# Sample Questions
# 2012 Advanced Level Syllabus
# Technical Test Analyst

Version 1.01

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International Software Testing Qualifications Board

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# Acknowledgements

This document was produced by a core team from the International Software Testing Qualifications Board Examination Working Group: Minna Aalto, Rex Black, Mette Bruhn-Pedersen, Debra Friedenberg, Brian Hambling, Inga Hansen, Kari Kakkonen, Judy McKay, Stuart Reid, and Mario Winter.

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# 0. Introduction

## 0.1 Purpose of this document

The sample questions, answer sets and associated justifications in this document have been created by a team of Subject Matter Experts and experienced question writers with the aim of assisting ISTQB® Member Boards and Exam Boards in their question writing activities.

These questions cannot be used as-is in any official examination, but they should serve as guidance for question writers. Given the wide variety of formats and subjects, these sample questions should offer many ideas for the individual Member Boards on how to create good questions and appropriate answer sets for their examinations.

## 0.2 Instructions

The question and answer sets are organized in the following way:

- Learning Objective and K-level
- Question - including any scenario followed by the question stem.
- Answer Set - correct answer(s) are indicated in **bold face**.
- Justification of the answers.
- Suggested point value for the question.

# 1. TTA Sample Questions

## CTAL-TTA _LO-1.3.1

TTA-1.3.1 (K2) Summarize the generic risk factors that the Technical Test Analyst typically needs to consider

**Question:**
Which of the following are generic risk factors that should be considered by the Technical Test Analyst? Select THREE options.

**Answer Set:**
- **A. Technology factors such as complexity and availability of tools**
- **B. Potential conflicts between stakeholders**
- **C. Large number of defects found with the reliability of the software**
- **D.** Large number of defects found with the usability of previous versions
- **E.** Availability of documentation from legacy systems to be used to verify the accuracy of computations
- **F.** Budgetary restrictions on the project
- **G.** High change rates of the business use cases

**Justification:**
- **A.** Correct answer per the syllabus.
- **B.** Correct answer per the syllabus.
- **C.** Correct answer per the syllabus.
- **D.** While this is certainly a risk factor, it should be handled by the TA rather than the TTA.
- **E.** Accuracy of the computations is a concern for the TA, not the TTA.
- **F.** Budgetary issues should be handled by the TM, not the TTA.
- **G.** High change rates in business use cases affect the functionality testing

**Point Value:** 1

## CTAL-TTA _LO-1.x.1

TTA-1.x.1 (K2) Summarize the activities of the Technical Test Analyst within a risk-based approach for planning and executing testing.

**Question:**
When participating in a risk analysis, the Technical Test Analyst is expected to work closely with which of the following sets of people?

**Answer Set:**
- **A. Developers**
- B. Users
- C. Business analysts
- D. Project sponsors

**Justification:**

- **A.** Correct answer per the syllabus. The TTA is expected to work with the technical people on the project, including developers.
- **B.** The TA would be expected to work with this group of people.
- **C.** The TA would be expected to work with this group of people.
- **D.** The TA would be expected to work with this group of people.

**Point Value:** 1

## CTAL-TTA _LO-2.2.1

TTA-2.2.1 (K2) Understand how to achieve condition coverage and why it may be less rigorous testing than decision coverage.

**Question:**
Which of the following statements about condition coverage is true?

**Answer Set:**

- **A. It requires setting each atomic condition to true and false, but does not require the resulting decision to be tested with both true and false outcomes**
- **B.** It requires setting each atomic condition to true and false, and requires the resulting decision to be tested with both true and false outcomes
- **C.** It requires evaluating the decision with both true and false outcomes, regardless of the atomic conditions
- **D.** It provides more thorough coverage than decision coverage

**Justification:**

- **A.** Correct answer per the syllabus. Condition testing cares about testing the atomic conditions, but not the result of the combination of those conditions.
- **B.** Incorrect. The resulting decision is not necessarily tested for both outcomes.
- **C.** Incorrect. The atomic conditions are evaluated, not the result.
- **D.** Incorrect. There are cases where condition coverage will miss test scenarios that would be covered by decision coverage.

**Point Value:** 1

## CTAL-TTA _LO-2.3.1

TTA-2.3.1 (K3) Write test cases by applying the Decision/Condition testing test design technique to achieve a defined level of coverage

**Question:**

You are testing a photo-enforcement system for traffic control in an intersection. A photo will be taken if the following two conditions are true: The light is red (RED) and the front wheels of the car are over the line marking the beginning of the intersection (WHEELS).

Consider these sets of values:
1. RED + WHEELS
2. RED + not WHEELS
3. not RED + WHEELS
4. not RED + not WHEELS

Assume the logic in the code is as follows:
If RED and WHEELS then
  Take the photo
Else
  Do not take the photo

Given this information, which sets of values provides the minimum tests to achieve 100% decision/condition coverage?

**Answer Set:**
- **A. 1 and 4**
- **B.** 1 and 2 or 1 and 3
- **C.** 1, 2, 3 and 4
- **D.** 2 and 3

**Justification:**
- **A.** Correct answer per the syllabus. These two sets test both the atomic values (condition) and result values (decision).
- **B.** Incorrect. Either of these would result in missing one of the tests for the different atomic values.
- **C.** Incorrect. This is not the minimum number of tests.
- **D.** Incorrect. Misses the decision outcome of true.

**Point Value:** 1

## CTAL-TTA _LO-2.4.1

TTA-2.4.1 (K3) Write test cases by applying the Modified Condition/Decision Coverage (MC/DC) testing test design technique to achieve a defined level of coverage

**Question:**
You are testing a photo-enforcement system for traffic control in an intersection. It has been determined that a photo should be taken if the signal light is red (RED) or the car is speeding (SPEED) and if the front wheels of the car are over the line marking the beginning of the intersection (WHEELS).

