SW QUALITY COURSE

ROLE OF TEST ENGINEERS IN SDLC

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COSTS OF DEFECT FIXING
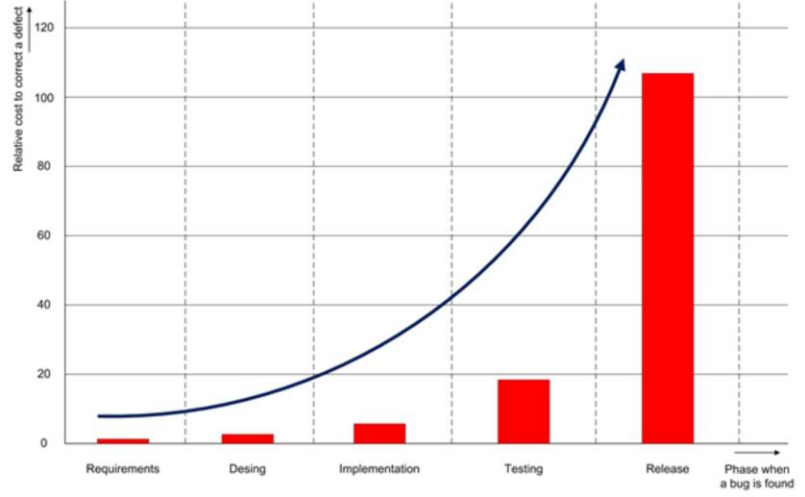
TEST PROCESS

	INPUT	OUTPUT
Planning, monitoring and control	Strategy	tasks, resources, objectives
Analysis	Test basis	Test Conditions
Design	Test Conditions	Test Cases
Implementation	Test Cases	Test Procedures, scripts
Execution		
Evaluating exit criteria and reporting		
Test Closure activities		

TEST ANALYSIS
REQUIREMENTS

Requirements Specification

R1: The SafeQ system shall have a login window.

    R1.1: The login window shall contain a username field.

    R1.2: The login window shall contain a password field.

    R1.3: The login window shall contain a login button.

    R1.4: The login window shall contain a Generate PUK button.

    R1.5: When the username field is filled in with existing username and the password field is field in with the corresponding password the system logs in when the login button is pressed.

    R1.6: When the login button is pressed and the username is not existing or the password does not correspond to the username the system opens a "invalid login dialog".

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Test Conditions (Test Design Specification)

TR 1: Test that the system has a login window.

TR 2: Test that the login window has a user name field.

TR 3: Test that the login window has a password field.

TR 4: Test that the login window has a login button.

TR 5: Test that the login window opens when a user logs out.

TR 6: Test that the system logs is when a correct username and password combination is given and the login button is pressed.

EXAMPLE: SAFEQ CLIENT SERVER AUTODISCOVERY BASED ON TERMINAL SESSIONS

Description:

Users work in various physical locations, either locally on their workstations or in terminal sessions (connected to a specific terminal server farm). When printing, they need to be able to pickup printed documents wherever they are currently located.

User Stories:

As an administrator, I want to have only one print queue which will be used by all users, no matter their current location.

As a user, I want to send print jobs to single printer/queue without need to select every time which printer should be used.

As a user, I want to retrieve such print jobs from any printer at my current location (office/branch), where I'm physically present.

As an administrator, I want to ensure that if users are not located at any known location (office/branch), but e.g. VPNed to the network, their print jobs will be kept in a central location.

Functional Requirements

SafeQ shall detect user's current location and when requested to print, route the print job to that particular location, so user can pick up the print out at any of the location's devices (note: SafeQ Client runs in user's terminal session, therefore can be used to retrieve further session details).

If SafeQ cannot determine the current user's location because the user's session is currently disconnected, the system shall use the location where the session was last connected from.

If SafeQ cannot determine the user's location for a different reason, the document shall be routed to the default path.

SafeQ Client shall allow each port to be configured separately for the autodiscovery feature, including a GUI element

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Non-functional Requirements

Environment/OS support

The feature must support users on a Windows Terminal Server and on a Citrix XenApp terminal server.

At least 2000 different subnets shall be supported (this is implied by the client's network structure).

Performance

Print job shall not be delayed by more than one second on average (assuming server is idle, has two CPU cores, 1,5Ghz and no hard page faults).

SafeQ must be able to handle the "location discovery" process without significantly (more than 10%) increasing system requirements.

