



Goal-Question-Metric (GQM)

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[Choosing Metrics]

- Goal-Question-Metric (GQM) was proposed by Basili and Weiss in 1994

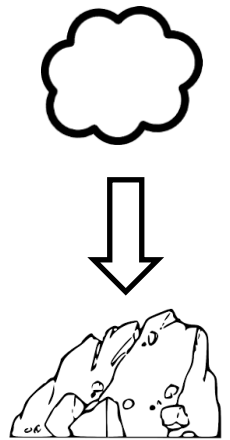


- It is a technique to identify meaningful metrics for the measurement process

- You may want to use the GQM method to choose the appropriate metric

[GQM Overview]

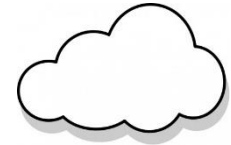
- Questions are formulated based on a more abstract goal
- Metrics are chosen to answer each question
- GQM emphasizes the need to
 - Establish an explicit measurement goal
 - Define a set of questions to achieve the goal
 - Identify metrics to answer the questions



[The GQM Method]

■ Goals

- They define what the organization wants to improve



■ Questions

- They refine each goal to a more quantifiable way

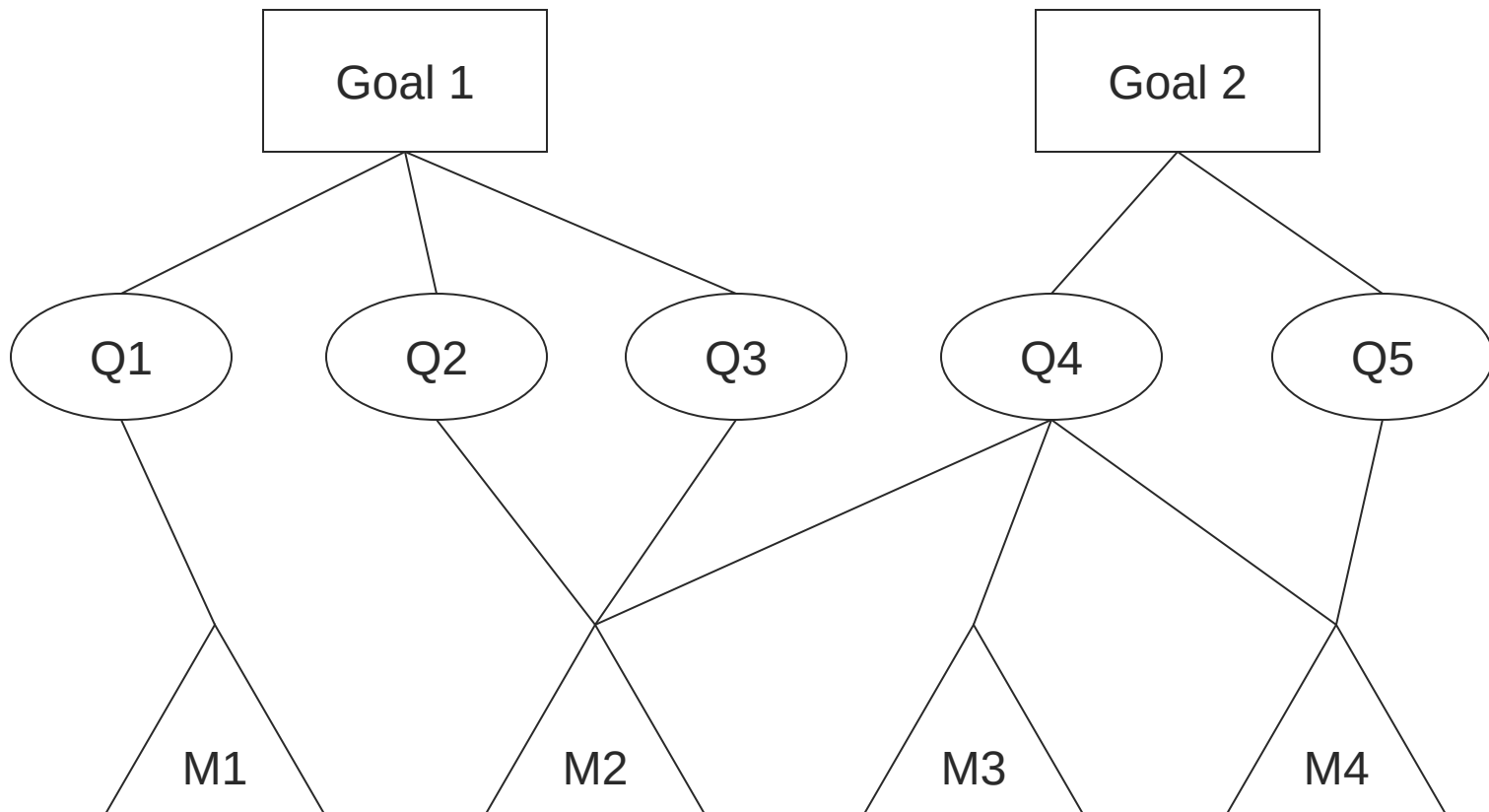


■ Metrics

- They indicate operational ways to answer each question



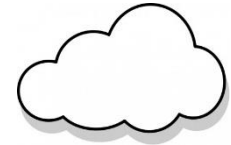
[GQM Representation]



[Example of Use (1)]

■ Goal

- Increase productivity



■ Questions

- What are productivity bottlenecks?
- How can we increase the amount of code we produce?



■ Metrics

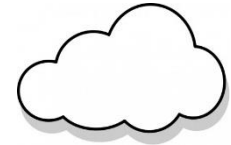
- Current lines of code (LOC) per developer



[Example of Use (2)]

■ Goal

- Decrease development time



■ Questions

- What are the bottlenecks?
- How to decrease specification time?



■ Metrics

- Time required for requirements
- Time required for modeling



[Goal Definition Template]

Analyze {the name of activity or attribute}
for the purpose of {overall goal}
with respect to {the aspect to be considered}
from the viewpoint of {interested people}
in the context of {environment}

[Example of Goal]

Analyze the Health Watcher software architecture **for the purpose of** evaluating architectural components **with respect to** the ability to make Health Watcher more extensible **from the viewpoint of** the software architects performing the work **in the context of** product enhancement over the next three years.

[Examples of Questions]

- Q1: Are architectural components characterized in a manner that modularizes function and related data?
- Q2: Is the complexity of each component within bounds that will facilitate modification and extension?

[Examples of Metrics]

- To answer Q1
 - Coupling metrics
 - Cohesion metrics
- To answer Q2
 - Component size
 - Interface complexity

[Bibliography]

- Ian Sommerville. Software Engineering, 9th Edition. Pearson Education, 2010.
 - Sections 24.4 and 26.2
- R. Pressman, B. Maxim. **Software Engineering: A Practitioner's Approach**, 8th Edition. McGraw-Hill Education, 2014.
 - Section 30.1.4