quiz 4a

#Question2 installed.packages() install.packages("testthat") library(testthat) version set.seed(123)

num_friends <- 20

true_heights <- rnorm(num_friends, mean = 170, sd = 10)

error_edward <- rnorm(num_friends, mean = 0, sd = 5) error_hugo <- rnorm(num_friends, mean = 0, sd = 8) error_lucy <- rnorm(num_friends, mean = 0, sd = 7)

observed_heights_edward <- true_heights + error_edward observed_heights_hugo <- true_heights + error_hugo observed_heights_lucy <- true_heights + error_lucy

height_data <- data.frame(Friend = rep(c(rep("Edward", num_friends), rep("Hugo", num_friends), rep("Lucy", num_friends)), each = 1), True_Height = rep(true_heights, times = 3), Observed_Height = c(observed_heights_edward, observed_heights_hugo, observed_heights_lucy), Measurement_Approach = rep(c(rep("Edward", num_friends), rep("Hugo", num_friends), rep("Lucy", num_friends)), each = 1))

head(height_data)

test_that("Test 1: Independence of Observed Heights for Edward", { edward_data <- subset(height_data, Friend == "Edward") chi_square_test_result <- chisq.test(table(edward_data$Observed_H eigh
expect_true(chi_square_test_result$p.value > 0.05, "Observed heights for Edward are independent of true heights.") })

test_that("Test 2: Independence of Observed Heights for Hugo", { hugo_data <- subset(height_data, Friend == "Hugo") chi_square_test_result <- chisq.test(table(hugo_data$Observed_H eight, hu
expect_true(chi_square_test_result$p.value > 0.05, "Observed heights for Hugo are independent of true heights.") })

test_that("Test 3: Independence of Observed Heights for Lucy", { lucy_data <- subset(height_data, Friend == "Lucy") chi_square_test_result <- chisq.test(table(lucy_data$Observed_H eight, luc
expect_true(chi_square_test_result$p.value > 0.05, "Observed heights for Lucy are independent of true heights.") })

#Question4 if (!requireNamespace(“ggplot2”, quietly = TRUE)) { install.packages(“ggplot2”)
}

library(ggplot2)

plot_data <- data.frame(Friend = height_data$Friend, Observed_Height = height_data$Observed_Height, True_Height = height_data$True_Height)

ggplot(plot_data, aes(x = True_Height, y = Observed_Height, color = Friend)) + geom_point() + geom_line() + labs(title = “Observed vs. True Heights”, x = “True Height”, y = “Observed Height”, color = “Friend”) + theme_minimal()