®

ISTQB® – Foundation Level Certified Tester

Sample questions & Exercises

2024 version 1.0.1

March 2024

Version Control

Version	Date	Remarks
1.0.1	06-Mar-2024	Initial version on the 2023 syllabus
1.0.2	19-Aug-2024	Trademark changes ISTQB®

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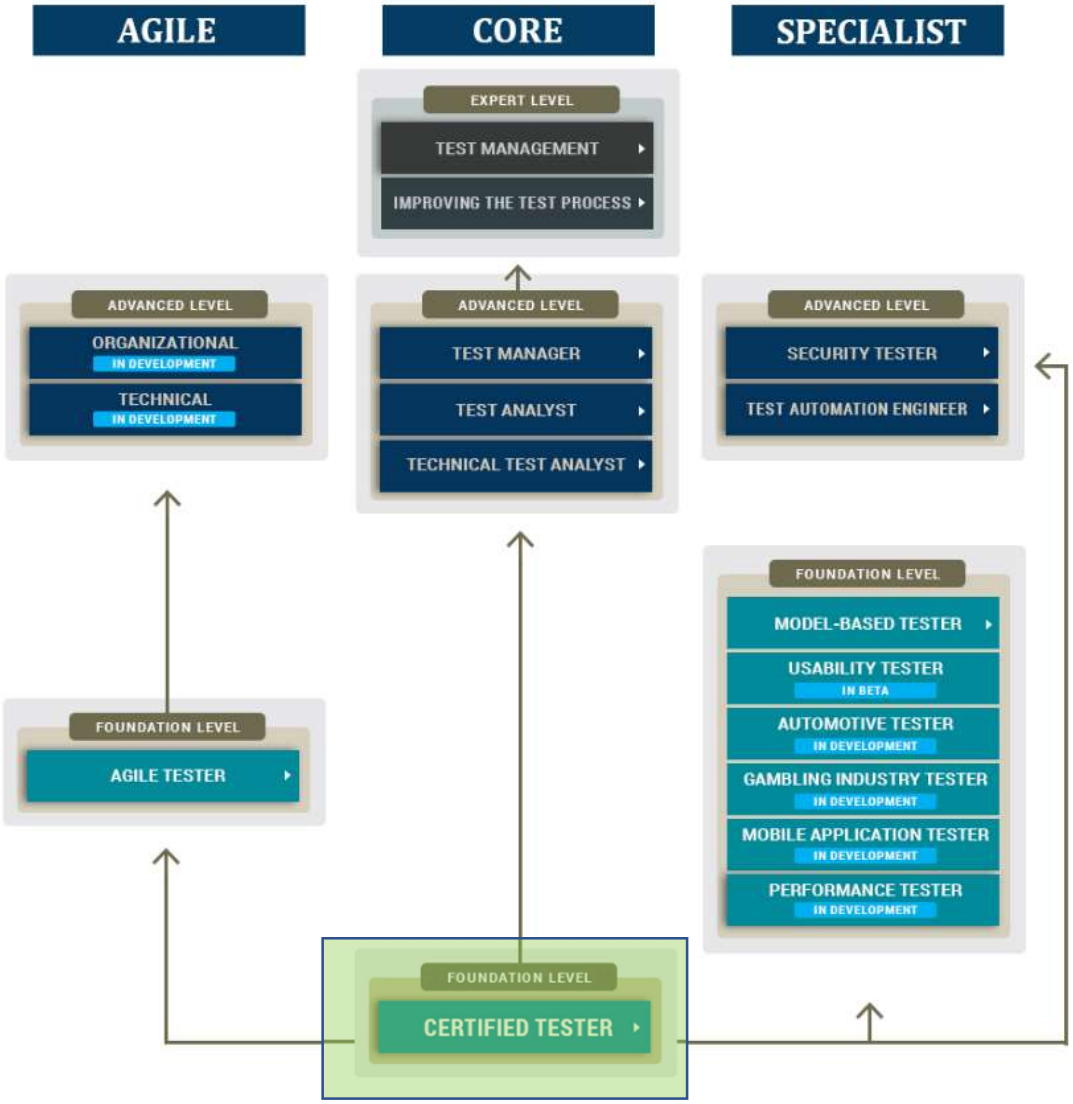
Introduction to ISTQB®

The International Software Testing Qualifications Board (ISTQB®) is a software testing qualification certification organization that was founded in November 2002, and is a non-profit association legally registered in Belgium

The ISTQB® Certified Tester scheme has become the world-wide leader in the certification of competences in software testing, its' certifications being internationally recognized and highly respected.

http://www.istqb.org/about-istqb.htm

ISTQB® Levels and Modules



K-Levels (Cognitive Levels)

K1: Remember

- The candidate should remember or recognize a term or a concept

K2: Understand

- The candidate should select an explanation for a statement related to the question topic

K3: Apply

- The candidate should select the correct application of a concept or technique and apply it to a given context

K4: Analyze

- The candidate can separate information related to a procedure or technique into its constituent parts for better understanding and can distinguish between facts and inferences

Information on the Foundation Exam

- 40 multiple-choice questions with 1 point for each correct answer
- A pass mark of 65% (26 or more points)
- Exam questions are distributed across K-Levels with estimated answer times:

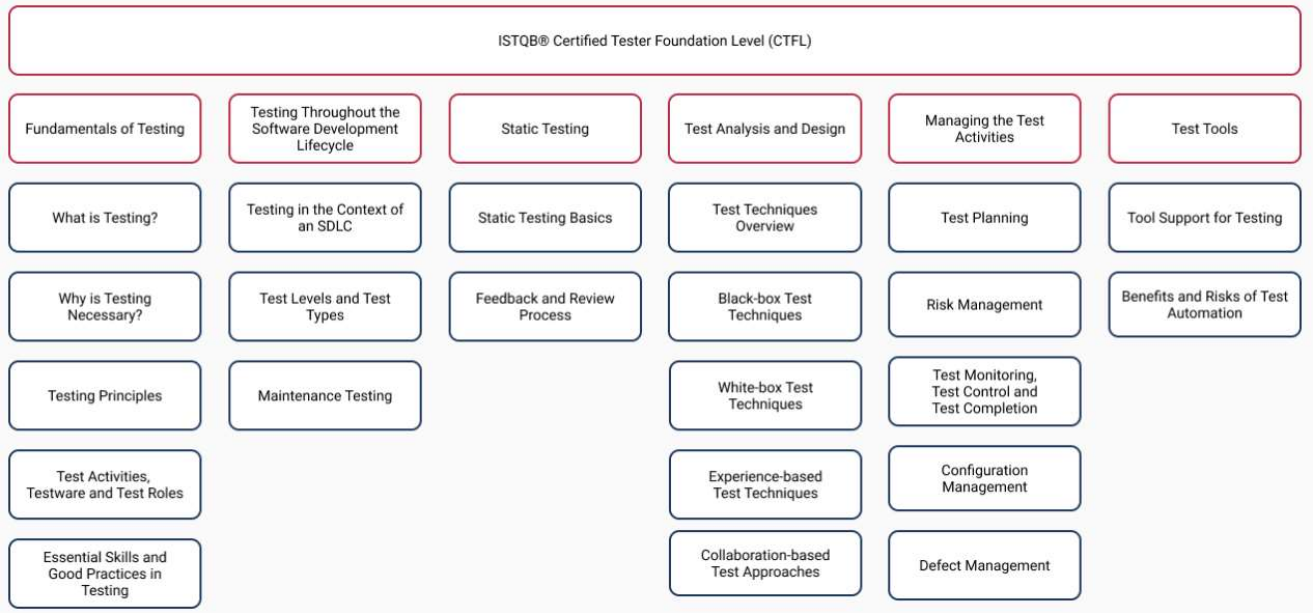
K-Level	Nr of Questions	Question Time	Total Time per K-Level
K1	8	1 min	8 min
K2	24	1 min	24 min
K3	8	3 min	24 min
Totals	40		56 min

Information on the Foundation Exam Content

Exam questions are distributed across Chapters & K-Levels

Chapter	K-Level	Nr of Questions
1	K1 K2	2 6
2	K1 K2	1 4
3	K1 K2 K3	1 3 1
4	K1 K2 K3	1 5 5
5	K1 K2 K3	2 5 2
6	K1 K2	1 1

Foundation level 2024 V4.0 – Certified Tester - Content



Sample Questions & Exercises

Chapter 1 – Fundamentals of Testing

Question 1

A company recently purchased a commercial off-the-shelf application to automate their bill-paying process. They now plan to run an acceptance test against the package prior to putting it into production. Which of the following is their most likely reason for testing?

a. To build confidence in the application
b. To detect bugs in the application
c. To gather evidence for a lawsuit
d. To train the users

Question 2

According to the ISTQB® Syllabus, a risk relates to which of the following?

a. Negative feedback to the tester
b. Negative consequences that will occur
c. Negative consequences that could occur
d. Negative consequences for the test object

Question 3

According to the ISTQB® Syllabus, the word 'bug' is synonymous with which of the following?

a. Incident
b. Defect
c. Mistake
d. Error

Question 4

Ensuring that test design starts during the requirements definition phase is important to enable which of the following test objectives?

a. Preventing defects in the system
b. Finding defects through dynamic testing
c. Gaining confidence in the system
d. Finishing the project on time

Question 5

A test team consistently finds between 90% and 95% of the defects present in the system under test. While the test manager understands that this is a good defect-detection percentage for her test team and industry, senior management and executives remain disappointed in the test group, saying that the team misses too many bugs, Given that the users are generally happy with the system and that the failures which have occurred have generally been low impact, which of the following test principles is most likely to help the test manager to explain to these managers and executives why some defects are likely to be missed?

a. Exhaustive testing is impossible
b. Defect clustering
c. Pesticide paradox
d. Absence-of-errors fallacy

Question 6

Which of the following statements describe a valid test objective?

a. To prove that there are no unfixed defects in the system under test
b. To prove that there will be no failures after the implementation of the system into production
c. To reduce the risk level of the test object and to build confidence in the quality level
d. To verify that there are no untested combinations of inputs

Question 7

Which of the statements below is the best assessment of how the test principles apply across the test life cycle?

a. Test principles only affect the preparation for testing
b. Test principles only affect test execution activities
c. Test principles affect the early test activities such as reviews
d. Test principles affect activities throughout the test life cycle

Question 8

Which of the following are MAJOR test implementation and execution tasks?

I. Repeating test activities
II. Creating test suites
III. Reporting discrepancies
IV. Logging the outcome
V. Analyzing lessons learned

a. II, III and IV
b. I, III, IV and V
c. I, II, III and IV
d. III, IV and V

Question 9

Which of the following is a KEY test control task

a. Initiating corrective actions
b. Determining the scope
c. Implementing the test policy
d. Scheduling test implementation

Question 10

Which of the following is a MAJOR task when evaluating the exit criteria?

a. Creating test suites and cases for efficient execution
b. Writing a test summary report for stakeholders
c. Handing the testware to the maintenance organization
d. Identifying any required infrastructure and tools

Question 11

What would usually have a set of input values and execution conditions?

a. Test basis
b. Test case
c. Test objective
d. Test control

Question 12

Which of the following is a MAJOR test planning task?

a. Determining the exit criteria
b. Measuring and analyzing results
c. Implementing corrective actions
d. Monitoring and documenting progress

Question 13

Which of the following is a KEY test closure task

a. Ensuring proper environment setup
b. Writing a test summary report
c. Assessing the need for additional tests
d. Finalizing and archiving testware

Question 14

Which one of the following is the BEST description of a test condition?

a. An attribute of a component or system specified or implied by requirements documentation.
b. An aspect of the test basis that is relevant to achieve specific test objectives.
c. The capability of the software product to provide functions which meet stated and implied needs when the software is used under specified conditions.
d. The percentage of all single condition outcomes that independently affect a decision outcome that have been exercised by a test case suite.

Question 15

Which of the following statements is a valid objective for testing?

a. To determine whether enough component tests were executed within system testing.
b. To find as many failures as possible so that defects can be identified and corrected.
c. To prove that all possible defects are identified.
d. To prove that any remaining defects will not cause any failures.

Question 16

Which of the following statements correctly describes the difference between testing and debugging?

a. Testing identifies the source of defects; debugging analyzes the defects and proposes prevention activities.
b. Testing shows failures caused by defects; debugging finds, analyzes, and removes the causes of failures in the software.
c. Testing removes faults; debugging identifies the causes of failures.
d. Testing prevents the causes of failures; debugging removes the failures.

Question 17

Which one of the statements below describes a failure discovered during testing or in production?

a. The product crashed when the user selected an option in a dialog box.
b. The wrong version of one source code file was included in the build.
c. The computation algorithm used the wrong input variables.
d. The developer misinterpreted the requirement for the algorithm.

Question 18

Which of the following statements CORRECTLY describes one of the seven key principles of software testing?

a. By using automated testing it is possible to test everything.
b. With sufficient effort and tool support, exhaustive testing is feasible for all software.
c. It is impossible to test all input and precondition combinations in a system.
d. The purpose of testing is to prove the absence of defects.

Question 19

In what way can testing be part of Quality Assurance?

a. It ensures that requirements are detailed enough.
b. It reduces the level of risk to the quality of the system.
c. It ensures that standards in the organization are followed.
d. It measures the quality of software in terms of number of executed test cases.

Question 20

Which of the below tasks is performed during the test analysis activity of the ISTQB® Test Process?

a. Identifying any required infrastructure and tools.
b. Creating test suites from test procedures.
c. Analyzing lessons learned for process improvement.
d. Evaluating the test basis for testability.

Question 21

Differentiate the following test work products (1-4) by mapping them to the right description (A-D).

1. Test suite
2. Test case
3. Test script
4. Test charter

A. A group of test scripts or test execution schedule.
B. A set of instructions for the automated execution of test procedures.
C. Contains expected results.
D. An event that could be verified.

a. 1A, 2C, 3B, 4D.
b. 1D, 2B, 3A, 4C.
c. 1A, 2C, 3D, 4B.
d. 1D, 2C, 3B, 4A.