Consider these sets of test values:
1. RED + SPEED + WHEELS
2. RED + SPEED + not WHEELS
3. RED + not SPEED + WHEELS

4. RED + not SPEED + not WHEELS
5. not RED + SPEED + WHEELS
6. not RED + SPEED + not WHEELS
7. not RED + not SPEED + WHEELS
8. not RED + not SPEED + not WHEELS

Assume the logic in the code is as follows:
If ((RED or SPEED) and WHEELS) then
  Take the photo
Else
  Do not take the photo

Given this information, which sets of values provides the minimum tests to achieve 100% modified condition/decision coverage?

**Answer Set:**

- **A. 3, 4, 5, 7**
- **B.** 1, 3, 8
- **C.** 2, 8
- **D.** 1, 5, 7, 8

**Justification:**

**A**. Correct. This answer provides the following:
(T or F) + T
(T or F) + F
(F or T) + T
(F or F) + T
This tests all values for the atomic conditions as well as all outcomes with the minimum number of tests.
**B.** Incorrect. Covers the outcomes but not the atomic conditions that affect the decision outcome
**C**. Incorrect. Does not sufficiently cover the atomic conditions affecting the decision outcome.
**D**. Incorrect. Does not sufficiently cover the atomic conditions affecting the decision outcome.

**Point Value:** 1

## CTAL-TTA _LO-2.5.1

TTA-2.5.1 (K3) Write test cases by applying the Multiple Condition testing test design technique to achieve a defined level of coverage

**Question:**

You are testing a photo-enforcement system for traffic control in an intersection. The requirements state a photo shall be taken if the signal light is red (RED) or the car is speeding (SPEED) and if the front wheels of the car are over the line marking the beginning of the intersection (WHEELS).

Consider these sets of values:

1. RED + SPEED + WHEELS
2. RED + SPEED + not WHEELS
3. RED + not SPEED + WHEELS
4. RED + not SPEED + not WHEELS
5. not RED + SPEED + WHEELS
6. not RED + SPEED + not WHEELS
7. not RED + not SPEED + WHEELS
8. not RED + not SPEED + not WHEELS

Assume the logic in the code is as follows:
If ((RED or SPEED) and WHEELS) then
  Take the photo
Else
  Do not take the photo

Given this information, which sets of values provide the minimum tests to achieve 100% multiple condition coverage?

**Answer Set:**

- **A. All the sets are needed**
- **B.** 3, 4, 5, 7
- **C.** 1, 3, 8
- **D.** 1, 5, 7, 8

**Justification:**

**A.** Correct. Multiple condition testing requires testing the entire truth table (all combinations of true and false possible). This requires all conditions provided above to be tested.
**B, C & D**. are incorrect.

**Point Value:** 1

## CTAL-TTA _LO-2.6.1

TTA-2.6.1 (K3) Write test cases by applying the Path testing test design technique.

**Question:**

You are testing a photo-enforcement system for traffic control in an intersection. The requirements state that a photo shall be taken if the signal light is red (RED) or the car is speeding (SPEED) and if the front wheels of the car are over the line marking the beginning of the intersection (WHEELS).

Consider these sets of values:

1. RED + SPEED + WHEELS
2. RED + SPEED + not WHEELS
3. RED + not SPEED + WHEELS

4. RED + not SPEED + not WHEELS
5. not RED + SPEED + WHEELS
6. not RED + SPEED + not WHEELS
7. not RED + not SPEED + WHEELS
8. not RED + not SPEED + not WHEELS

Assume the logic in the code is as follows:
If ((RED or SPEED) and WHEELS) then
  Take the photo
Else
  Do not take the photo

Given this information, which sets of values provide the minimum tests to achieve 100% path coverage.

**Answer Set:**
- **A. 2, 3**
- **B.** 3, 4, 5, 7
- **C.** 1, 3, 8
- **D.** 1

**Justification:**
- **A.** Correct. Path coverage requires that the statement evaluates to true and to false. 2 will give you False and 3 will give you True.
- **B.** Incorrect. 3 and 5 result in the same path.
- **C.** Incorrect. 1 and 3 result in the same path.
- **D.** Incorrect. Only tests the T, not the F

**Point Value:** 2

## CTAL-TTA _LO-2.7.1

TTA-2.7.1 (K2) Understand the applicability of API testing and the kinds of defects it finds

**Question:**
Which of the following types of defects are targeted by API testing? Select THREE options.

**Answer Set:**
- **A. incorrect data handling**
- **B. timing problems**
- **C. loss of transactions**
- **D.** non-conformance to coding standards
- **E.** lack of usability
- **F.** installation defects
- **G.** GUI faults

**Justification:**

**A.** Correct. This is listed under types of defects found in the syllabus.
**B.** Correct. This is listed under types of defects found in the syllabus.
**C.** Correct. This is listed under types of defects found in the syllabus.
**D.** This is targeted by maintainability testing
**E.** This is not listed in the targeted types of defects in the syllabus.
**F.** This is not listed in the targeted types of defects in the syllabus.
**G.** This is not listed in the targeted types of defects in the syllabus

**Point Value:** 1

## CTAL-TTA _LO-2.8.1

TTA 2.8.1 Select a structure-based technique according to a given project situation.

**Question:**
You are the Technical Test Analyst working on the testing of software that will control the movement of a roof on a new national sports stadium that seats 100,000 spectators. A failure analysis has shown that if the software system fails then it may cause the roof to break up and fall on the spectators. The government has requested that the level of testing for this software exceeds that normally required by the relevant regulatory standards.

Which is the level of test coverage you would expect to be achieved in the testing of the control software for the stadium roof?

**Answer Set:**
**A. Multiple Condition coverage**
**B.** Branch coverage + Modified Condition/Decision coverage
**C.** Branch coverage + Statement coverage
**D.** Modified Condition/Decision coverage

**Justification:**
**A**. Correct: MC/DC is required by the two example standards in the syllabus for the highest level criticality software, which this presumably is as several thousand spectators could be killed/injured. Multiple condition coverage provides a higher level of coverage than MC/DC and as this 'exceeds' that provided by MC/DC this is the correct option given the scenario.
**B.** Incorrect: This is the same as simple MC/DC as branch coverage is subsumed by MC/DC (see D).
**C.** Incorrect: This is the same as branch coverage as statement coverage is subsumed by branch coverage. Branch coverage, however, provides a lower level of rigor than MC/DC or multiple condition coverage
**D.** Incorrect: MC/DC is required by the two standards in the syllabus for the highest level criticality software, but this scenario requires this level of testing to exceed this, so this is not a correct option.

