

DRAW A HISTOGRAM AND A BOX-AND-WHISKER PLOT TO REPRESENT THE COMBINED DATA, AND ANSWER THE QUESTIONS.

DRAW A HISTOGRAM AND A BOX-AND-WHISKER PLOT TO REPRESENT THE COMBINED DATA, AND ANSWER THE QUESTIONS. UNDERSTANDING HOW TO EFFECTIVELY VISUALIZE AND INTERPRET DATA IS A FUNDAMENTAL SKILL IN STATISTICS. WHEN DEALING WITH COMBINED DATASETS FROM MULTIPLE GROUPS OR SOURCES, CREATING CLEAR VISUAL REPRESENTATIONS LIKE HISTOGRAMS AND BOX-AND-WHISKER PLOTS CAN REVEAL VALUABLE INSIGHTS. THESE TOOLS HELP IDENTIFY PATTERNS, OUTLIERS, AND THE DISTRIBUTION OF DATA, WHICH ARE ESSENTIAL FOR MAKING INFORMED DECISIONS OR DRAWING CONCLUSIONS. IN THIS ARTICLE, WE WILL EXPLORE THE PROCESS OF DRAWING A HISTOGRAM AND A BOX-AND-WHISKER PLOT FOR COMBINED DATA, INTERPRET THESE VISUALIZATIONS, AND ANSWER RELATED QUESTIONS TO DEEPEN YOUR UNDERSTANDING OF DATA ANALYSIS TECHNIQUES.

UNDERSTANDING THE DATA AND ITS CONTEXT

BEFORE DIVING INTO GRAPHICAL REPRESENTATIONS, IT'S CRUCIAL TO UNDERSTAND THE DATA YOU ARE WORKING WITH.

TYPES OF DATA SUITABLE FOR VISUALIZATION

DATA USED FOR HISTOGRAMS AND BOX PLOTS TYPICALLY INCLUDE CONTINUOUS NUMERICAL VALUES, SUCH AS MEASUREMENTS, SCORES, OR AGES. THESE VISUALIZATIONS HELP ASSESS THE DISTRIBUTION, CENTRAL TENDENCY, AND VARIABILITY WITHIN THE DATA.

COMBINING DATA FROM MULTIPLE SOURCES

WHEN DATA COMES FROM DIFFERENT GROUPS—SAY, TEST SCORES FROM DIFFERENT CLASSES OR SALES FIGURES FROM VARIOUS REGIONS—IT CAN BE COMBINED TO ANALYZE OVERALL TRENDS. HOWEVER, IT'S IMPORTANT TO CONSIDER WHETHER THE DATA SETS ARE COMPARABLE AND WHETHER COMBINING THEM MAKES SENSE CONTEXTUALLY.

PREPARING THE DATA FOR VISUALIZATION

ACCURATE VISUALIZATION DEPENDS ON PROPER DATA PREPARATION.

STEP 1: COLLECT AND ORGANIZE DATA

GATHER ALL RELEVANT DATA POINTS FROM THE VARIOUS GROUPS. FOR EXAMPLE:

- GROUP A: 65, 70, 75, 80, 85
- GROUP B: 60, 72, 78, 83, 88
- GROUP C: 68, 74, 77, 82, 86

COMBINE THESE INTO A SINGLE DATASET:

COMBINED DATA: 60, 65, 68, 70, 72, 74, 75, 77, 78, 80, 82, 83, 85, 86, 88

STEP 2: ORGANIZE DATA FOR ANALYSIS

ORDER THE DATA FROM SMALLEST TO LARGEST TO FACILITATE CALCULATIONS:

60, 65, 68, 70, 72, 74, 75, 77, 78, 80, 82, 83, 85, 86, 88

DRAWING A HISTOGRAM OF COMBINED DATA

A HISTOGRAM IS A BAR GRAPH THAT REPRESENTS THE DISTRIBUTION OF NUMERICAL DATA BY GROUPING DATA POINTS INTO INTERVALS CALLED BINS.

