Syllabus
Certified Test Automation Professional (CTAP)
Foundation

Version 1.0

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Description

This syllabus describes the Certified Test Automation Professional (CTAP) Foundation level certification requirements, learning objectives and related information to prepare for the CTAP Foundation exam.

Need for standardized approach in test automation

Professionals and organizations are becoming increasingly dependent on IT, which raises questions about the quality of software.

The speed at which software is developed today makes manual testing obsolete. It's not easy to keep the pace up. The speed of development and releases is important in an Agile/DevOps environment. The concepts of Continuous Integration and Continuous Delivery (CI/CD) are commonplace nowadays. Continuous testing is a requirement of CI/CD, where test automation plays a key role.

In this scenario, test automation extends beyond simply automating regression tests. Test automation must be implemented across the entire development process. This means that tests must be administered as quickly as possible and, preferably, automatically.

Test automation is one of the first things that is implemented within Agile teams. However, knowledge and expertise are frequently restricted to just one team or project and are difficult to transfer to other teams or projects.

An overly technical approach is frequently suggested, limited to a focus on tools, with too little attention paid to people, organizations, data and processes. This makes it difficult to scale and transfer best practices within an organization.

The goal is to set up test automation in a way that will be beneficial in the future so that other members of the organization can take advantage of it. Extra attention is required for the creation of test automation that is reusable, expandable and transferable, so that a reliable quality level of test automation is achieved within the organization.

This demands more attention to detail, with a focus on transferability and knowledge sharing, but it also affects how specific test situations and test scripts are created.

Certified Test Automation professionals and organizations benefit from:

- Increasing the quality of test automation
- Ensuring the reusability of test automation
- Leveraging industry best practice gained from large numbers of professionals over many years
- Having a common language within your team and organization in relation to the use of test automation
- Guaranteeing the quality level of a test automation engineer.

About the CTAP Consortium

The CTAP Consortium is a non-for-profit collaboration of industry experts, consultancy organizations, end users, trainers and academics. Who all believe that common approaches

on how to automate your testing should always be followed, regardless of your background, type of tooling or industry.

CTAP stands for Certified Test Automation Professional. The shared ambition of the consortium members and its founders is to encourage professionals who are active within the testing domain to gain a certification in CTAP and therefore, benefit from a common understanding of best practice in test automation. In addition, ensuring proper execution will deliver higher quality software and enable the reusability of test automation. The Foundation level is the first level which is completed. Applying the CTAP accreditation will guarantee an assured quality level of test automation engineers.

The CTAP Consortium has set out three main activity areas to achieve this goal:
1. Auditing the supported Test Automation certification and trainer accreditation program, based on market guidelines.
2. Promoting the adoption of test automation in public and private organizations.
3. Facilitating access to test automation learning materials and certification for individuals who want to enhance their employability.

The Certification Council is an independent panel of test automation and certification experts, each representing different industries and interests. Council members are selected from member organizations of the CTAP Consortium based on their experience, network and contributions to test automation.

The council provides advice on content-related matters and is responsible for auditing the Test Automation certification based on market standards.

The CTAP Consortium's ambition is to:

"Create a common understanding of the level of expertise required for managing test automation."

Practical information

You must pass a multiple-choice exam in which your knowledge of test automation will be tested in order to obtain the CTAP certificate.

All exam candidates will get access to the online exam environment and will need to answer 40 multiple-choice questions within 60 minutes.

You must answer 65% of the questions correctly (or at least 39 of the 60 questions) to pass.

You will receive the result immediately after the exam. (Digital) Access to your certificate will be given once you have passed.

Registration for the exam can be done by purchasing a participation certificate at www.vhls.global.

Number of questions:	40
Time (minutes) for the exam:	60 minutes
% minimal passing grade	65%
Open/closed book:	Closed
Language:	Dutch and English. See www.vhls.global for other available languages.
Exam format:	Online
Type of questions:	Multiple choice. Candidates are advised to read the questions carefully.
Are negative questions included in the exam? (For example: “Which of the following is NOT a principle in the Agile Manifesto”)	Yes. Candidates are advised to read the questions carefully.

