Day 3

Organizing Data

Data is often collected in an unorganized manner. The number of days each of 25 students was absent last month are as follows:

0, 3, 1, 0, 4, 2, 1, 3, 5, 0, 2, 0, 0, 0, 4, 0, 1, 1, 2, 1, 0, 7, 3, 1, 0

Unorganized data is often difficult to analyze. One way to organize data is to write in as an ordered list:

0, 0, 0, 0, 0, 0, 0, 0, 0, 1, 1, 1, 1, 2, 2, 2, 3, 3, 4, 4, 5, 7

Another way to create a Tally Chart or Frequency Distribution Table:

<table>
<thead>
<tr>
<th># Absences</th>
<th>Tally</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>[      ] [ ]</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>[ ]</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>[ ]</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>[ ]</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>[ ]</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>[ ]</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>[ ]</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>[ ]</td>
<td></td>
</tr>
</tbody>
</table>

Total Frequency = ______

Grouped Data

Given the test scores of 20 students, construct a Frequency Distribution table:

<table>
<thead>
<tr>
<th>Score Interval</th>
<th>Tally</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>40 - 49</td>
<td>[ ]</td>
<td>i</td>
</tr>
<tr>
<td>50 - 59</td>
<td>[ ]</td>
<td>a</td>
</tr>
<tr>
<td>60 - 69</td>
<td>[ ]</td>
<td>4</td>
</tr>
<tr>
<td>70 - 79</td>
<td>[ ]</td>
<td>i</td>
</tr>
<tr>
<td>80 - 89</td>
<td>[ ]</td>
<td>6</td>
</tr>
<tr>
<td>90 - 99</td>
<td>[ ]</td>
<td>3</td>
</tr>
</tbody>
</table>

20
Create a Stem-n-Leaf plot for the following data:

```
<table>
<thead>
<tr>
<th>Stem</th>
<th>Leaf</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>5</td>
<td>3, 8</td>
</tr>
<tr>
<td>6</td>
<td>1, 3, 8, 8</td>
</tr>
<tr>
<td>7</td>
<td>0, 5, 6, 7</td>
</tr>
<tr>
<td>8</td>
<td>0, 0, 3, 4, 5, 9</td>
</tr>
<tr>
<td>9</td>
<td>2, 3, 8</td>
</tr>
</tbody>
</table>
```

**The Histogram**

The Frequency Histogram and Cumulative Frequency Histogram

After data has been organized into tables, a histogram (bar chart) can be used to visualize the data.

A Frequency Histogram is a bar graph in which each interval in a frequency table is represented by the width of the bar and the frequency of the interval is represented by the height of the bar.

A Cumulative Frequency Histogram shows the accumulated frequencies from a frequency table. The accumulation of data begins with the lowest data values (scores, weights, heights, etc.)
Given the test scores of 20 students (as before), construct a Frequency Histogram and a Cumulative Frequency Histogram:

<table>
<thead>
<tr>
<th>Score Interval</th>
<th>Tally</th>
<th>Frequency</th>
<th>Cumulative Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>40 - 49</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>50 - 59</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>60 - 69</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>70 - 79</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>80 - 89</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>90 - 99</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Frequency Histogram
Cumulative Frequency Histogram

Scores
break when not starting at 0
Cumulative Frequency Histograms and Percentiles

A percentile is a score that tells us what percent of the entire population (or the total frequency) scored at or below that measure. For example, if you took a test and scored at the 90th Percentile, you scored better than 90% of the students that took that test. 10% of the students earned a higher score. Please keep in mind that scoring at the 90th Percentile is NOT that same as scoring 90% on the test.

Use the data in the following frequency table to complete the Cumulative Frequency column and construct a Cumulative Frequency Histogram.

<table>
<thead>
<tr>
<th>Score Interval</th>
<th>Frequency</th>
<th>Cumulative Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 - 5</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>6 - 10</td>
<td>5</td>
<td>14</td>
</tr>
<tr>
<td>11 - 15</td>
<td>6</td>
<td>18</td>
</tr>
<tr>
<td>16 - 20</td>
<td>4</td>
<td>20</td>
</tr>
<tr>
<td>21 - 25</td>
<td>2</td>
<td></td>
</tr>
</tbody>
</table>

When you have constructed the Cumulative Frequency Histogram, draw in the Cumulative Frequency Polygon (Line-Segment graph) and use it to answer the questions that appear below.

Determine the approximate score that falls at the
75th Percentile
50th Percentile
25th Percentile

Score of 8
Score of 18
A score of 8 is at approximately the _____ percentile.  
A score of 18 is at approximately the _____ percentile.

Using the Cumulative Frequency Histogram below, draw the Cumulative Frequency Polygon and use it to approximate each of the following:

- Age at the 60th percentile: 41
- Age at the first quartile: 22
- Age at the median: 35
- Age at the third quartile: 52
- Age at the 20th percentile: 19
- Age at the 80th percentile: 55

The percentile ranking for an age of 15 is approximately 7.

The percentile ranking for an age of 45 is approximately 26.

The percentile ranking for an age of 63 is approximately 37.