STEPS TO DRAW A HISTOGRAM

1. DETERMINE THE RANGE

CALCULATE THE DIFFERENCE BETWEEN THE MAXIMUM AND MINIMUM VALUES:

$$\text{Range} = 88 - 60 = 28$$

2. CHOOSE THE NUMBER OF BINS

A COMMON RULE IS TO USE BETWEEN 5 AND 10 BINS. FOR THIS DATASET, 5 BINS ARE SUITABLE:

$$\text{Bin Width} = \text{Range} / \text{Number of Bins} = 28 / 5 \approx 5.6$$

3. CREATE BIN INTERVALS

ROUND BIN WIDTH TO A CONVENIENT NUMBER, SAY 6:

- Bin 1: 60-65
- Bin 2: 66-71
- Bin 3: 72-77
- Bin 4: 78-83
- Bin 5: 84-89

4. COUNT DATA POINTS IN EACH BIN

DISTRIBUTE DATA POINTS:

- Bin 1 (60-65): 60, 65 2 POINTS
- Bin 2 (66-71): 68, 70 2 POINTS
- Bin 3 (72-77): 72, 74, 75, 77 4 POINTS
- Bin 4 (78-83): 78, 80, 82, 83 4 POINTS
- Bin 5 (84-89): 85, 86, 88 3 POINTS

5. DRAW THE HISTOGRAM

PLOT THE BINS ON THE X-AXIS AND THE FREQUENCY ON THE Y-AXIS. EACH BAR'S HEIGHT CORRESPONDS TO THE NUMBER OF DATA POINTS WITHIN THAT INTERVAL.

INTERPRETING THE HISTOGRAM

THE HISTOGRAM REVEALS THE DISTRIBUTION SHAPE:

- SYMMETRY OR SKEWNESS
- CONCENTRATION OF DATA AROUND CERTAIN VALUES
- PRESENCE OF GAPS OR OUTLIERS

IN THIS CASE, THE DATA APPEARS FAIRLY EVENLY DISTRIBUTED WITH A SLIGHT CONCENTRATION IN THE MIDDLE BINS.

CREATING A BOX-AND-WHISKER PLOT (BOX PLOT)

A BOX-AND-WHISKER PLOT SUMMARIZES THE DISTRIBUTION OF DATA BASED ON FIVE KEY NUMBERS: MINIMUM, FIRST QUARTILE (Q1), MEDIAN (Q2), THIRD QUARTILE (Q3), AND MAXIMUM.

STEPS TO DRAW A BOX PLOT

1. IDENTIFY THE MINIMUM AND MAXIMUM

- MINIMUM: 60
- MAXIMUM: 88

2. CALCULATE QUANTILES

- MEDIAN (Q2):

SINCE THERE ARE 15 DATA POINTS, THE MEDIAN IS THE 8TH VALUE:

ORDERED DATA: 60, 65, 68, 70, 72, 74, 75, 77, 78, 80, 82, 83, 85, 86, 88

MEDIAN (Q2): 77

- FIRST QUARTILE (Q1):

MEDIAN OF THE LOWER HALF (FIRST 7 VALUES): 60, 65, 68, 70, 72, 74, 75

Q1 IS THE 4TH VALUE: 70

- THIRD QUARTILE (Q3):

MEDIAN OF THE UPPER HALF (LAST 7 VALUES): 78, 80, 82, 83, 85, 86, 88

Q3 IS THE 4TH VALUE: 83

3. CONSTRUCT THE BOX PLOT

- DRAW A NUMBER LINE COVERING THE RANGE 60–88.
- DRAW A BOX FROM Q1 (70) TO Q3 (83).
- DRAW A LINE INSIDE THE BOX AT THE MEDIAN (77).
- EXTEND "WHISKERS" FROM THE BOX TO THE MINIMUM (60) AND MAXIMUM (88).
- MARK ANY OUTLIERS IF PRESENT (NONE IN THIS DATASET).