Levels

The Certified Test Automation Professional (CTAP) Foundation certification tests candidates at Levels 1 and 2, according to the Bloom Revised Taxonomy.

Bloom Level 1: Recall & Retention

We test candidates on their ability to memorize factual information, to retain information by collecting, remembering and recognizing specific knowledge. Knowledge includes facts, terms, answers or terminology.

Bloom Level 2: Understanding

We test candidates on their ability to construct meaning from oral, written or graphical pieces of information. This is done by interpreting, summarizing, distracting, comparing, classifying, predicting or explaining the message.

Learning objectives

The learning objectives state what the delegate will need to know and be able to execute after succeeding in this certification. The certificate that the delegate will obtain proves that they have learned:

- An understanding of test automation
- Why is test automation important for the current development methods
- What are the purposes of test automation
- Advantages and disadvantages of test automation
- In which cases is test automation applicable
- Which trends are recognized inside test automation
- Different kinds of test tools
- Selection of test tools
- The evolution of test automation
- Manual vs automated testing
- Scripting
- Implementation of test tooling
- Future-proof development of test automation
- Introduction to scripting
- Test automation and development methods
- Test automation functions
- A CTAP certified person is able to implement test automation inside an Agile release train and to transfer knowledge inside and outside the release train.

Attachment A provides (sub) learning objectives for each of the learning objectives.

Boundary conditions

The following boundary conditions are applicable in relation to the CTAP program:

- The course material will be reviewed and accredited by the CTAP Consortium;
- The course material/theory is supported by practical examples, real life cases and demonstrations;
- The course material covers the total chain of test automation, from test architecture to scripting and reporting results;
- Trainers are experienced in the area of test automation regarding:
    - Ability to teach the theory to students;
    - Working or training in the field of test automation;
    - Possessing didactic skills;
    - A passing rate of 75% (in comparison to 65% for regular candidates).

Exam requirements and specifications

Module	Exam requirements	Exam specification	Weight %	Ref.
1	Introduction		10%	
1.1		Why is test automation important for the current development methods		A, C,D
1.2		What are the purposes of test automation		D
1.3		Advantages and disadvantages of test automation		D
1.4		A CTAP certified person is able to implement test automation inside an Agile release train and to transfer knowledge inside and outside the release train		B, D
2	Test automation		30%	
2.1		In which cases is test automation applicable		D, H
2.2		Which trends are recognized inside the test automation		D
3	Tooling & scripting		35%	
3.1		Different kinds of test tools		D
3.2		Selection of test tools		D
3.3		Introduction to scripting		D, G
3.4		Implementation of test tooling		D
3.5		Scripting		D
4	Establishment of test automation		10%	
4.1		The evolution of test automation		A
5	Architecture		15%	
5.1		Manual vs automated testing		A
5.2		Future-proof development of test automation		A, E,F
5.3		Test automation and development methods		A,I,J
5.4		Test automation functions		A

List of key terms and concepts

The following terms are relevant to the CTAP certification.

Definition	Description
Agile	A method of software development that emphasizes short iterations and collaboration.
Architecture	A description of a system from different perspectives with the aim of guiding the design and evolution of the system.
Architecture principle	A statement that reflects a belief and guides the design of one or more systems.
Behavior-driven testing	A form of testing where test cases are expressed in pseudo-language that closely resembles natural language.
Capture & playback tool	A test tool that records input during manual test execution to generate test scripts that can be executed automatically later.
Data generation	The process of defining the test data that will be used to test an application.
Data-driven tests	A form of testing where test cases use test data (input and output) that is defined in a separate file.
DevOps	The integration of software development and operations so that the responsibility for the entire lifecycle falls under one team's responsibility.
Driver	A software component that invokes and/or controls other software components.
DTAP	Development, Testing, Acceptance, Production.
Dynamic test	A test in which the program code of the system under test is executed.
Event-driven testing	A form of testing where test cases are defined (recorded) in terms of the events that occur during the use of the system under test.
Feature	A description of a functionality in a way that is understood by the user organization.
Functional test	A test based on the functional requirements.
Keyword-driven testing	Testing based on test cases expressed in keywords, where the keywords are defined in terms of actions to be performed.
Model-driven testing	A form of testing where the test cases are expressed in structured models that can be interpreted automatically.
Non-functional testing	A test based on the quality requirements for non-functional aspects such as performance.
Perspective	A way of looking at reality.
Production data	Data as present in the production environment.

