Tutorial 4

Summary of penguins data

```
     species          island    bill_length_mm  bill_depth_mm
 Adelie   :152   Biscoe   :168   Min.   :32.10   Min.   :13.10
 Chinstrap: 68   Dream    :124   1st Qu.:39.23   1st Qu.:15.60
 Gentoo   :124   Torgersen: 52   Median :44.45   Median :17.30
                                 Mean   :43.92   Mean   :17.15
                                 3rd Qu.:48.50   3rd Qu.:18.70
                                 Max.   :59.60   Max.   :21.50
                                 NA's   :2       NA's   :2
 flipper_length_mm  body_mass_g       sex           year
 Min.   :172.0     Min.   :2700   female:165   Min.   :2007
 1st Qu.:190.0     1st Qu.:3550   male  :168   1st Qu.:2007
 Median :197.0     Median :4050   NA's  : 11   Median :2008
 Mean   :200.9     Mean   :4202                Mean   :2008
 3rd Qu.:213.0     3rd Qu.:4750                3rd Qu.:2009
 Max.   :231.0     Max.   :6300                Max.   :2009
 NA's   :2         NA's   :2
```

Regression model

Write the fitted regression line using the following regression output.

```
Call:
lm(formula = body_mass_g ~ species + island + bill_length_mm +
    bill_depth_mm + flipper_length_mm + sex, data = penguins)

Coefficients:
      (Intercept)   speciesChinstrap      speciesGentoo        islandDream
         -1500.03            -260.31             987.76             -13.10
  islandTorgersen     bill_length_mm      bill_depth_mm  flipper_length_mm
           -48.06              18.19              67.58              16.24
          sexmale
           387.22


Call:
lm(formula = body_mass_g ~ species + island + bill_length_mm +
    bill_depth_mm + flipper_length_mm + sex, data = penguins)

Residuals:
    Min      1Q  Median      3Q     Max
-779.20 -167.35   -3.16  179.37  914.27

Coefficients:
                   Estimate Std. Error t value Pr(>|t|)
(Intercept)       -1500.029    575.822  -2.605 0.009610 **
speciesChinstrap   -260.306     88.551  -2.940 0.003522 **
speciesGentoo       987.761    137.238   7.197 4.30e-12 ***
islandDream         -13.103     58.541  -0.224 0.823032
islandTorgersen     -48.064     60.922  -0.789 0.430722
```

```
bill_length_mm       18.189      7.136   2.549 0.011270 *
bill_depth_mm        67.575     19.821   3.409 0.000734 ***
flipper_length_mm    16.239      2.939   5.524 6.80e-08 ***
sexmale             387.224     48.138   8.044 1.66e-14 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 287.9 on 324 degrees of freedom
  (11 observations deleted due to missingness)
Multiple R-squared:  0.8752,    Adjusted R-squared:  0.8721
F-statistic: 284.1 on 8 and 324 DF,  p-value: < 2.2e-16


Analysis of Variance Table

Response: body_mass_g
                   Df    Sum Sq  Mean Sq  F value    Pr(>F)
species             2 145190219 72595110 875.7004 < 2.2e-16 ***
island              2      2064     1032   0.0124    0.9876
bill_length_mm      1  23800213 23800213 287.0972 < 2.2e-16 ***
bill_depth_mm       1   9839087  9839087 118.6870 < 2.2e-16 ***
flipper_length_mm   1   4204553  4204553  50.7187 6.926e-12 ***
sex                 1   5364097  5364097  64.7060 1.655e-14 ***
Residuals         324  26859432    82899
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```