INTERPRETING THE BOX PLOT

THE BOX PLOT SHOWS THE DATA'S SPREAD AND SKEWNESS:

- THE INTERQUARTILE RANGE (IQR): $Q3 - Q1 = 83 - 70 = 13$
- THE MEDIAN IS CLOSER TO Q1, INDICATING A SLIGHT SKEWNESS TOWARDS HIGHER VALUES.
- THE WHISKERS AND OUTLIERS PROVIDE INSIGHTS INTO DATA VARIABILITY AND POTENTIAL ANOMALIES.

ANALYZING AND ANSWERING QUESTIONS BASED ON VISUALIZATIONS

ONCE THE HISTOGRAM AND BOX PLOT ARE DRAWN, THEY SERVE AS TOOLS TO ANSWER SPECIFIC QUESTIONS ABOUT THE DATA.

COMMON QUESTIONS AND HOW TO ANSWER THEM

- **WHAT IS THE OVERALL DISTRIBUTION SHAPE?**
 - USE THE HISTOGRAM TO ASSESS WHETHER THE DATA IS SYMMETRIC, SKEWED, OR UNIFORM.

- IN OUR EXAMPLE, THE HISTOGRAM SUGGESTS A FAIRLY SYMMETRIC DISTRIBUTION WITH SLIGHT SKEWNESS.

- **WHERE IS THE CENTRAL TENDENCY LOCATED?**

- THE MEDIAN (77) INDICATES THE MIDDLE POINT OF THE DATA.
- THE BOX PLOT'S CENTER LINE SHOWS THE MEDIAN'S POSITION RELATIVE TO Q1 AND Q3.

- **WHAT IS THE SPREAD OR VARIABILITY?**

- THE IQR (13) FROM THE BOX PLOT INDICATES THE MIDDLE 50% OF DATA.
- THE RANGE (28) FROM MIN TO MAX SHOWS TOTAL VARIABILITY.

- **ARE THERE ANY OUTLIERS?**

- IN THIS CASE, NO OUTLIERS ARE EVIDENT AS THE WHISKERS EXTEND TO THE MIN AND MAX WITHOUT GAPS.

- **WHICH VALUES ARE MOST COMMON OR TYPICAL?**

- THE MEDIAN AND THE SHAPE OF THE HISTOGRAM SUGGEST MOST DATA POINTS CLUSTER AROUND THE MIDDLE VALUES (~70-80).

CONCLUSION: THE IMPORTANCE OF VISUAL DATA REPRESENTATION

DRAWING HISTOGRAMS AND BOX-AND-WHISKER PLOTS PROVIDES A COMPREHENSIVE VIEW OF COMBINED DATA SETS, FACILITATING BETTER UNDERSTANDING AND INTERPRETATION. THESE VISUAL TOOLS HELP IDENTIFY DISTRIBUTION PATTERNS, MEASURE VARIABILITY, DETECT OUTLIERS, AND SUMMARIZE DATA SUCCINCTLY. WHETHER YOU'RE ANALYZING TEST SCORES, SURVEY RESULTS, OR ANY OTHER NUMERICAL DATA, MASTERING THESE VISUALIZATION TECHNIQUES EMPOWERS YOU TO COMMUNICATE FINDINGS EFFECTIVELY AND MAKE DATA-DRIVEN DECISIONS.

REMEMBER, THE PROCESS BEGINS WITH PROPER DATA COLLECTION AND ORGANIZATION, FOLLOWED BY CAREFUL CALCULATION AND PLOTTING. PRACTICE WITH DIFFERENT DATA SETS ENHANCES YOUR SKILLS AND CONFIDENCE IN DATA ANALYSIS, MAKING YOU PROFICIENT IN TURNING RAW NUMBERS INTO MEANINGFUL INSIGHTS.

IN SUMMARY, CREATING A HISTOGRAM AND A BOX-AND-WHISKER PLOT FOR COMBINED DATA INVOLVES UNDERSTANDING YOUR DATASET, CHOOSING APPROPRIATE BIN SIZES AND INTERVALS, ACCURATELY CALCULATING KEY STATISTICAL MEASURES, AND INTERPRETING THE VISUALIZATIONS TO ANSWER RELEVANT QUESTIONS. THESE STEPS FORM THE FOUNDATION OF EFFECTIVE DATA ANALYSIS AND ARE INVALUABLE SKILLS FOR STUDENTS, RESEARCHERS, AND PROFESSIONALS ALIKE.

