l')
```

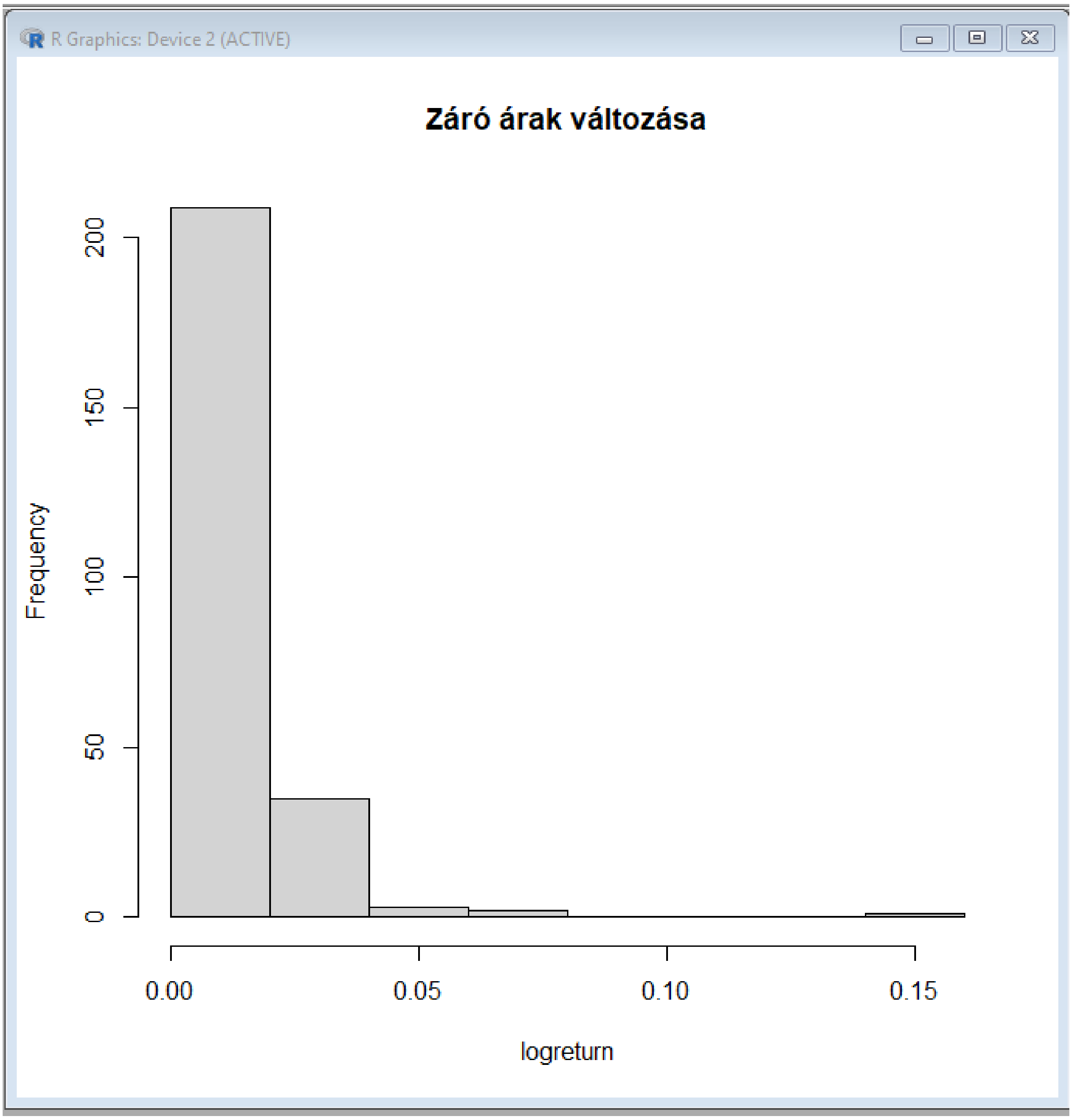


```
> summary(gbm)
    Min.   1st Qu.    Median      Mean   3rd Qu.      Max.
1.000e+02 6.805e+12 6.222e+23 3.003e+43 3.660e+34 2.833e+45
> library(moments)
> skewness(gbm)
[1] 9.401998
```

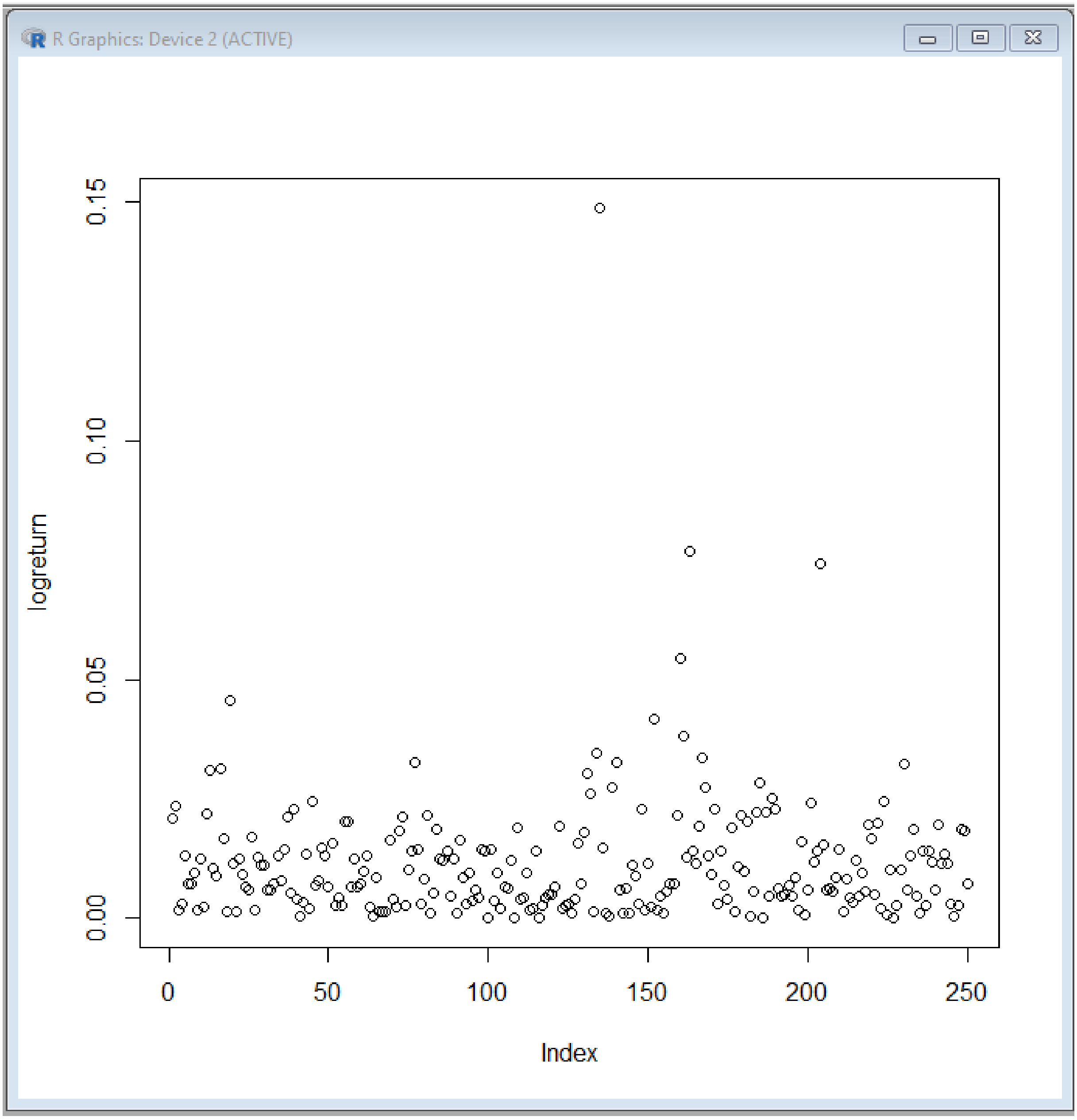
5.feladat:

behelyettesítem a részvényt a megadott címbe: https://finance.yahoo.com/quote/GOOG/history?p=GOOG

```
> details = read.csv("C:/Users/au084329/Downloads/GOOG.csv")
> logreturn = c()
> zaro = details$Close
> for (i in 1:length(zaro)-1){
+ logreturn[i] = abs(log(zaro[i+1]/zaro[i]))
+ }
> chisq.test(logreturn)

