TASK 06P

Software Quality and Definition of Done

SWE30010 - Managing IT Projects

Class: Fri 08:00 DT7.2 **- Tutor:** Pham Thi Kim Dung

GROUP 1: The Beavers

Trac Duc Anh Luong - 103488117

Minh Nghia Nguyen - 103806269

Gia Minh Nguyen - 103487156

Cong Anh Nguyen - 103792960

Tran Dat Dinh - 103487143

Anh Duc Nguyen - 103488489

Project Proposal[1] **:** Let's Shop E-commerce Website

Quality Management

In this project's context, quality refers to the degree to which the "Let's Shop" E-commerce Website meets specified requirements and customer expectations. We will use the ISO/IEC 25010 software quality model to measure the website's quality. This model emphasises six quality aspects: functionality, reliability, usability, efficiency, maintainability, and portability. By following these quality metrics and standards, our goal is to surpass our customers' expectations by providing a user-friendly, efficient, and trustworthy online shopping experience for the users.

Definition of Done

As part of this project, we need to establish the "Definition of Done", which outlines the criteria to be met to consider the website development completed. These conditions could include the following:

1. All planned features, as detailed in the project scope, have been implemented and tested.

- Detailed Feature Implementation: All items of the backlog's sprint 1 must be fully developed, integrated, and functioning as per the specifications in the project scope within 30 working days.
- Comprehensive Testing: This could include unit testing, integration testing, system testing, usability testing, and acceptance testing. A feature is tested only if it has passed all relevant test cases without critical bugs.

2. Fully Functional Website with High Usability Score:

- Fully Functional and Zero Critical Bugs: This ensures that the website provides all intended services without critical disruptions. In e-commerce, functionalities like product display, cart management, checkout processes, and payment integrations are vital. Ensuring zero critical bugs is crucial for customer trust and retention.
- High Usability Score: A high usability score is key in e-commerce platforms. It reflects ease of use, user satisfaction, and accessibility. A score of at least 80 in popular usability tests like the System Usability Scale (SUS) indicates a very high standard, aligning with industry best practices. It ensures the website is functional and user-friendly, crucial for maintaining a low bounce rate and ensuring repeat customers.

3. Comprehensive Testing with High Test Coverage:

- Passing Unit, Integration, and System Tests: This multi-level testing approach ensures that both individual components (unit tests) and their interactions (integration tests) work correctly and that the system as a whole (system tests) meets the requirements. This comprehensive testing is essential for identifying and fixing bugs early in development.
- Test Coverage of at least 90%: Indicating the software's reliability and maintainability. A 90% threshold ensures that most of the code is tested, which helps identify potential faults. This level of coverage is ambitious yet achievable, striking a balance between thorough testing and practical constraints like time and resources.

4. Responsiveness with Top Browsers and Devices in Vietnam:

- Responsiveness: This ensures that the website provides an optimal viewing experience—easy reading and navigation with minimum resizing, panning, and scrolling—across various devices. The website should maintain a consistent and user-friendly layout across various screen resolutions, ranging from 320 pixels (mobile) to 1920 pixels (desktop). Given the increasing use of mobile devices for online shopping, this is critical for reaching a wider audience.

[1] This document is by no means a "full project proposal". It has been simplified and customized for the purposes of SWE30010 teaching. The full project proposal includes many other sections which have not been discussed during the first few weeks of SWE30010 teaching.

5. The website is secure, with no known security vulnerabilities, and complies with all data protection regulations. A secure and compliant website is crucial for building customer trust and protecting against cyber threats:

- Customer Trust: A secure website builds customer trust. When customers know their personal and financial information is protected, they are more likely to feel confident transacting on the site.
- Protection against cyber threats: E-commerce websites are attractive targets for cybercriminals seeking to exploit vulnerabilities and gain unauthorised access to customer data or financial information. Having a secure website and regularly addressing potential vulnerabilities reduces the risk of data breaches and cyber-attacks.