FREQUENTLY ASKED QUESTIONS

WHAT IS THE PURPOSE OF DRAWING A HISTOGRAM AND A BOX-AND-WHISKER PLOT FOR COMBINED DATA?

TO VISUALLY SUMMARIZE THE DISTRIBUTION, SPREAD, AND CENTRAL TENDENCY OF THE DATA, ALLOWING FOR EASIER COMPARISON AND ANALYSIS.

HOW DO YOU CONSTRUCT A HISTOGRAM FOR COMBINED DATA?

FIRST, DETERMINE THE DATA RANGE AND DIVIDE IT INTO INTERVALS (BINS). THEN, COUNT THE NUMBER OF DATA POINTS IN EACH BIN AND DRAW BARS TO REPRESENT THESE FREQUENCIES.

WHAT INFORMATION DOES A BOX-AND-WHISKER PLOT PROVIDE ABOUT THE DATA?

IT SHOWS THE MEDIAN, QUANTILES, MINIMUM, AND MAXIMUM, HIGHLIGHTING THE DATA'S SPREAD AND IDENTIFYING OUTLIERS.

WHEN SHOULD YOU PREFER A HISTOGRAM OVER A BOX-AND-WHISKER PLOT?

WHEN YOU WANT TO SEE THE SHAPE OF THE DATA DISTRIBUTION, SUCH AS SKEWNESS OR MODALITY, WHICH HISTOGRAMS EFFECTIVELY DISPLAY.

HOW CAN YOU INTERPRET THE SKEWNESS FROM THESE PLOTS?

IF THE HISTOGRAM HAS A LONGER TAIL ON ONE SIDE, OR THE BOX PLOT SHOWS THE MEDIAN CLOSER TO ONE QUARTILE, IT INDICATES SKEWNESS IN THAT DIRECTION.

WHAT STEPS ARE INVOLVED IN ANALYZING COMBINED DATA USING THESE PLOTS?

GATHER ALL DATA POINTS, CREATE THE HISTOGRAM TO OBSERVE DISTRIBUTION SHAPE, DRAW THE BOX-AND-WHISKER PLOT TO UNDERSTAND SPREAD AND QUANTILES, AND INTERPRET THE FINDINGS.

CAN YOU IDENTIFY OUTLIERS FROM THESE PLOTS? HOW?

YES, OUTLIERS CAN BE IDENTIFIED AS INDIVIDUAL POINTS OUTSIDE THE WHISKERS IN THE BOX PLOT OR AS ISOLATED BARS OR GAPS IN THE HISTOGRAM.

HOW DOES COMBINING DATA FROM DIFFERENT GROUPS AFFECT THE HISTOGRAM AND BOX PLOT?

IT CREATES A COMPREHENSIVE VIEW OF ALL DATA, POSSIBLY REVEALING OVERALL DISTRIBUTION PATTERNS, BUT MAY ALSO MASK INDIVIDUAL GROUP DIFFERENCES.

WHAT INSIGHTS CAN BE GAINED BY COMPARING THE HISTOGRAM AND BOX-AND-WHISKER PLOT OF THE SAME DATA?

COMPARING THEM HELPS YOU UNDERSTAND BOTH THE OVERALL DISTRIBUTION SHAPE AND DETAILED SPREAD, CENTRAL TENDENCY, AND POTENTIAL OUTLIERS, PROVIDING A FULLER DATA ANALYSIS.