Regression test	Testing a previously tested software component after a change to ensure that no errors have been introduced or revealed in the unchanged areas of the software component as a result of those changes.
Repeatability	The repeated execution of automated tests without significant modifications.
Reusability	The reuse of developed automated components in other types or forms of testing.
Static test	A review or inspection of documentation, source code, or object code.
Stub	A minimal implementation of a software component, used to develop or test a component that invokes this software component or otherwise depends on it.
Synthetic test data	Data specifically generated for executing tests.
Test analyst	The person who defines tests at a functional level.
Test architect	The person who outlines the test project.
Test automatization	The use of software to perform or support testing activities.
Test automatization framework	A set of software components that can be used in programming automated tests, including conventions for their use.
Test policy	Documenting the main principles on how testing and test automation are handled, indicating how test automation is organized within the organization.
Test consultant	The person who advises the project and line organization on testing vision and policy.
Test data	Data required for a test to function or data that is generated during the execution of a test.
Test data engineer	The person who ensures that the necessary test data is made available in any way that complies with applicable laws and regulations.
Test data management	Ensuring that good test data is available to support the testing process.
Test data strategy	The approach and elaboration on how an organization handles the use of test data, the development, and management surrounding the use of test data.
Test engineer	The person who defines tests at a technical level.
Test management	Planning, budgeting, monitoring, and controlling testing activities.
Test run	The execution of one or more test cases on the system under test.

Test type	A group of testing activities that are organized and managed together. A test type is associated with project responsibilities, such as unit test, system test, functional acceptance test, chain test, user acceptance test, administrator acceptance test, and production acceptance test.
Test suite	A collection of test cases that belong together.
Test tool	A computer program that supports one or more test activities, such as planning and management, specifying, building initial files and data, executing the test, and test analysis.
Test executor	The person who executes the defined tests.
Test vision	Describing the objectives of test automation within an organization.
Test format	A set of test activities aimed at testing a component or application on one or more related quality attributes, such as a functional test, performance test, or security test.
Test ware	The products created to carry out the testing process, such as a test plan, test cases, test scripts, and test data.
Transferability	The transfer of automated tests to users other than the original test engineer, or to another technology.
Velocity	The speed of a development process, typically expressed in the number of user stories completed and tested per iteration.
Virtualization	Creating an environment within which software is executed.

Recommended literature

ID.	Source	Form
A	'Testautomatisering wendbaar organiseren' – Rooyen, van J, Mersie, MJ, 2020.	Core literature
D	'Geautomatiseerd software testen' - Egbert Bouman, 2009.	Core literature
H	M. Siteur: "Automate your testing, sleep while you are working, blz 143-144," Academic Service, 2005.	Core literature
B	'Het gebruik van testautomatisering binnen Agile projecten' – Rooyen, van J 2012.	Optional
C	'Acht redenen om te beginnen met unit tests' – https://www.delta-n.nl	Optional
E	D. Greefhorst, M. Mersie, J. van Rooyen: "Principes van testautomatisering," Computable, 2015.	Optional
F	J. van Rooyen: "Effort estimation test automation in an Agile environment," Valid2016, 2016.	Optional
G	C. Schotanus et al.: "Testframe, hoofdstuk 6,7,8," Academic Service, 2008.	Optional
I	J. van Rooyen: "Het gebruik van testautomatisering binnen Agile projecten", 2012.	Optional
J	Ravichandran et al.: "DevOps for Digital Leaders" CA Press, 2016.	Optional