Question 22

Which of the following provides the BEST description of a test case?

a. A document specifying a sequence of actions for the execution of a test. Also known as test script or manual test script
b. A set of input values and expected results, with execution preconditions and execution postconditions, developed for a particular test condition
c. An attribute of a system specified by requirements documentation (for example reliability, usability or design constraints) that is executed in a test
d. An item or event of a system that could be verified by one or more test conditions, e.g., a function, transaction, feature, quality attribute, or structural element

Question 23

Which of the following is a major objective of testing?

a. To prevent defects
b. To validate the project plan works as required
c. To gain confidence in the development team
d. To make release decisions for the system under test

Question 24

Which of the following is an example of a failure in a car cruise control system?

a. The developer of the system forgot to rename variables after a cut-and-paste operation
b. Unnecessary code that sounds an alarm when reversing was included in the system
c. The system stops maintaining a set speed when the radio volume is increased or decreased
d. The design specification for the system wrongly states speeds in km/h

Question 25

Which of the following is a defect rather than a root cause (in a fitness tracker)?

a. Because he was unfamiliar with the domain of fitness training, the author of the requirements wrongly assumed that users wanted heartbeat in beats per hour
b. The tester of the smartphone interface had not been trained in state transition testing, so missed a major defect
c. An incorrect configuration variable included for the GPS function could cause location problems during daylight saving times
d. Because she had never worked on wearable devices before, the designer of the user interface misunderstood the effects of reflected sunlight

Question 26

As a result of risk analysis, more testing is being directed to those areas of the system under test where initial testing found more defects than average.

Which of the following testing principles is being applied?

a. Beware of the pesticide paradox
b. Testing is context dependent
c. Absence-of-errors is a fallacy
d. Defects cluster together

Question 27

Given the following test activities and tasks:

a. Test design

b. Test implementation

c. Test execution

d. Test completion

1. Entering change requests for open defect reports
2. Identifying test data to support the test cases
3. Prioritizing test procedures and creating test data
4. Analyzing discrepancies to determine their cause

Which of the following BEST matches the activities with the tasks?

a. a-2, b-3, c-4, d-1

b. a-2, b-1, c-3, d-4

c. a-3, b-2, c-4, d-1

d. a-3, b-2, c-1, d-4

Question 28

Which of the following BEST describes how value is added by maintaining traceability between the test basis and test artifacts?

a. Maintenance testing can be fully automated based on changes to the initial requirements

b. It is possible to determine if a new test case has increased coverage of the requirements

c. Test managers can identify which testers found the highest severity defects

d. Areas that may be impacted by side-effects of a change can be targeted by confirmation testing

Question 29

Which of the following options shows an example of test activities that contribute to success?

a. Having testers involved during various software development lifecycle (SDLC) activities will help to detect defects in work products

b. Testers try not to disturb the developers while coding, so that the developers write better code

c. Testers collaborating with end users help to improve the quality of defect reports during component integration and system testing

d. Certified testers will design much better test cases than non-certified testers

Question 30

You have been assigned as a tester to a team producing a new system incrementally. You have noticed that no changes have been made to the existing regression test cases for several iterations and no new regression defects were identified. Your manager is happy, but you are not. Which testing principle explains your skepticism?

a. Tests wear out
b. Absence-of-errors fallacy
c. Defects cluster together
d. Exhaustive testing is impossible

Question 31

You work in a team that develops a mobile application for food ordering. In the current iteration the team decided to implement the payment functionality.

Which of the following activities is a part of test analysis?

a. Estimating that testing the integration with the payment service will take 8 person-days
b. Deciding that the team should test if it is possible to properly share payment between many users
c. Using boundary value analysis (BVA) to derive the test data for the test cases that check the correct payment processing for the minimum allowed amount to be paid
d. Analyzing the discrepancy between the actual result and expected result after executing a test case that checks the process of payment with a credit card, and reporting a defect

Question 32

Which of the following factors (i-v) have SIGNIFICANT influence on the test process?

i. The SDLC

ii. The number of defects detected in previous projects

iii. The identified product risks

iv. New regulatory requirements forcing formal white-box testing

v. The test environment setup

a. i, ii have significant influence; iii, iv, v have not
b. i, iii, iv have significant influence; ii, v have not
c. ii, iv, v have significant influence; i, iii have not
d. iii, v have significant influence; i, ii, iv have not

Question 33

Which TWO of the following tasks belong MAINLY to a testing role?

a. Configure test environments
b. Maintain the product backlog
c. Design solutions to new requirements
d. Create the test plan
e. Report on achieved coverage

Select TWO options.

Question 34

Which of the following skills (i-v) are the MOST important skills of a tester?

i. Having domain knowledge

ii. Creating a product vision

iii. Being a good team player

iv. Planning and organizing the work of the team

v. Critical thinking

a. ii and iv are important; i, iii and v are not
b. i, iii and v are important; ii and iv are not
c. i, ii and v are important; iii and iv are not
d. iii and iv are important; i, ii and v are not

Question 35

How is the whole team approach present in the interactions between testers and business representatives?

a) Business representatives decide on test automation approaches

b) Testers help business representatives to define test strategy

c) Business representatives are not part of the whole team approach

d) Testers help business representatives to create suitable acceptance tests

Root cause - Exercise A

Situation: Incorrect bonus amounts are calculated in HR software and customers of the software have started to complain. Several failures have been reported to this development team where calculations were not done as they should be done. The code was written on requirements that were unclear as the Product Owner did not understand the calculation for bonuses.

- What is the effect?
- What is the root cause?
- What is the solution?

Chapter 2 – Testing throughout the Software Development Lifecycle

Question 1

What are good practices for testing within the software lifecycle?

a. Early test analysis and design
b. Different test levels are defined with specific objectives
c. Testers will start to get involved as soon as coding is done
d. A and B above

Question 2

Which of the following is a test type?

a. Component testing
b. Functional testing
c. System testing
d. Acceptance testing

Question 3

Which option best describes objectives for test levels with a life cycle model?

a. Objectives should be generic for any test level
b. Objectives are the same for each test level
c. The objectives of a test level don't need to be defined in advance
d. Each level has objectives specific for that level

Question 4

Which of the following is a non-functional quality characteristic?

a. Feasibility
b. Usability
c. Maintenance
d. Regression

Question 5

Which of these is a functional test?

a. Measuring response time on an on-line booking system
b. Checking the effect of high volumes of traffic in a call-center system
c. Checking the on-line bookings screen information and the database contents against the information on the letter to customers
d. Checking how easy the system is to use

Question 6

A regression test

a. Is only run once
b. Will always be automated
c. Will check unchanged areas of the software to see if they have been affected
d. Will check changed areas of the software to see if they have been affected

Question 7

How can white-box testing be applied during acceptance testing?

a. To check if large volumes of data can be transferred between integrated systems.
b. To check if all code statements and code decision paths have been executed.
c. To check if all work process flows have been covered.
d. To cover all web page navigations.

Question 8

Which of the following statements comparing component testing and system testing is TRUE?

a. Component testing verifies the functionality of software modules, program objects, and classes that are separately testable, whereas system testing verifies interfaces between components and interactions between different parts of the system.
b. Test cases for component testing are usually derived from component specifications, design specifications, or data models, whereas test cases for system testing are usually derived from requirement specifications, functional specifications, or use cases.
c. Component testing only focuses on functional characteristics, whereas system testing focuses on functional and non-functional characteristics.
d. Component testing is the responsibility of the testers, whereas system testing typically is the responsibility of the users of the system.

Question 9

Which one of the following is TRUE?

a. The purpose of regression testing is to check if the correction has been successfully implemented, while the purpose of confirmation testing is to confirm that the correction has no side effects.
b. The purpose of regression testing is to detect unintended side effects, while the purpose of confirmation testing is to check if the system is still working in a new environment.
c. The purpose of regression testing is to detect unintended side effects, while the purpose of confirmation testing is to check if the original defect has been fixed.
d. The purpose of regression testing is to check if the new functionality is working, while the purpose of confirmation testing is to check if the originally defect has been fixed.

Question 10

Which one of the following is the BEST definition of an incremental development model?

a. Defining requirements, designing software and testing are done in a series with added pieces.
b. A phase in the development process should begin when the previous phase is complete.
c. Testing is viewed as a separate phase which takes place after development has been completed.
d. Testing is added to development as an increment.

Question 11

Which of the following should NOT be a trigger for maintenance testing?

a. Decision to test the maintainability of the software.
b. Decision to test the system after migration to a new operating platform.
c. Decision to test if archived data is possible to be retrieved.
d. Decision to test after “hot fixes”.

Question 12

Non-functional testing involves?

a. Testing to see where the system does not function correctly
b. Testing the quality attributes of the system including reliability and usability
c. Gaining user approval for the system
d. Testing a system feature using only the software required for that version

Question 13

Given the following statements about the relationships between software development activities and test activities in the software development lifecycle:

1. Each development activity should have a corresponding testing activity
2. Reviewing should start as soon as final versions of documents become available
3. The design and implementation of tests should start during the corresponding development activity
4. Testing activities should start in the early stages of the software development lifecycle

Which of the following CORRECTLY shows which are true and false?

a. True – 1, 2; False – 3, 4
b. True – 2, 3; False – 1, 2
c. True – 1, 2, 4; False – 3
d. True – 1, 4; False – 2, 3

Question 14

Given that the testing being performed has the following attributes:

- based on interface specifications;
- focused on finding failures in communication;
- the test approach uses both functional and structural test types.

Which of the following test levels is MOST likely being performed?

a. Component integration testing
b. Acceptance testing
c. System testing
d. Component testing

Question 15

Which of the following statements about test types and test levels is CORRECT?

a. Functional and non-functional testing can be performed at system and acceptance test levels, while white-box testing is restricted to component and integration testing
b. Functional testing can be performed at any test level, while white-box testing is restricted to component testing
c. It is possible to perform functional, non-functional and white-box testing at any test level
d. Functional and non-functional testing can be performed at any test level, while whitebox testing is restricted to component and integration testing

Question 16

Which of the following statements BEST compares the purposes of confirmation testing and regression testing?

a. The purpose of regression testing is to ensure that all previously run tests still work correctly, while the purpose of confirmation testing is to ensure that any fixes made to one part of the system have not adversely affected other parts
b. The purpose of confirmation testing is to check that a previously found defect has been fixed, while the purpose of regression testing is to ensure that no other parts of the system have been adversely affected by the fix
c. The purpose of regression testing is to ensure that any changes to one part of the system have not caused another part to fail, while the purpose of confirmation testing is to check that all previously run tests still provide the same results as before
d. The purpose of confirmation testing is to confirm that changes to the system were made successfully, while the purpose of regression testing is to run tests that previously failed to ensure that they now work correctly

Question 17

Which of the following statements CORRECTLY describes a role for impact analysis in maintenance?

a. Impact analysis is used when deciding if a fix to a maintained system is worthwhile
b. Impact analysis is used to identify how data should be migrated into the maintained system
c. Impact analysis is used to decide which hot fixes are of most value to the user
d. Impact analysis is used to determine the effectiveness of new maintenance test

Question 18

Consider the following rule: “for every SDLC activity there is a corresponding test activity”. In which SDLC models does this rule hold?

a. Only in sequential SDLC models
b. Only in iterative SDLC models
c. Only in iterative and incremental SDLC models
d. In sequential, incremental, and iterative SDLC models

Question 19

Which of the following statements BEST describes the acceptance test-driven development (ATDD) approach?

a. In ATDD, acceptance criteria are typically created based on the given/when/then format
b. In ATDD, test cases are mainly created at component testing and are code-oriented
c. In ATDD, tests are created, based on acceptance criteria to drive the development of the related software
d. in ATDD, tests are based on the desired behavior of the software, which makes it easier for team members to understand them

Question 20

Which of the following is NOT an example of the shift left approach?

a. Reviewing the user requirements before they are formally accepted by the stakeholders
b. Writing a component test before the corresponding code is written
c. Executing a performance efficiency test for a component during component testing
d. Writing a test script before setting up the configuration management process

Question 21

Which of the arguments below would you use to convince your manager to organize retrospectives at the end of each release cycle?

a. Retrospectives are very popular these days and clients would appreciate it if we added them to our processes
b. Organizing retrospectives will save the organization money because end user representatives do not provide immediate feedback about the product
c. Process weaknesses identified during the retrospective can be analyzed and serve as a to do list for the organization's continuous process improvement program
d. Retrospectives embrace five values including courage and respect, which are crucial to maintain continuous improvement in the organization

Question 22

Which types of failures (1-4) fit which test levels (A-D) BEST?

1. Failures in system behavior as it deviates from the user's business needs
2. Failures in communication between components
3. Failures in logic in a module
4. Failures in not correctly implemented business rules

A. Component testing
B. Component integration testing
C. System testing
D. Acceptance testing

a. 1D, 2B, 3A, 4C
b. 1D, 2B, 3C, 4A
c. 1B, 2A, 3D, 4C
d. 1C, 2B, 3A, 4D

Select ONE option.

Question 23

You are testing a user story with three acceptance criteria: AC1, AC2 and AC3. AC1 is covered by test case TC1, AC2 by TC2, and AC3 by TC3. The test execution history had three test runs on three consecutive versions of the software as follows:

	Execution 1	Execution 2	Execution 3
TC1	(1) Failed	(4) Passed	(7) Passed
TC2	(2) Passed	(5) Failed	(8) Passed
TC3	(3) Failed	(6) Failed	(9) Passed

Tests are repeated once you are informed that all defects found in the test run are corrected and a new version of the software is available.

Which of the above tests are executed as regression tests?

a. Only 4, 7, 8, 9
b. Only 5, 7
c. Only 4, 6, 8, 9
d. Only 5, 6

Chapter 3 – Static Testing

Question 1

Which of the following artefacts can be examined by using review techniques?

a. Software code
b. Requirements specification
c. Test designs
d. All of the above

Question 2

Which is not a type of review?

a. Walkthrough
b. Inspection
c. Informal review
d. Management approval

Question 3

Which statement about the function of a static analysis tool is true?

a. Gives quality information about the code without executing it
b. Checks expected results against actual results
c. Can detect memory leaks
d. Gives information about what code has and has not been exercised

Question 4

Static code analysis typically identifies all but one of the following problems. Which is it?

a. Unreachable code
b. Undeclared variables
c. Faults in the requirements
d. Too few comments

Question 5

What is the main difference between a walkthrough and an inspection?

a. An inspection is led by the authors while a walkthrough is led by a trained moderator
b. An inspection has a trained leader, while a walkthrough has no leader
c. Authors are not present during inspections, while they are during walkthroughs
d. A walkthrough is led by the author, while an inspection is led by a trained moderator

Question 6

Which of the following statements about early test design are true and which are false?