ADDITIONAL RESOURCES

DRAW A HISTOGRAM AND A BOX-AND-WHISKER PLOT TO REPRESENT THE COMBINED DATA, AND ANSWER THE QUESTIONS

INTRODUCTION

IN THE REALM OF STATISTICAL ANALYSIS, VISUAL REPRESENTATIONS PLAY A PIVOTAL ROLE IN UNDERSTANDING AND INTERPRETING DATA. AMONG THE MOST COMMON AND INSIGHTFUL TOOLS ARE HISTOGRAMS AND BOX-AND-WHISKER PLOTS. THESE GRAPHICAL TECHNIQUES ENABLE ANALYSTS TO GRASP THE UNDERLYING DISTRIBUTION, VARIABILITY, AND CENTRAL TENDENCY OF DATASETS AT A GLANCE. THIS ARTICLE DELVES INTO THE PROCESS OF DRAWING A HISTOGRAM AND A BOX-AND-WHISKER PLOT BASED ON COMBINED DATA, EXPLORING THEIR SIGNIFICANCE, THE METHODOLOGY FOR CONSTRUCTING THEM, AND HOW THEY FACILITATE ANSWERING PERTINENT QUESTIONS ABOUT THE DATA.

THE IMPORTANCE OF VISUAL DATA REPRESENTATION

DATA VISUALIZATION SERVES AS AN ESSENTIAL BRIDGE BETWEEN RAW DATA AND MEANINGFUL INSIGHTS. WHILE NUMERICAL SUMMARIES SUCH AS MEANS, MEDIAN, AND QUANTILES PROVIDE QUANTITATIVE SNAPSHOTS, VISUALS REVEAL PATTERNS, OUTLIERS, AND DISTRIBUTION SHAPES THAT MIGHT OTHERWISE BE OVERLOOKED.

- HISTOGRAMS DISPLAY THE FREQUENCY DISTRIBUTION OF CONTINUOUS DATA, HIGHLIGHTING MODES, SKEWNESS, AND SPREAD.
- BOX-AND-WHISKER PLOTS SUCCINCTLY SUMMARIZE DATA DISTRIBUTION, EMPHASIZING MEDIAN, QUANTILES, AND POTENTIAL OUTLIERS.

USING BOTH TOOLS IN TANDEM OFFERS A COMPREHENSIVE UNDERSTANDING, ESPECIALLY WHEN ANALYZING COMBINED DATASETS FROM MULTIPLE SOURCES OR GROUPS.

UNDERSTANDING THE DATA: CONTEXT AND PREPARATION

BEFORE CONSTRUCTING THE VISUALIZATIONS, IT IS CRUCIAL TO UNDERSTAND THE NATURE OF THE DATA:

- TYPE OF DATA: IS IT CONTINUOUS OR DISCRETE? FOR HISTOGRAMS AND BOX PLOTS, CONTINUOUS DATA IS TYPICAL.
- SOURCES: ARE THE DATA POINTS FROM DIFFERENT GROUPS OR CATEGORIES? COMBINING DATA FROM MULTIPLE SOURCES REQUIRES CAREFUL MERGING.
- SAMPLE SIZE: SUFFICIENT DATA POINTS ENSURE MEANINGFUL VISUALIZATION.
- DATA CLEANING: REMOVING ERRORS, DUPLICATES, OR IRRELEVANT ENTRIES ENHANCES ACCURACY.

SUPPOSE WE HAVE TWO DATASETS REPRESENTING TEST SCORES FROM TWO DIFFERENT CLASSES. OUR GOAL IS TO COMBINE THESE DATASETS, VISUALIZE THE OVERALL DISTRIBUTION, AND ANSWER QUESTIONS ABOUT THE COMBINED PERFORMANCE.

STEP 1: COMBINING THE DATA

ASSUMING THE DATASETS:

- CLASS A SCORES: 75, 80, 85, 90, 95
- CLASS B SCORES: 70, 78, 82, 88, 92

COMBINED DATA: 70, 75, 78, 80, 82, 85, 88, 90, 92, 95

THIS COMBINED DATASET WILL BE THE BASIS FOR OUR VISUALIZATIONS.

STEP 2: DRAWING THE HISTOGRAM

A. DETERMINING THE BIN WIDTH AND RANGE

THE HISTOGRAM DIVIDES THE DATA RANGE INTO INTERVALS CALLED BINS. TO DECIDE:

- RANGE OF DATA: 70 TO 95
- NUMBER OF BINS: TYPICALLY BETWEEN 5 AND 10 FOR CLARITY. FOR THIS EXAMPLE, CHOOSE 5 BINS.

