STAT 13 Homework 1 Solutions

(**HW_1.1**)

(a)
2| 0 1 1 3 3 4 6 7 7 7 8 8 9 9 9
3| 0 0 0 1 3 3 4 5 5 5 7 7
4| 0 1 3 8 9
5| 1 1 4 7

(b) See Figure 1.

(**HW_1.2**) See Figure 2.

(**HW_1.3**) Boxplot (b) goes with the histogram for two reasons. First, the lower bound is slightly less than 15 and slightly greater than 35, which eliminates boxplots (a) and (c). Second, half of the data lie inside the interval of 20 and 30, which distinguishes boxplot (b) from boxplot (d).

(**HW_1.4**)

(a) Mean = (6.8 + 5.3 + 6.0 + 5.9 + 6.8 + 7.4 + 6.2) / 7 = 6.3
Standard deviation: Variance = $\{(6.8 – 6.3)^2 + (5.3 – 6.3)^2 + (6.0 – 6.3)^2 + (5.9 – 6.3)^2 + (6.8 – 6.3)^2 + (7.4 – 6.3)^2 + (6.2 – 6.3)^2\}/(7 – 1) = 0.495$
SD = $\sqrt{Variance} = \sqrt{0.495} = 0.70356\ldots$ rounded to 0.704

(b) Median = 6.2
Interquartile range = Q3 – Q1 = 6.8 – 5.9 = 0.9

(c) Coefficient of variation = SD / mean = 0.651372 / 6.3 = 0.103392 rounded to 0.103

(d) Mean = (6.8 + 5.3 + 6.0 + 5.9 + 6.8 + 10.4 + 6.2) / 7 = 6.7
Standard deviation: Variance = $\{(6.8 – 6.7)^2 + (5.3 – 6.7)^2 + (6.0 – 6.7)^2 + (5.9 – 6.7)^2 + (6.8 – 6.7)^2 + (10.4 – 6.7)^2 + (6.2 – 6.7)^2\}/(7 – 1) = 2.775$
SD = $\sqrt{Variance} = \sqrt{2.775} = 1.6658\ldots$ rounded to 1.67

Median = 6.2
Interquartile range = Q3 – Q1 = 6.8 – 5.9 = 0.9

Median and interquartile range display resistance; mean and standard deviation do not. Descriptive measures that display resistance do not change when a portion of the data changes.

(**HW_1.5**)

(a) Median = (29 + 31) / 2 = 30
Q1 = (22 + 24) / 2 = 23
Q3 = (46 + 48) / 2 = 47

(b) Interquartile range = Q3 – Q1 = 47 – 23 = 24

(c) See Figure 3.

(**HW_1.6**)

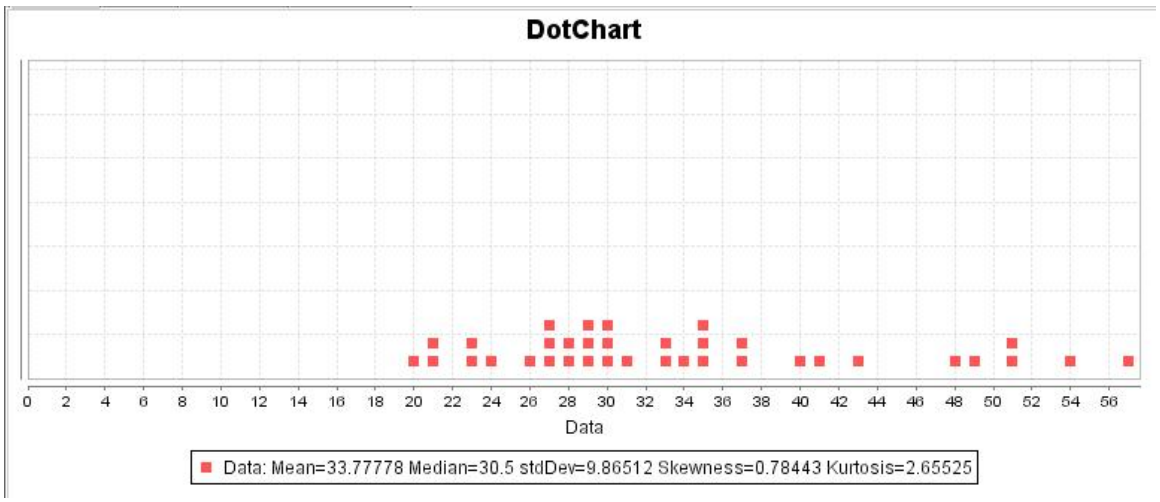
(a) Since there are 119 observations, the 60th observation shows the median number of bristles. Therefore, the median is 38.

(b) Following the same logic, Q1 and Q3 are the 30th observation and the 90th observation, respectively. So Q1 is 36 and Q3 is 41.

(c) See Figure 4.

(d) 79 out of 119 observations fall between 35.25 and 41.65. The answer is 79/119 = 0.664 so 66.4%.