1. Defects found during early test design are more expensive to fix
2. Early test design can find defects
3. Early test design can cause changes to the requirements
4. Early test design takes more effort

a. 1 and 3 are true. 2 and 4 are false
b. 2 is true.1, 3 and 4 are false
c. 2 and 3 are true. 1 and 4 are false
d. 2, 3 and 4 are true. 1 is false

Question 7

Which of the following options are roles in a formal review?

a. Developer, Moderator, Review leader, Reviewer, Tester.
b. Author, Moderator, Manager, Reviewer, Developer.
c. Author, Manager, Review leader, Reviewer, Designer.
d. Author, Moderator, Review leader, Reviewer, Scribe.

Question 8

Which of the following describes the main activities of a formal review?

a. Initiation, backtracking, individual review, issue communication and analysis, rework, follow-up.
b. Planning, individual review, issue communication and analysis, rework, closure, follow-up.
c. Planning, initiate review, individual review, issue communication and analysis, fixing and reporting.
d. Individual review, review meeting, rework, closure, follow-up, root cause analysis.

Question 9

Which of the review types below is the BEST option to choose when the review must follow a formal process based on rules and checklists?

a. Informal Review.
b. Technical Review.
c. Inspection.
d. Walkthrough.

Question 10

Which TWO of the following statements about static testing are MOST true?

a. A cheap way to detect and remove defects.
b. It makes dynamic testing less challenging.
c. Early validation of user requirements.
d. It makes it possible to find run-time problems early in the lifecycle.
e. When testing safety-critical system, static testing has less value because dynamic testing finds the defects better.

Question 11

The design of a newspaper subscriptions system is being reviewed. The expected system users are:

- Subscribers
- Technical support team
- Billing department
- Database administrator

Each type of user logs into the system through a different login interface (e.g. subscribers login via a web page; technical support via an application). Different reviewers were requested to review the system's login flow from the perspective of the above user categories.

Which of the following review comments is MOST LIKELY to have been made by all reviewers?

a. The login page on the web is cluttered with too much advertisement space. As a result, it is hard to find the "forgot password?" link.
b. The login to access the billing information should also allow access to subscribers' information and not force a second login session.
c. After logging-in to the database application, there is no log-out function.
d. The log in flow is un-intuitive since it requires entering the password first, before the user name can be keyed-in.

Question 12

Which statement about static analysis is true?

a. With static analysis, defects can be found that are difficult to find with dynamic testing
b. Compiling is not a form of static analysis
c. When properly performed, static analysis makes functional testing redundant
d. Static Analysis finds all faults

Question 13

Which of the following statements CORRECTLY reflects the value of static testing?

a. By introducing reviews, we have found that both the quality of specifications and the time required for development and testing have increased
b. Using static testing means we have better control and cheaper defect management due to the ease of removing defects later in the lifecycle
c. Now that we require the use of static analysis, missed requirements have decreased and communication between testers and developers has improved
d. Since we started using static analysis, we have found coding faults that we would not have found by only performing dynamic testing

Question 14

Which of the following sequences BEST shows the main activities of the work product review process?

a. Initiate review – Reviewer selection – Individual review – Issue communication and analysis – Rework
b. Planning & preparation – Overview meeting – Individual review – Fix– Report
c. Preparation – Issue detection – Issue communication and analysis – Rework – Report
d. Plan – Initiate review – Individual review – Issue communication and analysis – Fix defects & report

Question 15

Which of the following CORRECTLY matches the roles and responsibilities in a formal review?

a. Manager – Decides on the execution of reviews
b. Review Leader - Ensures effective running of review meetings
c. Scribe – Fixes defects in the work product under review
d. Moderator – Monitors ongoing cost-effectiveness

Question 16

The reviews being used in your organization have the following attributes:

• There is a role of a scribe
• The purpose is to detect potential defects
• The review meeting is led by the author
• Reviewers find potential defects by individual review
• A review report is produced

Which of the following review types is MOST likely being used?

a. Informal Review
b. Walkthrough
c. Technical Review
d. Inspection

Question 17

You have been asked to take part in a checklist-based review of the following excerpt from the requirements specification for a library system:

Librarians can:

1. Register new borrowers.
2. Return books from borrowers.
3. Accept fines from borrowers.
4. Add new books to the system with their ISBN, author and title.
5. Remove books from the system.
6. Get system responses within 5 seconds.

Borrowers can:

7. Borrow a maximum of 3 books at one time.
8. View the history of books they have borrowed / reserved.
9. Be fined for failing to return a book within 3 weeks.
10. Get system responses within 3 seconds.
11. Borrow a book at no cost for a maximum of 4 weeks.
12. Reserve books (if they are on-loan).

All users (librarians and borrowers):

13. Can search for books by ISBN, author, or title.
14. Can browse the system catalogue.
15. The system shall respond to user requests within 3 seconds.
16. The user interface shall be easy-to-use.

You have been assigned the checklist entry that requires you to review the specification for inconsistencies between individual requirements (i.e. conflicts between requirements).

Which of the following CORRECTLY identifies inconsistencies between pairs of requirements?

a. 6-10, 6-15, 7-12
b. 6-15, 9-11
c. 6-10, 6-15, 9-11
d. 6-15, 7-12

Question 18

Which of the following is NOT a benefit of static testing?

a. Having less expensive defect management due to the ease of detecting defects later in the SDLC
b. Fixing defects found during static testing is generally much less expensive than fixing defects found during dynamic testing
c. Finding coding defects that might not have been found by only performing dynamic testing
d. Detecting gaps and inconsistencies in requirements

Question 19

Which of the following is a benefit of early and frequent feedback?

a. It improves the test process for future projects
b. It forces customers to prioritize their requirements based on agreed risks
c. It is the only way to measure the quality of changes
d. It helps avoid requirements misunderstandings

Question 20

The reviews being used in your organization have the following attributes:

- There is the role of a scribe
- The main purpose is to evaluate quality
- The meeting is led by the author of the work product
- There is individual preparation
- A review report is produced

Which of the following review types is MOST likely being used?

a. Informal review
b. Walkthrough
c. Technical review
d. Inspection

Question 21

Which of these statements is NOT a factor that contributes to successful reviews?

a) Participants should dedicate adequate time for the review

b) Splitting large work products into small parts to make the required effort less intense

c) Participants should avoid behaviors that might indicate boredom, exasperation, or hostility to other participants

d) Failures found should be acknowledged, appreciated, and handled objectively

Applying Review Techniques – Exercise A

Scenario: a developer in a small, start-up software firm has a good idea on a new web-based software product and has started building it. He would like some people to have a look at the first version before he continues.

1. As there is no documentation, which review technique would you advise to be used?
2. What would you advise this company to do better next time?

Applying Review Techniques – Exercise B

Scenario: below business requirement document needs to be reviewed.

1. Based on the attached business requirement document starting on the next page, which review techniques are best suitable?
2. Review the document and find as many defects as you can.
3. Come up with suggested fixes for the found defects

Exercise B

ProTest Solutions

Business Requirement Document

Project Description:	Creating a web application for hardware registration
Author:	Wouter Vrijen
Customer(s):	All Customers
Date Created:	15-JUL-2018
BRD No.:	97608
Revision No.:	1
Delivery/Release Due Date:	31-Dec-2018

Stage approvals

Stage	Name	Title	Signature	Sign off Date	Due Date
Business Owner Approval	Wouter Vrijen	Business Owner		15-JUL-2018	
Product Owner Approval	Ronald O'Neil	Product Owner			
Product Director Approval	Matt Davies	Director Products and Services			

PROJECT SUMMARY

Scope:

As in each company there is a lot of hardware that needs to be registered (for accountancy purposes, keeping track, etc), a simple web application should be built where this information can be entered and viewed.

Needs:

- A secured web application where users can log in with their password
- Each customer needs to be able to specify which fields need to be specified on a certain type of hardware
- Each customer will have different types of hardware
- Regardless of the type of asset there are certain fields that are mandatory on each and every hardware type
- All hardware entered into the system is saved in a sql database, one per customer
- A user can see all the hardware entered based on 'status, type, date in, date out'
- On each hardware item, a depreciation schedule can be set that depreciates the value of the asset over time based on variables set by the user

- A flexible report builder should be included so that the user can create reports with variables selected, specific for that customer

Glossary:

- Asset – an item or property owned by a person, company or entity that has economic value and/or can generate income.
- Asset Status – The technical status of an Asset or a group of assets

Actors:

- Finance Manager – wants to track hardware assets and value within the company
- Insurance Manager – wants to know the current value of hardware in the company in case something happens

Technical Requirements:

As a variety of different hardware and software components will be used to run this application, it will have to have multi-browser, multi Operating System support.

Security:

Within a customer, users can be given rights to view only, enter, edit, delete

Constraints:

There are no constraints at the time of writing this BRD

Out of Scope:

There are no out of scope items at the time of writing this BRD

Validation criteria checklist

- Business Requirements:
  - Is the problem statement (summary) clear?
  - Are provided requirements clear?
  - Is additional information needed?
- Sample data:
  - Is sample data required?
  - If required, has sample data been provided?
- Technical feasibility:
  - Is the problem / requirements feasible?
- Development Effort:
  - Is there Development effort or Dev team assistance needed?

Chapter 4 – Test Analysis and Design

Question 1

Which of the following could be a coverage measure for state transition testing?

V. All states have been reached

W. The response time for each transaction is adequate

X. Every transition has been exercised

Y. All boundaries have been exercised

Z. Specific sequences of transitions have been exercised

a. X, Y and Z
b. V, X, Y and Z
c. W, X and Y
d. V, X and Z

Question 2

Why are both specification-based and structure-based testing techniques useful?

a. They find different types of defects
b. Using more techniques is always better
c. Both find the same types of defects
d. Because specifications tend to be unstructured

Question 3

Which of the following is a characteristic of experience-based test techniques?

a. Test cases are created based on detailed design information
b. Items tested within the interface code section are used to measure coverage
c. The techniques heavily rely on the tester's knowledge of the software and the business domain
d. The test cases are used to identify deviations from the requirements

Question 4

Postal letters for light letters are 25p up to 10g, 35p up to 50g plus an extra 10p for each additional 25g up to 100g.

Which test inputs in grams would be selected using equivalence partitioning?

a. 8,42,82,102
b. 4,15,65,92,159
c. 10,50,75,100
d. 5,20,40,60,80

Question 5

Which of the following could be used to assess the coverage achieved for specification-based (black box) techniques?

V. Decision outcomes exercised

W. Partitions exercised

X. Boundaries exercised

Y. State transitions exercised

Z. Statements exercised

a. V, W, Y or Z
b. W, X or Y
c. V, X or Z
d. W, X, Y or Z

Question 6

What is checklist-based testing?

a. A test technique in which tests are derived based on the tester's knowledge of past failures, or general knowledge of failure modes.
b. Procedure to derive and/or select test cases based on an analysis of the specification, either functional or non-functional, of a component or system without reference to its internal structure.
c. An experience-based test technique whereby the experienced tester uses a high-level list of items to be noted, checked, or remembered, or a set of rules or criteria against which a product has to be verified.
d. An approach to testing where the tester dynamically designs and executes tests based on their knowledge, exploration of the test item and the results of previous tests.

Question 7

With a highly experienced tester with a good business background, which approach to defining test procedures would be effective and most efficient for a project under severe time pressure?

a. A high-level outline of the test conditions and general steps to take
b. Every step in the test spelled out in detail
c. A high-level outline of the test conditions with the steps to take discussed in detail with another experienced tester
d. Detailed documentation of all test cases and careful records of each step taken in testing

Question 8

What is the key characteristic of structure-based techniques?

a. They are mainly used to assess the structure of a specification
b. They are used to measure coverage and to design tests to increase coverage
c. They are based on the skills and experience of the tester
d. They use a formal or informal model of the software or component

Question 9

Which of the following would be an example of decision-table testing for a financial application applied at the system-level?

a. A table containing rules for combinations of inputs to two fields on a screen
b. A table containing rules for interfaces between components
c. A table containing rules for mortgage applications
d. A table containing rules for chess

Question 10

Which of the following would structure-based test design techniques be most likely be applied to?

1. Boundaries between mortgage interest rate bands
2. An invalid transition between two different arrears statuses
3. The business process flow for mortgage approval
4. Control flow of the program to calculate repayments

a. 2, 3 and 4
b. 2 and 4
c. 3 and 4
d. 1,2 and 3

Question 11

Which of the following statements about the relationship between statement coverage and branch coverage is true?

a. 100% branch coverage is achieved if statement coverage is greater than 90%
b. 100% statement coverage is achieved if branch coverage is greater than 90%
c. 100% branch coverage always means 100% statement coverage
d. 100% statement coverage always means 100% branch coverage

Question 12

When choosing which technique to use in a given situation, which factors should be taken into account?

U. Previous experience of types of defects found in this or similar systems
V. Existing knowledge of the testers
W. Regulatory standards that apply
X. The type of test execution tool that will be used
Y. The documentation available
Z. Previous experience in the development language

a. V, W, Y and Z
b. U, V, W and Y
c. U, X and Y
d. V, W and Y

Question 13

Why are error guessing and exploratory testing good to do?

a. They can find defects missed by behavior and structure-based techniques
b. The don't require any training to be as effective as formal techniques
c. They can be used most effectively when there are good specifications
d. They will ensure that all of the code or system is tested

Question 14

How do experience-based techniques differ from specification-based techniques?

a. They depend on the tester's understanding of the way the system is structured rather than on a documented record of what the system should do
b. They depend on having older testers rather than younger testers
c. They depend on a documented record of what the system should do rather than on an individual's personal view
d. They depend on an individual's personal view rather than on a documented record of what the system should do

Question 15

Which one of the following options is categorized as a black-box test technique?

a. Techniques based on analysis of the architecture.
b. Techniques checking that the test object is working according to the technical design.
c. Techniques based on the expected use of the software.
d. Techniques based on formal requirements.

Question 16

The following statement refers to decision coverage:

"When the code contains only a single 'if' statement and no loops or CASE statements, any single test case we run will result in 50% decision coverage."

Which of the following sentences is correct?

a. The sentence is true. Any single test case provides 100% statement coverage and therefore 50% decision coverage.
b. The sentence is true. Any single test case would cause the outcome of the "if" statement to be either true or false.
c. The sentence is false. A single test case can only guarantee 25% decision coverage in this case.
d. The sentence is false. The statement is too broad. It may be correct or not, depending on the tested software.

