question-4-code/random_walk.R +14 -11

```
@@ -1,34 +1,36 @@
#install.packages("ggplot2")
#install.packages("gridExtra")

library(ggplot2)
library(gridExtra)

- random_walk  <- function (n_steps) {
+ random_walk  <- function (n_steps, seed = 123) {
+
+   set.seed(seed)

    df <- data.frame(x = rep(NA, n_steps), y = rep(NA, n_steps), time = 1:n_steps)

-   df[1,] <- c(0,0,1)
+   df[1,] <- c(0,0,1)    # Starting point of random walk

-   for (i in 2:n_steps) {
+   for (i in 2:n_steps) { # For loop starts at i = 2 and runs until i = n_steps

-     h <- 0.25
+     h <- 0.25 # Constant height

-     angle <- runif(1, min = 0, max = 2*pi)
+     angle <- runif(1, min = 0, max = 2*pi) # random angle generated between 0 and 2 pi

-     df[i,1] <- df[i-1,1] + cos(angle)*h
+     df[i,1] <- df[i-1,1] + cos(angle)*h # cos() changes x-direction

-     df[i,2] <- df[i-1,2] + sin(angle)*h
+     df[i,2] <- df[i-1,2] + sin(angle)*h # sin() changes y direction

-     df[i,3] <- i
+     df[i,3] <- i

    }

-   return(df)
+   return(df)

  }

- data1 <- random_walk(500)
+ data1 <- random_walk(500, seed = 123) # 500 steps in this random walk (with seed)

  plot1 <- ggplot(aes(x = x, y = y), data = data1) +
@@ -40,7 +42,7 @@
    ylab("y-coordinate")

- data2 <- random_walk(500)
+ data2 <- random_walk(500, seed = 123) # 500 steps in this random walk (with same seed so will be the same)

  plot2 <- ggplot(aes(x = x, y = y), data = data2) +
@@ -53,3 +55,4 @@
    ylab("y-coordinate")

  grid.arrange(plot1, plot2, ncol=2)
+
```