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 Probability applet to carry out the simulation, as described in the exercise. The PSLS applet does not allow a sample size of 20, so we use 15 (the default) instead for part (a).

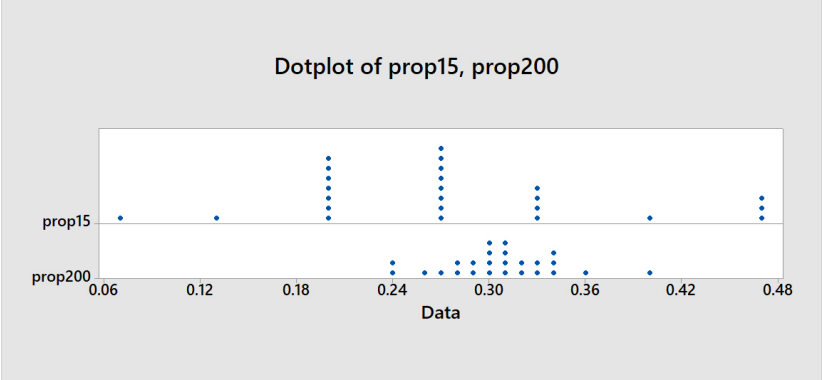
It is recommended to type the results (number of heads $\sim$ Internet users) into columns in a Minitab worksheet, in order to facilitate processing of the results; below the columns are labeled "prop15" and "prop200" for the trials with 15 and 200 tosses, respectively. The two distributions were obtained in one session with the Probability applet, resetting between the two series. The Minitab commands include some of the most obvious descriptive statistics and simple graphical displays.

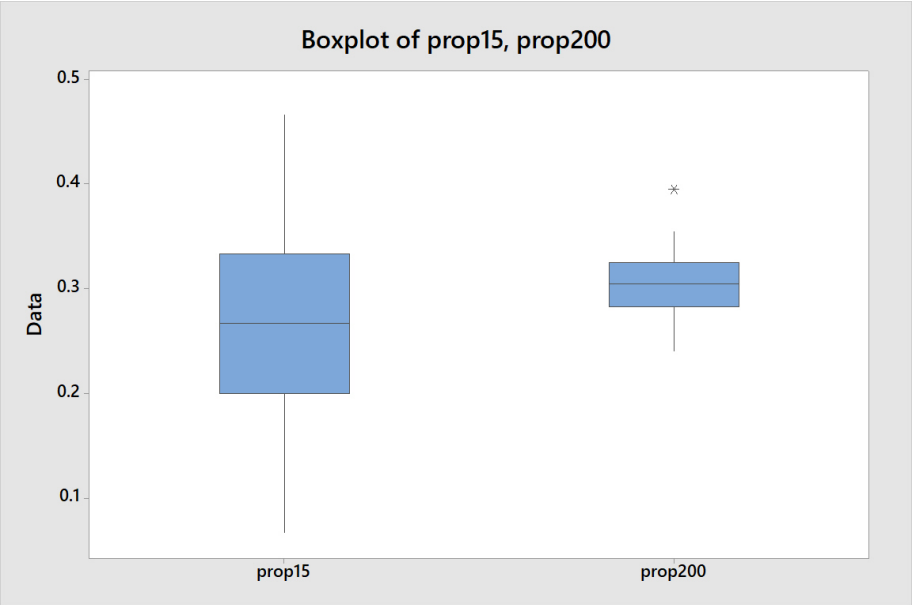
```
name c1 "count15"
name c2 "count200"
Name C3 'prop15'
Let 'prop15' = 'count15'/15
Name C4 'prop200'
Let 'prop200' = 'count200'/200
Describe 'prop15' 'prop200'.
Dotplot 'prop15' 'prop200';
 Overlay.
Boxplot 'prop15' 'prop200';
 Overlay;
 IQRBox;
 Outlier.
Stem-and-Leaf 'prop15' 'prop200';
 Increment .05.
```

Descriptive Statistics: prop15, prop200

Statistics

Variable	N	N*	Mean	SE Mean	StDev	Minimum	Q1	Median	Q3	Maximum
prop15	25	0	0.2747	0.0201	0.1006	0.0667	0.2000	0.2667	0.3333	0.4667
prop200	25	0	0.30440	0.00711	0.03554	0.24000	0.28250	0.30500	0.32500	0.39500





Stem-and-Leaf Display: prop15, prop200

Stem-and-leaf of prop15 N = 25

1	0	6
2	1	3
2	1	
9	2	0000000
(8)	2	66666666
8	3	3333
4	3	
4	4	0
3	4	666

Leaf Unit = 0.01

Stem-and-leaf of prop200 N = 25

2	2	44
11	2	568889999
(12)	3	000112222444
2	3	59

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 15 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.