Due Date: October 8th, 2021
Problems Due: 1,3,5

1. Suppose `x` is a vector. Describe what each of the below commands do.

```
> length(x)
> x[2]
> x[-2]
> x[1:5]
> x(length(x) -5 : length(x))
> x[c(1,3,5)]
> x[x>3]
> x[x<-2 | x>2]
> which(x == max(x))
```

2. Consider the dataset `diamonds` in `ggplot2` inR.
   (a) In two to three lines describing the dataset.
   (b) Write down the list of categories considered.
   (c) Construct a Bar Plot using the below command:
      i.
```
> library(ggplot2)
>  ggplot(data=diamonds) +
+    geom_bar(mapping=aes(x=cut,  fill=clarity))+
+      scale_fill_viridis_d()
```
      ii.
```
> ggplot(data=diamonds) +
+     geom_bar(mapping=aes(x=cut,  fill=clarity), position="dodge") +
+     scale_fill_viridis_d()
```
   and describe the differences in the outputs.

3. Load the package `UsingR` consider the dataset `cavendish`.
   (a) In two to three lines describing the dataset.
   (b) Provide the five number summary of the three variables considered using the `summary` function.

4. Suppose we roll a dice five times. Let Y be the sum of the outcomes in each roll.Find the distribution of Y.

5. Toss a fair coin: if head roll a 1-6 flat die (i.e 1,6 have probability $\frac{1}{4}$ and 2,3,4,5 have probability $\frac{1}{8}$); and if tail roll a 3-4 flat die (i.e 3,4 have probability $\frac{1}{4}$ and 1,2,5,6 have probability $\frac{1}{8}$). Let X be the outcome of the toss of a coin. Let Y be the outcome of the roll of the die.

(a) Find the conditional distribution of $Y|X = Head$

(b) Find the conditional distribution of $Y|X = Tail$

(c) Find the $P(X = Head|Y = 3)$

6. Complete Worksheet 2.

Book-Keeping Exercises

From Probability and Statistics with Examples Using R

1. Ex 1.1.3
2. Ex 1.2.12
3. Example 1.3.10,1.3.12
4. Ex 1.3.9
5. Ex 1.3.10
6. Ex 1.3.13