Ira A. Fulton Schools of Engineering
Arizona State University

CSE 598: Advanced Software Analysis and Design

Online Shopping Store Project

Purpose

Software quality can be relative to various stakeholder perspectives; it is important for designers to be able to identify software quality needs and how to measure it. This project provides learners with the opportunity to put their knowledge of software quality attributes and documentation into practice. Learners will evaluate the description of an online clothing store to develop appropriate quality attribute scenarios and produce software architecture documentation using the C4 approach.

Objectives

Learners will be able to:

- Develop quality attribute scenarios from given software design requirements.
- Assess the software quality needs for a given project.
- Develop software architecture documents using C4 software architecture documentation notations.

Technology Requirements

- Access to a modeling and drawing tool to create software architecture diagrams based upon the C4 model.
    - C4 software architecture modeling tools:
        - Draw.iO **(*strongly* preferred)**
        - Structurizr
        - Structurizr Express
        - C4-PlantUML
        - Structurizr for Java/.NET + PlantUML
        - Structurizr for Java + Graphviz
        - Structurizr.Dgml
        - C4 Detonator

- OmniGraffle
- Sparx Enterprise Architect

Project Overview

Phase I: Develop measurable and testable quality attribute scenarios.

Phase II: Software architecture documentation using C4 approach.

Project Description

Suppose there is a client-server web application that implements online shopping systems for a department store that sells clothing. The main business goals of the application are to make shopping for clothes online a positive experience for customers, increase the sales of well-known brands, and introduce new brands. This store expects availability 24 hours a day, 7 days a week, and the responses to customer queries for clothing selections, checkout, and other operations should occur in 20-30 seconds.

This system offers a more customized clothing selection process, utilizing a virtual fitting-room functionality that shows customers how the clothing may look on them. Customers have the option to enter their weight, height, and other relevant parameters and select an option that allows them to virtually "try on" the clothing.

For future shopping purposes, each customer's shopping history, address, contact information, and payment methods are stored on the system.

In the case of a failure, the system is expected to recover as fast as possible, with no more than 10 minutes of downtime. The data's confidentiality and integrity is a high priority. The online shopping application expects to expand its customer base and make the shopping application available across different types of mobile devices in addition to client-server web access. Therefore, three (3) of the most important quality factors for this system are **time behavior**, **confidentiality and data integrity**, and **recoverability**.

This store uses three (3) third-party systems: a credit card payment system for processing payments, a delivery system for shipping and handling, and an email system through which customers receive confirmation emails and receipts after each purchase.

Directions

Refer to the *Template_Your Name_CSE 598 ASAD_Online Shopping Store Project* document to complete Phases I and II.

Phase I

Develop a quality attribute scenario for the three (3) identified quality factors: time behavior, confidentiality, and recoverability. Explain how to test each quality factor for the client-server web application.

Your quality attribute scenarios should be developed using a six-part quality attribute scenario model. For a visual representation of this model, please refer to **Figure 1: Quality Attribute Scenario Model.**

Quality Attribute Scenario Model:

1. Source of Stimulus
2. Stimulus
3. Environment
4. Artifact
5. Response
6. Response Measure

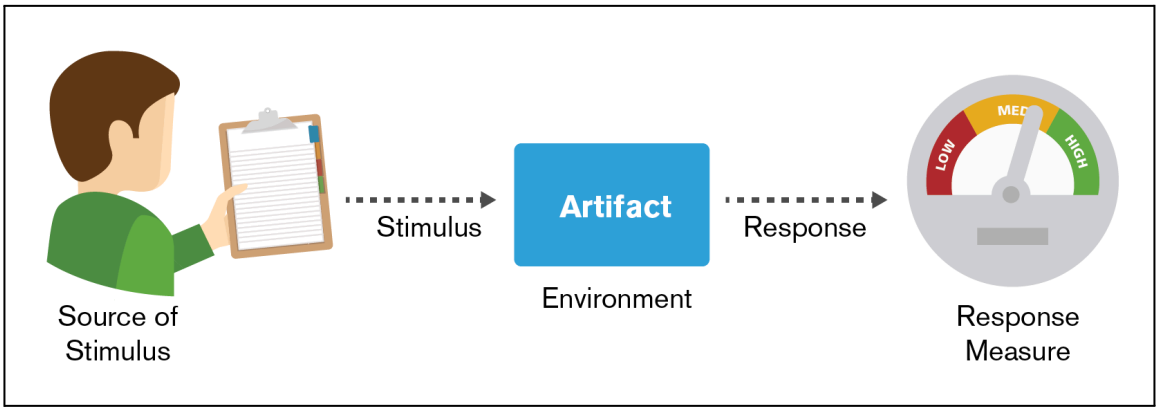

Figure 1: Quality Attribute Scenario Model

After you have developed your scenarios, briefly explain how to test the quality factors for a client-server web application.

Include your scenarios and test descriptions on your copy of the learner submission template in the space provided for Phase I. You may add pages if necessary.

