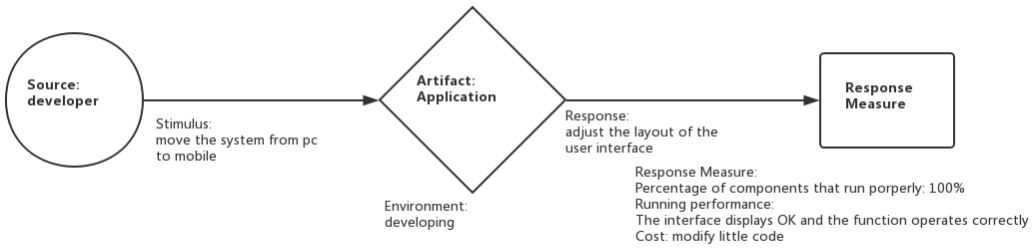
Assignment 1

1. Portability

1.1. General Scenario

Portion of Scenario	Possible Values
Source	developer, user
Stimulus	Move the system to a different terminal to run
Artifact	Application or component
Environment	developing, test, runtime
Response	adapt to different terminal display environment UI to make responsive adjustments The system in different environments should be able to run all the normal functions
Response Measure	Cost(manpower, resources, time) Percentage of components that can run properly after portability The error and crash rate after portability Running performance

1.2. Concrete Scenario

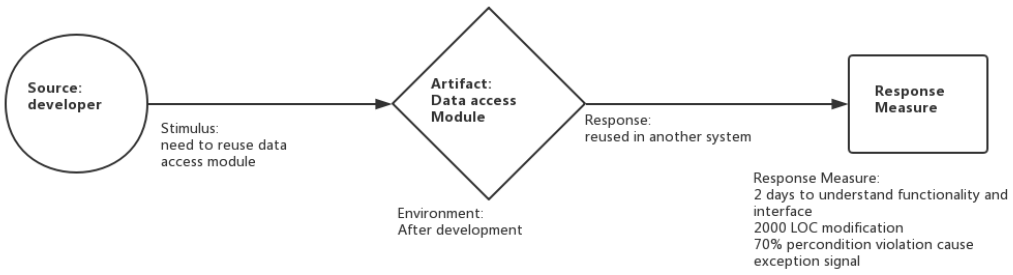


2. Reusability

2.1. General Scenario

Portion of Scenario	Possible Values
Source	Software, people
Stimulus	Have partial of an existing program used in another program
Artifact	Framework or component that is going to be reused
Environment	After development
Response	Component is reused in another system
Response Measure	Time to understand the functionality of a component. Modification needed to adapt one component to the specific functional requirement in a new system. Proportion of precondition violation get handled by exception signaling.

2.2. Concrete Scenario



2.3. Tactics for reusability

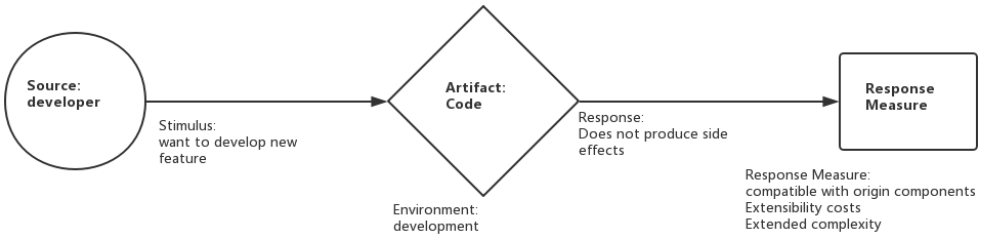
Modularization: Modularization is the process of encapsulating complexity of related classes and exposing their abstract interface. After modularization, program is divided into components, which have high intra-component cohesion and low inter-component coupling. Components have relatively simple and independent function. They can be composed to perform complex tasks. So they are quite suitable for code reuse.