Figure 1



http://www.stat.ucla.edu/~dinov/courses_students.dir/08/Fall/STAT13.1.dir

Figure 2

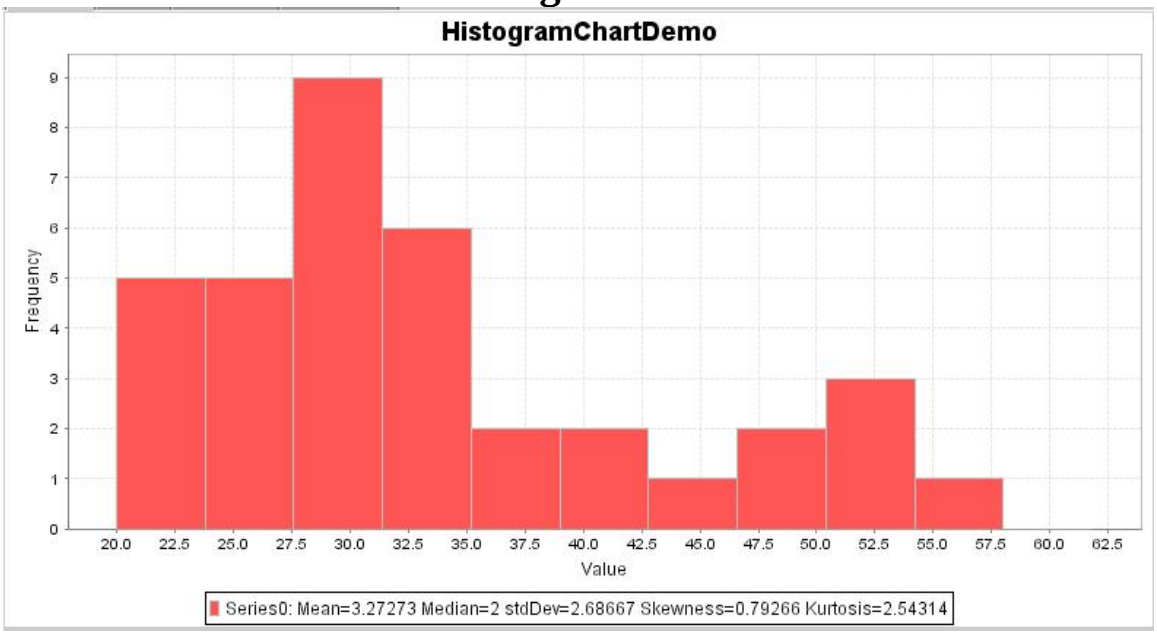


Figure 3

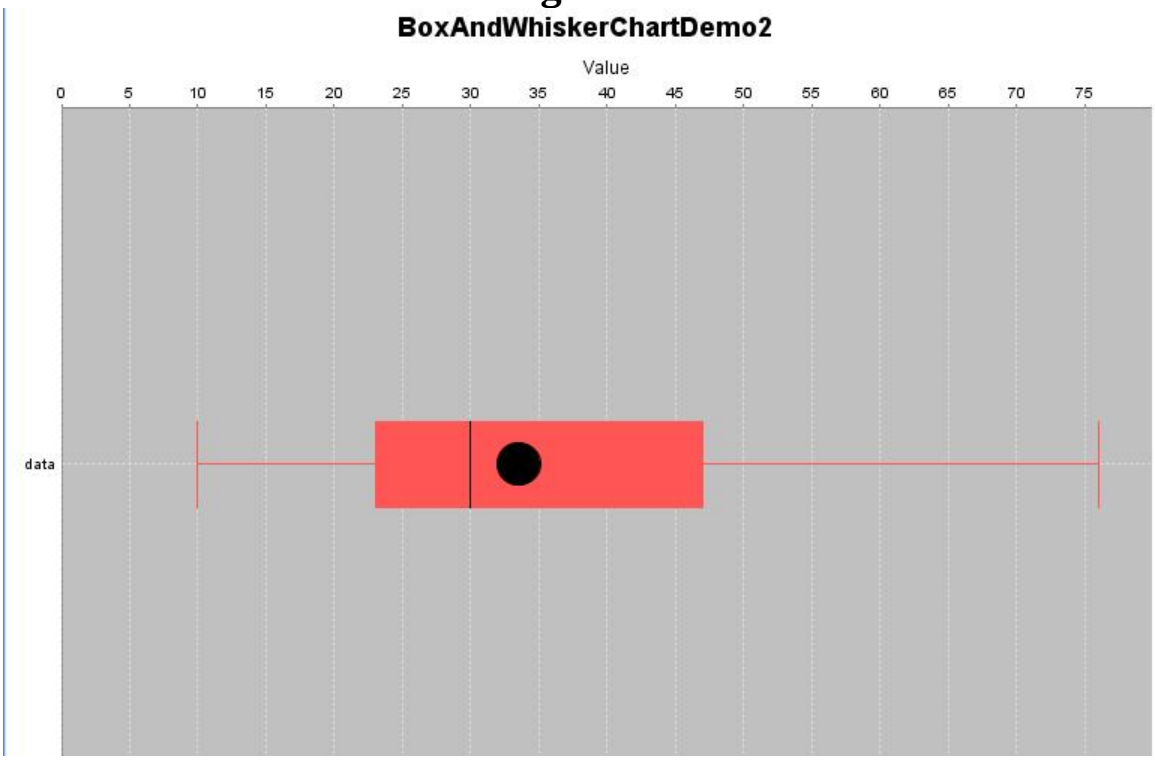


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Figure4