If the "location discovery" process runs on the terminal session, up to 200 parallel instances must be supported.

Up to 999 port monitors on one server must be supported.

REVIEWS

Managerial reviews
Audits

Informal reviews
Walkthrough
Technical review
Inspection

Process:
planning, kick-off, preparation, review meeting, rework, follow-up

Contractual reviews - Managerial reviews
Standards compliance - Audits

Requirements reviews – Walkthrough, Technical review, inspection
Design reviews – Technical review, inspection
Code reviews - Technical review, Walkthrough
Test work product reviews – Walkthrough for high level documents and Technical review for risks analysis and test environments
Test entry reviews and test exit reviews – Management reviews

Acceptance reviews –Management reviews or audits

TESTING APPROACHES

Requirements-based testing

Risk-based testing

Operational profiles

Methodical techniques

- Checklists for both functional and nonfunctional requirements

Reactive techniques

- Experienced-based testing / Exploratory testing

RISK MANAGEMENT

Quality vs product risks

Risk analysis
- Risk identification
  - Brainstorming, checklist, retrospectives, expert interviews, …

- Risk assessment
  - Risk level = Probability x Impact

- Risk mitigation / Risk control
  - Elimination, Reduction, Transfer, Retention

RISK BASED TESTING

Company XY developing a booking system. They won the contract despite major competition, but a tight timescale has been agreed with penalty clauses for late delivery.

SCRUM is used on this project. Customer requires client/server architecture supporting Win XP, Win Vista, MacOS.

Company XY is well established and familiar with Windows platform (although the last project found many compatibility issues when developing systems for Win Vista), but this is the first project MacOS system.

Company XY develops for many years and has good reputation for quality due to the skills and dedication of developers and QA engineers. Over the past 2 months 3 key engineers (developers and QA) left the company and have been replaced by new staff.

Requirements:

New system consists of number of screens requesting inputs from clients to make a reservation. Having entered the information from the customer (system end user), the searching engine provides variety of possible bookings and offers various payment options as well.

Non-functional requirements:

service times of the search and payment features must be complete within 10 seconds

system must be accessible to partially sighted and blind people

payments must be secure

the mea time between failures (MTBF) must be greater that 72 hours

IMPACT		Low	Medium	High
	High	6	8	9
	Medium	3	5	7
	Low	1	2	4
		Low	Medium	High
			PROBABILITY	

BUSINESS VALUE OF TESTING

Costs of prevention
> training

Costs of detection
> test cases implementation, configuring test environments, reviews

Costs of internal failure
> fixing defects

Costs of external failure
> support costs

COSTS OF QUALITY

Last project states: 100 incidents were found during system testing at a cost of 200.000 CZK.

You estimate that:

40% of the time spent is on test work that is independent of failures that occurs in testing

the rest of the work is extra work caused by the failure discovered during testing

On the top if this cost of correcting defects (development effort) is estimated to be 600.000 CZK.

During the 6 months after the release 25% of the defects are found, but at a cost of 100.000 CZK in the testing and 800.000 CZK in development.

Reasons for defects:

developers not familiar with new programming language and libraries

a poor requirements specification

Actions:

developers get a training on technologies (at a cost of 100.000 CZK)

estimate: training reduces number of errors by 3% (both internal and external)

review of requirements specification becomes a part of testing (at the cost of 30.000 CZK)

estimate: review reduces number of errors by 6% (both internal and external)

200.000 CZK

40% testing – 80.000 CZK (Costs of detection)

40% development – 120.000 CZK (Cost of internal error)

COSTS OF QUALITY
TRAINING ON TECHNOLOGY FOR DEVELOPERS

	Testing	Development	Totals	With 3% reduction
Cost of prevention		100.000	100.000	100.000
Cost of detection	80.000		80.000	80.000
Cost of internal error	120.000	600.000	720.000	698.400
Cost of external error	100.000	800.000	900.000	873.000

Total cost of quality: 1.751.140 CZK

COSTS OF QUALITY
REQS REVIEW

	Testing	Development	Totals	With 6% reduction
Cost of prevention				
Cost of detection	110.000		110.000	110.000
Cost of internal error	120.000	600.000	720.000	676.800
Cost of external error	100.000	800.000	900.000	846.000

Total cost of quality: 1.632.800 CZK

THANKS!

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PV260 - SOFTWARE QUALITY