Linear Model Equation Practice

Instructions

Your team will be assigned one of the models below. Answer the questions. If time, do another!

Metadata available at: https://stacyderuiter.github.io/stat245-sp25/tehran-glucose-meta.html

Model 1

```
chol_model <- lm(total_cholesterol ~ age,
                 data = TGS)
summary(chol_model)
```

```
Call:
lm(formula = total_cholesterol ~ age, data = TGS)

Residuals:
    Min      1Q  Median      3Q     Max
-3.9314 -0.6492 -0.0245  0.6419  3.9595

Coefficients:
             Estimate Std. Error t value Pr(>|t|)
(Intercept) 4.9255885  0.0448688 109.778  < 2e-16 ***
age         0.0022937  0.0008642   2.654  0.00797 **
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 0.9739 on 7716 degrees of freedom
Multiple R-squared:  0.0009122, Adjusted R-squared:  0.0007827
F-statistic: 7.045 on 1 and 7716 DF,  p-value: 0.007966
```

1. What are the predictor and response variables?
2. What question can this model answer?
3. Write the model equation, using information from the model `summary()`.

Model 2

```
bp_model <- lm(SBP ~ triglyceride,
               data = TGS)
summary(bp_model)
```

```
Call:
lm(formula = SBP ~ triglyceride, data = TGS)

Residuals:
    Min      1Q  Median      3Q     Max
-49.795 -12.732  -0.556  12.139  59.211

Coefficients:
             Estimate Std. Error t value Pr(>|t|)
(Intercept)  116.1229     0.4798 242.041  < 2e-16 ***
triglyceride   1.6257     0.2438   6.668 2.77e-11 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 18.33 on 7716 degrees of freedom
Multiple R-squared:  0.005729,  Adjusted R-squared:  0.0056
F-statistic: 44.46 on 1 and 7716 DF,  p-value: 2.773e-11
```

1. What are the predictor and response variables?
2. What question can this model answer?
3. Write the model equation, using information from the model `summary()`.

Model 3

```
tri_model <- lm(triglyceride ~ age,
                data = TGS)
summary(tri_model)
```

```
Call:
lm(formula = triglyceride ~ age, data = TGS)

Residuals:
    Min      1Q  Median      3Q     Max
-1.2279 -0.6347 -0.2579  0.4028  3.6682

Coefficients:
             Estimate Std. Error t value Pr(>|t|)
(Intercept) 1.4815691  0.0392847   37.71  < 2e-16 ***
age         0.0057727  0.0007566    7.63 2.64e-14 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 0.8527 on 7716 degrees of freedom
Multiple R-squared:  0.007488,  Adjusted R-squared:  0.007359
F-statistic: 58.21 on 1 and 7716 DF,  p-value: 2.638e-14
```

1. What are the predictor and response variables?
2. What question can this model answer?
3. Write the model equation, using information from the model `summary()`.

Model 4

```
tri_model2 <- lm(triglyceride ~ total_cholesterol,
                 data = TGS)
summary(tri_model2)
```

```
Call:
lm(formula = triglyceride ~ total_cholesterol, data = TGS)

Residuals:
    Min      1Q  Median      3Q     Max
-1.2382 -0.6375 -0.2611  0.4052  3.6641

Coefficients:
                  Estimate Std. Error t value Pr(>|t|)
(Intercept)        1.72025    0.05134  33.506   <2e-16 ***
total_cholesterol  0.01027    0.01000   1.027    0.305
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 0.8558 on 7716 degrees of freedom
Multiple R-squared:  0.0001366, Adjusted R-squared:  6.991e-06
F-statistic: 1.054 on 1 and 7716 DF,  p-value: 0.3046
```

1. What are the predictor and response variables?
2. What question can this model answer?
3. Write the model equation, using information from the model `summary()`.

Model 5

```r
bmi_model <- lm(BMI ~ age,
                data = TGS)
summary(bmi_model)
```

```
Call:
lm(formula = BMI ~ age, data = TGS)

Residuals:
    Min      1Q  Median      3Q     Max
-43.138  -3.800  -0.309   3.226  54.031

Coefficients:
             Estimate Std. Error t value Pr(>|t|)
(Intercept) 27.390979   0.358423  76.421  < 2e-16 ***
age          0.022622   0.006903   3.277  0.00105 **
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 7.78 on 7716 degrees of freedom
Multiple R-squared:  0.00139,   Adjusted R-squared:  0.00126
F-statistic: 10.74 on 1 and 7716 DF,  p-value: 0.001054
```

1. What are the predictor and response variables?
2. What question can this model answer?
3. Write the model equation, using information from the model `summary()`.

Model 6

```
whr_model <- lm(SBP ~ WHR100,
                data = TGS)
summary(whr_model)
```

```
Call:
lm(formula = SBP ~ WHR100, data = TGS)

Residuals:
    Min      1Q  Median      3Q     Max
-52.844 -12.887  -0.421  12.161  62.278

Coefficients:
            Estimate Std. Error t value Pr(>|t|)
(Intercept) 83.92289    2.59452   32.35   <2e-16 ***
WHR100       0.36919    0.02722   13.56   <2e-16 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 18.17 on 7716 degrees of freedom
Multiple R-squared:  0.02329,   Adjusted R-squared:  0.02316
F-statistic:   184 on 1 and 7716 DF,  p-value: < 2.2e-16
```

1. What are the predictor and response variables?
2. What question can this model answer?
3. Write the model equation, using information from the model `summary()`.