

## Tutorial Sheet 7: Measurement Theory and Process

### Assignment 1: Aggregation of Clone Coverage

Assume that in a Java project a clone detection tool is employed that computes the clone coverage for each class. These values shall be aggregated to the project level.

- In which type of scale is the clone coverage metric?

[Response: Ratio]

- Which aggregation operator can be used to aggregate the values?

[Response: Mean]

- The current status of cloning in the project shall be shown by a virtual "traffic light". A clone coverage of less than 5% is considered "green", a value between 5% and 10% is considered "yellow" and a value of more than 10% is considered "red". Which aggregation operators can be used in order to realize the traffic light? Apply the aggregation to a Java system that consists of five classes with the following clone coverage values: 0%, 21%, 7%, 3%, 14%. What color does the traffic light show?

[Response: Mean, Grouping  
9% → yellow]

### Assignment 2: Aggregation of Usability Assessments

Assume that the usability of a software product is assessed by a survey with its users. The users can choose whether they agree with the statement: "*The software is easy to use*" by using the Likert Scale: Strongly disagree, Disagree, Neither agree nor disagree, Agree, Strongly agree.

- Which type of scale is this scale?

[Response: Ordinal]

- Which aggregation operators can be used for computing the *central tendency* and *dispersion*?

[Response: *central tendency*: Median, *dispersion*: Minimum and Maximum]

- Apply the operators from your previous answer to the data in the following table.

Response	Number of respondents
Strongly disagree	0
Disagree	14
Neither agree nor disagree	30
Agree	65
Strongly agree	11
TOTAL	120

[Response: Median: Agree  
Minimum=Disagree, Maximum=Strongly agree]

### Assignment 3: Goal Question Metric Approach

Apply the Goal Question Metric Approach to the following goal: *"Improve the system stability of the software system from the customer's viewpoint."*

Give at least two questions for this goal and for each question at least two metrics.

[Response:

*Question:* How often does the system crash during operation?

*Metrics:*

- Mean hours of operation without a system crash
- Probability of a crash during one business day

*Question:* Is the stability of the system improving?

*Metrics:*

- Subjective rating of customer's satisfaction
- $\frac{\text{Current crashes per month}}{\text{Baseline crashes per month}} \cdot 100$

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