Question 17

Which one of the following is the BEST description of statement coverage?

a. It is a metric which is used to calculate and measure the percentage of test cases that have been executed.
b. It is a metric, which is used to calculate and measure the percentage of statements in the source code which have been executed.
c. It is a metric, which is used to calculate and measure the number of statements in the source code which have been executed by test cases that are passed.
d. It is a metric that give a true/false confirmation if all statements are covered or not.

Question 18

Which TWO of the following statements about the relationship between statement coverage and branch coverage are true?

a. Branch coverage is stronger than statement coverage.
b. Statement coverage is stronger than branch coverage.
c. 100% statement coverage guarantees 100% branch coverage.
d. 100% branch coverage guarantees 100% statement coverage.
e. Branch coverage can never reach 100%.

Question 19

Which of the following situations is NOT suited for using exploratory testing?

a. When there is time pressure, and/or the requirements are incomplete or inapplicable
b. When the system is developed and tested incrementally.
c. When only new and inexperienced testers are available.
d. When the main part of the application can be tested only at the customer's site.

Question 20

An employee's bonus is to be calculated. It cannot be negative, but it can be calculated down to zero. The bonus is based on the length of employment.

The categories are: less than or equal to 2 years, more than 2 years but less than 5 years, 5 or more years, but less than 10 years, 10 years or longer.

What is the minimum number of test cases required to cover all valid equivalence partitions for calculating the bonus?

a. 3
b. 5
c. 2
d. 4

Question 21

A speed control and reporting system has the following characteristics:

If you drive 50 km/h or less, nothing will happen.

If you drive faster than 50 km/h, but 55 km/h or less, you will be warned.

If you drive faster than 55 km/h but not more than 60 km/h, you will be fined.

If you drive faster than 60 km/h, your driving license will be suspended.

Which would be the most likely set of values (km/h) identified by two-point boundary value analysis?

a. 0, 49, 50, 54, 59, 60.

b. 50, 55, 60.

c. 49, 50, 54, 55, 60, 62.

d. 50, 51, 55, 56, 60, 61.

Question 22

A video application has the following requirement:

The application shall allow playing a video on the following display sizes:

1. 640x480.
2. 1280x720.
3. 1600x1200.
4. 1920x1080.

Which of the following list of test cases is a result of applying the Equivalence Partitioning test technique to test this requirement?

a. Verify that the application can play a video on a display of size 1920x1080 (1 test).

b. Verify that the application can play a video on a display of size 640x480 and 1920x1080 (2 tests).

c. Verify that the application can play a video on each of the display sizes in the requirement (4 tests).

d. Verify that the application can play a video on any one of the display sizes in the requirement (1 test).

Question 23

A company's employees are paid bonuses if they work more than a year in the company and achieve individually agreed targets. The following decision table has been designed to test the logic for paying bonuses:

		T1	T2	T3	T4	T5	T6	T7	T8
Conditions									
Cond1	Employment for more than 1 year?	YES	NO	YES	NO	YES	NO	YES	NO
Cond2	Agreed target?	NO	NO	YES	YES	NO	NO	YES	YES
Cond3	Achieved target?	NO	NO	NO	NO	YES	YES	YES	YES
Action									
	Bonus payment?	NO	NO	NO	NO	NO	NO	YES	NO

Which test cases could be eliminated in the above decision table because the test case wouldn't occur in a real situation?

a. T1 and T2.

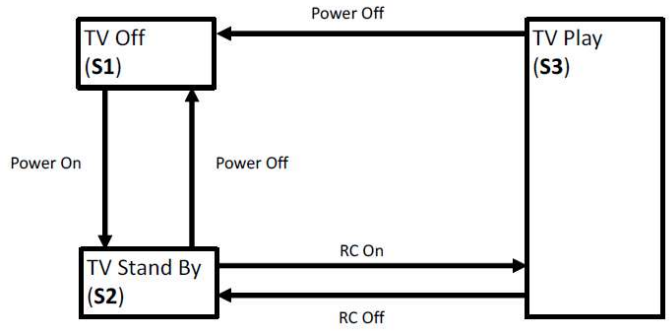
b. T3 and T4.

c. T7 and T8.

d. T5 and T6.

Question 24

Which of the following statements about the given state transition diagram and table of test cases is TRUE?



Test Case	1	2	3	4	5
Start State	S1	S2	S2	S3	S3
Input	Power On	Power Off	RC On	RC Off	Power Off
Expected Final State	S2	S1	S3	S2	S1

a. The given test cases can be used to cover both valid and invalid transitions in the state transition diagram.

b. The given test cases represent all possible valid transitions in the state transition diagram.

c. The given test cases represent only some of the valid transitions in the state transition diagram.

d. The given test cases represent sequential pairs of transitions in the state transition diagram.

Question 25

Which of the following provides the BEST description of exploratory testing?

a. A testing practice in which an in-depth investigation of the background of the test object is used to identify potential weaknesses that are examined by test cases
b. An informal test design technique where the tester actively controls the design of the tests as those tests are performed and uses information gained while testing to design new and better tests
c. An approach to test design in which test activities are planned as uninterrupted sessions of test analysis and design, often used in conjunction with checklist-based testing
d. Testing based on the tester's experience, knowledge and intuition

Question 26

Which of the following BEST matches the descriptions with the different categories of test techniques?

1. Coverage is measured based on a selected structure of the test object
2. The processing within the test object is checked
3. Tests are based on likely defects and their distribution
4. Deviations from the requirements are checked
5. User stories are used as the test basis

Black	-	Black-box test techniques
White	-	White-box test techniques
Experience	-	Experience-based test techniques

a.	Black – 4, 5	White – 1, 2	Experience – 3
b.	Black – 3	White – 1, 2	Experience – 4, 5
c.	Black – 4	White – 1, 2	Experience – 3, 5
d.	Black – 1, 3, 5	White – 2	Experience – 4

Question 27

A fitness app measures the number of steps that are walked each day and provides feedback to encourage the user to keep fit. The feedback for different numbers of steps should be:

Up to 1000	- Couch Potato!
Above 1000, up to 2000	- Lazy Bones!
Above 2000, up to 4000	- Getting There!
Above 4000, up to 6000	- Not Bad!
Above 6000	- Way to Go!

Which of the following sets of test inputs would achieve the highest equivalence partition coverage?

a. 0, 1000, 2000, 3000, 4000
b. B. 1000, 2001, 4000, 4001, 6000
c. C. 123, 2345, 3456, 4567, 5678
d. D. 666, 999, 2222, 5555, 6666

Question 28

A daily radiation recorder for plants produces a sunshine score based on a combination of the number of hours a plant is exposed to the sun (below 3 hours, 3 to 6 hours or above 6 hours) and the average intensity of the sunshine (very low, low, medium or high).

Given the following test cases:

	hours	intensity	score
T1	1.5	v. low	10
T2	7.0	medium	60
T3	0.5	v. low	10

What is the minimum number of additional test cases that are needed to ensure full coverage of all valid INPUT equivalence partitions?

a. 1
b. 2
c. 3
d. 4

Question 29

A smart home app measures the average temperature in the house over the previous week and provides feedback to the occupants on their environmental-friendliness based on this temperature. The feedback for different average temperature ranges (to the nearest °C) should be:

Up to 10°C	- Icy Cool!
11°C to 15°C	- Chilled Out!
16°C to 19°C	- Cool Man!
20°C to 22°C	- Too Warm!
Above 22°C	- Hot & Sweaty!

Using two-point BVA, which of the following sets of test inputs provides the highest level of boundary coverage?

a. 0°C, 11°C, 20°C, 22°C, 23°C
b. 9°C, 15°C, 19°C, 23°C, 100°C
c. 10°C, 16°C, 19°C, 22°C, 23°C
d. 14°C, 15°C, 18°C, 19°C, 21°C, 22°C

Question 30

You are testing a simplified apartment search form which has only two search criteria:

- floor (with three possible options: ground floor; first floor; second or higher floor)
- garden type (with three possible options: no garden; small garden; large garden)

Only apartments on the ground floor have gardens. The form has a built-in validation mechanism that will not allow you to use the search criteria which violate this rule.

Each test has two input values: floor and garden type. You want to apply equivalence partitioning (EP) to cover each floor and each garden type in your tests.

What is the minimal number of test cases to achieve 100% EP coverage?

a. 3

b. 4

c. 5

d. 6

Question 31

Decision table testing is being performed on a speeding fine system. Two test cases have already been generated for rules 1 and 4, which are shown below:

	RULES	R1	R4
Conditions	Speed > 50	T	F
	School Zone	T	F
Actions	$250 Fine	F	F
	Jail	T	F

Given the following additional test cases:

	Test Case	DT1	DT2	DT3	DT4
Inputs	Speed	55	44	66	77
	School Zone	T	T	T	F
Expected Result	$250 Fine	F	F	F	T
	Jail	T	F	T	F

Which two of the additional test cases would achieve full coverage of the complete decision table (when combined with the test cases that have already been generated for rules 1 and 4)?

a. DT1, DT2

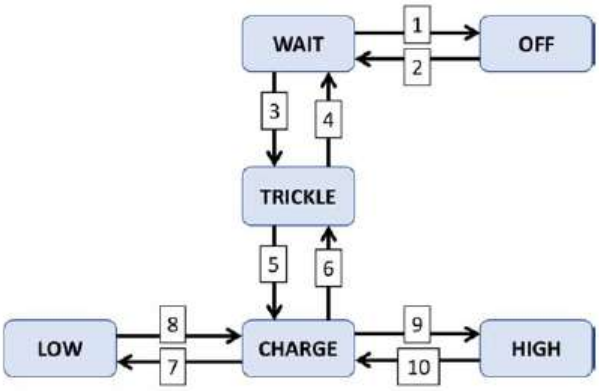
b. DT2, DT3

c. DT2, DT4

d. DT3, DT4

Question 32

Given the following state model of battery charger software:



Which of the following sequences of transitions provides the highest level of transition coverage for the model?

a. OFF – WAIT – OFF – WAIT – TRICKLE – CHARGE – HIGH – CHARGE - LOW
b. WAIT - TRICKLE - WAIT - OFF - WAIT - TRICKLE - CHARGE - LOW - CHARGE
c. HIGH - CHARGE - LOW - CHARGE - TRICKLE - WAIT - TRICKLE – WAIT - TRICKLE - CHARGE
d. WAIT - TRICKLE - CHARGE - HIGH - CHARGE - TRICKLE - WAIT – OFF - WAIT

Question 33

Which of the following descriptions of statement coverage is CORRECT?

a. Statement coverage is a measure of the number of lines of source code (minus comments) exercised by tests
b. Statement coverage is a measure of the proportion of executable statements in the source code exercised by tests
c. Statement coverage is a measure of the percentage of lines of source code exercised by tests
d. Statement coverage is a measure of the number of executable statements in the source code exercised by tests

Question 34

Which of the following descriptions of decision coverage is CORRECT?

a. Decision coverage is a measure of the percentage of possible paths through the source code exercised by tests
b. Decision coverage is a measure of the percentage of business flows through the component exercised by tests
c. Decision coverage is a measure of the 'if' statements in the code that are exercised with both the true and false outcomes
d. Decision coverage is a measure of the proportion of decision outcomes in the source code exercised by tests

Question 35

Which of the following BEST describes the concept behind error guessing?

a. Error guessing requires you to imagine you are the user of the test object and guess mistakes the user could make interacting with it
b. Error guessing involves using your personal experience of development and the mistakes you made as a developer
c. Error guessing involves using your knowledge and experience of defects found in the past and typical mistakes made by developers
d. Error guessing requires you to rapidly duplicate the development task to identify the sort of mistakes a developer might make

Question 36

You are testing a system that calculates the final course grade for a given student.

The final grade is assigned based on the final result, according to the following rules:

- 0 – 50 points: failed
- 51 – 60 points: fair
- 61 – 70 points: satisfactory
- 71 – 80 points: good
- 81 – 90 points: very good
- 91 – 100 points: excellent

You have prepared the following set of test cases:

	Final result	**Final grade**
TC1	91	excellent
TC2	50	failed
TC3	81	very good
TC4	60	fair
TC5	70	satisfactory
TC6	80	good

What is the 2-value Boundary Value Analysis (BVA) coverage for the final result that is achieved with the existing test cases?

a. 50%
b. 60%
c. 33.3%
d. 100%

Question 37

Your favorite bicycle daily rental store has just introduced a new Customer Relationship Management system and asked you, one of their most loyal members, to test it.
The implemented features are as follows:

- Anyone can rent a bicycle, but members receive a 20% discount
- However, if the return deadline is missed, the discount is no longer available
- After 15 rentals, members get a gift: a T-Shirt

Decision table describing the implemented features looks as follows:

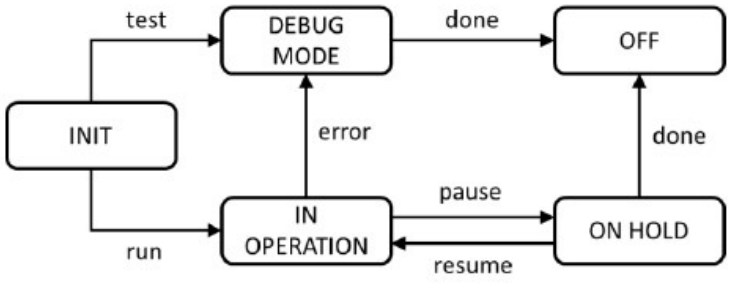
Conditions	**R1**	**R2**	**R3**	**R4**	**R5**	**R6**	**R7**	**R8**
Being a member	T	T	T	T	F	F	F	F
Missed deadline	T	F	T	F	T	F	F	T
15th rental	F	F	T	T	F	F	T	T
Actions								
20% discount		X		X				
Gift T-Shirt			X	X				X

Based ONLY on the feature description of the Customer Relationship Management system, which of the above rules describes an impossible situation?

a. R4
b. R2
c. R6
d. R8

Question 38

You test a system whose lifecycle is modeled by the state transition diagram shown below. The system starts in the INIT state and ends its operation in the OFF state.



