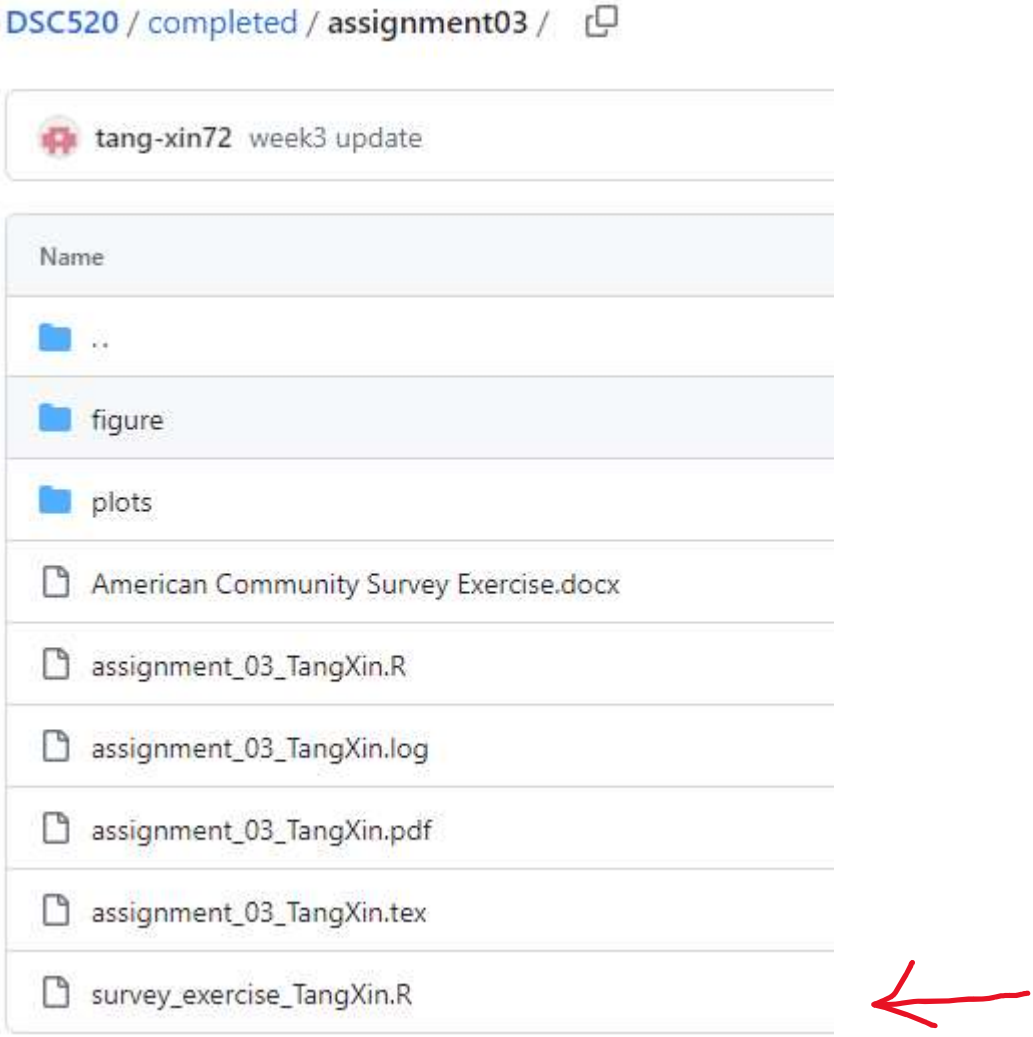
The Github repo link for the linked R file:

https://github.com/tang-xin72/DSC520/tree/main/completed/assignment03



American Community Survey Exercise:

1. What are the elements in your data (including the categories and data types)?

```
'data.frame':       136 obs. of  8 variables:

$ Id                    : chr
$ Id2                   : integer
$ Geography             : chr
$ PopGroupID            : integer
$ POPGROUP.display.label: chr
$ RacesReported         : integer
$ HSDegree              : number
$ BachDegree            : number
```

