Goal Question Metric (GQM) Method

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Outline

At the end of today's lecture you should be able to:

- Understand the basics of the GQM
- Understand the components the GQM
- Be able to generate goals, questions, and metrics using the GQM Method

Introduction

- Goal-Question-Metric (GQM) has been proposed by Basili and Weiss
- 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

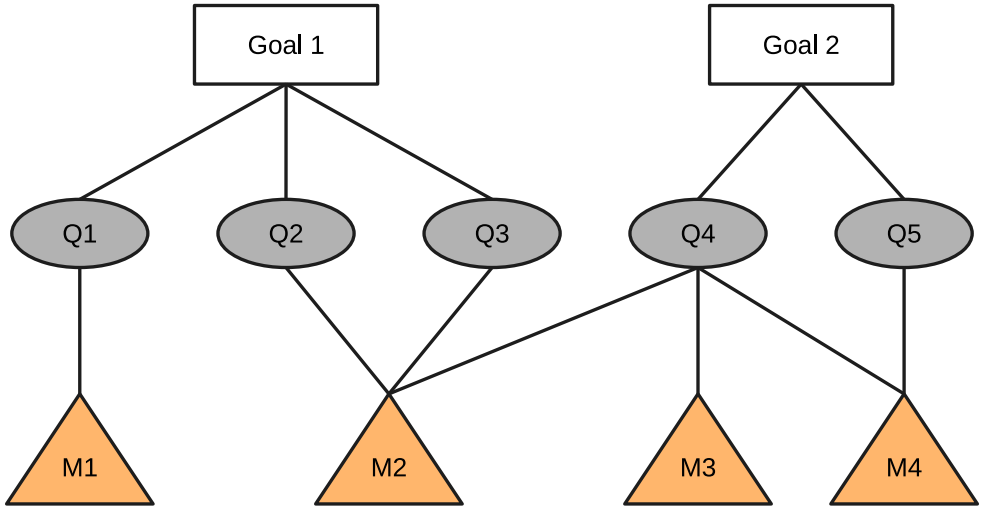
GQM Overview

- Questions are formulated based on a more abstract goal
- Metrics are selected 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 the measurable quantities necessary to answer each question

GQM Representation



Example (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 (2)

- Goal
  - Decrease development time
- Questions
  - What are the bottlenecks?
  - How to decrease specification time?
- Metrics
  - Time required for requirements
  - Time required for modeling

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Goal Definition Template

Analyze {Object(s) of study}

for the purpose of {Purpose}

with respect to {Quality focus}

from the viewpoint of {Perspective}

in the context of {Context}

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Example Components for Goals Def

Object of study	Purpose	Quality Focus	Perspective
Product	Characterize	Effectiveness	Developer
Process	Monitor	Cost	Modifier
Model	Evaluate	Reliability	Maintainer
Metric	Predict	Maintainability	Product Manager
Theory	Control	Portability	Corporate Manager
	Change		Customer
			User
			Researcher

Example Goals

- RG1: **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.
- RG2: **Analyze** the PBR and checklist techniques **for the purpose of** evaluation **with respect to** effectiveness and efficiency **from the point of view** of the researcher **in the context of** M.Sc. and Ph.D. students reading requirements documents.

Example Questions for RG1

- 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

Are there any questions?

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