What is the MINIMAL number of test cases to achieve valid transitions coverage?

a. 4
b. 2
c. 7
d. 3

Question 39

Your test suite achieved 100% statement coverage. What is the consequence of this fact?

a. Each instruction in the code that contains a defect has been executed at least once
b. Any test suite containing more test cases than your test suite will also achieve 100% statement coverage
c. Each path in the code has been executed at least once
d. Every combination of input values has been tested at least once

Question 40

Which of the following is NOT true for white-box testing?

a. During white-box testing the entire software implementation is considered
b. White-box coverage metrics can help identify additional tests to increase code coverage
c. White-box test techniques can be used in static testing
d. White-box testing can help identify gaps in requirements implementation

Question 41

Which of the following BEST describes the concept behind error guessing?

a. Error guessing involves using your knowledge and experience of defects found in the past and typical errors made by developers
b. Error guessing involves using your personal experience of development and the errors you made as a developer
c. Error guessing requires you to imagine that you are the user of the test object and to guess errors the user could make interacting with it
d. Error guessing requires you to rapidly duplicate the development task to identify the sort of errors a developer might make

Question 42

In your project there has been a delay in the release of a brand-new application and test execution started late, but you have very detailed domain knowledge and good analytical skills. The full list of requirements has not yet been shared with the team, but management is asking for some test results to be presented.

Which test technique fits BEST in this situation?

a. Checklist-based testing
b. Error guessing
c. Exploratory testing
d. Branch testing

Question 43

Which of the following BEST describes the way acceptance criteria can be documented?

a) Performing retrospectives to determine the actual needs of the stakeholders regarding a given user story

b) Using the given/when/then format to describe an example test condition related to a given user story

c) Using verbal communication to reduce the risk of misunderstanding the acceptance criteria by others

d) Documenting risks related to a given user story in a test plan to facilitate the risk-based testing of a given user story

Question 44

Consider the following user story:

As an Editor
I want to review content before it is published
so that I can assure the grammar is correct

and its acceptance criteria:

- The user can log in to the content management system with "Editor" role
- The editor can view existing content pages
- The editor can edit the page content
- The editor can add markup comments
- The editor can save changes
- The editor can reassign to the "content owner" role to make updates

Which of the following is the BEST example of an ATDD test for this user story?

a. test if the editor can save the document after deleting the page content
b. test if the content owner can log in and make updates to the content
c. test if the editor can schedule the edited content for publication
d. test if the editor can reassign to another editor to make updates

Equivalence Partitioning - Exercise A

Scenario: when setting a password, it can be between min 6 and max 10 characters

1. Please draw up the equivalent partitions and indicate whether they are valid or invalid
2. How many test cases do you need for 100 EP coverage?
3. Please give the input values and responses of each EP test case.

Boundary Value Analysis - Exercise A

Scenario: in the below equivalence partitions:

Invalid	Valid	Invalid
0-5	6-10	11 >

1. Please give me the values that need to be tested for a standard (2-value) BVA.
2. And for full (3-value) BVA.
3. So how many test cases would you need for full EP and BVA coverage?

Decision table testing – Exercise A, B

Scenario: bonus percentage depends on permanent contract, performance being excellent

- If permanent and excellent performance, 100 %
- If permanent and not excellent performance, 50 %
- If not permanent and excellent performance, 75%
- If not permanent and not excellent performance, 25 %

1. Please draw the Decision Table and give me the different test cases needed incl the output (action).
2. If we would add one more condition, like if the employee is above 50 years of age there is an extra 10% bonus, how many extra test cases would be needed?
3. Based on the below new condition, draw up the decision table with all conditions and actions

State transition testing – Exercise A - E

Scenario: let's take a simplified ATM process:

- Insert the card, wait for the PIN screen to come up, enter PIN, if correct, you have access to the account, if incorrect, try again, if incorrect after the 3rd try, the ATM eats the card

A. Please draw the State Transition Diagram with the states and the transitions.

B. On the same scenario, draw a State Transition table:
   - States as rows
   - Actions (events) as columns

C. How many test cases do you need to test all states and please specify the test cases.

D. How many test cases do you need to test all transitions and please specify the test cases.

E. Please give two examples of invalid transitions.

Statement testing & coverage – Exercise A

Consider the below pseudo-code

Code:

```
READ A
READ B
IF A > B THEN C = 0
ENDIF
```

1. How many testcases are needed to achieve 100 % statement coverage and please provide example values for A & B.

Statement testing & coverage – Exercise B

Consider the below pseudo-code:

```
READ A
READ B
C = A + 2 x B
IF C > 50 THEN
        PRINT 'Large C'
ENDIF
```

1. What's the statement coverage with the below tests?

- 1. A = 2, B = 3
- 2. A = 0, B = 25
- 3. A = 47, B = 1

2. How many tests are needed (with A & B values) to get 100 % statement coverage?

Decision & Branch testing & coverage – Exercise A

Consider the below pseudo-code:

```
READ A
READ B
IF A > B THEN C = 0
ENDIF
READ D
IF D = 2*B THEN C = 100
ELSE C = 1
ENDIF
```

1. What is the decision / branch coverage with A = 12, B = 10, D = 5?
2. How many testcases are needed to achieve 100 % decision / branch coverage?

Applying Acceptance Test Driven Development

1. **Come up with a story**

'As a finance manager I want to be able to set-up payment schedules with complex calculations that automatically generate several thousand 1-page invoices a day and send them to my customers over email on the due date of each line in the schedule so that I have less manual work to do. If anything in the process does not go as it should, I want an error message to be shown.'

- Go through the ATDD process with this story
    - First a specification workshop takes place (like static testing session)
    - Acceptance tests are created

2. **Specification workshop takes place (like static testing session)**

Example outcomes are answers to the below:

- What kind of calculations?
- What are acceptable response times?
- How can we confirm an invoice has been sent?
- How big can an invoice be?
- What is the expected nr of invoices created at once?
- What should the different errors say?
    - Schedule creation error
    - Invoice generation error
    - Email sending error

3. **Each person takes one area - item - and created a positive acceptance test for it.**

Examples are:

- Input 1000 per day results in 31000 for Jan 2019, 28000 for Feb 2019, etc
- Schedule generates in 1 second
- Email with attached invoice is stored on the server
- Email with invoice generates a confirmation email to internal
- 1000 invoices generated within 10 seconds
- Size of email incl attached invoice is max 50 kb

4. **Each person please give one example of a negative acceptance test**

Examples are:

- Schedule generates in more than 5 seconds – fail
- User forgets a field – error shows that field should be filled in
- Email with invoice generates a confirmation email to internal, where out of office is on
- In the middle of generating 1000 invoices – unplug internet – see the result (sequence kept, etc)
- Generate 100000 invoices at once – monitor servers and performance

Chapter 5 – Test Management

Question 1

How do testers add value to iteration and release planning?

a. Testers determine the priority of the user stories to be developed
b. Testers focus only on the functional aspects of the system to be tested
c. Testers participate in the detailed risk identification and risk assessment of user stories
d. Testers guarantee the release of high-quality software through early test design during the release planning

Question 2

Which TWO of the following options are the exit criteria for testing a system?

a. Test environment readiness
b. The ability to log in to the test object by the tester
c. Estimated defect density is reached
d. Requirements are translated into given/when/then format
e. Regression tests are automated

Select TWO options.

Question 3

Your team uses the three-point estimation technique to estimate the test effort for a new high-risk feature. The following estimates were made:

- Most optimistic estimation: 2 person-hours
- Most likely estimation: 11 person-hours
- Most pessimistic estimation: 14 person-hours

What is the final estimate?

a. 9 person-hours
b. 14 person-hours
c. 11 person-hours
d. 10 person-hours

Question 4

A product risk analysis meeting is held during the project planning period. Which of the following determines the level of risk?

a. Difficulty of fixing related problems in the code
b. The harm that might result to the user
c. The price for which software is sold
d. The technical staff in the meeting

Question 5

Which of the following factors is an influence on the test effort?

a. Geographical separation of testers and programmers
b. The departure of the test manager during the project
c. The quality of information used to develop tests
d. Unexpected long-term illness of a member of the project team

Question 6

You are testing a mobile application that allows users to find a nearby restaurant based on the type of food they want to eat. Consider the following list of test cases, priorities (i.e., a smaller number means a higher priority), and dependencies:

Test case number	Test condition covered	Priority	Logical dependency
TC 001	Select type of food	3	none
TC 002	Select restaurant	2	TC 001
TC 003	Get direction	1	TC 002
TC 004	Call restaurant	2	TC 002
TC 005	Make reservation	3	TC 002

Which of the following test cases should be executed as the third one?

a. TC 003
b. TC 005
c. TC 002
d. TC 001

Question 7

During test execution, the test manager described the following situation to the project team: '90% of the test cases have been run. 20% of the test cases have identified defects. 127 defects have been found. 112 defects have been fixed and have passed confirmation testing. Of the remaining 15 defects, project management has decided they do not need to be fixed prior to the release.' Which of the following is the most reasonable interpretation of this test status report?

a. The remaining 15 defects should be confirmation tested prior to release
b. The remaining 10% of test cases should be run prior to release
c. The system is now ready for release with no further testing or development effort
d. The programmers should focus their attention on fixing the remaining known defects prior to release

Question 8

According to the ISTQB® Glossary, what is a test level?

a. A group of test activities that are organized together
b. One or more test design specification documents
c. A test type
d. An ISTQB® certification

Question 9

Which of the following metrics would be most useful to monitor during test execution?

a. Percentage of test cases written
b. Number of test environments remaining to be configured
c. Number of defects found and fixed
d. Percentage of requirements for which a test has been written

Question 10

During an early period of test execution, a defect is located, resolved and confirmed as resolved by re-testing, but is seen later again during subsequent test execution. Which of the following is a testing-related aspect of configuration management that is most likely broken now?

a. Traceability
b. Confirmation testing
c. Configuration control
d. Test documentation management

Question 11

You are working as a tester on a project to develop a point-of-sales system for grocery stores and other similar retail outlets. Which of the following is a product risk for such a project?

a. The arrival of a more-reliable competing product on the market
b. Delivery of an incomplete test release to the first cycle of system test
c. An excessively high number of defect fixes fail during re-testing
d. Failure to accept allowed credit cards

Question 12

You and the project stakeholders develop a list of product risks and project risks during the planning stage of a project. What else should you do with those lists of risks during test planning?

a. Determine the extent of testing required for the product risks and the mitigation and contingency actions required for the project risks
b. Obtain the resources needed to completely cover each product risk with tests and transfer responsibility for the project risks to the project manager
c. Execute sufficient tests for the product risks, based on the likelihood and impact of each product risk and execute mitigation actions for all project risks
d. No further risk management action is required at the test planning stage

Question 13

A product risk analysis is performed during the planning stage of the test process. During the execution stage of the test process, the test manager directs the testers to classify each defect report by the known product risk it relates to (or to 'other'). Once a week, the test manager runs a report that shows the percentage of defects related to each known product risk and to unknown risks. What is one possible use of such a report?

a. To identify new risks to system quality
b. To locate defect clusters in product subsystems
c. To check risk coverage by tests
d. To measure exploratory testing

Question 14

Consider the following test categories (1-4) and agile testing quadrants (A-D):

1. Usability testing
2. Component testing
3. Functional testing
4. Reliability testing

A. Agile testing quadrant Q1: technology facing, supporting the development team
B. Agile testing quadrant Q2: business facing, supporting the development team
C. Agile testing quadrant Q3: business facing, critique the product
D. Agile testing quadrant Q4: technology facing, critique the product

How do the following test categories map onto the agile testing quadrants?

a. 1C, 2A, 3B, 4D
b. 1D, 2A, 3C, 4B
c. 1C, 2B, 3D, 4A
d. 1D, 2B, 3C, 4A

Question 15

Which of the following metrics would be MOST useful to monitor during test execution?

a. Percentage of executed test cases.
b. Percentage of work done in test environment preparation.
c. Percentage of planned test cases prepared.
d. Percentage of work done in test case preparation.

Question 16

Which TWO of the following can affect and be part of test planning?

a. Budget limitations.
b. Test objectives.
c. Test log.
d. Failure rate.
e. Use cases.

Question 17

Which of the following are typical exit criteria from testing?

a. Reliability measures, degree of tester's independence, and product completeness.
b. Reliability measures, test cost, availability of testable code, time to market, and product completeness.
c. Reliability measures, test cost, schedule and unresolved defects.
d. Time to market, residual defects, tester qualification, degree of tester independence and test cost.

Question 18

Which one of the following is NOT included in a test progress report?

a. Defining pass/fail criteria and objectives of testing.
b. Deviations from the test approach.
c. Measurements of actual progress against exit criteria.
d. Evaluation of the quality of the test item.

Question 19

Which one of the following is the characteristic of a metrics-based approach for test estimation?

a. Budget which was used by a previous similar test project.
b. Overall experience collected in interviews with test managers.
c. Overall estimate agreed with the developers.
d. Average of calculations collected from business experts.

Question 20

During a risk analysis the following risk was identified and assessed:

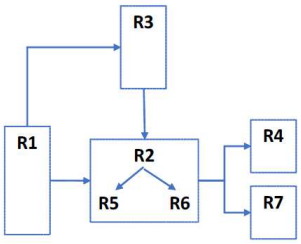
- Risk: Response time is too long to generate a report
- Risk likelihood: medium; risk impact: high
- Response to risk:
    - an independent test team performs performance testing during system testing
    - a selected sample of end users performs alpha and beta acceptance testing before the release

What measure is proposed to be taken in response to this analyzed risk?

a. Risk acceptance
b. Contingency plan
c. Risk mitigation
d. Risk transfer

Question 21

The following diagram shows the logical dependencies between a set of seven requirements, where a dependency is shown by an arrow. For example, "R1 -> R3" means that R3 depends on R1.



Which one of the following options structures the test execution schedule according to the requirement dependencies?

a. R1 → R3 → R1 → R2 → R5 → R6 → R4 → R7.
b. R1 → R3 → R2 → R5 → R2 → R6 → R4 → R7.
c. R1 → R3 → R2 → R5 → R6 → R4 → R7.
d. R1 → R2 → R5 → R6 → R3 → R4 → R7.

Question 22

You are testing a new version of software for a coffee machine. The machine can prepare different types of coffee based on four categories. i.e., coffee size, sugar, milk, and syrup.

The criteria are as follows:

- Coffee size (small, medium, large),
- Sugar (none, 1 unit, 2 units, 3 units, 4 units),
- Milk (yes or no),
- Coffee flavor syrup (no syrup, caramel, hazelnut, vanilla).

