Econ 3040 - Assignment 2: Ice cream revenue and temperature

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Due date: October 21st, 2023. Worth 3% of your final grade.

Instructions:

- Submit your assignment in the "Assignment 2" drop box on UM Learn. Include your name and student number.
- Do not copy and paste output from `R`. Format your results nicely.
- Submit the `R` code that you used for each question in your assignment.

Do people buy more ice cream when it is hotter? If so, by how much? This assignment uses data from "Jen & Barry's Ice Cream Stand". Load the data using:

```
mydata <- read.csv("https://rtgodwin.com/data/icecream.csv")
```

The data contains information for 142 days of ice cream sales. The variables in the data are `revenue` - the dollar amount of sales made in a day, `temp` - the temperature in Celsius on that day, and `weekend` - a dummy variable equal to 1 if it was a weekend, and 0 if a weekday.

1. Using least squares, estimate the model: $revenue = \beta_0 + \beta_1 temp + \epsilon$. Report the estimated intercept and slope, and the estimated standard errors for each. Interpret the estimated value for the slope.
2. What is the R^2 for the estimated model in Question 1? Interpret this number.
3. Calculate the 95% confidence interval around the estimated slope. Interpret this interval.
4. "Ice Cream Age", another ice cream stand located across town, said they make an extra \$4 dollars for every rise in 1°C. Test if this is true for "Jen & Barry's Ice Cream Stand".
5. Now, estimate the model: $revenue = \beta_0 + \beta_1 weekend + \epsilon$. Report the estimated values for β_0 and β_1. What is the interpretation of b_0 and b_1? What is the average revenue on weekends?
6. Test the hypothesis that weekends bring in the same revenue as weekdays.
7. Plot the data, using two different colours, one for weekdays and one for weekends. Add the estimated line from Question 1 to the plot. Include this plot in your assignment.