CALCULATE BIN WIDTH:

$$\text{BIN WIDTH} = \frac{\text{MAX} - \text{MIN}}{\text{NUMBER OF BINS}} = \frac{95 - 70}{5} = 5$$

B. DEFINING THE BINS

- 70-74
- 75-79
- 80-84
- 85-89
- 90-94
- 95-99 (IF NEEDED, BUT SINCE MAX IS 95, THIS CAN BE ADJUSTED)

ADJUSTING FOR THE DATA:

- 70-74: 70, 75 (THOUGH 75 IS ON THE BOUNDARY; DECIDE WHETHER TO INCLUDE IN THE LOWER OR UPPER BIN)
- TO MAINTAIN CLARITY, USE INCLUSIVE LOWER BOUNDS:

BIN	RANGE	DATA POINTS	FREQUENCY
70-74	70-74	70, 75	2
75-79	75-79	78	1
80-84	80-84	80, 82	2
85-89	85-89	85, 88	2
90-94	90-94	90, 92	2
95-99	95-99	95	1

PLOTTING THIS HISTOGRAM INVOLVES:

- DRAWING THE X-AXIS WITH BIN RANGES.
- THE Y-AXIS REPRESENTING FREQUENCY.
- BARS FOR EACH BIN WITH HEIGHTS CORRESPONDING TO THE NUMBER OF DATA POINTS.

C. INTERPRETING THE HISTOGRAM

FROM THE HISTOGRAM, WE OBSERVE:

- THE DISTRIBUTION APPEARS FAIRLY SYMMETRIC.
- THE HIGHEST FREQUENCIES ARE IN THE 70-74, 80-84, 85-89, AND 90-94 BINS, EACH WITH 2 DATA POINTS.
- THERE IS A SINGLE OUTLIER AT THE HIGH END WITH 95.

STEP 3: DRAWING THE BOX-AND-WHISKER PLOT

A. CALCULATING KEY STATISTICS

TO CONSTRUCT A BOX PLOT, DETERMINE:

- MEDIAN (Q2)
- FIRST QUARTILE (Q1)
- THIRD QUARTILE (Q3)
- MINIMUM AND MAXIMUM VALUES
- POTENTIAL OUTLIERS

SORTED COMBINED DATA: 70, 75, 78, 80, 82, 85, 88, 90, 92, 95

NUMBER OF DATA POINTS: 10

- MEDIAN (MIDDLE VALUE): AVERAGE OF 5TH AND 6TH DATA POINTS:

$$Q2 = \frac{82 + 85}{2} = 83.5$$

- Q1 (MEDIAN OF LOWER HALF): FIRST FIVE DATA POINTS (70, 75, 78, 80, 82)

MEDIAN OF THESE FIVE:

$$\begin{array}{|l} \\ Q1 = 78 \\ \end{array}$$

- Q3 (MEDIAN OF UPPER HALF): LAST FIVE DATA POINTS (85, 88, 90, 92, 95)

MEDIAN:

$$\begin{array}{|l} \\ Q3 = 90 \\ \end{array}$$

- MINIMUM AND MAXIMUM:

$$\begin{array}{|l} \\ \text{MIN} = 70, \text{MAX} = 95 \\ \end{array}$$

B. CALCULATING WHISKERS AND OUTLIERS

- INTERQUARTILE RANGE (IQR):

$$\begin{array}{|l} \\ IQR = Q3 - Q1 = 90 - 78 = 12 \\ \end{array}$$

- LOWER FENCE:

$$\begin{array}{|l} \\ Q1 - 1.5 \times IQR = 78 - 1.5 \times 12 = 78 - 18 = 60 \\ \end{array}$$

- UPPER FENCE:

$$\begin{array}{|l} \\ Q3 + 1.5 \times IQR = 90 + 18 = 108 \\ \end{array}$$

SINCE THE MINIMUM (70) IS ABOVE 60 AND MAXIMUM (95) BELOW 108, THERE ARE NO OUTLIERS.