Now you are writing a defect report with the following information:
Title: Low coffee temperature.
Short summary: When you select coffee with milk, the time for preparing coffee is too long and the temperature of the beverage is too low (less than 40 oC)
Expected result: The temperature of coffee should be standard (about 75 oC).
Degree of risk: Medium
Priority: Normal

What valuable information is MOST likely to be omitted in the above defect report?
Select one option.

a. The actual test result.
b. Data identifying the tested coffee machine.
c. Status of the defect.
d. Ideas for improving the test case.

Question 23

Which tool can be used by an agile team to show the amount of work that has been completed and the amount of total work remaining for a given iteration?

a. Acceptance criteria
b. Defect report
c. Test completion report
d. Burndown chart

Question 24

You need to update one of the automated test scripts to be in line with a new requirement. Which process indicates that you create a new version of the test script in the test repository?

a. Traceability management
b. Maintenance testing
c. Configuration management
d. Requirements engineering

Question 25

Given the following examples of entry and exit criteria:

1. The original testing budget of $30,000 plus contingency of $7,000 has been spent
2. 96% of planned tests for the drawing package have been executed and the remaining tests are now out of scope
3. The trading performance test environment has been designed, set-up and verified
4. There are now no outstanding critical defects and two high-priority defects
5. The autopilot design specifications have been reviewed and reworked
6. The tax rate calculation component has passed unit testing

Which of the following BEST categorizes them as entry and exit criteria:

a. A. Entry criteria - 5, 6 Exit criteria - 1, 2, 3, 4
b. B. Entry criteria - 2, 3, 6 Exit criteria - 1, 4, 5
c. C. Entry criteria - 1, 3 Exit criteria - 2, 4, 5, 6
d. D. Entry criteria - 3, 5, 6 Exit criteria - 1, 2, 4

Question 26

Given the following priorities and dependencies for these test cases:

Test Case	Priority	Technical dependency on:	Logical dependency on:
TC1	High	TC4	
TC2	Low		
TC3	High		TC4
TC4	Medium		
TC5	Low		TC2
TC6	Medium	TC5	

Which of the following test execution schedules BEST takes into account the priorities and technical and logical dependencies?

a. TC1 - TC3 - TC4 - TC6 - TC2 - TC5
b. TC4 - TC3 - TC1 - TC2 - TC5 - TC6
c. TC4 - TC1 - TC3 - TC5 - TC6 - TC2
d. TC4 - TC2 - TC5 - TC1 - TC3 - TC6

Question 27

Which of the following statements about test estimation approaches is CORRECT?

a. With the metrics-based approach, the estimate is based on test measures from the project and so this estimate is only available after the testing starts
b. With the expert-based approach, a group of expert users identified by the client recommends the necessary testing budget
c. With the expert-based approach, the test leads responsible for the different testing activities predict the expected testing effort
d. With the metrics-based approach, an average of the testing costs recorded from several past projects is used as the testing budget

Question 28

Which of the following BEST defines risk level?

a. Risk level is calculated by adding together the probabilities of all problem situations and the financial harm that results from them
b. Risk level is estimated by multiplying the likelihood of a threat to the system by the chance that threat will occur and lose money
c. Risk level is determined by a combination of the probability of an undesirable event and the expected impact of that event
d. Risk level is the sum of all potential hazards to a system multiplied by the sum of all potential losses from that system

Question 29

Which of the following is MOST likely to be an example of a PRODUCT risk?

a. The expected security features may not be supported by the system architecture
b. The developers may not have time to fix all the defects found by the test team
c. The test cases may not provide full coverage of the specified requirements
d. The performance test environment may not be ready before the system is due for delivery

Question 30

Which of the following is LEAST likely to be an example of product risk analysis CORRECTLY influencing the testing?

a. The potential impact of security flaws has been identified as being particularly high, so security testing has been prioritized ahead of some other testing activities
b. Testing has found the quality of the network module to be higher than expected, so additional testing will now be performed in that area
c. The users had problems with the user interface of the previous system, so additional usability testing is planned for the replacement system
d. The time needed to load web pages is crucial to the success of the new website, so an expert in performance testing has been employed for this project

Question 31

You are performing system testing of a train booking system and have found that occasionally the system reports that there are no available trains when you believe that there should be, based on the test cases you have run. You have provided the development manager with a summary of the defect and the version of the system you are testing. The developers recognize the urgency of the defect and are now waiting for you to provide more details so that they can fix it.

Given the following pieces of information:

1. Degree of impact (severity) of the defect
2. Identification of the test item
3. Details of the test environment
4. Urgency/priority to fix
5. Actual results
6. Reference to test case specification

Apart from the description of the defect, which includes a database dump and screenshots, which of the pieces of information would be MOST useful to include in the initial defect report?

a. 1, 2, 6
b. 1, 4, 5, 6
c. 2, 3, 4, 5
d. 3, 5, 6

Question 32

You received the following defect report from the developers stating that the anomaly described in this test report is not reproducible.

> *Application hangs up*
>
> *2022-May-03 - John Doe - Rejected*
>
> *The application hangs up after entering "Test input: $ä" in the Name field on the new user creation screen. Tried to log off, log in with test_admin01 account, same issue. Tried with other test admin accounts, same issue. No error message received; log (see attached) contains fatal error notification. Based on the test case TC-1305, the application should accept the provided input and create the user. Please fix with high priority, this feature is related to REQ-0012, which is a critical new business requirement.*

What critical information is MISSING from this test report that would have been useful for the developers?

a. Expected result and actual result
b. References and defect status
c. Test environment and test item

d. Priority and severity

Test estimation techniques – Estimation based on ratios – exercise

- A standard calculated ratio is calculated from past similar projects
- Development-to-test-effort was 5:3
- Current estimated development effort is 1000 person-days
- How much is the test effort?

Test estimation techniques - Extrapolation - Exercise - Solution

A project has started 3 sprints ago; each sprint taking 2 weeks

The velocity (delivery capacity) in story points of the team has been the below, divided into development and test:

	Sprint 1	Sprint 2	Sprint 3	Sprint 4?
Dev	13	18	17	16
Test	3	6	6	5

1. Based on this, calculate the dev AND test velocity for the next sprint using extrapolation

2. Let's say the high-level estimate is that in these 3 sprints about 10% of the application is done, how long do you estimate the entire project to take?

	Sprint 1	Sprint 2	Sprint 3	Sprint N
Dev	13	18	17	16
Test	3	6	6	5

Test estimation techniques - three-point estimation - exercise

Three estimates are made by experts

The most optimistic estimation (a) is 12 person-days

The most likely estimation (m) is 14 person-days

The most pessimistic estimation (b) is 18 person-days

The estimate (E) is calculated as 'E = (a+(4*m)+b) / 6

The most likely estimate is weighed 4 times and the others only once.

1. Please calculate the estimate E:
2. Please calculate the measurement error (SD) using the formula SD = (b-a) / 6

The estimate E is (12+(4*14)+18) / 6 = 88 / 6 = 14.67

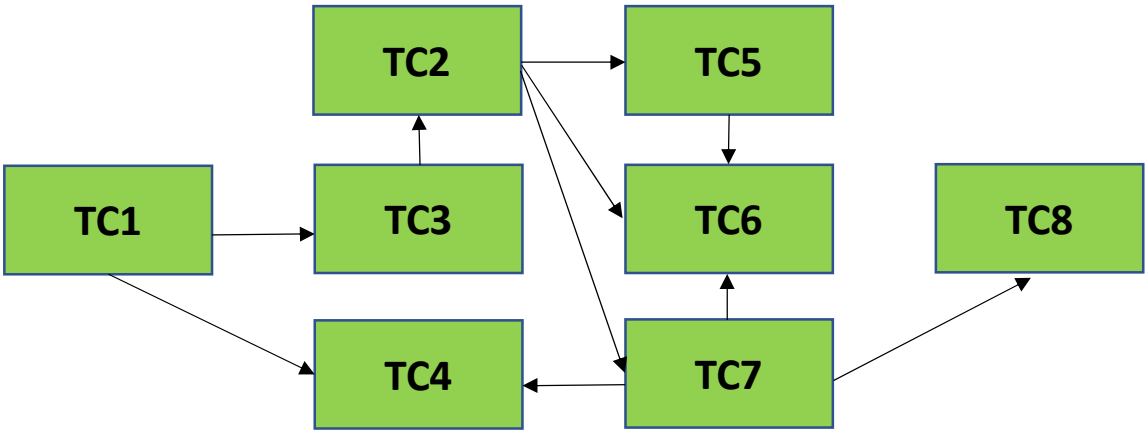
The standard deviation or measurement error (SD) is calculated as SD = (b-a) / 6

SD = (18-12) / 6 = 1

Meaning the final estimate in person days is between (14.67-1=) 13.67 and (14.67+1=) 15.67

Test execution Schedule – Exercise A

Scenario; there are 8 test cases, TC1 has the highest priority, TC8 the lowest, with their dependencies (logical or technical). An arrow from TC1 to TC4 means that TC4 is dependent on TC1



1. Please create the test execution schedule according to the requirement dependencies
2. Please give me one impossible sequence based on the dependencies and explain.

Test execution Schedule - Exercise B

Scenario; there are 6 test cases with various priorities and some dependencies (logical or technical)

Test Case	Priority	Technical dependency on	Logical dependency on
1	High	3	2
2	Medium	4	
3	Low	2	
4	High		
5	Low	1	4
6	Medium	5	5

1. If there were no dependencies, which would be the best order?
2. Please create the test execution schedule according to the priority and requirement dependencies

Defect Report – Exercise A

Scenario; Let's say you have tested a web-application called 'WEBAPPPROTEST' in UAT for a customer called 'KLJUC'. You are executing testcase 81754 (creating an asset) and upon saving the system freezes and closes in 20 seconds. When restarting the application, you end up in a frozen screen and cannot continue. Let's report this in a defect report and fill in as much data as you can and divide the information in the chapters of an incident report.

Chapter 6 – Tool Support for Testing

Question 1

Which tools help to support static testing?

a. Static analysis tools and test execution tools
b. Review tools, static analysis tools and coverage measurement tools
c. Dynamic analysis tools and modelling tools
d. Review tools, static analysis tools and modelling tools

Question 2

What are the potential benefits of using tools in general to support testing?

a. Greater quality of code, reduced number of testers needed, better objectives for testing
b. Greater repeatability of test, reduced repetitive work, objective assessment
c. Greater responsiveness of users, reduction of tests run, objectives not necessary
d. Greater quality of code, reduction in paperwork, fewer objectives to test

Question 3

What is a potential risk in using tools to support testing?

a. Unrealistic expectations, expecting the tool to do too much
b. Insufficient reliance on the tool, i.e. still doing manual testing when a test execution tool has been purchased
c. The tool may find defects that aren't there
d. The tool will repeat exactly the same thing it did the previous time

Question 4

Which test activity does a data preparation tool support?

a. Test monitoring and control
b. Test analysis and design
c. Test implementation and execution
d. Test completion

Question 5

Which of the following are advanced scripting techniques for test execution tools?

a. Data-driven and keyword-driven
b. Data-driven and capture driven
c. Capture-driven and keyhole driven
d. Playback-driven and keyword-driven

Question 6

Which item correctly identifies a potential risk of performing test automation?

a. It may introduce unknown regressions in production
b. Sufficient efforts to maintain testware may not be properly allocated
c. Testing tools and associated testware may not be sufficiently relied upon
d. It may reduce the time allocated for manual testing

Question 7

Which one of the following is MOST likely to be a benefit of test execution tools?

a. It is easy to create regression tests.
b. It is easy to maintain version control of test assets.
c. It is easy to design tests for security testing.
d. It is easy to run regression tests.

Question 8

Which test activities are supported by test harness or unit test framework tools?

a. Test management and control
b. Test specification and design
c. Test execution and logging
d. Performance and monitoring

Question 9

Which test tool is characterized by the classification below?

1. Tool support for management of testing and testware.
2. Tool support for static testing.
3. Tool support for test execution and logging.
4. Tool support for performance measurement and dynamic analysis.

A. Coverage tools.
B. Configuration management tools.
C. Review tools.
D. Monitoring tools.

a. 1A, 2B, 3D, 4C.
b. 1B, 2C, 3D, 4A.
c. 1A, 2C, 3D, 4B.
d. 1B, 2C, 3A, 4D.

Question 10

Given the following test activities and test tools:

1. Performance measurement and dynamic analysis
2. Test execution and logging
3. Management of testing and testware
4. Test design

a. Requirements coverage tools
b. Dynamic analysis tools
c. Test data preparation tools
d. Defect management tools

Which of the following BEST matches the activities and tools?

a. 1 – b, 2 – c, 3 – d, 4 – a
b. 1 – b, 2 – a, 3 – c, 4 – d
c. 1 – b, 2 – a, 3 – d, 4 – c
d. 1 – a, 2 – b, 3 – d, 4 – c

Question 11

Which of the following is MOST likely to be used as a reason for using a pilot project to introduce a tool into an organization?

a. The need to evaluate how the tool fits with existing processes and practices, and determining what would need to change
b. The need to evaluate the test automation skills and training, mentoring and coaching needs of the testers who will use the tool
c. The need to evaluate whether the tool provides the required functionality and does not duplicate existing test tools
d. The need to evaluate the tool vendor in terms of the training and other support they provide

Answers & Solutions

Chapter 1 – Fundamentals of Testing

Question	Answer	Question	Answer	Question	Answer	Question	Answer
1	A	11	B	21	A	31	B
2	C	12	A	22	B	32	B
3	B	13	D	23	A	33	A, E
4	A	14	B	24	C	34	B
5	A	15	B	25	C	35	D
6	C	16	B	26	D	36	
7	D	17	A	27	A	37	
8	C	18	C	28	B	38	
9	A	19	B	29	A	39	
10	B	20	D	30	A	40	

Root cause - Exercise A - Solution

Situation: Incorrect bonus amounts are calculated in HR software and customers of the software have started to complain. Several failures have been reported to this development team where calculations were not done as they should be done. The code was written on requirements that were unclear as the Product Owner did not understand the calculation for bonuses.