	Chi-squared test for given probabilities

data:  logreturn
X-squared = 4.0683, df = 249, p-value = 1

Warning message:
In chisq.test(logreturn) : Chi-squared approximation may be incorrect
> hist(logreturn, main="Záró árak változása")
```



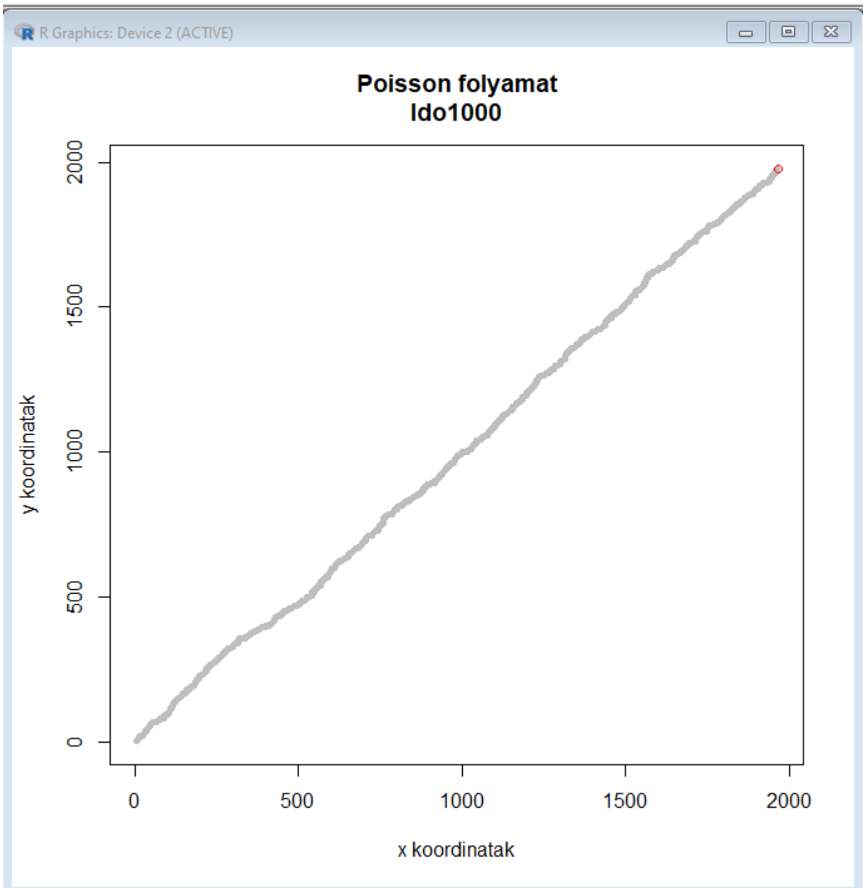
> plot(logreturn)



4. Feladat:

```
> poisson <- function () {
+   set.seed(ss+17)
+   lambda <- 2
+   time_interval <- 1000
+   x.new.p <- y.new.p <- numeric()
+
+   for (i in 1:time_interval) {
+     x <- rpois(1, lambda)
```

```
+    y <- rpois(1, lambda)
+
+    x.new.p <- c(x.new.p, ifelse(length(x.new.p) > 0, x.new.p[length(x.new.p)] + x, x))
+    y.new.p <- c(y.new.p, ifelse(length(y.new.p) > 0, y.new.p[length(y.new.p)] + y, y))
+
+    plot(x.new.p, y.new.p, type = "b", main = paste("Poisson folyamat\nIdo", i, sep = ""),
+        xlab = "x koordinatak", ylab = "y koordinatak", col = c(rep("gray", i - 1), "red"),
+        pch = c(rep(20, i - 1), 1))
+  }
+
+  poisson_g <- matrix(c(x.new.p, y.new.p), ncol = 2)
+  return(poisson_g)
+ }
>
> poisson_generalt <- poisson()
```



2.feladat:

```
correlation <- -0.7

sample_size <- 1000


# Exponenciális eloszlású minták generálása

x <- rexp(sample_size)

y <- rexp(sample_size)


# Korreláció alkalmazása

correlated_x <- x

correlated_y <- correlation * x + sqrt(1 - correlation^2) * y


# Ábrázolás

plot(correlated_x, correlated_y, type = "p", pch = 16, col = "blue",

    xlab = "X", ylab = "Y", main = "Exponenciális eloszlású minta")
```