Abdullah Gul University

Math-301 (Probability & Statistics)

Fall 2022, QUIZ - II

Name & Surname:
ID Number:

Q 1. (100 pt.)

The measurements in the table below were recorded for the drying time, in hours, of a certain brand of latex paint. Assume that the measurements are a simple random sample. Under that assumption;

a. Find the standard deviation for the data shown below? (20 pt)
b. Construct a stem-and-leaf plot for the data shown below. (20 pt)
c. Construct the box-and-whisker plot for the data shown below. (30 pt)
d. Plot the histogram of the data with an interval of 4 hours. (30 pt)

104	105	118	109	106
118	113	126	117	108
114	120	122	110	118

SOLUTION:

a. First, the sample mean should be calcullated as below;

Sample size = N= 3x5 = 15

Mean = $\mu = \frac{104+105+118+109+106+118+113+126+117+108+114+120+122+110+118}{N} = \frac{1708}{15} \approx 113.9$

Then, let us apply the formula of the standard devition as below;

$$std = \sqrt{\frac{\sum(X_i - \mu)^2}{N-1}}$$

$$= \sqrt{\frac{(104-113.9)^2 + (105-113.9)^2 + (118-113.9)^2 + \ldots\ldots\ldots + (118-113.9)^2}{15-1}}$$

$$= \sqrt{\frac{623.73}{14}} = 6.67$$

b.

STEM	LEAF
10	45689
11	0347888
12	026

c. To draw the box & whisker plot, we should sort the measurements and find the medium values at each quarter regions as below;

Sorting:

~~104~~	~~105~~	~~106~~	~~108~~	~~109~~
~~110~~	~~113~~	114	~~117~~	~~118~~
~~118~~	~~118~~	~~120~~	~~122~~	~~126~~

The medium for the whole data will give us the end of the 2nd quarter:
The sample size is an odd number, so:
Median = $m = x_{(n+1)/2} = 114$

For the end of the 1st quarter, let us focus on the the first half part of the whole data shown below;

~~104~~	~~105~~	~~106~~	108	~~109~~
~~110~~	~~113~~			

For the the first half part of the whole data, the new sample size (7) is an odd number, so:
Median = $m = x_{(n+1)/2} = 108$

For the end of the 3rd quarter, let us focus on the the first half part of the whole data shown below;

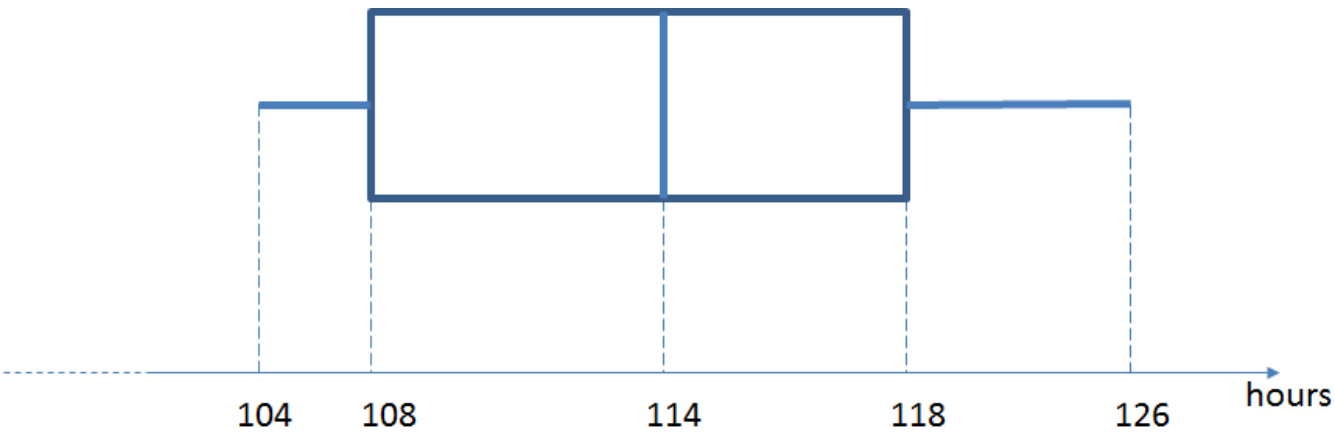
~~117~~	~~118~~	~~118~~	118	~~120~~
~~122~~	~~126~~			

For the the second half part of the whole data, the sample size (7) is an odd number, so:
Median = $m = x_{(n+1)/2} = 118$

To find the starting point of the 1st quarter region; it is equal to the smallest value of the whole data. So, **the starting point of the 1st quarter region is 104**.

To find the end point of the 4th quarter region; it is equal to the largest value of the whole data. So, **the end point of the 4th quarter region is 126**.

NOW, let us draw the box&whisker plot as below;



d. To plot the histogram, let us sort the measurements as below;

104	105	106	108	109
110	113	114	117	118
118	118	120	122	126

By the way, the group interval is given as 4 hours. Then, the group names can be arranged as below for the data;

Group-I: from 104 to 107,	104	105	106	
Group-II: from 108 to 111,	108	109	110	
Group-III: from 112 to 115,	113	114		
Group-IV: from 116 to 119,	117	118	118	118
Group-V: from 120 to 123,	120	122		
Group-VI: from 124 to 127,	126			

NOW, let us draw the histogram: