南京大学

体系结构

Assignment-1

管登荣 MF1632020

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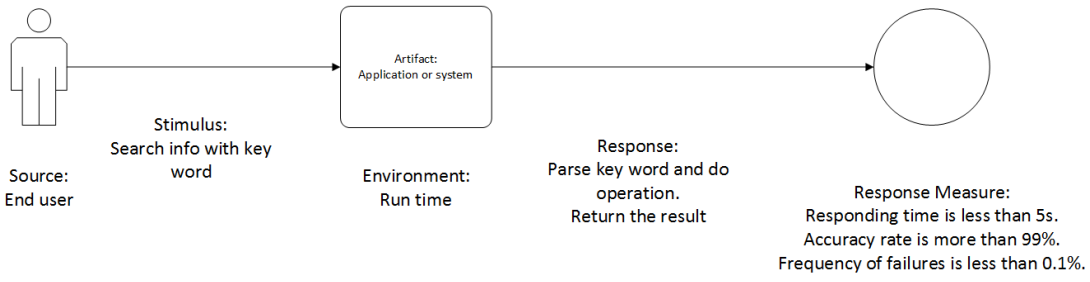
Reliability

1. General Scenario

Portion of Scenario	Possible Values
Source	Developer, tester, system administrator and end user
Stimulus	Request from a user or external system, an operation, emergency
Artifact	Code, application, component, configurations, system
Environment	Design time, deploy time, startup, shutdown, run time, repair mode, overloaded operation, continuous operation
Response	Estimate the risk of failure: ● History data and experiences ● Design pattern ● Evaluation and review ● Comprehensive test Prevent the failure from happening Handle the failure Record and manage the failure: ● Log the fault ● Notify appropriate entities(people or systems)
Response Measure	Frequency of failures or the probability of success Time of failures Time to respond Accuracy rate of response Accuracy rate of the operation's result Continuous operation hours General indexes are as follows: ● MTBF: Mean Time Between Failure ● MTTR: Mean Time To Repair ● MTTF: Mean Time To Failure

2. Concrete scenario

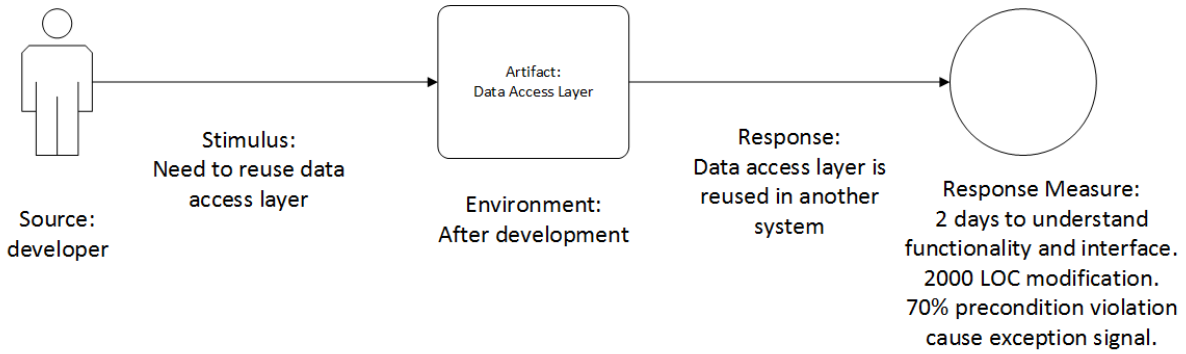


Reusability

1. General scenario

Portion of Scenario	Possible Values
Source	Developer, software architect
Stimulus	Develop similar portion, extend system functionality, develop utility class or class for public use
Artifact	Framework or component that is going to be reused
Environment	After during development
Response	Component or framework is reused in another system
Response Measure	• Time to understand the functionality of a component or framework. • Modification needed to adapt one component to the specific functional requirement in a new system. • Proportion of precondition violation get handled by exception signaling.

2. Concrete scenario



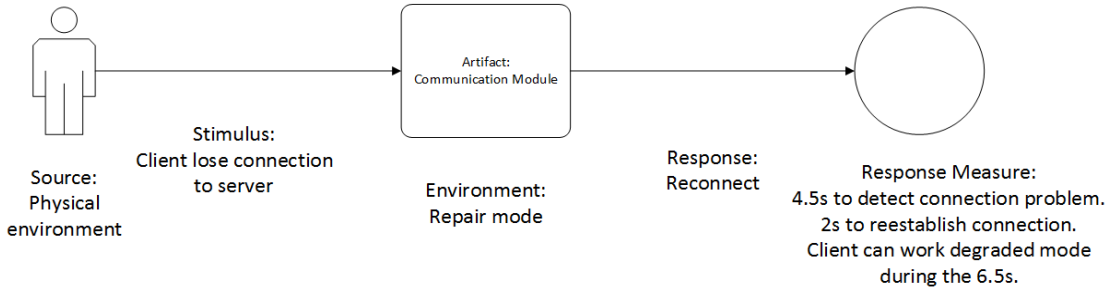
Recoverability

1. General scenario

Portion of Scenario	Possible Values

Source	Developer, system Maintenance Engineer, physical environment, end user
Stimulus	Process crash, power off, hardware failure
Artifact	Process, persistent storage
Environment	Overloaded operation, degraded operation
Response	● Log the fault or error message ● Restore system to a consistent state
Response Measure	● Time to detect the fault ● Time to recover from the fault ● Time in which system can work in degraded state

2. Concrete scenario



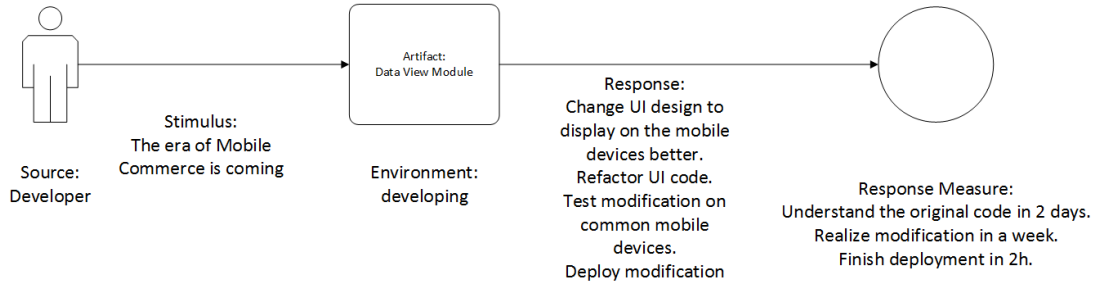
Maintainability

1. General scenario

Portion of Scenario	Possible Values
Source	Developer who works on first, second or muti-development , system administrator and end user
Stimulus	Defect, new requirement, changed environment, software evolution
Artifact	Code, data, interfaces, components, resources, configurations
Environment	Run time, failure even break down
Response	Handle the defect: ● Locate defects or their cause ● Isolate defects or their cause ● Correct defects or their cause, repair or replace faulty or worn-out components without having to replace still working parts

	Meet the new requirements: ● Confirm the new requirement ● Locate the addition portion ● Integrate the addition portion Cope with a changed environment: ● Read and understand the source code ● Design and refactor code Test modification/addition, and then deploy modification and update the version
Response Measure	Cost in the process of maintain, general indexes are as follows: ● MI (Maintainability Index) -- lines-of-code, McCabe and Halstead complexity ● WMC (weighted methods per class) ● DIT (Depth of Inheritance Tree) ● NOC, CBO, RFC, LCOM, etc.

2. Concrete scenario



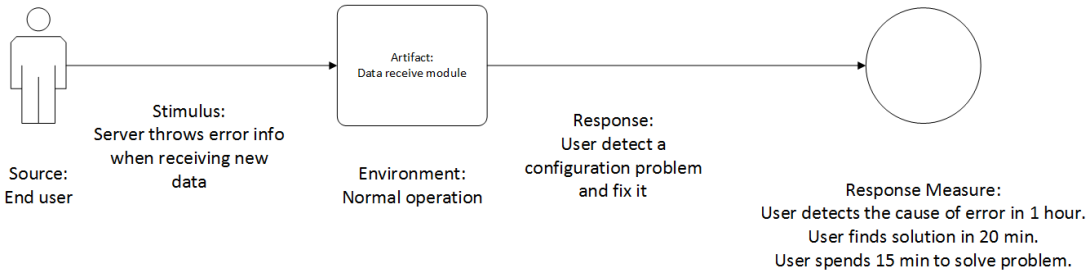
Supportability

1. General scenario

Portion of Scenario	Possible Values
Source	End user, technical support staff
Stimulus	Maintainer also need to install, configure and upgrade the program. Maintainer needs to identify and resolve issues when the program works incorrectly.
Artifact	monitoring component, logging component
Environment	installation, upgrading, normal operation

Response	Log the fault, together with global variables and execution path
Response Measure	• Time to find cause of a problem • Time to find solution of the problem in document • Time to actually solve the problem

2. Concrete scenario



Internal or External

In my opinion, internal quality attributes can be measured from development view and external quality attributes can be measured from product view. As a result, reliability, supportability, recoverability can be classified as external quality attributes, reusability and maintainability can be classified as internal quality attributes.