NOTE: One criterion is said to subsume another if, for all software and their specifications, every test case suite that satisfies the first criterion also satisfies the second. For example, branch coverage subsumes statement coverage because if branch coverage is achieved (to 100%), then statement coverage is always guaranteed to be achieved (to 100%) as well.

**Point Value:** 2

## CTAL-TTA _LO-3.2.1

TTA-3.2.1 Use control flow analysis to detect if code has any control flow anomalies.

**Question:**

Below is the pseudo-code for a TRICKY program:

```
0     program  TRICKY
1     var1, var2, var3 : integer
2     begin
3           read ( var2 )
4           read ( var1 )
5           while var2 < 10 loop
6                 var3 = var2 + var1
7                 var2 = 4
8                 var1 = var2 + 1
9                 print ( var3 )
10                if var1 = 5 then
11                      print ( var1 )
12                else
13                      print ( var1+1 )
14                endif
15                var2 = var2 + 1
16          endloop
17          write ( “Wow – that was tricky!” )
18          write ( “But the answer is…” )
19          write ( var2+var1 )
20    end program TRICKY
```

Which of the following statements about the TRICKY program MOST correctly describes any control flow anomalies in it?

**Answer Set:**

- **A. The TRICKY program contains unreachable code and an infinite loop**
- **B.** The TRICKY program contains no control flow anomalies
- **C.** The TRICKY program contains unreachable code
- **D.** The TRICKY program contains a loop with multiple entry points

**Justification:**

```
0     program  TRICKY
1     var1, var2, var3 : integer
2     begin
```

```
3          read ( var2 )
4          read ( var1 )
5          while var2 < 10 loop
6                var3 = var2 + var1
7                var2 = 4
8                var1 = var2 + 1
9                print ( var3 )
10               if var1 = 5 then
11                     print ( var1 )
12               else
13                     print ( var1 + 1 )
14               endif
15               var2 = var2 + 1
16         endloop
17         write ( “Wow – that was tricky!” )
18         write ( “But the answer is…” )
19         write ( var2+var1 )
20   end program TRICKY
```

**A**; Correct: The decision at line 10 will always be true as var1 will always be 5 at line 10, thus line 13 is unreachable. The loop at line 5 can only be left if var2 is 10 or more, but each time through the loop var2 is reset at line 7 back to 4 and only incremented by 1 in the loop at line 15, so it only ever reaches 5.

**B,C** & **D** are incorrect.

**Point Value:** 2

## CTAL-TTA _LO-3.2.2

TTA-3.2.2 Use data flow analysis to detect if code has any data flow anomalies

**Question:**

Below is the pseudo-code for a program that calculates and prints sales commissions:

```
0    program  Calculate Commission
1    total, number : integer
2    commission_hi, commission_lo : real
3    begin
4          read ( number )
5          while number ≠ -1 loop
6                total = total + number
7                read ( number )
8          endloop
9          if total > 1000 then
10               commission_hi = 100 + 0.2 * ( total – 1000 )
```

```
11          else
12                  commission_lo = 0.15 * total
13          endif
14          write ( “This salesman’s commission is:”)
15          write ( commission_hi )
16    end program Calculate Commission
```

Which of the following correctly lists data flow anomalies that exist in the ‘Calculate Commission’ program?

**Answer Set:**

**A.** total: line 6; commission_lo: line 12; commision_hi: line 15
**B.** commision_hi: line 10; commission_lo: line 12
**C.** number: line 5; number: line 6
**D.** total: line 6; commision_hi: line 10; commission_lo: line 12

**Justification:**

```
0           program  Calculate Commission
1           total, number : integer
2           commission_hi, commission_lo, : real
3           begin
4                   read ( number )                                 number (d)
5                   while number ≠ -1 loop                          number (u)
6                         total = total + number                    total (u, d); number (u)
7                         read ( number )                           number (d)
8                   endloop
9                   if total > 1000 then                            total (u)
10                        commission_hi = 100 + 0.2 * ( total – 1000 )  commission_hi (d)
11                  else
12                        commission_lo = 0.15 * total              commission_lo (d); total (u)
13                  endif
14                  write ( “This salesman’s commission is:”)
15                  write ( commission_hi )                         commission_hi (u)
16          end program Calculate Commission
```

**A** is correct:
Anomalies:
total: used at line 6 before it is defined.
commission_lo: defined at line 12 & no subsequent use
commision_hi: used at line 15 but may be no definition if line 12 subpath followed instead of line 10 subpath.
**B, C** & **D** are incorrect.

**Point Value:** 2

## CTAL-TTA _LO-3.2.3

TTA-3.2.3 Propose ways to improve the maintainability of code by applying static analysis

**Question:**

You have been provided with the following system-wide average measures for the four systems, W, X, Y and Z.

| System | W | X | Y | Z |
|---|---|---|---|---|
| **Cyclomatic Complexity (CC)** | 23 | 8 | 12 | 7 |
| **Cohesion (CH)** | High | Medium | Low | High |
| **Coupling (CP)** | Low | High | Medium | Medium |
| **Commented Code (CO)** | 60% | 10% | 45% | 8% |
| **Repeated code instances (RE)** | 9 | 2 | 3 | 12 |

Budget is available to improve the maintainability of the code in each of the four systems by applying the results of static analysis to the individual components.

Which of the following is the BEST application of static analysis if only two measures per system can be resourced?