1. What is the effect?
2. What is the root cause?
3. What is the solution?

Solution

1. The effect of a defect is the last result from a defect, so **the customer complaining**.

- **Why** is the customer complaining? Because the bonus calculation is wrong.
- **Why** is the calculation wrong? Because the code is incorrect.
- **Why** is the code incorrect? Because the user story was not clear.
- **Why** was the user story not clear? Because the Product Owner misunderstood the requirements.
- **Why** did the Product Owner misunderstand the requirements? Because he has not enough knowledge on how bonus calculations need to be done – **Root Cause**

2. Root cause ifs that the Product Owner does not have enough knowledge on how bonus calculations need to be done
3. A solution could be to send the Product Owner on some training on how these kinds of calculations are done

Chapter 2 – Testing throughout the Software Development Lifecycle

Question	Answer	Question	Answer	Question	Answer
1	D	11	A	21	C
2	B	12	B	22	A
3	D	13	D	23	B
4	B	14	A	24	
5	C	15	C	25	
6	C	16	B	26	
7	C	17	A	27	
8	B	18	D	28	
9	C	19	C	29	
10	A	20	D	30	

Chapter 3 – Static Testing

Question	Answer	Question	Answer	Question	Answer
1	D	11	D	21	D
2	D	12	A	22	
3	A	13	D	23	
4	C	14	D	24	
5	D	15	A	25	
6	C	16	B	26	
7	D	17	B	27	
8	C	18	A	28	
9	C	19	D	29	
10	A, C	20	B	30	

Applying Review Techniques – Exercise A - Solution

Scenario: a developer in a small, start-up software firm has a good idea on a new web-based software product and has started building it. He would like some people to have a look at the first version before he continues.

1. As there is no documentation, which review technique would you advise to be used?
2. What would you advise this company to do better next time?

Solution

1. Only the ad-hoc technique can be used as there is:

- No documentation
- No analysis on expected usage of the system
- No defined user roles, stakeholders, etc

2. Advise to use proper analysis, Product management etc to get documentation and actually a valid basis for the development of new products

Applying Review Techniques – Exercise B - Solution

Scenario: below business requirement document needs to be reviewed.

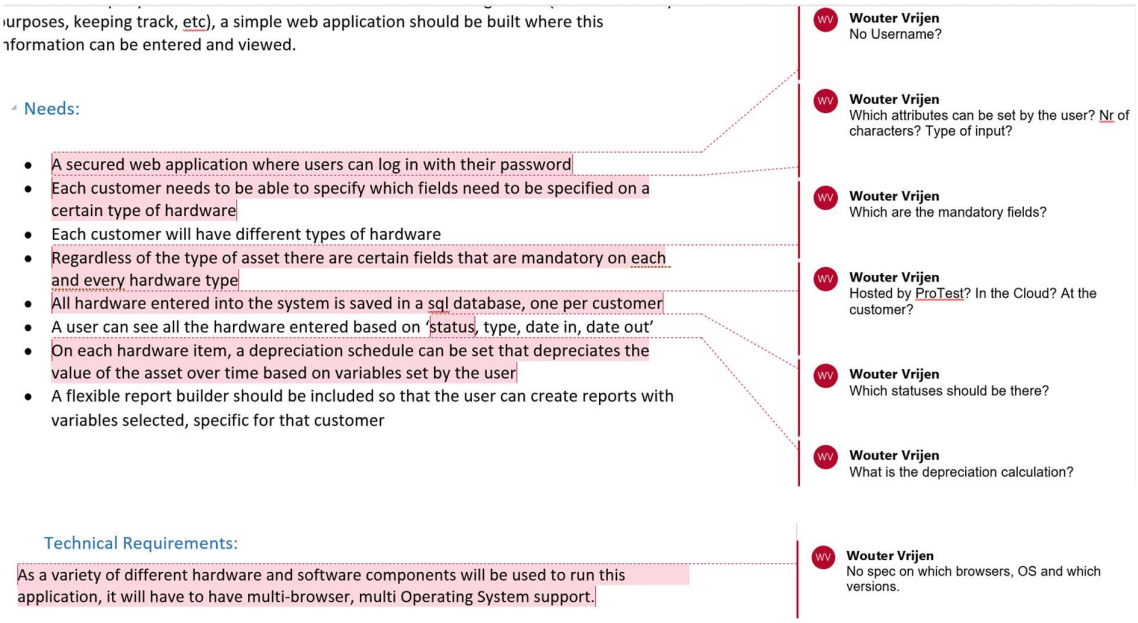
1. Based on the business requirement document, which review techniques are best suitable?
2. Review the document and find as many defects as you can.
3. Come up with suggested fixes for the found defects

Solution

1. There is documentation and there is a checklist so:

- Checklist based approach
- Role based approach

2. See below:



Chapter 4 – Test Analysis and Design

Question	Answer	Question	Answer	Question	Answer	Questions	Answers
1	D	11	C	21	D	31	C
2	A	12	B	22	C	32	D
3	C	13	A	23	D	33	B
4	B	14	D	24	B	34	D
5	B	15	D	25	B	35	C
6	C	16	B	26	A	36	A
7	A	17	B	27	D	37	D
8	B	18	A,D	28	B	38	D
9	C	19	C	29	C	39	A
10	C	20	D	30	B	40	D

Question	Answer	Question	Answer	Question	Answer	Questions	Answers
41	A						
42	C						
43	B						
44	A						
45							
46							
47							
48							
49							
50							

Equivalence Partitioning - Exercise A - Solution

Scenario: when setting a password, it can be between min 6 and max 10 characters

1. Please draw up the equivalent partitions and indicate whether they are valid or invalid
2. How many test cases do you need for 100 EP coverage?
3. Please give me the input values and responses of each EP test case.

Solution

1. See the below:

Invalid	Valid	Invalid
0-5	6-10	11 >

2. 3 in order to cover each partition once
3. For example 2, 7 and 13

Boundary Value Analysis - Exercise A - Solution

Scenario: in the below equivalence partitions:

Invalid	Valid	Invalid
0-5	6-10	11 >

1. Please give me the values that need to be tested for a standard (2-value) BVA.
2. And for full (3-value) BVA.
3. So how many test cases would you need for full EP and BVA coverage?

Solution

1. 5, 6, 10, 11
2. 5,6,7,9,10,11
3. 9

Decision table testing - Exercise A, B - Solution

Scenario: bonus percentage depends on permanent contract, performance being excellent

- If permanent and excellent performance, 100 %
- If permanent and not excellent performance, 50 %
- If not permanent and excellent performance, 75%
- If not permanent and not excellent performance, 25 %

1. Please draw the Decision Table and give the different test cases needed including the output (action).
2. If we would add one more condition, like if the employee is above 50 years of age there is an extra 10% bonus, how many extra test cases would be needed?
3. Based on the below new condition, draw up the decision table with all conditions and actions

Solution

1. See below

Conditions	Rule 1		Rule 2	Rule 3	Rule 4
Permanent?	T		T	F	F
Excellent?	T		F	T	F
Actions					
Bonus	100 %		50 %	75 %	25 %

2. 4 more extra test cases would be needed, as 2 conditions with True-False answers equal 4 rules (combinations) and 3 conditions with True-False answers equal 8 rules (combinations)
3. See below

Conditions	Rule 1	Rule 2	Rule 3	Rule 4	Rule 5	Rule 6	Rule 7	Rule 8
Permanent?	T	T	F	F	T	T	F	F
Excellent?	T	F	T	F	T	F	T	F
> 50 years old?	F	F	F	F	T	T	T	T
Actions								
Bonus	100 %	50 %	75 %	25 %	110 %	60 %	85 %	35 %

State transition testing – Exercise A - E - Solution

Scenario: let's take a simplified ATM process:

- Insert the card, wait for the PIN screen to come up, enter PIN, if correct, you have access to the account, if incorrect, try again, if incorrect after the 3rd try, the ATM eats the card

A. Please draw the State Transition Diagram with the states and the transitions.

B. On the same scenario, draw a State Transition table:

- States as rows
- Actions (events) as columns

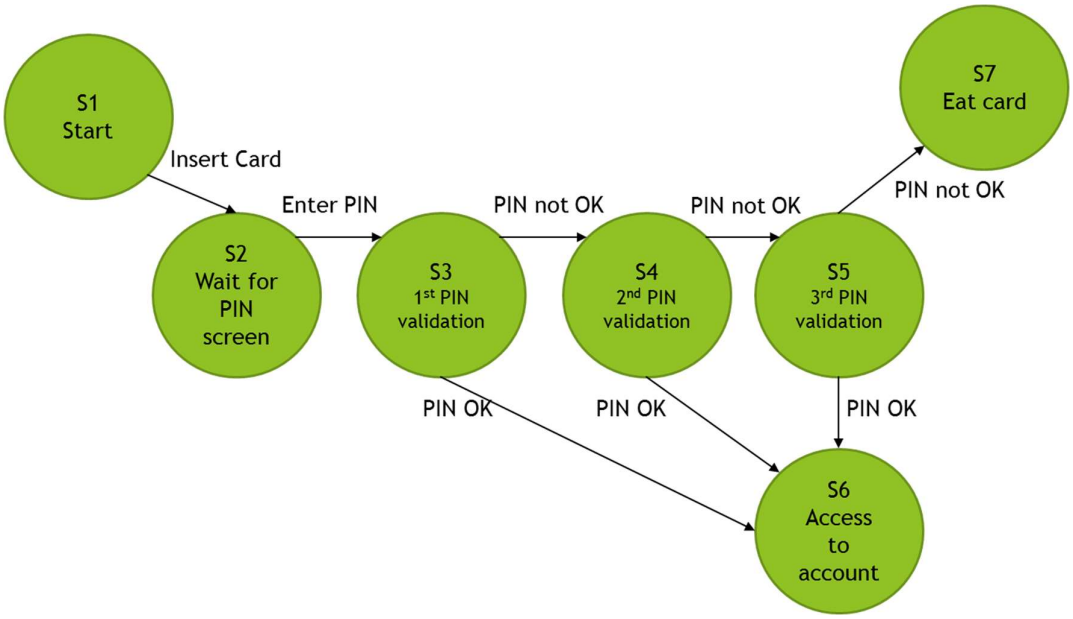
C. How many test cases do you need to test all states and please specify the test cases.

D. How many test cases do you need to test all transitions and please specify the test cases.

E. Please give two examples of invalid transitions.

Solution

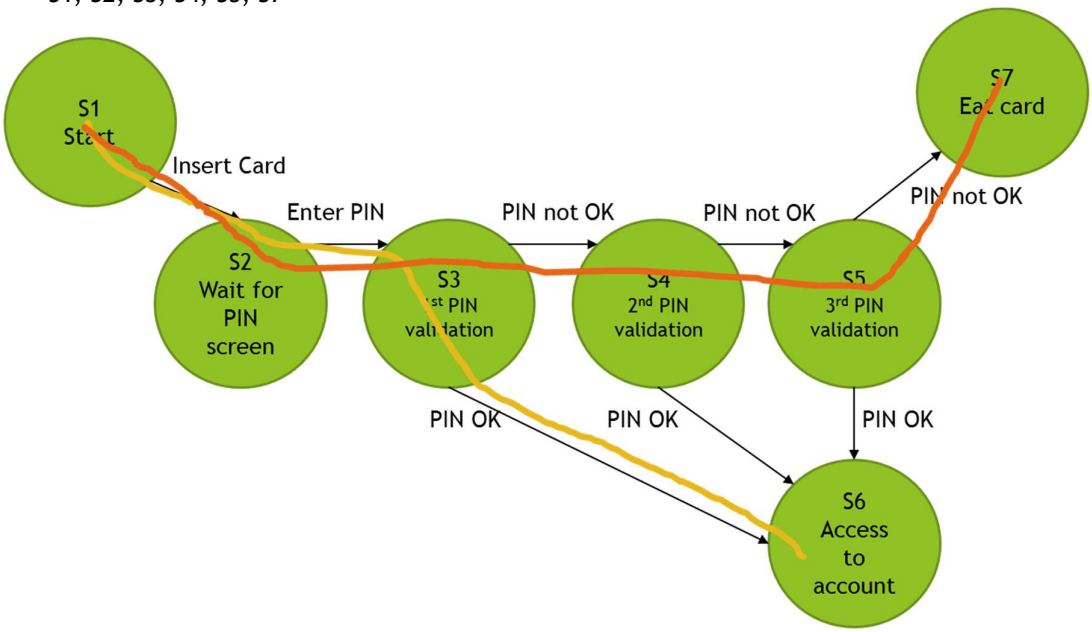
A. See below:



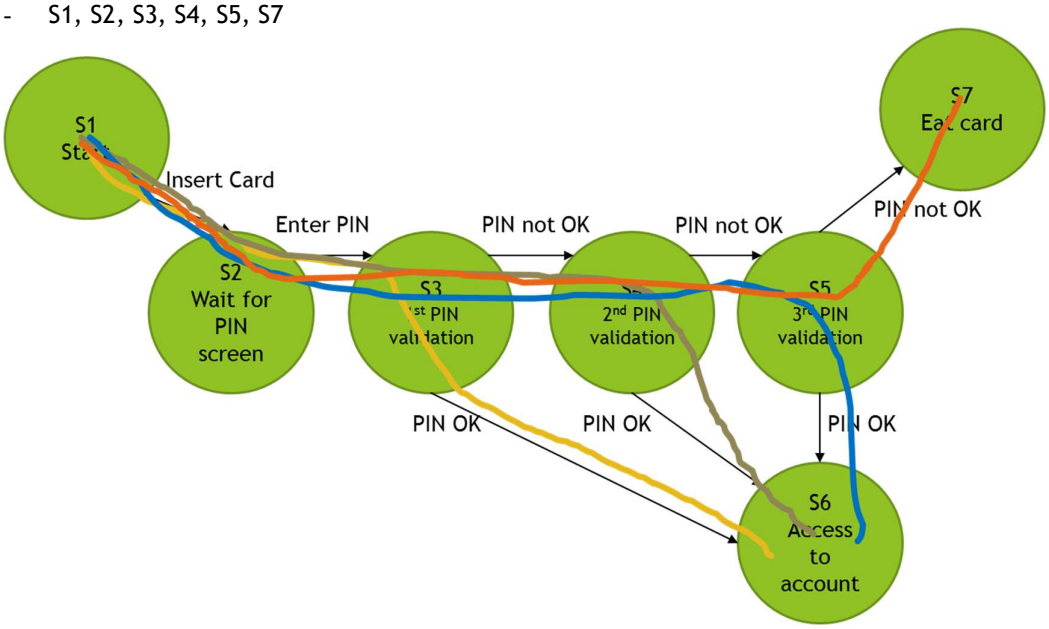
B. See below:

State or event	Insert card	Enter PIN	PIN not OK	Pin OK
S1 Start	S2	-	-	-
S2 Wait for PIN screen	-	S3	-	-
S3 PIN 1st validation	-	-	S4	S6
S4 PIN 2nd validation	-	-	S5	S6
S5 PIN 3rd validation	-	-	S7	S6
S6 Account access	-	-	-	-
S7 Eat card	-	-	-	-

C. Two test cases are needed to cover all the states:
- S1, S2, S3, S6
- S1, S2, S3, S4, S5, S7



D. 4 test cases are needed to cover all the transitions:
- S1, S2, S3, S6
- S1, S2, S3, S4, S6
- S1, S2, S3, S4, S5, S6
- S1, S2, S3, S4, S5, S7



E. For example:
- Insert card from a Pin 1st validation state
- Enter PIN from Account Access state

Statement testing & coverage - Exercise A - Solution

Consider the below pseudo-code

Code:

READ A

READ B

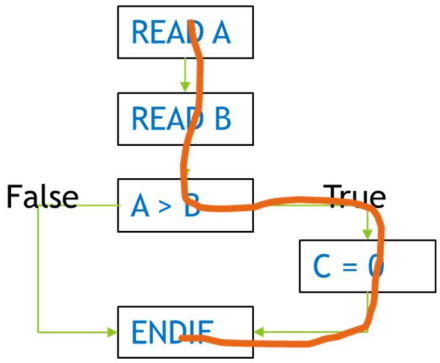
IF A > B THEN C = 0

ENDIF

1. How many testcases are needed to achieve 100 % statement coverage and please provide example values for A & B.

Solution

1. 1 test case is needed with for example values of A=12 and B=10



Statement testing & coverage - Exercise B - Solution

Consider the below pseudo-code:

```
READ A
READ B
C = A + 2 x B
IF C > 50 THEN
        PRINT 'Large C'
ENDIF
```

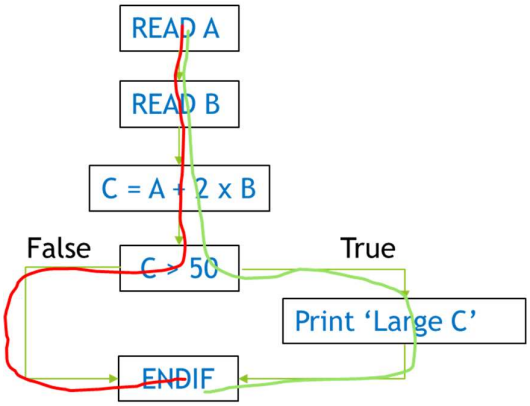
1. What's the statement coverage with the below tests?

- 1. A = 2, B = 3
- 2. A = 0, B = 25
- 3. A = 47, B = 1

2. How many tests are needed (with A & B values) to get 100 % statement coverage?

Solution

1. The statement coverage is 5/6, which is 83.33 %. All combinations use only 5 of the 6 statements, not 'Print 'Large C'
2. 1 test is enough, A and B values should be chosen so that the IF statement is true, for example A=20 and B=25



Decision / Branch testing & coverage - Exercise A - Solution

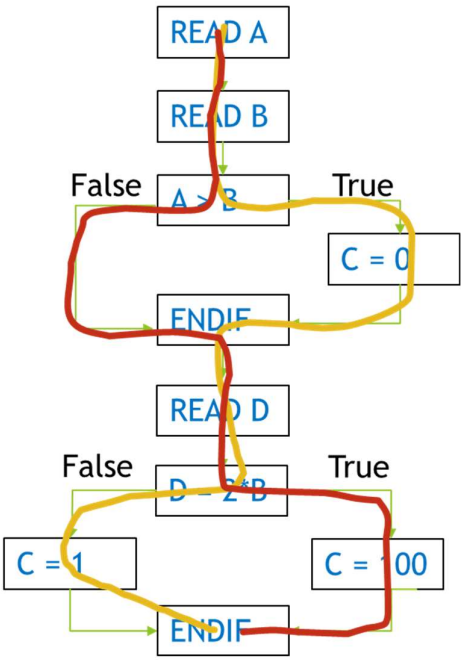
Consider the below pseudo-code:

```
READ A
READ B
IF A > B THEN C = 0
ENDIF
READ D
IF D = 2*B THEN C = 100
ELSE C = 1
ENDIF
```

1. What is the decision / branch coverage with A = 12, B = 10, D = 5?
2. How many testcases are needed to achieve 100 % decision / branch coverage?

Solution

1. 50 % as 2 of the 4 possible decision outcomes / branches have been covered (yellow line)
2. 2 test cases in total are needed, the test case under 1 and for example A=9, B=9, D=20 (red line)



Chapter 5 – Test Management

Question	Answer	Question	Answer	Question	Answer
1	C	12	A	23	D
2	C, E	13	A	24	C
3	D	14	A	25	D
4	B	15	A	26	B
5	C	16	A,B	27	C
6	A	17	C	28	C
7	B	18	A	29	A
8	A	19	A	30	B
9	C	20	C	31	D
10	C	21	C	32	C
11	D	22	B		

Test estimation techniques - Estimation based on ratios - Exercise - Solution

- A standard calculated ratio is calculated from past similar projects
- Development-to-test-effort was 5:3
- Current estimated development effort is 1000 person-days
- How much is the test effort?
    - 1000 / 5 = 200
    - 200 * 3 = 600
    - The test effort is estimated to be 600 person-days

Test estimation techniques - Extrapolation - Exercise - Solution

A project has started 3 sprints ago; each sprint taking 2 weeks

The velocity (delivery capacity) in story points of the team has been the below, divided into development and test:

	Sprint 1	Sprint 2	Sprint 3	Sprint 4?
Dev	13	18	17	16
Test	3	6	6	5

3. Based on this, calculate the dev AND test velocity for the next sprint using extrapolation

   Dev: (13+18+17)/3 = 16 story points

   Test: (3+6+6)/3 = 5 story points

4. Let's say the high-level estimate is that in these 3 sprints about 10% of the application is done, how long do you estimate the entire project to take?

	Sprint 1	Sprint 2	Sprint 3	Sprint N
Dev	13	18	17	16
Test	3	6	6	5

10% of the application has taken 63 story points

100% of the application is estimated on 630 story points

90% is still to be done, estimated to take ((630 / 100) * 90%) = 567 story point

567 story points is estimated to take (567 / 21 story points per sprint) = 27 sprints, so 54 weeks

Test estimation techniques - three-point estimation - Exercise - Solution

Three estimates are made by experts

The most optimistic estimation (a) is 12 person-days

The most likely estimation (m) is 14 person-days

The most pessimistic estimation (b) is 18 person-days

The estimate (E) is calculated as 'E = (a+(4*m)+b) / 6

The most likely estimate is weighed 4 times and the others only once.

1. Please calculate the estimate E
2. Please calculate the measurement error (SD) using the formula SD = (b-a) / 6

Solutions:

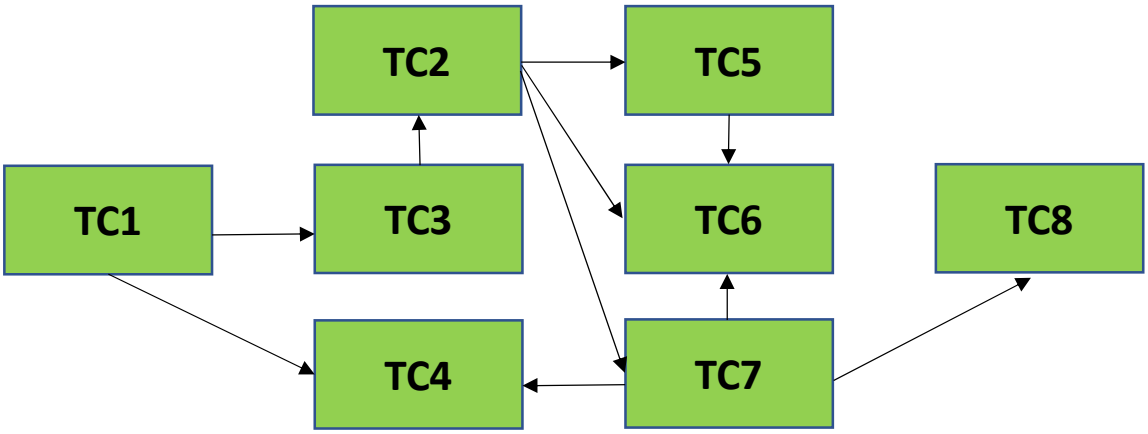
1. The estimate E is (12+(4*14)+18) / 6 = 88 / 6 = 14.67
2. The standard deviation or measurement error (SD) is calculated as SD = (b-a) / 6

   SD = (18-12) / 6 = 1

   Meaning the final estimate in person days is between (14.67-1=) 13.67 and (14.67+1=) 15.67

Test execution Schedule – Exercise A - Solution

Scenario; there are 8 test cases, TC1 has the highest priority, TC8 the lowest, with their dependencies (logical or technical). An arrow from TC1 to TC4 means that TC4 is dependent on TC1



1. Please create the test execution schedule according to the requirement dependencies
2. Please give me one impossible sequence based on the dependencies and explain.

Solution

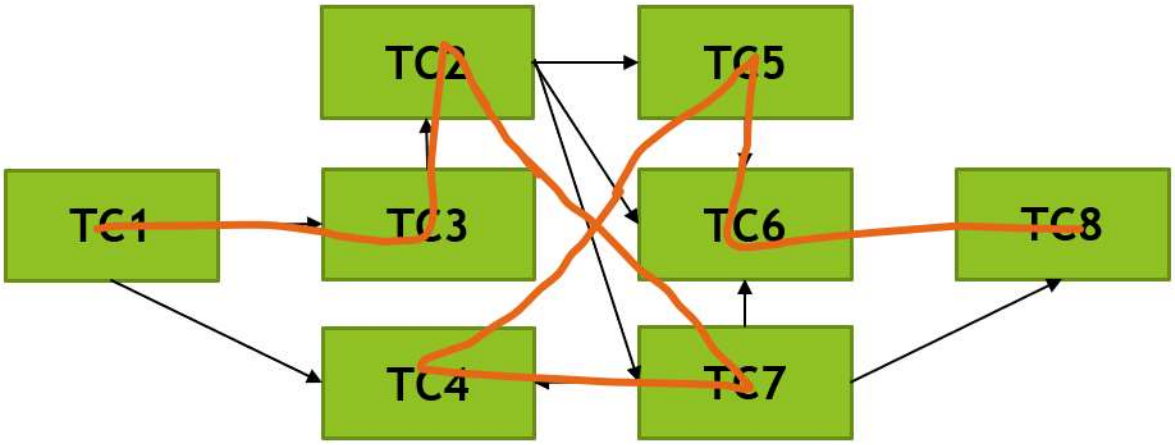
TC1 has the highest priority and several TC's depend on it so TC1 should be first

TC2 has the highest priority after TC1, but depends on TC3, so first TC3, then TC2

TC4 has the highest priority after TC3, but is dependent on TC7, which can be executed now, so TC7, then TC4

TC6 is dependent on TC5, so TC5, then TC6, then TC8

1. The test execution schedule is TC1, TC3, TC2, TC7, TC4, TC5, TC6, TC8
2. Impossible would be to start with anything except TC1 for example



Test execution Schedule – Exercise B - Solution

Scenario; there are 6 test cases with various priorities and some dependencies (logical or technical)

Test Case	Priority	Technical dependency on	Logical dependency on
1	High	3	2
2	Medium	4	
3	Low	2	
4	High		
5	Low	1	4
6	Medium	5	5

1. If there were no dependencies, which would be the best order?
2. Please create the test execution schedule according to the priority and requirement dependencies

Solution

1. 1, 4, 2, 6, 3, 5

As 1 cannot be executed before 3 and 2 and 2 is dependent on 4, 4 is the first one to be executed, followed by the two lower priority ones to get 1 ready for execution. After that 5 needs to be executed as 6 depends on 5.

2. 4, 2, 3, 1, 5, 6

Defect Report – Exercise A - Solution

Scenario; Let's say you have tested a web-application called 'WEBAPPPROTEST' in UAT for a customer called 'KLJUC'. You are executing testcase 81754 (creating an asset) and upon saving the system freezes and closes in 20 seconds. When restarting the application, you end up in a frozen screen and cannot continue. Let's report this in a defect report and fill in as much data as you can and divide the information in the chapters of an incident report.

Solution

An example of in incident report would be the below:

Identifier
Automatically assigned by the Defect Management tool
Title and short summary of the defect
WEBAPPPROTEST freezes and closes when saving an Asset
Date of the defect report, issuing organization and author
02/JUL/2018
Identification of the test item (configuration)
UAT WEBAPPPROTEST - KLJUC
Development lifecycle phase
UAT
Description of the incident incl logs, db dumps, screenshots (reproduceable steps)
When logging into UAT WEBAPPPROTEST, customer KLJUC, I get to the Asset Overview and click 'Create new asset'. I fill in the necessary data (see screenshot attached) and hit save (same behavior on 'save and exit'. The system freezes for 20 seconds (see attached screenshot) and then closes down. When I restart the application (also after a hard laptop restart, incognito mode or clearing the cache) I get back into the frozen session and I cannot do anything in the application. When checking the database directly I see that the asset has not been saved. (see attached db dump)
Expected and actual results
Expected: Upon saving I expect the Asset to be saved and to be returned to the Asset Overview screen
Actual: Upon saving the system freezes and closes, after which I can log into the application but I keep ending up in the frozen session.
Scope or degree of impact (severity) of the defect on the stakeholder's interests
Blocking
Urgency – priority to fix
Critical
State of the defect report
New
Conclusions, recommendations and approvals
Recommendation to fix this asap as this is blocking a lot of tests (child tests of Test Case 81754)
Global issues (such as areas affected by a fix)
Areas affected by the fix can be the generic save functionality, and the specific open, create, update, delete functionality in the asset
Change history

Chapter 6 – Tool Support for Testing

Question	Answer
1	D
2	B
3	A
4	C
5	A
6	B
7	D
8	C
9	D
10	C
11	A

References

Standards

ISO/IEC/IEEE 29119-1 (2013) Software and systems engineering - Software testing - Part 1: Concepts and definitions

ISO/IEC/IEEE 29119-2 (2013) Software and systems engineering - Software testing - Part 2: Test Processes

ISO/IEC/IEEE 29119-3 (2013) Software and systems engineering - Software testing - Part 3: Test Documentation

ISO/IEC/IEEE 29119-4 (2015) Software and systems engineering - Software testing - Part 4: Test Techniques

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