Phase II

Identify the main components in the online shopping system, and draw these three (3) software architecture diagrams:

- Level 1: System Diagram
- Level 2: Container Diagram
- Deployment Diagram

Draw your diagrams according to the description of the online shopping store situation. Take a clear screenshot of each diagram and paste them into your copy of the learner submission template in the corresponding spaces provided for Phase II. You may add pages if necessary.

For C4 diagram terminology and usage, please review the "From Requirements to Objects" topic in your course and this link: https://c4model.com/.

You may use the Draw.iO diagramming tool to construct these diagrams. Draw.iO is free, open-source software that has C4 modeling plugging. A tutorial that shows the step-by-step process for using Draw.iO to construct C4 architecture diagrams can be found here: https://github.com/tobiashochguertel/c4-draw.io.

Submission Directions for Project Deliverables

You are given a limited number of attempts to submit your best work. The number of attempts is given to anticipate any submission errors you may have in regards to properly submitting your best work within the deadline (e.g., accidentally submitting the wrong paper). It is **not** meant for you to receive multiple rounds of feedback and then one (1) final submission. Only your most recent submission will be assessed.

You must submit your Online Shopping Store Project deliverable in the designated submission space in the course. Learners may not email or use other means to submit any project for review, including feedback, and grading.

The Online Shopping Store Project includes one (1) deliverable:

1. **Project Answers PDF:** Phase I and II of your project must be a **single PDF** with the correct naming convention: *Your Name_CSE 598 ASAD_Online Shopping Store Project*. You are **required** to use the provided template document, *Template_Your Name_CSE 598 ASAD_Online Shopping Store Project*.

Making File Submissions in Canvas

Before submitting, confirm that your deliverables follow the requirements for the project, and then submit your work in the designated submission space in the course. File submissions are manually graded by the course team.

1. In your course, go to **Submission: Online Shopping Store Project**.
2. Click **Start Assignment**.
3. Click **Choose File**.
4. Locate and select **one (1)** deliverable file from your device.
5. If needed, click **+Add Another File** and repeat Steps 3 and 4 until all deliverables are added.

6. Select the **agreement** and then click **Submit Assignment**.

7. (If needed and allowed) To resubmit files:
    a. Return to the Canvas submission space, click **New Attempt**, and repeat the process from Step 3.

Evaluation

Please review the rubric for how your Online Shopping Store Project will be graded. Projects will be evaluated based on each criterion and will receive a total score. Projects missing any part of the project will be graded based on what was submitted against the rubric criteria. Missing parts submitted after the deadline will not be graded.

Review the course syllabus for details regarding late penalties.

Rubric

Rubrics communicate specific criteria for evaluation. Prior to starting any graded coursework, learners are expected to read through the rubric, so they know how they will be assessed. You are encouraged to self-assess your responses and make informed revisions before submitting your final report. Engaging in this learning practice will support you in developing your best work. Points may be deducted at the discretion of the faculty for disorganized submissions that convolute the grading process.

Component	No Attempt	Undeveloped	Developing	Approaching	Meets
Phase I: 6-part quality attribute scenario for time behavior, confidentiality, and recover-ability.	Provided no response	Submission does not contain six-part quality attribute scenarios for some or all of the three (3) quality factors.	Submission contains six-part quality attribute scenarios for all three (3) quality factors with several or major mistakes.	Submission contains fully-developed six-part quality attribute scenarios for all three (3) quality factors with a few mistakes.	Submission contains fully-developed, accurate six-part quality attribute scenarios for all three (3) quality factors.
Phase I: Explanation of how to test each quality factor.	Provided no response	Submission is missing explanations of how to test the quality factors.	Submission contains incomplete explanations of how to test each quality factor, or has major inaccuracies or flaws.	Submission contains complete explanations of how to test each quality factor, but has minor inaccuracies or flaws.	Submission contains complete and accurate explanations of how to test each quality factor.
Phase II: System Diagram	Provided no response	The diagram is not a system diagram, the wrong system diagram is submitted, or the system diagram is not drawn using the correct C4 model.	The system diagram has major mistakes, is missing most or all necessary components, or is not readable.	The system diagram contains almost all necessary components with few mistakes, and is mostly accurate and readable.	The system diagram contains all necessary components and is accurate and readable.

Component	No Attempt	Undeveloped	Developing	Approaching	Meets
Phase II: Container Diagram	Provided no response	The diagram is not a container diagram, the wrong container diagram is submitted, or the container diagram is not drawn using the correct C4 model.	The container diagram has major mistakes, is missing most or all necessary components, or is not readable.	The container diagram contains almost all necessary components with few mistakes, and is mostly accurate and readable.	The container diagram contains all necessary components and is accurate and readable.
Phase II: Deployment Diagram	Provided no response	The diagram is not a deployment diagram, the wrong deployment diagram is submitted, or the deployment diagram is not drawn using the correct C4 model.	The deployment diagram has major mistakes, is missing most or all necessary components, or is not readable.	The deployment diagram contains almost all necessary components with few mistakes, and is mostly accurate and readable.	The deployment diagram contains all necessary components and is accurate and readable.