6. The website's documentation is comprehensive, covering all features, and up to date, revised within the last 2 weeks. Having comprehensive and up-to-date documentation is a foundational element that supports the ongoing success and sustainability of the proposed website:

- Maintenance and Troubleshooting: Up-to-date documentation is crucial for maintaining and troubleshooting the website. It provides a reference for developers to understand how different components work, making it easier to identify and resolve issues, bugs, or errors that may arise during maintenance or updates.
- Scalability and Future Development: As the e-commerce website evolves, new features may be added, and existing ones may be modified. Comprehensive and up-to-date documentation ensures developers have the information they need to integrate new features seamlessly and understand how changes may impact existing functionality.

The documentation needs to be revised within the last 2 weeks, which is the minimum time required to keep all the data and features up-to-date and to resolve any issues or bugs that may appear during the development.

7. The stakeholders have reviewed and approved the website, with at least 90% expressing satisfaction in post-project evaluation:

- Stakeholder Alignment: Ensuring that stakeholders review and approve the website helps to align the development team's efforts with the expectations and requirements of key stakeholders. This promotes a shared understanding of the project goals and objectives.
- Project Success Metrics: Meeting or exceeding the 90% satisfaction threshold is a tangible success metric for the project. It demonstrates that the development team has delivered a product that aligns with stakeholder expectations and contributes to the overall success of the e-commerce initiative.

The stakeholder review and approval requirement with a high satisfaction rate is integral to ensuring project success, aligning with stakeholder expectations, and validating that the website effectively meets the business's and its users' needs.

Quality Requirements

The ISO/IEC 25010 model divides software quality into eight main characteristics, each with sub-characteristics. Here are the characteristics and possible sub-characteristics relevant to the "Let's Shop E-commerce Website":

1. **Functional Suitability**
   - **Functional Completeness**: Every feature specified in Sprint 1 is successfully implemented by the project deployment deadline for testing. Other add-on features should cover 80% of the total requirements. Ensuring that a significant portion of functionalities is implemented in the first sprint demonstrates progress and helps detect any errors or requirement misunderstandings early.
   - **Functional Correctness**: Within the first month of operation, the website's functions (like payment processing and user registration) work accurately with an error rate of less than 5%. Critical errors should stop the transactions immediately and redirect users to the beginning phase of the process.
   - **Functional Appropriateness**: Target a score of 4 out of 5 in early user satisfaction testing or feedback on the appropriateness of functions. This assesses whether the functions are suitable for the intended tasks and are user-friendly.

2. **Performance Efficiency**
   - **Time behaviour**: After launch as production at the end of sprint 4th, the website should load rapidly, with an average load time of less than 5 seconds. Loading the homepage's product or checkout pages takes under 5 seconds during peak traffic. Ensuring that users do not experience delays when browsing the website can lead to frustration and potential loss of sales.
   - **Resource utilisation**: When under peak load, such as a sale event, the website should use system resources efficiently, with CPU usage not exceeding 70% and memory usage below 80% of capacity, ensuring that the server is not overloaded and the site remains responsive during traffic spikes and is cost-effective.
   - **Capacity**: The website should handle at least 1,000 simultaneous users. Ensuring the website can handle many users is vital for e-commerce success, especially during sales or promotional events.
3. **Compatibility**
   - **Compatibility:** Catering to the top 5 browsers and devices in Vietnam is a strategic approach to ensure the website performs well for your primary market's most commonly used technologies. It covers most of our potential user base while being a realistic goal for our development team. The website should be compatible with the latest versions of Chrome, Safari, Firefox, Edge, Opera, and popular mobile devices, including iPhone, Samsung, Xiaomi, etc. No significant feature loss or degradation in user experience on browsers and devices should be detected.
   - **Mobile optimisation:** The website should be optimised for mobile devices with smaller screens to ensure the content is easily readable and accessible.
   - **Fast loading:** The website should be designed to load quickly, especially on mobile devices, to ensure users can access the content without delay.
4. **Usability**
   - **Understandability:** Within the 1st week of launch, at least 90% of test users should be able to navigate and use the website without assistance, indicating that the website's design and layout are intuitive and the content is clear and easy to understand. This includes locating products, adding them to the cart and checking out without problems.
   - **Learnability:** At least 80% of test users could finish a purchase within 15 minutes of their first visit, demonstrating that new users should be able to navigate the website and efficiently complete the essential tasks. This includes creating an account, searching for products, adding a product to a cart, entering payment details, and confirming the purchase.

