

Homework 3

100 Possible Points

| 10/21/2022

Attempt 1



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Mitigating Quality Risks

Overview

This assignment is intended to solidify your understanding of how and when some of the techniques we are learning about can address specific software quality risks. You will compare and contrast how scenario-based usability engineering and architecture-oriented design affect different quality attributes. The background for this assignment will come from prior reading assignments and one new resource. The prior readings that are most relevant to this assignment include:

- Pressman's **Chapter 14** (<https://canvas.vt.edu/courses/156121/files/23790876/download?wrap=1>) from **Reading 01** (<https://canvas.vt.edu/courses/156121/assignments/1540821>)
- **Chapter 3** (<https://canvas.vt.edu/courses/156121/files/23790897/download?wrap=1>) in *Scenario-Based Usability Engineering* from **Reading 05** (<https://canvas.vt.edu/courses/156121/assignments/1540825>)

The new resource is:

- **Air Traffic Control--A Case Study in Designing for High Availability** (<https://canvas.vt.edu/courses/156121/files/23790900/download?wrap=1>), a case study from Bass' book

Assignment

Both Chapter 3 from *Scenario-Based Usability Engineering* and the case study from Bass' book focus on the design of air traffic control systems. The first focuses on the use of usability engineering techniques, including participatory design and scenario-based design, as a requirements gathering technique, explaining how that played out in an air traffic control project. The case study from Bass instead focuses on the software architecture that was used in an air traffic control system as an example of how software architecture choices can be used to address challenges in complex systems.

The main task of your assignment is to evaluate both scenario-based usability engineering and software architecture-based design in terms of how they affect each software quality attribute, using McCall's list of software quality attributes (see 14.2.2 in Pressman's Chapter 14). Systematically go through each of the quality attributes in that list and consider whether (and how) both scenario-based usability engineering and architecture-based design addressed or helped achieve that specific quality attribute.

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1. **Summary:** provide a brief description of the two methods being compared, using your own words, and provide an introduction to the remainder of your paper.
2. **Comparison:** Using a separate subsection for each of the quality attributes listed in McCall's list, briefly but explicitly describe how scenario-based usability engineering affects that attribute (or whether it has no significant effect). You can use (but are not limited to) the air traffic control examples as source material to ground your argument. Your goal is to conclude whether scenario-based usability engineering will help significantly increase the chances of meeting a project's goal with respect to that quality attribute. Identify what you believe are the important characteristics/properties of a software project that make scenario-based usability engineering an important consideration for that specific quality attribute on the project.

Then perform the same analysis for architecture-driven design with respect to that quality (i.e., handle both techniques for one quality attribute in each subsection, with a separate subsection for each quality attribute in McCall's list).

3. **Conclusions:** Look back over the analysis you have performed, and summarize which group of quality attributes are affected by scenario-based usability engineering, and what characteristics of a software project make scenario-based usability engineering relevant in order to meet desired quality goals. Similarly, summarize which group of quality attributes are affected by architecture-driven design, and what characteristics of a software project make architectural decisions relevant in order to meet desired quality goals.

Assessment

The following rubric will be used to assess your work:

Criteria	Points
Project Summary	10 points
Excellent: Provides a clear explanation of both techniques and gives an appropriate overview of the comparative analysis you are performing, including a summary of the quality attributes used as the basis for the comparison.	10/10
Good: Provides an explanation of both techniques and lists the quality attributes used in the analysis, but there is clear room for improving the overview/introduction so it is more understandable.	8/10
Satisfactory: Names the techniques to be compared, but does not provide a clear explanation of at least one of the techniques, or fails to clearly articulate the quality attributes used in the analysis.	6/10
Poor: Provides an introductory summary that does not clearly describe either of the techniques analyzed.	3/10
No attempt: Section is missing.	0/10
Comparison	45 points
Excellent: Provides a clear, specific evaluation of how each of the two techniques helps support (or does not support) each of the quality attributes in the required list. The analysis is clearly broken into sections based on the quality attribute list, and both techniques are directly address in every section. Identifies the properties of a software system that make each technique appropriate, when the technique can directly affect software quality.	45/45
Good: Provides a clear evaluation of the two techniques for each quality attribute, with the analysis broken down into sections based on the quality attribute list indicated. A few sections may not provide a clear analysis of one of the techniques, or may fail to describe the properties of a software system that	36/45

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Criteria	Points
Satisfactory: All quality attributes are addressed, but many sections do not clearly describe the effects of both techniques on the attribute, mischaracterize the effects, or fail to clearly identify the properties of software systems that make the technique relevant.	27/45
Poor: Simply restates basic concepts from the reading without contributing a useful discussion of when/why a technique addresses each quality attribute.	18/45
No attempt: Section is missing.	0/45
Conclusions	35 points
Excellent: Explicitly identifies which quality attributes are significantly affected by each of the two techniques analyzed, what characteristics of a software project make the technique important to use, and generalizes from this a coherent description of "when" each of the two techniques should be applied (or at least considered). Also discusses what kind of project would be appropriate for applying both techniques.	35/35
Good: Identifies which quality attributes are significantly affected by each of the two techniques analyzed, and what characteristics of a software project make the technique important to use..	28/35
Satisfactory: Identifies which quality attributes are significantly affected by each of the two techniques analyzed. One or more of the attributes may be glossed over or omitted. Some important system characteristics necessary for a technique to be important may be identified, but some may be missing.	22/35
Poor: Attempts to evaluate the four architectures, but without any clear connection to the presented evaluation criteria or any clear summary of strengths and weaknesses for each architecture.	16/35
No attempt: Section is missing.	0/10
Writing/Presentation	10 points
Excellent: All writing is clear and readable, without grammar errors, punctuation errors, or other writing problems. Figures or summary tables are used appropriately where they clarify presentation. Clear headings and a cohesive document organization are used. The whole document looks like a professionally prepared report.	10/10
Good: All writing is clear and readable, with only occasional minor writing errors. An appropriate attempt is made to use appropriate figures or summary tables where they help clarify presentation. Clear headings and a cohesive document organization are used.	8/10
Satisfactory: The document is readable, but some significant errors appear in the writing and/or organization. Some parts of the exposition may not communicate clearly. Summary representations of key portions of the work may be missing. Clear headings are used.	6/10
Poor: The document is readable, but includes significant errors in both writing and organization that make portions of the document hard to follow.	3/10
No attempt: Section is missing.	0/10
Total	100 points

Submission

Be careful in writing up your assignment. Since your submission will be a written paper, clear communication and good use of English are very important; part of your grade will be based on the effectiveness of your presentation.

Please prepare your assignment using MS Word or LaTeX, and print to a PDF file. Name your file **H3-yourPID.pdf** and upload it here.

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Homework 3 Evaluation						
Criteria	Ratings					Pts
Project Summary view longer description	10 pts Excellent	8 pts Good	6 pts Satisfactory	3 pts Poor	0 pts No attempt	/ 10 pts
Comparison view longer description	45 pts Excellent	36 pts Good	27 pts Satisfactory	18 pts Poor	0 pts No attempt	/ 45 pts
Conclusions view longer description	35 pts Excellent	28 pts Good	22 pts Satisfactory	16 pts Poor	0 pts No attempt	/ 35 pts
Writing/Presentation view longer description	10 pts Excellent	8 pts Good	6 pts Satisfactory	3 pts Poor	0 pts No attempt	/ 10 pts
						Total Points: 0

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