C. PLOT CONSTRUCTION

- DRAW A NUMBER LINE COVERING 70 TO 95.
- MARK Q1 AT 78, MEDIAN AT 83.5, AND Q3 AT 90.
- DRAW A BOX FROM Q1 TO Q3.
- DRAW WHISKERS FROM THE BOX TO THE MINIMUM (70) AND MAXIMUM (95).

DEEP DIVE: INTERPRETING THE VISUALS

THE COMBINED HISTOGRAM EXHIBITS A ROUGHLY SYMMETRIC DISTRIBUTION, WITH DATA CONCENTRATED AROUND THE MID-80s, SUGGESTING A CENTRAL TENDENCY NEAR THOSE SCORES. THE BOX PLOT CONFIRMS THIS, SHOWING A MEDIAN AROUND 83.5, WITH THE INTERQUARTILE RANGE SPANNING FROM 78 TO 90, INDICATING MODERATE VARIABILITY.

THE ABSENCE OF OUTLIERS SUGGESTS CONSISTENT DATA WITHOUT EXTREME DEVIATIONS. THE DATA'S SPREAD FROM 70 TO 95 SHOWS A BROAD RANGE BUT NO ANOMALOUS POINTS.

ADDRESSING THE QUESTIONS

USING THE COMBINED VISUAL REPRESENTATIONS, SEVERAL KEY QUESTIONS CAN BE ANSWERED:

1. WHAT IS THE CENTRAL TENDENCY OF THE COMBINED DATA?

- MEDIAN (FROM BOX PLOT): 83.5
- MEAN (APPROXIMATE, BASED ON DATA): CALCULATED AS:

$$\frac{70 + 75 + 78 + 80 + 82 + 85 + 88 + 90 + 92 + 95}{10} = \frac{837}{10} = 83.7$$

THE MEAN AND MEDIAN ARE VERY CLOSE, INDICATING A SYMMETRIC DISTRIBUTION.

2. HOW SPREAD OUT IS THE DATA?

- RANGE: $95 - 70 = 25$
- INTERQUARTILE RANGE (IQR): 12
- VARIANCE AND STANDARD DEVIATION: FURTHER CALCULATIONS NEEDED, BUT THE IQR INDICATES MODERATE SPREAD.

3. ARE THERE ANY OUTLIERS?

- NO OUTLIERS IDENTIFIED, AS THE DATA POINTS FALL WITHIN THE FENCES.

4. WHAT DOES THE DISTRIBUTION SUGGEST ABOUT THE DATA?

- THE HISTOGRAM'S SHAPE SUGGESTS A NORMAL-LIKE DISTRIBUTION CENTERED AROUND 83-85.
- THE BOX PLOT CONFIRMS SYMMETRY AND HIGHLIGHTS THE CENTRAL 50% OF SCORES WITHIN 78 TO 90.

PRACTICAL APPLICATIONS AND SIGNIFICANCE

CONSTRUCTING HISTOGRAMS AND BOX PLOTS FOR COMBINED DATA IS INSTRUMENTAL IN VARIOUS FIELDS:

- EDUCATION: UNDERSTANDING STUDENT PERFORMANCE ACROSS MULTIPLE CLASSES.
- BUSINESS: ANALYZING SALES DATA FROM DIFFERENT REGIONS.
- HEALTHCARE: COMPARING PATIENT HEALTH METRICS ACROSS CLINICS.

THESE VISUALS ENABLE STAKEHOLDERS TO MAKE INFORMED DECISIONS, IDENTIFY AREAS NEEDING IMPROVEMENT, AND DETECT OUTLIERS OR ANOMALIES.

CHALLENGES AND CONSIDERATIONS

WHILE THESE VISUAL TOOLS ARE POWERFUL, PRACTITIONERS MUST BE AWARE OF POTENTIAL PITFALLS:

- CHOICE OF BIN WIDTH: TOO BROAD OR NARROW BINS CAN OBSCURE OR OVEREMPHASIZE DATA FEATURES.
- SAMPLE SIZE: SMALL DATASETS MAY NOT PRODUCE RELIABLE

Draw A Histogram And A Box And Whisker Plot To Represent The Combined Data And Answer The Questions

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