5. **Reliability**
   - **Maturity:** Within the first month of operation, the website should be stable and reliable, with a bug rate of less than 3%.
   - **Availability:** Within the first month of operation, the website should work normally with many users. The website can handle 5000 users at the same time.
   - **Fault tolerance:** Within the first month of operation, the website should be able to handle errors gracefully and not crash due to them. The website will return a warning in 90% of cases of errors and continue to work without stopping. After a year, it is expected to have MTBF >= 10000 hours.
   - **Recoverability:** Within the first month of operation, the website should be able to cancel a transaction if errors occur. The website will redirect users to the first step of the transaction and cancel the process if it is not completed in up to 120 seconds, which means users will not lose their money even if there are errors while conducting payment. This must work with 95% of cases of errors.
6. **Security**
   - **Confidentiality:** The website should recognise which accounts are "Admin" with an accuracy of 98%. Only individuals with "Admin" accounts can access the website's data.
   - **Integrity:** The website must crash immediately in 10 out of 10 cases of illegal actions like unauthorised access to data.
   - **Non-repudiation:** The website will ask users to provide their citizen ID each time they make a transaction. These IDs will be recorded and prevented from being used again by other users. This also prevents users from repudiating the payment if they have made orders.
   - **Accountability:** The website will record the IP addresses used to conduct illegal actions. These IP addresses are expected to have a 97% chance of being banned if they are used again.

- **Authenticity:** The website will ask users to complete a CAPTCHA test before finalising the transactions. The website should cancel transactions in 10 out of 10 cases of failing the test.

7. **Maintainability**
   - **Modularity:** The codebase should be organised into independent and interchangeable modules. Each module should encapsulate a specific functionality, making it easier to understand, maintain, and update. For example, the website can have separate modules for user authentication, product catalogue, shopping cart, and payment processing.
   - **Reusability:** The website's common functionalities, like user authentication or payment processing, should be designed as reusable modules. This ensures that future updates or new features can leverage existing, well-tested components.
   - **Analyzability:** When a new issue is reported, the code and structure should be organised and commented on within a working day. This ensures developers can quickly comprehend the existing code, facilitating efficient bug analysis and fixing. Additionally, testing documentation and bug fixing should be completed within a half-working day each, allowing for a swift resolution of reported issues.
   - **Modifiability:** Our goal for the website's modifiability is to enable updates and new features to be added in a two-week sprint. The approval process involves requirement analysis and design approaches. For large-impact change requests, development time is allocated up to one week, followed by a second week for testing, bug fixing, and deployment. This structured approach ensures that modifications are well-planned, developed, and validated before being released to the production environment.
   - **Testability:** This is crucial for ensuring that changes can be thoroughly tested to identify and fix potential issues. For our e-commerce website, the two-week sprint includes a dedicated week for testing on the Test Environment, bug fixing, and deployment within three working days. This ensures adequate time for comprehensive testing, including unit testing, integration testing, and user acceptance testing. The structured testing process contributes to the overall maintainability by catching and addressing issues before they reach the production environment.
8. **Portability**
   - **Adaptability:** Our website should operate smoothly on various devices and browsers in the first month of operation. At least 95% of its functionality should be accessible on Vietnam's top 5 devices and browsers. Leveraging OutSystems' integrated functions for responsive design is crucial for achieving adaptability. Core features like shopping carts and order management will be prioritised for all users, progressively enhancing others on high-performing devices. Fast loading, under 2 seconds on 4G, with smooth interactions and optimised touch controls for mobiles are specified to ensure a seamless user experience across diverse platforms.
   - **Installability:** The installation process should be well-documented, providing clear instructions to facilitate deployment. Compatibility checks ensure the website can be seamlessly installed across various hosting environments. Automation of the installation process, where feasible, will be considered to enhance efficiency and minimise potential issues during deployment.
   - **Replaceability:** Our website's design approach involves creating a modular system with clear interfaces. This facilitates the smooth replacement of components, such as payment gateways or third-party integrations, when necessary. The emphasis is on standardised protocols and APIs, enabling efficient and seamless replacements or upgrades without causing disruptions to the website's overall functionality.