**Answer Set:**

**A. W – CC, RE; X – CP, CO; Y – CC, CH; Z – CO, RE**
**B.** W – CO, RE; X – CC, CH; Y – CP, CO; Z – CC, RE
**C.** W – CC, CP; X – CH, CO; Y – CC, CH; Z – CO, RE
**D.** W – CH, CO; X – CC, RE; Y – CP, RE; Z – CC, CH

**Justification:**

**A** is correct:
CC of 10 or over suggests this is worth addressing.
CH of Low suggests this is worth addressing.
CP of High suggests this is worth addressing.
CO of l0% or less suggests this is worth addressing.
RE of 9 or more suggests this is worth addressing.

**B, C** & **D** are less correct

**Point Value:** 3

## CTAL-TTA _LO-3.2.4

TTA-3.2.4 (K2) Explain the use of call graphs for establishing integration testing strategies.

**Question:**
Which of the following is a way to use call graphs to determine integration testing requirements?

**Answer Set:**

**A.** Establishing the number of locations within the software from where a module or system is called
**B.** Establishing the number of locations within the software from where a method or function is called

**C.** Determining conditional and unconditional calls for performance analysis
**D.** Detecting areas to be targeted for possible memory leaks

**Justification:**
**A.** Correct per the syllabus.
**B.** Incorrect. This is a use of call graphs, but is used for unit testing, not integration testing per the syllabus.
**C.** Incorrect. Determining conditional and unconditional calls can be used for integration, but using them for performance analysis has nothing to do with integration.
**D.** Incorrect. Call graphs don't detect memory leaks or possible areas for memory leaks.

**Point Value:** 1

## CTAL-TTA _LO-3.3.1

TTA-3.3.1(K3) Specify goals to be achieved by the use of dynamic analysis

**Question:**
You are the Technical Test Analyst working on a project developing a new Ambulance Dispatch System (ADS). This ADS assists operators in taking calls about incidents, identifying available ambulances and mobilizing ambulances to handle the incidents. You know that the ADS was designed using an object-oriented approach and implemented using a language with automated garbage collection. During system and acceptance testing the system has been perceived to be generally performing correctly, but also rather slowly, and it has also occasionally 'crashed'; the subsequent (brief) investigations were inconclusive.

Which of the following statements would BEST justify the use of dynamic analysis in this situation?

**Answer Set:**
**A.** **Dynamic analysis could identify memory access violations caused by a wild pointer that result in the occasional 'crashes'.**
**B.** Dynamic analysis could be used to measure response times for various functions to subsequently allow system tuning.
**C.** Dynamic analysis could be used to generate call graphs of the system to allow targeted performance enhancement.
**D.** Dynamic analysis could be used to determine if defects introduced by programmers failing to release allocated memory are causing the 'crashes'.

**Justification:**
**A.** Correct: Dynamic analysis can identify memory access violations caused by a wild pointer and these could be causing the 'occasional' crashes.
**B.** Incorrect: Dynamic analysis is not typically used for measuring response times (it requires instrumentation and so makes response time measurement impractical), but instead provides lower level performance metrics - these can be used for performance tuning.
**C.** Incorrect: Call graphs are generated by static analysis.
**D.** Incorrect: The scenario tells us that automated garbage collection was used, so it is unlikely programmers will need to release memory. May also be because memory leaks usually cause performance degradation and ultimately out-of-resource errors from the OS side.

**Point Value:** 2

## CTAL-TTA _LO-4.2.1

TTA 4.2.1 (K4) For a particular project and system under test, analyze the non-functional requirements and write the respective sections of the test plan

**Question:**
Assume you are working as a technical test analyst on a project where a new banking system is being developed. This system will store customer financial data, including personally identifying information, account numbers and balances, and transaction history. Based on this information, which of the following topics are you most likely to need to contribute to the test plan?

**Answer Set:**
- **A. Testing data encryption**
- **B.** Test data anonymization
- **C.** Coordination of distributed components
- **D.** Testing in production

**Justification:**
- **A.** Correct: The bank is likely required by regulation to encrypt the customer financial data, which has testing implications.
- **B.** B is incorrect because, while subsequent releases of this system may be tested with real customer data, this is a new system and existing customer data is not available.
- **C.** C is not the answer because there's no indication this is a distributed system.
- **D.** D is incorrect because it's not clear whether this system will be used in-house (thus a production environment might be available) or sold to customers (thus production environments would likely not be available).

**Point Value:** 2

## CTAL-TTA _LO-4.3.1

TTA-4.3.1 (K3) Define the approach and design high-level test cases for security testing

**Question:**
A system has an editable, free-form input field labeled "File Name to Open". Based on this information only, which of the following security threats should you test?

**Answer Set:**
- **A. Buffer overflow**
- **B.** Cross-site scripting
- **C.** Denial of service
- **D.** Breaking encryption

**Justification:**
- **A.** Correct: the free-form nature of the input field allows the attackers to try to insert large, malicious inputs.

**B.** Incorrect: we have no information that this system is browser based or what the file is to be used for.
**C.** Incorrect: DOS attacks work through computer interfaces, not user interfaces.
**D.** Incorrect: we have no indication that any encryption is involved.

**Point Value:** 1

## CTAL-TTA _LO-4.4.1

TTA-4.4.1 (K3) Define the approach and design high-level test cases for the reliability quality characteristic and its corresponding ISO9126 sub-characteristics

**Question:**

Scenario 1.

Assume that you are working for a start-up company with big ambitions but a limited initial funding. They are creating a system that will provide customized loyalty and rewards programs for small- and medium-sized businesses selling to customers on the web. These companies enroll themselves on the system's web store. This allows the companies to create customized buttons, to be placed on their websites, that let customers enroll in the companies' loyalty and rewards program. Each subsequent purchase earns points, and both companies and their customers can manage the program; for example, companies can determine the number of points required for customers to receive a free product or service, and customers can monitor their points.

Your employer's marketing staff is heavily promoting the system, offering aggressive discounts on the first year's fees to sign up new companies. The marketing materials state that the service will be highly reliable and extremely fast for companies and their customers.

At this time, the requirements are complete and development of the software has just begun. The current schedule will allow companies and their customers to enroll starting in three months.