Attachment A: (Sub) learning objectives

Learning objective	(Sub) learning objectives	Remark
What is test automation?	The definitions.	
	Define why test automation is complex.	
	Define what is meant by test automation.	
	Indicate the importance of test automation.	
	Explain the difference between test automation and automated testing?	
Why test automation?	Explain why test automation is becoming increasingly important.	
	Indicate what should and should not be automated.	
	Identify which parts of an application should or should not be automated.	
Objectives of test automation	Indicate which goals test automation can support.	
	Indicate which goals test automation cannot support.	
Pros and cons of test automation	Indicate what the advantages of test automation are.	
	Indicate what the disadvantages of test automation are.	
	Explain the difference between applying test automation to packaged software and custom-built software.	
	Explain the difference between applying test automation to GUI and non-GUI testing.	
	Explain the difference between applying test automation to embedded systems and administrative systems.	
	Indicate what the outcomes of test automation are.	
When to apply test automation	Indicate where in the test pyramid test automation can be applied.	
	Indicate the differences within the layers of the test pyramid.	
	Explain why certain test types are not applicable at different levels of the test pyramid.	
Trends within test automation	Indicate how test automation can be applied in static and/or dynamic testing.	
	Explain what zero-touch test automation is.	
	Indicate which approaches to test automation can be applied.	
	Indicate which application areas can be distinguished.	
Various types of tools	Indicate which families of tools can be distinguished.	

	Indicate what types of embedded tools exist and how they differ from other tools.	
	Indicate the characteristics of test management tools.	
	Indicate the characteristics of test design tools.	
	Indicate the characteristics of test environment tools.	
	Indicate the characteristics of tools for test execution: • Testing via the user interface (Record and Playback tools) • Testing via the program interface/API.	
	Indicate how the different tools complement each other.	
	Indicate how the different tools can work together.	
Methods of test automation	Indicate which methods of test automation design are recognized.	
	Indicate where the differences lie between the various methods.	
Selection of test tools	Indicate how the right tool can be selected.	
	Indicate what should be considered when selecting a tool.	
	Indicate the difference in tools for static or dynamic applications.	
	Indicate which tools are important at different levels (e.g., GUI, API, etc.).	
	Indicate why tools should match the maturity level of the organization.	
	Describe the difference in tool usage for developers versus non-developers.	
	Be able to explain the relationship between the test tool and the development language.	
Generations of test automation	Indicate which generations of test automation can be distinguished.	
	List the advantages of the tools, per generation.	
	Indicate the differences between the various generations.	
	Explain why different generations of test automation have emerged.	
Manual vs. automated testing	Indicate whether everything can be tested through automation.	
	Indicate what is not useful to automate.	
Implementing scripting	Indicate the aspects of data-driven test automation.	
	Explain what variation in test scripting is.	
	Indicate the different ways to create test scripts.	

	What is scripting?	
	Indicate how to achieve stable test scripts.	
Tooling setup	Indicate how tools handle Service Virtualization.	
	Indicate how tools handle Test Data Management.	
	Identify the aspects to consider when setting up a tool.	
	Explain the relationship with containers (e.g., Docker, etc.).	
Setting up future-proof test automation	Indicate the characteristics of a test automation architecture.	
	Explain what the 3-layer model entails.	
	Establish the requirements for a good test automation strategy.	
	Describe the approach for implementing a test automation architecture.	
	Indicate the elements that should be considered in test architecture.	
	Indicate how to design a roadmap based on a growth model.	
Introduction frameworks	Identify the basic principles of error handling.	
	Identify the basic principles of libraries.	
	Identify the basic principles of setting up a framework.	
	Indicate why frameworks are necessary.	
	Indicate the types of frameworks that can be distinguished.	
	Explain what is meant by a framework.	
Test automation and development methodologies	Indicate the impact on test automation when applying CI/CD.	
	Indicate the impact on test automation when applying DevOps.	
	Indicate the differences in test automation when Waterfall or Agile is applied.	
	Indicate the impact on test automation when applying BDD/TDD.	
Test automation roles	Indicate which roles can be distinguished.	
	Explain the role distribution between Functional Tester/Test Analyst and Test Tool Expert.	
	Identify the skills of a test automation professional.	