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Assignments - session-2

(1) $X = \{24, 25, 26, 27, 28, 90, 100, 1000, 1200, 1400, 1400, 1400\}$

Find Mean, Median and Mode.

$$\text{Mean} = \frac{24+25+28+27+28+98+100+1000+3\times1400}{12}$$

$$= \frac{6720}{12} = 560$$

$$\text{Median} = \frac{90+100}{2} = 95$$

$$\text{Mode} = 1400$$

② Age = {23, 24, 28, 27, NAN, 31, 58, NAN}

Salary = {40,000, 41,000, 72,000, NAN, 48,000, 100000, 50,000}

Find the mean and median of Age and Salary

Age (sorted) = {23, 24, 27, 28, NAN, 31, 58, N...

$$\text{Mean}(\bar{x}) = \frac{23+24+27+28+31+58}{6}$$

$$= \frac{191}{6} = 31.8$$

$$\text{Median} = \frac{27+28}{2} = 27.5$$

(3) $x = \{23, 21, 20, 19, 24, 27, 28\}$

Find the variance and standard deviation.

$$\mu = \frac{23+21+20+19+24+27+28}{7}$$

$$= 162/7 = 23.14$$

$$\text{population Variance}(\sigma^2) = \sum_{i=1}^{N} \frac{(x_i - \mu)^2}{N}$$

$$= \frac{(23-23.14)^2 + (21-23.14)^2 + (20-23.14)^2 + (19-23.14)^2 + (24-23.14)^2 + (27-23.14)^2 + (28-23.14)^2}{7}$$

$$= \frac{(-0.14)^2 + (-2.14)^2 + (-3.14)^2 + (-4.14)^2 + (0.86)^2 + (3.86) + (4.86)}{7}$$

$$= \frac{0.0196 + 4.5796 + 9.8596 + 17.1396 + 0.7396 + 14.8996 + 23.6196}{7}$$

$$= \frac{70.8572}{7} = \boxed{10.1224}$$

$$\text{Population Standard deviation}(\sigma) = \sqrt{\sigma^2}$$

$$= \sqrt{10.1224}$$

$$= \boxed{3.18}$$

$\sigma = 3.18$

$\sigma^2 = 10.1224$

Sample variance (s^2) =

$$\frac{\sum_{i=1}^{N} (x_i - \bar{x})^2}{N-1}$$

$$= \frac{70.8572}{N-1} = \frac{70.8572}{(7-1)} = \frac{70.8572}{6}$$

$$= 11.8$$

Sample standard deviation

$$= \sqrt{\frac{\sum_{i=1}^{N} (x_i - \bar{x})^2}{(N-1)}}$$

$$= \sqrt{11.8}$$

$$= 3.45$$

$$s = 3.43$$
$$s^2 = 11.8$$

(4) $x = \{2, 2, 3, 4, 5, 5, 5, 6, 7, 8, 8, 8, 8, 8, 9, 10, 11, 11, 12\}$

(a) percentile ranking of 10

$$= \frac{\text{Number of values below}}{\text{Total Sample N}} \times 100$$

$$= \frac{16}{20} \times 100$$

$$= 80\%$$

(b) percentile ranking of 11

$$= \frac{17}{20} \times 100 = 85\%$$

(c) 25th percentile value

$$= \frac{25}{100}(N+1) = \frac{25}{100} \times 21 = 5.25$$

$$= \frac{5+5}{2} = 5$$

(d) 75th percentile value $= \frac{75}{100} \times (N+1)$

$= \frac{75}{100} \times 21 \quad 5.25$

$= 15.75$ Lady

$= \frac{9+9}{2} = \frac{18}{2} = 9$

(5) $X = \{-8, 1, 2, 4, 5, 6, 8, 15, 20, 120\}$

Find the five number summary and draw box plot.

Ans - 5 Number Summary

(a) Minimum = $\boxed{-8}$

(b) $Q1 = \frac{25}{100} \times (N+1) = \frac{25}{100} \times 11 = 2.75$

$= \frac{1+2}{2} = \boxed{1.5}$

(c) Median $= \frac{5+6}{2} = \frac{11}{2} = \boxed{5.5}$

(d) $Q3 = \frac{75}{100}(N+1) = \frac{75}{100} \times 11 = 8.$

$= \frac{15+20}{2} = \boxed{17.}$

(e) Maximum = 20

IQR = $17.5 - 1.5 = 16.0$

LF = $1.5 - 1.5(16.0) = -22.$

UF = $17.5 + 1.5(16.0) = 41.$

That means Outlier = 120

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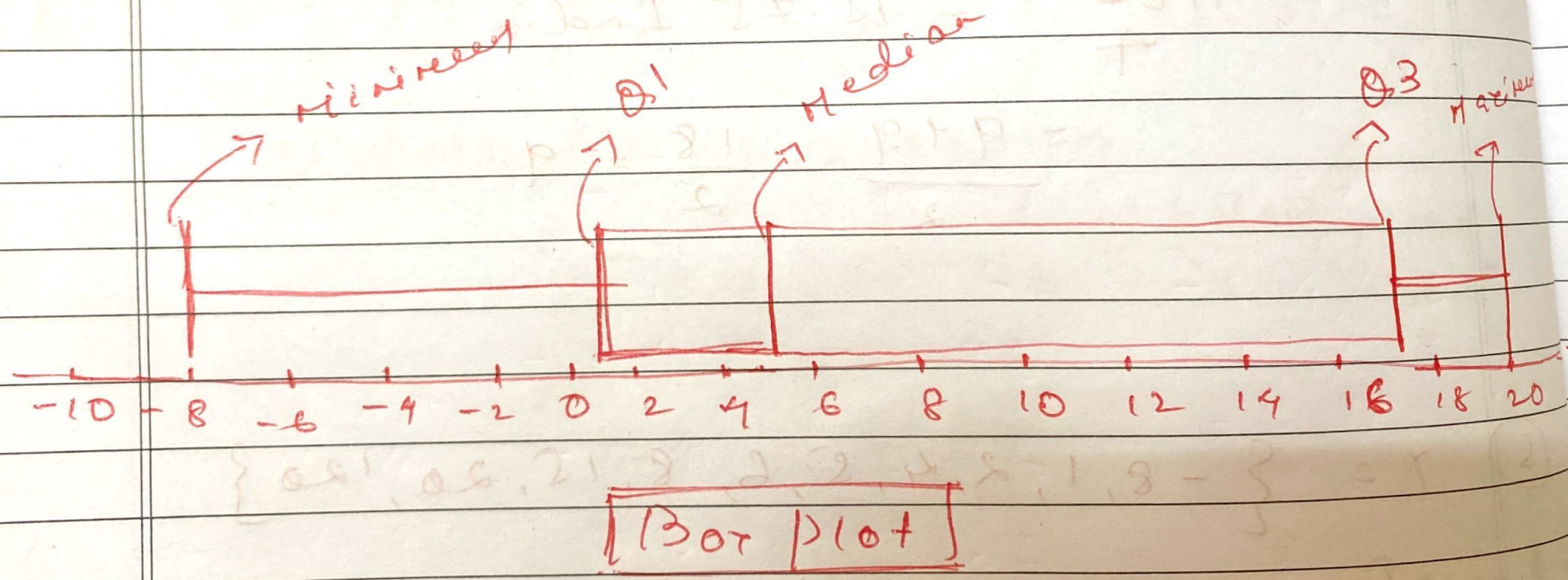

Box Plot

Outlier