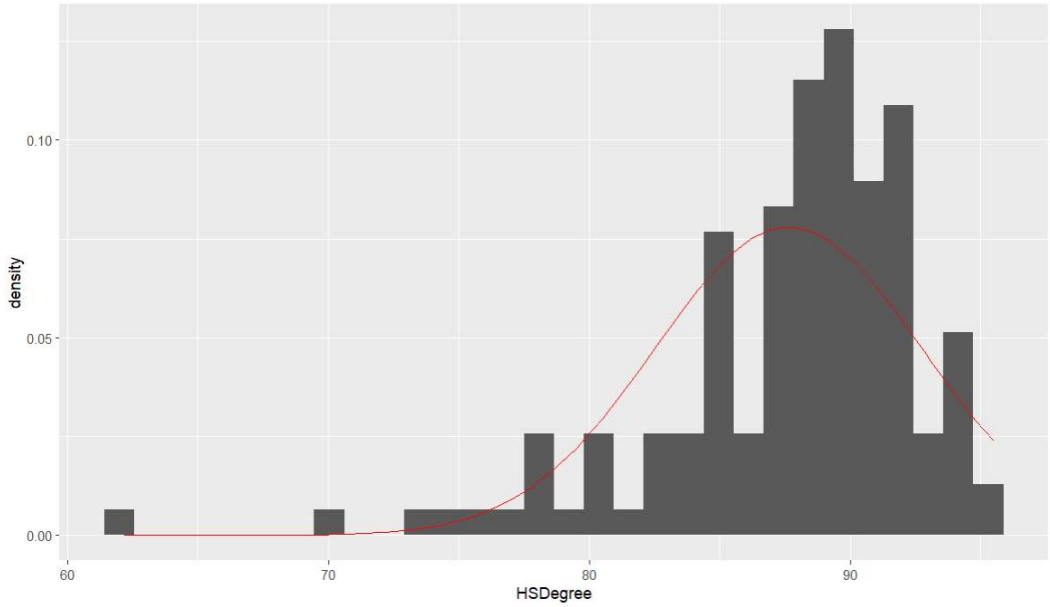
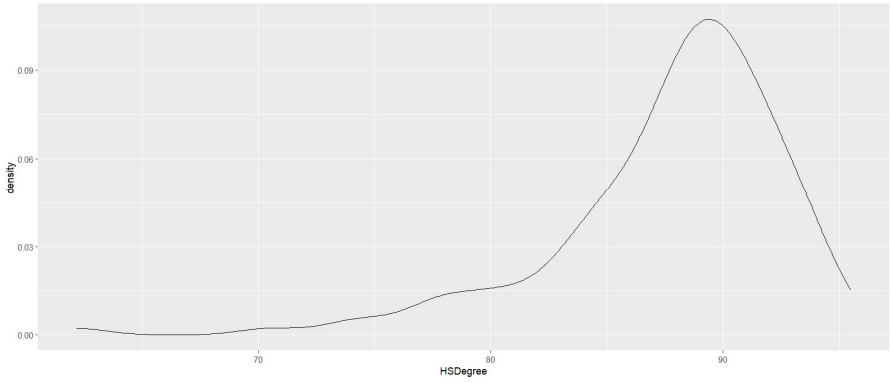


Figure 1: high school degree holder percentage per population in different counties

2. Histogram observation

- This data distribution is unimodal.
- The distribution is not symmetrical.
- The distribution is close to a bell shape but has multiple high peaks with concentrated bell shape.
- The distribution is not normal.
- The distribution is negatively skewed.
- A normal distribution is not preferred to model this data.



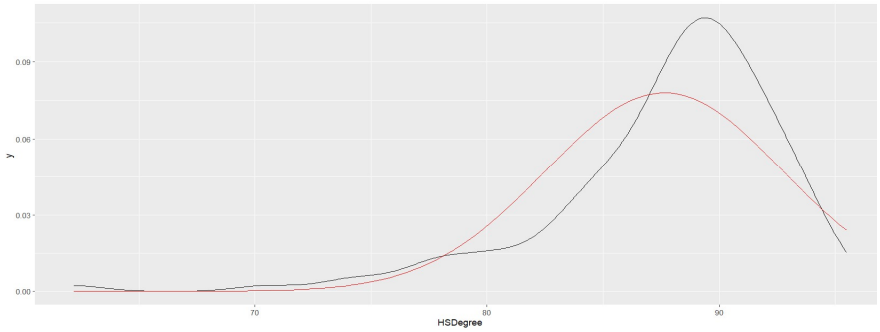


Figure 2: probability chart: high school degree holder percentage per population in different counties

probability observation

- **This distribution is not normal, since it has peak not centered.**
- **It is negatively skewed toward right side. The left side has long tail but right side has sharp and short decline.**

```
> stat.desc(data$HSDegree, basic = TRUE, desc =TRUE, norm = TRUE, p = 0.95)
     nbr.val     nbr.null       nbr.na          min          max        range          sum       median         mean      SE.mean
1.360000e+02 0.000000e+00 0.000000e+00 6.220000e+01 9.550000e+01 3.330000e+01 1.191800e+04 8.870000e+01 8.763235e+01 4.388598e-01
CI.mean.0.95          var      std.dev     coef.var     skewness     skew.2SE     kurtosis     kurt.2SE    normtest.W    normtest.p
8.679296e-01 2.619332e+01 5.117941e+00 5.840241e-02 -1.674767e+00 -4.030254e+00 4.352856e+00 5.273885e+00 8.773635e-01 3.193634e-09
```

Summary:

- The skewness = -1.67, since it is less than _1, it is highly skewed and skewed tow ard left. Which is proven by chart above.
- The kurtosis = 4.35, a normal distribution should get 3. So it have thin bell.
- Since the kurt.2SE = 5.27 and skew.2SE = -4.03. so the skew is unlikely by chance. It is a real skewness.
- Since Z score is normalized, this analysis works for small samples size, if the sample size is large, it won't be accurate and need to look at the actual distribution shape.