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STAT F300 Statistics, Dr. Short
Homework 2, Due Friday, January 27, 23:59

1.

Done.

2. Use R to construct a stem-and-leaf plot of this data set:

{66, 66, 69, 74, 74, 75, 75, 76, 76, 76, 76, 78, 79, 79, 81, 81, 82, 83, 83, 84, 86, 87, 87, 92, 98}

R code:

```
> x <- c(66, 66, 69, 74, 74, 75, 75, 76, 76, 76, 76,
78, 79, 79, 81, 81, 82, 83, 83, 84, 86, 87, 87, 92, 98)
> x <- sort(x)
> stem(x)

    The decimal point is 1 digit(s) to the right of the |

    6 | 669
    7 | 44556666899
    8 | 112334677
    9 | 28
```

Also, what is a fairly typical value, based on the stem-and-leaf plot?

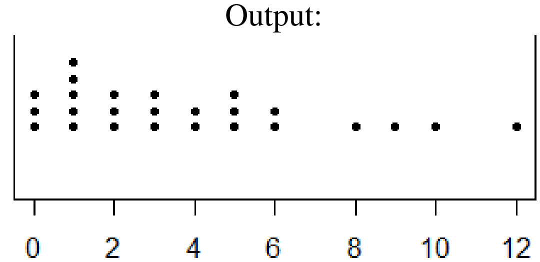
It looks like 7 is a typical value, followed closely by 8.

3 Construct a dot plot of this data set: {2,3,3,0,12, 0,1,4,6,2, 0,6,5,9,8, 1,1,1,2,3, 10,4,5,5,1}

R code:

```
> x <- c(2,3,3,0,12, 0,1,4,6,2,
0,6,5,9,8,1,1,1,2,3,10,4,5,5,1)
> stripchart(x, method="stack",
  offset=0.5, at=0.15, pch=20)
```

Output:



4. This is a modified version of Devore (8th ed) §1.4: # 45 (p.44) The article "Oxygen Consumption During Fire Suppression: Error of Heart Rate Estimation" (Ergonomics, 1991: 1469-1474) reported the following data on oxygen consumption (mL/kg/min) for a sample of ten firefighters performing a fire-suppression simulation:

29.5, 49.3, 30.6, 28.2, 28.0, 26.3, 33.9, 29.4, 23.5, 31.6

(a) Find the sample range

The sample range is $49.3 - 23.5 = \boxed{25.8}$

(b) Find the sample variance s^2 from the definition (i.e., by first computing deviations, then squaring them, etc.)

$$S^2 = \frac{1}{n-1}\sum_{i=1}^{n}(x_i - \bar{x})^2$$
$$\bar{x} = \frac{1}{n}\sum_{i=1}^{n} x_i = 31.03$$
$$S^2 = \frac{1}{10-1}\sum_{i=1}^{n}(x_i - 31.03)^2 = \frac{1}{9}((23.5-31.03)^2 + \cdots + (49.3-31.03)^2)$$
$$\approx \boxed{5.479}$$

(c) Find the sample standard deviation

$$\sigma = \sqrt{\frac{\sum_{i=1}^{n}(x_i - \bar{x})^2}{N-1}}$$
$$\sum_{i=1}^{n}(x_i - \bar{x})^2 = 49.31 = s^2; \quad N = 10$$
$$\sigma = \sqrt{\frac{s^2}{N-1}} = \sqrt{\frac{49.31}{10-1}} = \boxed{5.48}$$

(d) Find s^2 using the shortcut method. (Your answer should match part (b).)

Yeah okay

(e) By how much could the observation 23.5 be increased without affecting the value of the sample median? Explain.

Yeah okay

(f) Create a box plot for these data.

Yeah okay

5. Devore §1.4 # 50, modified. In 1997 a woman sued a computer keyboard manufacturer, charging that her repetitive stress injuries were caused by the keyboard (Genessy v. Digital Equipment Corp.). The injury awarded about \$3.5 million for pain and suffering, but the court then set aside that award as being unreasonable compensation. In making this determination, the court identified a "normative" group of 27 similar cases and specified a reasonable award as one within two standard deviations of the mean of the awards in the 27 cases. The 27 awards were (in \$1000s)

37, 60, 75, 115, 135, 140, 149, 150, 238, 290, 340, 410, 600, 750, 750, 750, 1050, 1100, 1139, 1150, 1200, 1200, 1250, 1576, 1700, 1825, 2000

Here is summary information:

$\sum x_i = 20{,}179$ and $\sum x_i^2 = 24{,}657{,}511$

What is the maximum possible amount that could be awarded under the two-standard deviation rule?

Yeah okay