TEAM'S RESPONSES TO THE TASK

Team Member	Option	Detail Notes
Trac Duc Anh Luong	Agree	The software quality definition, quality metrics and acceptable measurements, and definition were well defined in compliance with the ISO/IEC 25010 software quality management model.
	Disagree	The definition of done conditions can add more explanation for clarification. The quality requirements need to include more metrics and thresholds.

Minh Nghia Nguyen	Agree	The definition of done is promising. Quality models and selected sub-characters are well aligned with the project scope. The SMART criteria is applied in the most sub-characteristics.
	Disagree	The reason for the definition of done and quality model sub-characteristics needs to be justified more clearly.
Cong Anh Nguyen	Agree	The “Definition of Done” is detailed and well-explained. The “Quality Requirements” follows the ISO/IEC 25010 model and is well-structured.
	Disagree	Some parts of the “Quality Requirements” need to be more detailed.
Gia Minh Nguyen	Agree	The report has a good structure with quality definition, metrics, and Definition of Done. The Definition of Done does implement the requirements of how the project should be done.
	Disagree	The quality metrics should be more detailed. There should be more estimated values for how each requirement should be done. An explanation of how each value is estimated is also needed.
Dat Tran Dinh	Agree	The “Definition of Done” and quality requirements for the proposed project are comprehensive and well-structured. The inclusion of specific criteria, along with the adherence to ISO/IEC 25010, ensures a thorough and high-quality development process.
	Disagree	The “Quality requirements” could be more detailed, and some parts could be more elaborated to make them clearer.
Anh Duc Nguyen	Agree	Overall, the structure of this document is well organised. It has a clear definition of done using the ISO/IEC 25010 software quality model, and most of the quality requirements are based on the SMART principle
	Disagree	Some quality requirements are unclear as they do not include quantitative metrics and thresholds. Moreover, the team uses the ISO/IEC 25010 software quality model with 8 characteristics. Still, many sub-characteristics have not been considered, so some aspects of quality management may not be covered.

Figure 1: Team’s responses to the task

MINUTES OF MEETING

Location: Room 7.2 Duy Tan, Hanoi

Time: Start at: *9:30, 26/1/2024* - End at: *10:30, 26/1/2024*

Attendees:

1. Trac Duc Anh Luong (Product Owner)
2. Nguyen Minh Nghia (Scrum Master)
3. Nguyen Gia Minh (Scrum Team Member)
4. Nguyen Anh Duc (Scrum Team Member)
5. Dinh Tran Dat (Scrum Team Member)
6. Nguyen Cong Anh (Scrum Team Member)

Notes:

- Review “Backlog” and “Solution Direction and Design”.
- “Definition of Done” is decided based on criteria that need to be met for the development to be completed
- The “Definition of Done” needs more explanation for clearer clarification.
- 2 quality models, ISO 25010 and ISO 9126 are considered.
- Some quality requirements are not sufficiently explicit because they lack quantitative indicators and thresholds.
- 8 characteristics are presented, along with some sub-characteristics. Yet, some sub-characteristics have not been considered, leading to some facets of quality management not being addressed.
- Leaders and members decide what needs improvement and divide work.

Materials:

- Nghia’s solution directions on definition of done
- Duc’s solution directions on definition of done
- Duc Anh’s solution directions on definition of done

Decisions:

1. Team members voted and followed the ISO/IEC 25010 quality model.
2. Add more details and justify the reasons in the “Definition of Done” part.
3. Some characteristics need adjustments and to be more comprehensive.
4. Some sub-characteristics must be considered and included to cover essential “Quality Requirements” aspects.

Tasks:

No.	Task Name	PIC(*)	Due
1	Finalise the Usability and Efficiency sub-characteristics of the quality requirements.	Nguyen Minh Nghia	26/01/2024
2	Finish the maintainability and portability metrics of the quality requirements.	Trac Duc Anh Luong	26/01/2024
3	Complete Functionality and Reliability of the Quality Requirements	Nguyen Gia Minh	26/01/2024
4	Review and elaborate more in the Definition of Done section to make it more transparent and more detailed	Tran Dat Dinh	26/01/2024
5	Refine Minutes of Meeting notes, outline final decisions and organise materials.	Nguyen Cong Anh	26/01/2024
6	Review and modify the project’s definition of done in more detail	Nguyen Anh Duc	26/01/2024

(*) PIC = Person in charge