3. Extensibility

3.1. General Scenario

Portion of Scenario	Possible Values
Source	Developer, System Administrator, User
Stimulus	On the basis of the origin system, add new features and plugins Add new quality attributes Expand capacity
Artifact	System user interface, source code, interface, component
Environment	Runtime, build, design
Response	Find the location of the system needs to be extended, without affecting the expansion of other functions, the expansion of the test, the deployment of the expansion. Ensures the availability of extensions.
Response Measure	Cost, funds, Complexity The impact of the original system components Compatibility

3.2. Concrete Scenario



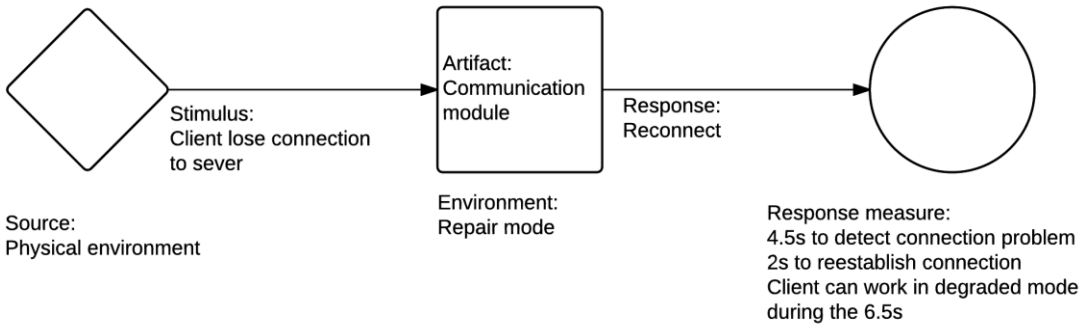
4. Recoverability

4.1. General Scenario

Portion of Scenario	Possible Values

Source	Software, physical infrastructure, physical environment, people
Stimulus	Process crash, power off, hardware failure
Artifact	Process, persistent storage
Environment	Overloaded operation, degraded operation
Response	Log the fault 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

4.2. Concrete Scenario



4.3. Tactics for reusability

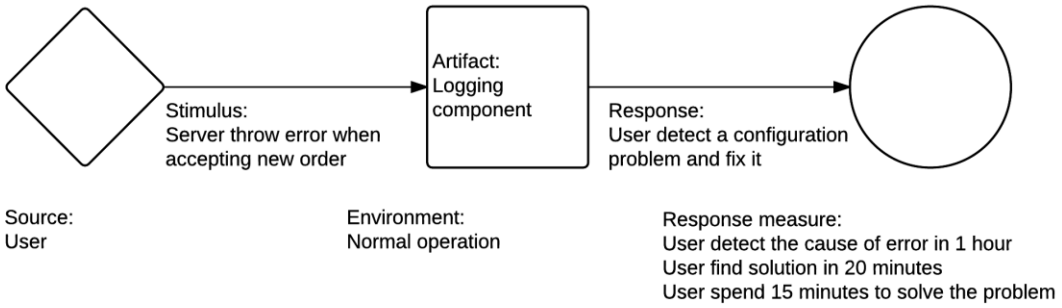
Replication: Replication can be used on server or database, usually with a master/slave relationship between the primary and the copy. Primary responds to inform the copy of state updates it must make. When the primary is down, the copy takes over and continues to provide service.
Checkpoint and operation log: Checkpoint is periodical dumping of consistent state. Operation log records important operation performed by system, typically data updating operation. When a failure occurs, system loads latest checkpoint and replays operation log to restore to the state before failure.

5. Supportability

5.1. 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

5.2. Concrete Scenario



5.3. Tactics for reusability

Graceful degradation: Maintain limited function when part of the software failed to work properly due to hardware failure or exhausted resource. Degradation allows recovery from exception without intervention by technical support staff.

Event logging: Event logging provides system administrators with information useful for diagnostics and auditing. Log high-level information, especially failure information.