Your employer intends to use cloud computing resources to host this service, and to have no hardware resources other than ordinary office computers for its developers, testers, and other engineers and managers. Industry-standard web-based application software components will be used to build the system.

The production environment will be used for testing, and the operations team has already defined and tested the process for configuring this environment as needed.

Refer to scenario 1. Assume that marketing wants the mean time between failure to be three months or longer, with a mean time to repair of ten minutes or less when the system does fail. Which THREE of the options should be addressed as challenges in planning for the reliability testing of this system prior to release?

**Answer Set:**

**A. Cost of a reliability test environment**
**B. Duration of the reliability testing**
**C. Forcing hardware and operating system faults**
**D.** Defining the reliability requirement
**E.** Configuring a production-like test environment
**F.** Determining the target availability for the system

**G.** Monitoring reliability in production

**Justification:**

**A.** Correct: the test environment must mimic production and be available for an extended period (see B).
**B.** Correct: the marketing wants an MTBF of three months, and we have only three months left on the schedule with development just starting.
**C.** Correct: testing fault-tolerance is part of reliability testing, but, as the hardware and OS will be under the control of our cloud computing provider, it may be hard to force faults to occur during testing without disrupting their other customers.
**D.** Incorrect: D is not a problem, because we have clearly defined reliability requirements in the question.
**E.** Incorrect: you will use the ultimate production hosting environment—cloud resources—to create a production-like environment at will, and this is already a solved problem.
**F.** Incorrect: the target availability is a given in the scenario, provided by marketing in terms of mean time between failure and mean time to repair.
**G.** Incorrect: it does not relate to testing prior to release.

**Point Value:** 2

## CTAL-TTA _LO-4.5.1

TTA-4.5.1 (K3) Define the approach and design high-level test cases for performance testing

**Question:**

Scenario 1.

Assume that you are working for a start-up company with big ambitions but a limited initial funding. They are creating a system that will provide customized loyalty and rewards programs for small- and medium-sized businesses selling to customers on the web. These companies enroll themselves on the system's web store. This allows the companies to create customized buttons, to be placed on their websites, that let customers enroll in the companies' loyalty and rewards program. Each subsequent purchase earns points, and both companies and their customers can manage the program; for example, companies can determine the number of points required for customers to receive a free product or service, and customers can monitor their points.

Your employer's marketing staff is heavily promoting the system, offering aggressive discounts on the first year's fees to sign up new companies. The marketing materials state that the service will be highly reliable and extremely fast for companies and their customers.

At this time, the requirements are complete and development of the software has just begun. The current schedule will allow companies and their customers to enroll starting in three months.

Your employer intends to use cloud computing resources to host this service, and to have no hardware resources other than ordinary office computers for its developers, testers, and other engineers and managers. Industry-standard web-based application software components will be used to build the system.

The production environment will be used for testing, and the operations team has already defined and tested the process for configuring this environment as needed.

Refer to scenario 1. Assume that marketing wants to ensure that the system will be very fast. Which TWO of the options should be addressed as challenges in planning for the performance testing of this system prior to release?

**Answer Set:**

- **A. Defining the performance requirements**
- **B. Cost of performance test tools**
- **C.** Selection of test data
- **D.** Compatibility of performance test tools
- **E.** Configuring a production-like test environment
- **F.** Developing a complex simulator
- **G.** Anonymization of test data

**Justification:**

- **A.** Correct: the marketing has only said they want a "very fast" system, and it's not clear what that will mean in practice.
- **B.** Correct: performance testing tools can be quite expensive, especially when trying to simulate large numbers of users.
- **C.** Correct: you need to make an educated guess about the number of users, the type of programs companies will end up having, the type and frequency of actions companies and customers will do, etc.
- **D.** Incorrect: the system uses standard web interfaces.
- **E.** Incorrect: you can use the ultimate production hosting environment—cloud resources—to create a production-like environment at will.
- **F.** Incorrect: there is no need for any simulator in this situation, just simulated users via a standard performance testing tool.
- **G.** Correct: there is no production data that needs anonymization at this point.

**Point Value:** 2

## CTAL-TTA _LO-4.x.1

TTA-4.x.1 (K2) Understand and explain the reasons for including maintainability, portability and resource utilization tests in a testing strategy and/or test approach

**Question:**
Which TWO of the following test types will be most important for a software control system that will be integrated into a wider system and is expected to generate several variants and undergo a number of environment changes over a period of 10 years?

**Answer Set:**

- **A. Adaptability testing**
- **B. Maintainability testing**
- **C.** Recoverability testing
- **D.** Replaceability testing
- **E.** Security testing

**Justification:**

The scenario emphasizes longevity and the expectation of installation in a variety of vehicle platforms. Performance is implied but does not feature in the options

- **A.** Correct: Adaptability testing is likely to be important because the system will be installed in a variety of environments.
- **B.** Correct: Maintainability is important given the need for continuous development and multiple configurations.
- **C.** Incorrect: Recoverability testing is not suggested by the scenario, in which recovery from software or hardware failures would not be expected during operation (i.e. on a single journey).
- **D.** Incorrect: Replaceability testing is not suggested by the scenario; there is no suggestion of component replacement.
- **E.** Incorrect: Security is not a particular issue in this scenario.

**Point Value:** 2

## CTAL-TTA _LO-4.x.2

TTA-4.x.2 (K3) Given a particular product risk, determine the particular non-functional test type(s) which are most appropriate

**Question:**

Consider the following product risk:

Abnormal application termination due to network connection failure

Which of the following is the appropriate test type to address this risk?

**Answer Set:**

- **A. Reliability testing**
- **B.** Performance testing
- **C.** Operability testing
- **D.** Portability testing

**Justification:**

- **A.** Correct: fault-tolerance testing is part of reliability.
- **B.** Incorrect: we are not worried about response time, throughput, or resource utilization here.
- **C.** Incorrect: this risk does not relate to usability.
- **D.** Incorrect: the specific type of network is not in question here.

