Lab 5

1. Do the chocolate chip melting activity as a class! Submit your responses to the link on PolyLearn by Lab 5.

2. R The text file `Graduate.txt` folder contains the time (in years) that 1000 students (472 males and 528 females) took to graduate (obtain a bachelor's degree) from college (measured from the time they entered a post-secondary institution, i.e. either a junior college or four year degree granting institution). The `Gender` column contains the gender of each student (`0 = male`, `1 = female`), and `Censor` contains the values of the censoring status variable.

   (a) Save the data to your computer and read the data into R. Here is an example command you can use. *No written response required.*

   ```
   graduate <- read.table("FILE PATH/Graduate.txt", header = TRUE)
   ```

   (b) Construct Kaplan-Meier estimates to compare the "survival" experiences among male and female college students (i.e., create the `KM_obj`). Plot the Kaplan-Meier estimates to compare the "survival" experiences in the samples of male and female college students by the method of your choice. Comment on what you observe in the survival curves.

   (c) Report the median "survival" time by gender.

   (d) Obtain the Kaplan-Meier estimates of survival probabilities by gender. Report the estimated probabilities that time to graduate exceeds 4 years for both males and females.

   (e) State the null and alternative hypotheses in words and using symbols to compare the overall survival experiences of males and females.

(f) Perform the log-rank test to compare the "survival" experiences of the population of male and female college students. Be sure to report the value of the test statistic and the p-value. State a conclusion in the context of the problem, using a significance level of $\alpha = 0.05$.

3. | Minitab | Locate the Minitab file `Melt Times Lab 5 W2018` on PolyLearn. We are interested in comparing the "survival" experiences of milk chocolate and white chocolate chips.

   (a) Briefly describe the two populations of interest relevant to this (pseudo) experiment.

   (b) State the null and alternative hypotheses in words and using symbols to compare the survival experiences of the two appropriate populations described.

   (c) Plot the Kaplan-Meier curves for both the milk chocolate and white chocolate melting times. In the context of the problem, compare the survival experiences of the two samples of chips. Does there appear to be any observed differences in the survival experiences?

   (d) Report the median event time (if available) for each type of chip to melt, and comment on which type of chip tends to melt faster.

   (e) Conduct the log-rank and Wilcoxon tests at the .05 significance level (the output for both tests follows the Kaplan-Meier results in the Session Window). Be sure to report the values of the test statistics and p-values, and state a conclusion in the context of the problem. If the results of the tests disagree, attempt to explain why.