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| **ISTANBUL TECHNICAL UNIVERSITY FACULTY OF COMPUTER AND INFORMATICS** | | |
|  | **BLG475E - Software Quality and Testing 2014 -2015 Fall Midterm Exam** | |
| **Date:** | 30.10.2014 |
| **Duration:** | 120 mins. |
| **Instructors:** | Assist. Prof. Dr. Ayşe Tosun Mısırlı  Lecturers from Turkcell |
| **Notes:** | Closed book, dictionaries are allowed! Write your answers on this paper. |
| |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | | **Student ID:** |  | **Name, Surname:** |  | **Signature:** |  | | | |

**Q. 1: [**15 points**]** Give 3 examples of software faults that can be found prior to test execution using other VV activities. Which VV activities would help you find those faults?

Examples:

Violations against coding rules --- Code review

Design faults --- Inspections on design documents

Requirements specification faults --- Inspections on specification documents, walkthroughs

**Q. 2:** [8 points]ExplainMAJOR steps before test execution.

Planning and control (throughout the whole testing process)

Analysis and design (transforming test objectives into test conditions, deciding exit criteria, test design, deciding test types)

Implementation (writing test cases and setup test environment)

**Q. 3:** [12 points] Give three examples of non-functional testing types.

1. Performance………………………………………….
2. Security………………………………………….
3. Usability………………………………………….

**Q. 4:** [20 points] Explain the following test types by answering the following questions: What is the objective? Who performs these tests?

Consider the V-model, and define the association of these tests with the processes in this model.

Which process would provide the required artifacts and test plans for each of these test types?

Functional testing.

Input – output checks for each module in a software system.

Developers.

Code and functional specs are the artifacts for the functional testing.

Integration testing.

Interactions between modules.

Integration test teams (also developers)

Detailed design documents are the artifacts for integration tests.

System testing.

Verification of the complete systems functionality as a whole.

System test teams (sometimes outsourced)

High level design documents and system requirements are the artifacts for planning system tests.

User acceptance testing.

Check the system against user needs /requirement specs.

Customer and an independent test team (for alpha ve beta tests)

Requirements are the artifacts for user acceptance tests.

**Q. 5:** [15 points] Using the Failure Mode & Effect Analysis (FMEA) Technique, calculate the Risk Priority Number(RPN) for the following three cases in the Collection application, and determine the testing density according to following table.

TESTING DENSITY TABLE

|  |  |
| --- | --- |
| **Testing Density** | **RPN Interval** |
| Extensive Testing | 1-5 |
| Balanced Testing | 6-20 |
| Opportunity Testing | 21-50 |
| Reporting Observed Bugs | >51 |

TTECH-Collection Application

Quality Risk Category=Functionality 1.000

Case 1.001:Multiple payments of one invoice for the different periods

Severity =1 – Loss of functionality

Priority = 1 – Urgent

Likelihood = 2 – Possible

1x1x2 = 2 Extensive testing

Case 1.002:Payment transaction per second

Severity =2 – Data Loss

Priority = 1 – Urgent

Likelihood = 2 – Possible

2x1x2 = 4 Extensive

Case 1.003:Lack of navigation path through functional menus

Severity =5 – Cosmetic Risk

Priority = 3 – Major

Likelihood = 2 – Possible

5x3x2 = 30 Opportunity

**Q. 6:** [**30 points**] *Read the following functional specification*.

A new discount package will be offered to customers who are invoiced subscribers of Turkcell for at least 5 years. This package gives a 20% discount in data transfer for a period of one month. Eligible customers, whose requests will be collected via an SMS message, shall get this discount package and use it for a period of one month.

1. (10 pts.) Draw the testing flow graph of this functional specification, and list all test scenarios that should be covered.
2. (20 pts.) Write the test cases for different testing types (e.g. smoke test, functional test). *Hint: Consider equivalence class partitioning rules for defining the test cases in a functional test*.

*Note: You can also check if the customer is an invoiced subscriber in a new decision node after the steps 111.*

Test scenarios: Path #1: 1111

Path #2: 1112244

Path #3: 11122(33...3)44

Smoke test: Check if the customer database could be accessed, and customers with more than 5years old could be retrieved. Check if the invoice calculation is up and running.

Stress test , load test examples are OK.

Functional test: Detailed test cases

1. Customer check:
   1. if the customer membership is higher than or equal to 365x5 days (EC1)
   2. if the membership is lower than 365x5 days (EC2)
2. SMS request collection
   1. if customer requests with a certain format (e.g. EVET DATAPAKET) are stored in the database. (EC1)
   2. if requests are not in the given format (EC2)
3. Apply discount
   1. if discount is activated from the day of the request onwards
   2. if discount is applied for 30 days
   3. if discount is reported in the invoice system
4. Terminate discount
   1. if discount is no longer available after 30 days.

User acceptance test: Checking against requirements.

1. Check if the customers are informed about the campaign
2. Check if the requests can be collected
3. Check if eligible customers could get the discount
4. Check if the 20% discount is applied to the invoice
5. Check if the package is terminated after a month

Start

*Note: You can also add an activity node for applying the discount to the invoice for that month, between nodes “Terminate the discount package” and “End”.*

Inform invoiced customers about the discount package

Inform the customer about the rule.

3

44

4

2

2

1

1

1

1

1

End

YES

Terminate the discount package

NO

YES

One month period ends

NO

Customer is 5 years old

Apply the discount package to the customer

Collect requests from customers via SMS