**Point Value:** 1

## CTAL-TTA _LO-4.x.3

TTA-4.x.3 (K3) Understand and explain the stages in an application's lifecycle where non-functional tests should be applied

**Question:**

Scenario 1.

Assume that you are working for a start-up company with big ambitions but a limited initial funding. They are creating a system that will provide customized loyalty and rewards programs for small- and medium-sized businesses selling to customers on the web. These companies enroll themselves on the system's web store. This allows the companies to create customized buttons, to be placed on their websites, that let customers enroll in the companies' loyalty and rewards program. Each subsequent purchase earns points, and both companies and their customers can manage the program; for example, companies can determine the number of points required for customers to receive a free product or service, and customers can monitor their points.

Your employer's marketing staff is heavily promoting the system, offering aggressive discounts on the first year's fees to sign up new companies. The marketing materials state that the service will be highly reliable and extremely fast for companies and their customers.

At this time, the requirements are complete and development of the software has just begun. The current schedule will allow companies and their customers to enroll starting in three months.

Your employer intends to use cloud computing resources to host this service, and to have no hardware resources other than ordinary office computers for its developers, testers, and other engineers and managers. Industry-standard web-based application software components will be used to build the system.

Consider scenario 1. Assume that adequate system response time is considered one of the most important product risks for this system.

Which of the following statements is true?

**Answer Set:**

- **A. Performance testing should start on initial builds of the system**
- **B.** Performance testing should happen after functional testing is done
- **C.** Dynamic performance testing should happen during code reviews.
- **D.** Reliability testing should happen after performance testing.

**Justification:**

- **A.** Correct: we need to address important risks early as possible.
- **B.** Incorrect: for the same reason that A is correct.
- **C.** Incorrect: C is impossible because code reviews are static tests.
- **D.** Incorrect: we don't have any information on the relative risk of reliability.

**Point Value:** 1

## CTAL-TTA _LO-4.x.4

TTA-4.x.4 (K3) For a given scenario, determine the types of defects you would expect to find by using non-functional testing types

**Question:**

Scenario 1.

Assume that you are working for a start-up company with big ambitions but a limited initial funding. They are creating a system that will provide customized loyalty and rewards programs for small- and medium-sized businesses selling to customers on the web. These companies enroll themselves on

the system's web store. This allows the companies to create customized buttons, to be placed on their websites, that let customers enroll in the companies' loyalty and rewards program. Each subsequent purchase earns points, and both companies and their customers can manage the program; for example, companies can determine the number of points required for customers to receive a free product or service, and customers can monitor their points.

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At this time, the requirements are complete and development of the software has just begun. The current schedule will allow companies and their customers to enroll starting in three months.

Your employer intends to use cloud computing resources to host this service, and to have no hardware resources other than ordinary office computers for its developers, testers, and other engineers and managers. Industry-standard web-based application software components will be used to build the system.

Consider scenario 1. Assume that you are executing security tests against the system

Which of the following types of defects would you expect to find during this testing?

**Answer Set:**

- **A. System allows unauthorized access to data**
- **B.** System clears screen too quickly after login
- **C.** System removes user temporary files after logout
- **D.** System allows access from unsupported browser.

**Justification:**

- **A.** Correct: a typical security defect.
- **B.** Incorrect: B is a usability failure, not a security defect.
- **C.** Incorrect: C is a security feature, not a defect.
- **D.** Incorrect: D, if it is a defect at all, is a portability defect.

**Point Value:** 1

## CTAL-TTA _LO-5.1.1

TTA-5.1.1 (K2) Explain why review preparation is important for the Technical Test Analyst

**Question:**
A technical test analyst has been invited to the review of an architectural design specification. The review has been called at short notice for the following day and although there is nothing in the analyst's diary for that time, there is no time to prepare. Which of the following would be the most appropriate response to the invitation?

**Answer Set:**

- **A. I will not have enough time to prepare for a review meeting tomorrow so I must decline unless the review can be postponed.**
- **B.** I am free at that time and I will be pleased to attend
- **C.** I do not have time to prepare but I will attend rather than cause a delay
- **D.** I cannot attend the review because I am unfamiliar with the specification

**Justification:**

- **A.** This is the correct response.
- **B.** Incorrect: This response indicates a willingness to co-operate in getting the review done but the analyst will be unable to make a full contribution without preparation and the review would therefore be less effective than it should be .
- **C.** Incorrect: This response flags up the lack of preparation time but does not insist on allowing time for adequate preparation.
- **D.** Incorrect: This response is accurate but preparation would remove the obstacle. This is therefore not the best response when declining to attend a review.

**Point Value:** 1

## CTAL-TTA _LO-5.2.1

TTA-5.2.1 (K4) Analyze an architectural design and identify problems according to a checklist provided in the syllabus.

**Question:**
You have been participating in an architectural review of a new product design. This is an embedded product that has severe memory restrictions. Consider the following lists of programming practices and problems that can result from using those practices.

Programming Practices:

1. Connection pooling
2. Data caching
3. Lazy instantiation
4. Transaction concurrency

Problems:

1. Performance impact when the instantiation is needed
2. Transaction loss due to processor unavailability
3. Errors in multi-threading logic
4. Stale data

Which of the above is a programming practice that can be used to reduce unnecessary memory use in this scenario and what are the possible problems in using this practice?

**Answer Set:**

- **A. Practice 3, Problem 1**
- **B.** Practice 2, Problem 4
- **C.** Practice 4, Problem 3
- **D.** Practice 1, Problem 2

**Justification:**

- **A.** Correct. This would reduce unnecessary memory use, but does have the possible problem of the delayed performance when the class is needed.
- **B.** Incorrect. Data caching helps performance, not memory use.
- **C.** Incorrect. Transaction concurrency uses more memory.

**D.** Incorrect. Connection pooling can help memory and performance, but the possible problem is in running out of connections, not in losing a process

**Point Value:** 2

## CTAL-TTA _LO-5.2.2

TTA-5.2.2 (K4) Analyze a section of code or pseudo-code and identify problems according to a checklist provided in the syllabus.

