

# M06 Activity

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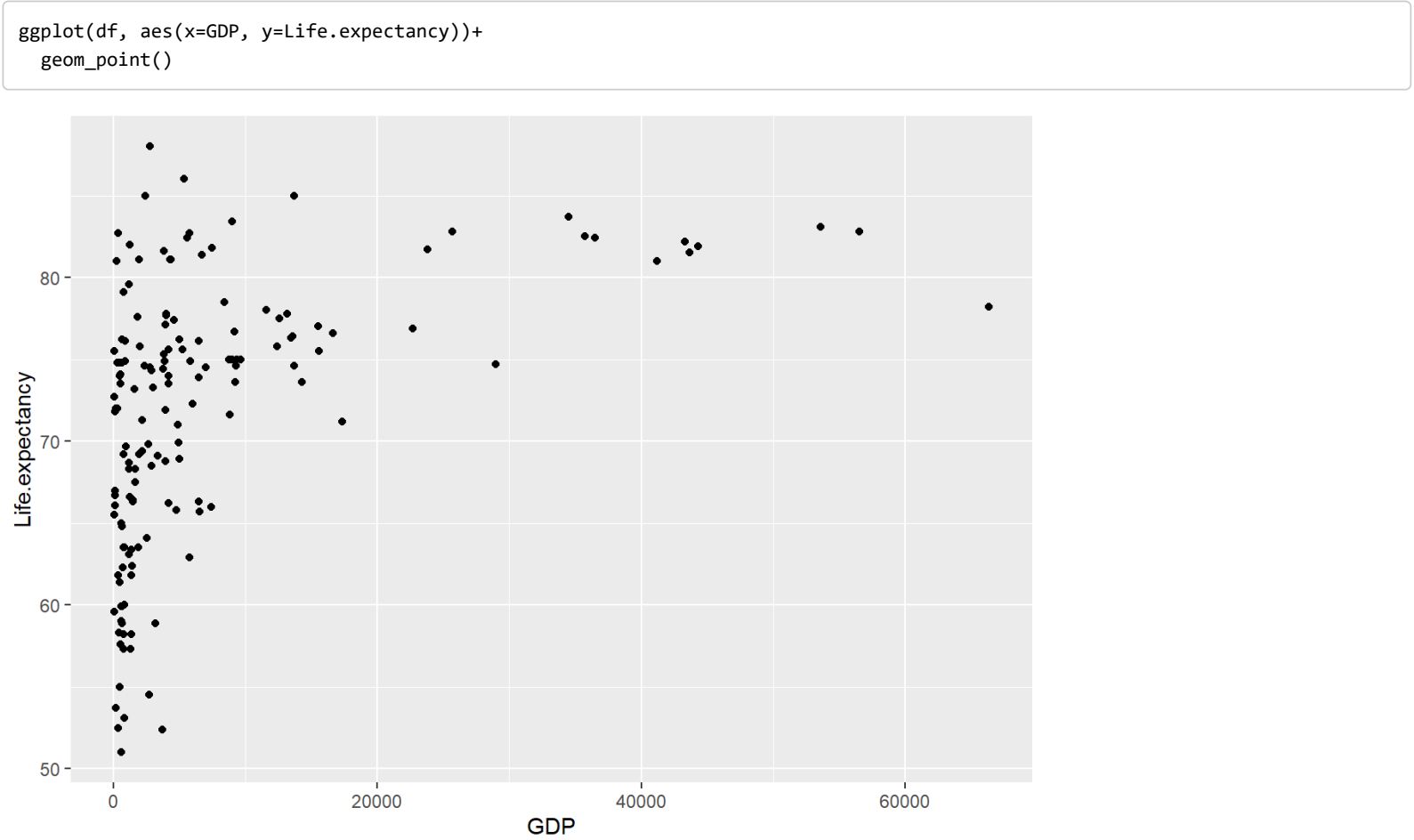
Task 0

```
library(tidyverse)

## — Attaching core tidyverse packages — tidyverse 2.0.0 —
## ✓ dplyr      1.1.4    ✓ readr      2.1.5
## ✓ forcats    1.0.0    ✓ stringr   1.5.1
## ✓ ggplot2     3.5.1    ✓ tibble    3.2.1
## ✓ lubridate  1.9.3    ✓ tidyr     1.3.1
## ✓ purrr      1.0.2
## — Conflicts — tidyverse_conflicts() —
## ✖ dplyr::filter() masks stats::filter()
## ✖ dplyr::lag()     masks stats::lag()
## i Use the conflicted package (<http://conflicted.r-lib.org/>) to force all conflicts to become errors

lifedf <- read.csv('expectancy.csv')
df <- select(lifedf, Life.expectancy, GDP) %>%
  na.omit()
```

Task 1.A



Task 1.B

```
cor(x=df$GDP, y=df$Life.expectancy)

## [1] 0.454491
```

Task 1.C

A linear model is not appropriate for predicting life expectancy using GDP.

Task 2

```
r <- cor(x=df$GDP, y=df$Life.expectancy)
sx <- sd(df$GDP)
sy <- sd(df$Life.expectancy)
B_1 <- (r*sy/sx)
B_0 <- mean(df$Life.expectancy) - B_1*mean(df$GDP)

B_1

## [1] 0.000321739

B_0

## [1] 69.37846
```

Task 3

```
model <- lm(Life.expectancy~GDP,data=df)
coef(model)

## (Intercept)      GDP
## 69.378458568  0.000321739
```

Task 4.A

```
des_matrix <- as.matrix(data.frame(rep(1, length(df$GDP)), df$GDP))
```

Task 4.B

```
xtx <- t(des_matrix)%*%des_matrix
inverse_xtx <- solve(xtx)
xty <- t(des_matrix)%*%df$Life.expectancy
beta <- inverse_xtx %*% xty
beta

##              [,1]
## rep.1..length.df.GDP.. 69.378458568
## df.GDP                0.000321739
```