MATH 120: Quiz 2 - 2/16/2022

Worldwide meat consumption has increased significantly over the past 50 years, according to data from the UN Food and Agriculture Organization. Shown below, in ascending order, is the annual per-capita meat consumption in the U.S. between the years 1960 and 2018, in units of pounds per person. (Data are sampled from 14 years in that period.)

$$164, 178, 183, 193, 194, 198, 198, 207, 207, 209, 212, 215, 220, 224$$

Sketch a suitably scaled, neat, accurate, boxplot for these data.
[Show all needed steps, calculations, units, axis labels.]

Solution

There are 14 data values here, already in ascending order. Therefore:
Median = average of 7th & 8th value = $(198+207)/2 = 202.5$ pounds
Q1 = median of lower 7 values = 4th value = 193 pounds
Q3 = median of upper 7 values = 11th value = 212 pounds

5-number summary: min = 164, Q1 = 193, med = 202.5,
Q3 = 212, max = 224. (all values in pounds per-capita)

IQR = $212 - 193 = 19$ pounds per-capita
Upper fence: Q3 + 1.5 IQR = $212 + 28.5 = 240.5$
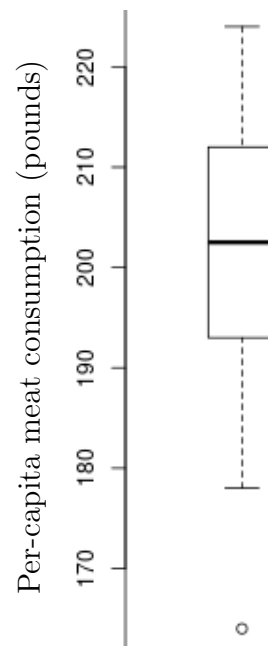 $\Rightarrow$ no high outliers.
Lower fence: Q1 $-$ 1.5 IQR = $193 - 28.5 = 164.5$
    $\Rightarrow$ low outlier at 164.
    $\Rightarrow$ lower whisker ends at 178.

Boxplot sketch is shown on the right.

Grading: Total points possible = 6.
    2 pt = find correct median, Q1, and Q3 for original data.
    (partial credit 1.5pt if correct median, but Q1, and/or Q3 off by 1 position in data)
    2 pt = boxplot fence calculations.
    2 pt = correct boxplot graph (with outlier, and axis labels for full credit).