**Question:**

You are participating in a code review and have noticed a problem in the following section of pseudo-code (assume *** indicates a comment).

*** this code checks for valid card type ***
If credit card is type “Discover” then
  Display error message 437
Else if credit card is type “Visa” or “MasterCard” then
  Process purchase
Else if credit card is type “AmericanExpress” then
  Display error message 439
Else
  Display error message 440
End if

Which of the following problems is demonstrated in this section of the code and why should it be corrected?

**Answer Set:**

**A.** **The most likely case is not tested first, resulting in a potential performance impact**
**B.** The comment in the code is incorrect, resulting in a maintainability impact
**C.** An external library should be used to validate the credit card, resulting in inefficiency by not re-using existing components
**D.** There is no default clause, resulting in potential cases not being handled

**Justification:**

**A.** Correct. It is most likely the card will be Visa or MC so that check should be exercised first.
**B.** Incorrect. The comment is correct.
**C.** Incorrect. We have no way of knowing if there is an external library available.
**D.** Incorrect. The else handles all conditions not met by the if.

**Point Value:** 2

## CTAL-TTA _LO-6.1.1

TTA-6.1.1 (K2) Explain technical aspects to consider when multiple tools are used together

**Question:**

Scenario 2.

Assume that you are involved in testing a mature application. This application is an online dating service that allows users: to enter a profile of themselves; to meet orientation-appropriate people who would be a good match for them; to arrange social events with those people; and, to block people they don't want to contact them.

Defects and test cases are managed in an existing commercial test management tool, which is working well. Source code and other project work products are stored in an open source configuration management system.

Your manager directs you to help her select a test execution automation tool to automate most of the regression testing.

Consider scenario 2. Which of the following is an important consideration in relation to the existing tools?

**Answer Set:**

- **A. The process for storing and versioning automated tests.**
- **B.** The cost of the test execution automation tool.
- **C.** The process of removing duplicate defect reports created by the automated tests.
- **D.** Selecting a test execution automation tool from the test management tool vendor.

**Justification:**

- **A.** Correct: this can be a source of inefficiency and/or risk.
- **B.** Incorrect: it has nothing to do with the existing tools.
- **C.** Incorrect: the real issue is avoiding such duplicates, not removing them.
- **D.** Incorrect: this does not guarantee successful integration.

**Point Value:** 1

## CTAL-TTA _LO-6.2.1

TTA-6.2.1 (K2) Summarize the activities that the Technical Test Analyst performs when setting up a test automation project

**Question:**

Which TWO of the following are typical activities performed by a Technical Test Analyst when setting up a test automation project?

**Answer Set:**

- **A. Defining the interface requirements between the project's test management tool and the test automation tool**
- **B. Scheduling the test automation project and allocating time for maintenance with the test manager**
- **C.** Designing the test data for the automated test cases

**D.** Defining the business process keywords for use in test cases when using keyword-driven testing
**E.** Determining who will be responsible for the test analysis and design of test cases to be automated

**Justification:**
**A.** Correct: In syllabus
**B.** Correct: In syllabus
**C.** Incorrect: Test data is normally the responsibility of the test analysts or business analysts
**D.** Incorrect: Defining the keywords is normally done by the test analysts or business analysts
**E.** Incorrect: Who performs test analysis and design (even of automated test cases) is not decided by the TTA.

**Point Value:** 1

## CTAL-TTA _LO-6.2.2

TTA-6.2.2 (K2) Summarize the differences between data-driven and keyword-driven automation

**Question:**
Which of the following statements best captures the difference between data-driven and keyword-driven test automation?

**Answer Set:**
**A.** **Keyword-driven test automation extends data-driven automation by defining keywords corresponding to business processes.**
**B.** Data-driven test automation extends keyword-driven automation by defining data corresponding to business processes.
**C.** Data-driven test automation is more maintainable than keyword-driven test automation.
**D.** Keyword-driven test automation is easier to develop than data-driven test automation.

**Justification:**
**A.** Correct: keyword-driven tests are data-driven, too, but also have process-based keywords.
**B.** Incorrect: B is incorrect because it's backwards.
**C.** Incorrect: keyword-driven tests are easier to maintain (due to the separation of roles).
**D.** Incorrect: D is incorrect because of the difficult in defining the correct architecture for the keyword-driven framework.

**Point Value:** 1

## CTAL-TTA _LO-6.2.3

TTA-6.2.3 (K2) Summarize common technical issues that cause automation projects to fail to achieve the planned return on investment

**Question:**

Which of the following describes a common technical issue that causes automation projects to fail to achieve the planned return on investment?

**Answer Set:**
- **A. Lack of separation between code and changeable data in the testware**
- **B.** Elimination of duplication of information across tools
- **C.** Removal of manual checking of data exchanges between tools
- **D.** Use of an integrated development environment to simplify integration between tools

**Justification:**
- **A.** Correct: In syllabus.
- **B.** Incorrect: Elimination of duplication is a positive for a toolset.
- **C.** Incorrect: Ideally data should be exchanged with no manual intervention.
- **D.** Incorrect: Using an IDE is often worthwhile as long as tools 'fit' the IDE.

**Point Value:** 1

## CTAL-TTA _LO-6.2.4

TTA-6.2.4 (K2) Create a keyword table scheme based on a given business process

**Question:**
Scenario 2.

Assume that you are involved in testing a mature application. This application is an online dating service that allows users: to enter a profile of themselves; to meet orientation-appropriate people who would be a good match for them; to arrange social events with those people; and, to block people they don't want to contact them.

Defects and test cases are managed in an existing commercial test management tool, which is working well. Source code and other project work products are stored in an open source configuration management system.

Your manager directs you to help her select a test execution automation tool to automate most of the regression testing.

Consider scenario 2. Assume you are using a keyword-driven automation approach. Which THREE of the options would be the MOST LIKELY keywords for this application?

