

Satoshi Ido
3488706
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STAT 522 HW3

A. Select an SRS of size 200 from the population in file `shapespop.sas7bdat` or `shapespop.csv`.

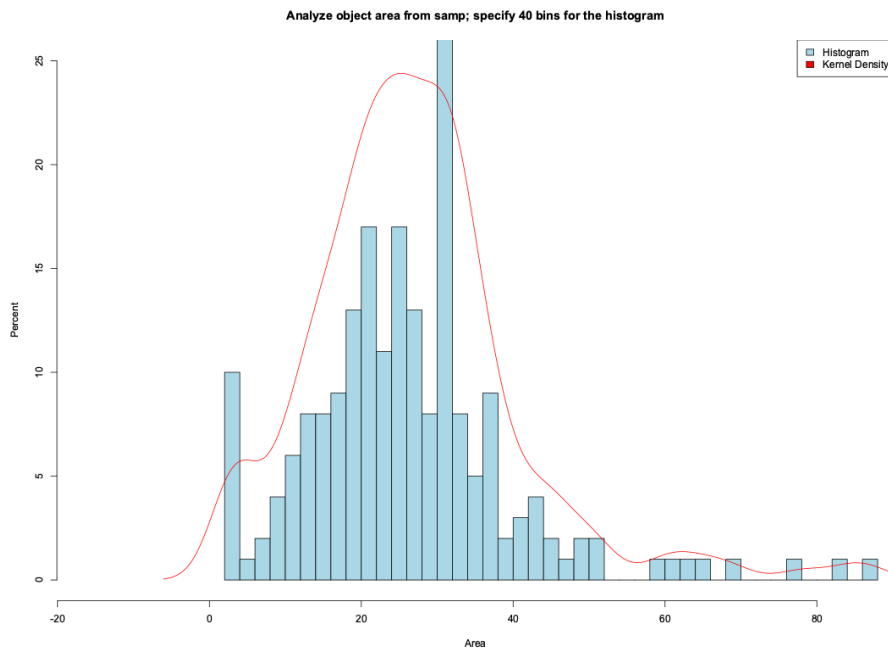
a. What is the sampling weight for each sampled object?

100

b. Save your sample for possible exercises in later chapters

```
write.table(file=file.path(current_dir, "/hw/hw3/samp.csv"), samp, sep = ",",  
row.names = F)
```

B. Obtain a histogram of the areas for the objects in the sample.



C. Using the sample, estimate the average area for objects in the bin. Give a 95% CI. What is the estimate of the total area covered by all objects in the bin?

a. Interpret your sample mean estimate and the confidence interval for the mean

```
> print(sample_mean)
      mean      SE
area 28.99 1.1429
> confint(sample_mean, df=199)
      2.5 %    97.5 %
area 26.73618 31.24382
```

- i. The sample mean estimate is **28.99**
- ii. CI for the mean estimate is **[26.73618, 31.24382]**
- iii. 28.99 represents the average value of the `area`. we can say with 95% confidence that the true population mean is somewhere between 26.73618 and 31.24382.

b. Interpret your sample total estimate and the confidence interval for the total

```
> print(sample_total)
      total      SE
area 579800 22859
> confint(sample_total, df=199)
      2.5 %    97.5 %
area 534723.6 624876.4
```

- i. The sample total estimate is **579800**
- ii. The CI for the total estimate is **[534723.6, 624876.4]**
- iii. 579800 represents the average value of the `total`. We can say with 95% confidence that the true population mean is somewhere between 534723.6 and 624876.4.

D. Using the sample, estimate the total number of gray objects in the population, along with the 95% CI.

```
> print(gray_total)
      total      SE
colorblack 13000 672.84
colorgray  7000 672.84
> confint(gray_total, df=199)
```

```

                2.5 %    97.5 %
colorblack 11673.189 14326.811
colorgray  5673.189  8326.811

```

- a. Does the CI contain the population quantity?
 - i. The estimate is **7000**
 - ii. The CI for the estimate is **[5673.189, 8326.811]**
 - iii. Yes, the CI includes the population quantity, 7000.
- E. Using the sample, estimate the total number of circles in the population, along with the 95% CI.

```

> print(circle_total)
      total      SE
shapecircle 4100 569.48
shapessquare 15900 569.48
> confint(circle_total, df=199)
                2.5 %    97.5 %
shapecircle 2977.002 5222.998
shapessquare 14777.002 17022.998

```

- a. Does the CI contain the population quantity?
 - i. The estimate is **4100**
 - ii. The CI for the estimate is **[2977.002, 5222.998]**
 - iii. Yes, the CI includes the population quantity, 5000.