NAME:

Stat 205 Quiz 2

The following are the same $n = 20$ times in minutes to complete a task (involving stacking blocks given to preschoolers) that you analyzed on Quiz 1. Here they are ordered. The sample mean is $\bar{y} = 1.875$ and the sample standard deviation is $s = 1.181$.

0.1	0.2	0.3	0.6	0.7	0.7	0.8	0.8	0.9	1.1
1.4	1.4	1.8	2.1	2.1	2.7	3.3	4.1	5.7	6.7

1. Find the five number summary of these data: $y_{(1)}$, Q_1, Q_2, Q_3, and $y_{(20)}$.
   Answer:
   $$y_{(1)} = 0.1, \quad Q_1 = \frac{0.7 + 0.7}{2} = 0.7, \quad Q_2 = \frac{1.1 + 1.4}{2} = 1.25,$$
   $$Q_3 = \frac{2.1 + 2.7}{2} = 2.4, \quad y_{(20)} = 6.7.$$

2. What percentage of the data points are *larger than* than Q_3?
   Answer:
   $$\frac{5}{20} = 0.25 = 25\%.$$

3. Make a regular boxplot from the 5 number summary.

4. Find the interquartile range IQR. Is it larger than the standard deviation?
   Answer: $IQR = Q_3 - Q_1 = 2.4 - 0.7 = 1.7$. Yes, $1.7 = IQR > s = 1.181$.

5. Find the lower and upper fences. Which, if any, observations are outliers?
   Answer:
   $$LF = Q_1 - 1.5\ IQR = 0.7 - 1.5(1.7) = -1.85,$$
   $$UF = Q_3 + 1.5\ IQR = 2.4 + 1.5(1.7) = 4.95.$$

   There are two outliers: 5.7 and 6.7 minutes.

6. Compare the mean to the median. Is the mean pulled in the direction of skew? Comment.
   Answer: The mean $\bar{y} = 1.875$ is larger than the median $Q_2 = 1.25$. The data are skewed right, so *yes* the mean is pulled in the direction of skew.