**Answer Set:**
- **A. Enter_Profile**
- **B. Block_Person**
- **C. Find_Match**
- **D.** Delete_Profile
- **E.** Enter_Test_Data
- **F.** Remove_Test_Data
- **G.** Pay_Bill
- **H.** Exclude_Non_Smokers
- **I.** Take_Hottie_to_Dinner

**Justification:**

**A.** Correct: A, B, and C are correct because they are explicitly mentioned in the scenario as being capabilities of the application.
**B.** Correct: A, B, and C are correct because they are explicitly mentioned in the scenario as being capabilities of the application.
**C.** Correct: A, B, and C are correct because they are explicitly mentioned in the scenario as being capabilities of the application.
**D.** Incorrect: D might be a capability of the application, but it's not mentioned in the scenario, so it's not the most likely keyword on the list.
**E.** Incorrect: E and F are incorrect because the keywords are supposed to be about the business process supported by the application, not the test process.
**F.** Incorrect: E and F are incorrect because the keywords are supposed to be about the business process supported by the application, not the test process.
**G.** Incorrect: G is incorrect for the same reason as D, and also because there was no mention that the product charges its customers.
**H.** Incorrect: H is incorrect because this is probably a small part of entering a profile, and the keywords should not be too fine-grained.
**I.** Incorrect: I is unlikely because it's an action in the real world, rather than a process in the application, and also because using humorous, culture-specific, and suggestive words like "hottie" is not a good practice.

**Point Value:** 1

## CTAL-TTA _LO-6.3.1

TTA-6.3.1 (K2) Summarize the purpose of tools for fault seeding and fault injection

**Question:**
Which of the following statements about fault seeding tools is NOT correct?

**Answer Set:**
**A.** **These tools insert defects into the source code to test the input checking capabilities of the software**
**B.** These tools insert defects into the source code to check the level of fault tolerance of the software
**C.** These tools insert defects into the source code to check the test effectiveness of the test suite
**D.** These tools insert defects into the source code as part of the mutation testing technique

**Justification:**
**A.** Correct: Input checking can be done by mutating test inputs, but to test input checking inputs would need to be mutated.
**B.** Incorrect: In syllabus
**C.** Incorrect: In syllabus
**D.** Incorrect: In syllabus

**Point Value:** 1

## CTAL-TTA _LO-6.3.2

TTA-6.3.2 (K2) Summarize the main characteristics and implementation issues for performance testing and monitoring tools

**Question:**
Which of the following statements about performance testing and monitoring tools is correct?

**Answer Set:**
- **A. These tools generate a load by simulating a large number of virtual users following their designated operational profiles to generate specific volumes of input data**
- **B.** These tools drive the application at the communications protocol level rather than through its user interface to more accurately measure response times
- **C.** These tools capture a script from an individual user interaction and multiple identical copies of the script are then replayed in parallel to represent the full range of possible users
- **D.** These tools take a wide range of measurements after test execution to enable the analysis of the most significant performance characteristics of the test object

**Justification:**
- **A.** Correct: In syllabus
- **B.** Incorrect: Driving through the user interface would normally provide more accurate results than at the communications protocol level
- **C.** Incorrect: The script needs to be changed to take account of variability of different users and their transactions.
- **D.** Incorrect: Measurements need to be taken during execution.

**Point Value:** 1

## CTAL-TTA _LO-6.3.3

TTA-6.3.3 (K2) Explain the general purpose of tools used for web-based testing

**Question:**
Which TWO of the following BEST describe the purpose of tools supporting web-based testing?

**Answer Set:**
- **A. Scanning through the server checking for orphaned files**
- **B. Checking for accessibility standards violations**
- **C.** Executing a model of the execution-time behavior to generate test cases
- **D.** Changing variable values during line by line execution to isolate faults in the user interface
- **E.** Injecting defects into the test object for test suite quality measurement

**Justification:**
- **A.** Correct: In syllabus
- **B.** Correct: In syllabus
- **C.** Incorrect: Describes a MBT tool
- **D.** Incorrect: Describes a debugger
- **E.** Incorrect: Describes a fault seeding tool

**Point Value:** 1

## CTAL-TTA _LO-6.3.4

TTA-6.3.4 (K2) Explain how tools support the concept of model-based testing

**Question:**
Which of the following BEST describes how tools can support the concept of model-based testing (MBT)?

**Answer Set:**
- **A. MBT tools can be used to generate test cases by saving interesting execution threads**
- **B.** MBT tools significantly increase the number of paths that can be generated in a model
- **C.** MBT tools provide an alternative view of the internal structure of the software under test
- **D.** MBT tools often provide an engine that enables 'execution' of models but execution threads cannot be saved

**Justification:**
- **A.** This is the correct response.
- **B.** Incorrect: MBT tools actually decrease the possible paths.
- **C.** Incorrect: MBT tools provide a different view to supplement functional testing.
- **D.** Incorrect: The MBT tool 'engine' does enable some execution threads to be saved (typically those related to failed test cases).

**Point Value:** 1

## CTAL-TTA _LO-6.3.5

TTA-6.3.5 (K2) Outline the purpose of tools used to support component testing and the build process

**Question:**
Which of the following statements BEST explains the relationship between component testing tools and build automation tools?

**Answer Set:**
- **A. Component testing frameworks can simplify automation of component testing; build automation tools allow a new build to be triggered when a component is changed**
- **B.** A JUnit framework can simplify automation of component testing in a Java environment; build automation tools automatically trigger the component tests whenever a component changes in a build
- **C.** An xUnit framework can be used to automate component testing; build automation tools execute automated component tests
- **D.** A Component testing tool can be used against multiple programming languages; build automation tools allow a new build to be triggered when a component changes

**Justification:**
- **A.** This is the correct option.
- **B.** Incorrect: The component testing statement is true but the build automation statement is incorrect.
- **C.** Incorrect: The xUnit framework statement is incorrect; but tempting; the build automation statement is incorrect.

**D.** Incorrect: The component testing statement is correct; the build automation statement is incorrect.

**Point Value:** 1