Supplementary exercise 4.9 of IPS7e

Simulation of draws of Internet users' age group; specifically whether a randomly selected Internet user is of age 18-29 years. The (true) probability of this event is assumed to be 0.3. We use the *Coin Flip Simulation* applet to carry out the simulation, with 1 coin and probability 0.3. The applet does not allow a sample size of 20, but we can do two flips of 10 for part (a).

It is recommended to type the results (number of heads $\sim$ Internet users) into columns in a Minitab worksheet, in order to facilitate processing of the results; below the columns are labeled "count20" and "count200" for the trials with 20 and 200 tosses, respectively. From those columns the corresponding proportions are computed. The two distributions were obtained in one session with the applet, resetting after each simulation of either 20 or 200 tosses. The Minitab commands include some of the most obvious descriptive statistics and simple graphical displays.

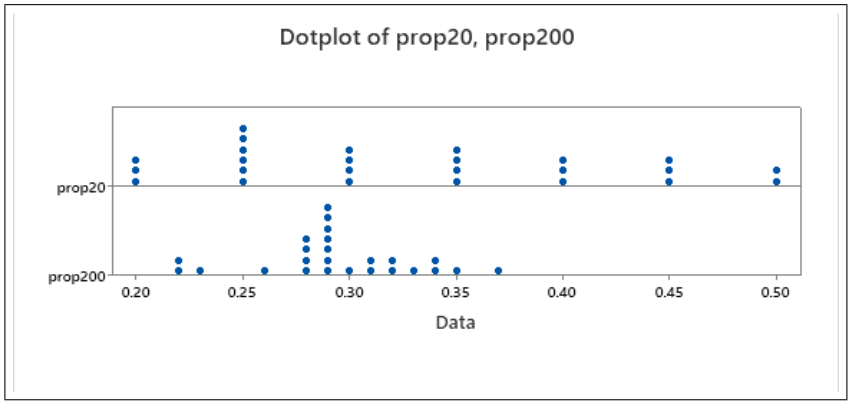
```
name c1 "count20"
name c2 "count200"
Name C3 'prop20'
Let 'prop20' = 'count20'/20
Name C4 'prop200'
Let 'prop200' = 'count200'/200
Describe 'prop20' 'prop200'.
Dotplot 'prop20' 'prop200';
 Overlay.
Boxplot 'prop20' 'prop200';
 Overlay;
 IQRBox;
 Outlier.
Stem-and-Leaf 'prop20' 'prop200';
 Increment .05.
```

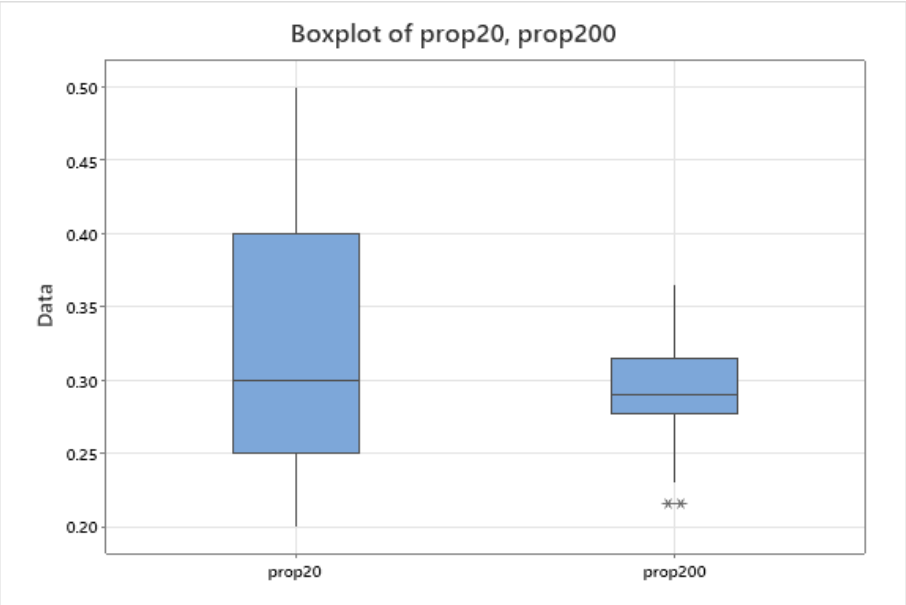
04_009.MWX

Descriptive Statistics: prop20, prop200

Statistics

Variable	N	N*	Mean	SE Mean	StDev	Minimum	Q1	Median	Q3	Maximun
prop20	25	0	0.33	0.0187083	0.0935414	0.2	0.25	0.3	0.4	0.
prop200	25	0	0.292	0.0074889	0.0374444	0.215	0.2775	0.29	0.315	0.36





04_009.MWX

Stem-and-Leaf Display: prop20, prop200

Stem-and-leaf of prop20 N = 25

```
3   2 000
9   2 555555
(4) 3 0000
12  3 5555
8   4 000
5   4 555
2   5 00
```

Leaf Unit = 0.01

Stem-and-leaf of prop200 N = 25

```
3     2 113
(13)  2 6778888889999
9     3 0111334
2     3 56
```

Leaf Unit = 0.01

Comments:

Note that the stem-and-leaf plots were generated with the same stem increment value (0.05 $\sim$ the range of values within one stem), so that the displays may more easily be compared. As also indicated in the exercise question, the distribution for 20 tosses is more variable and not centered as closely to the true probability (0.3) as the distribution for 200 tosses. See Supplementary exercise 4.10 for a numerical comparison of the variability based on a larger number of repetitions of experiments.