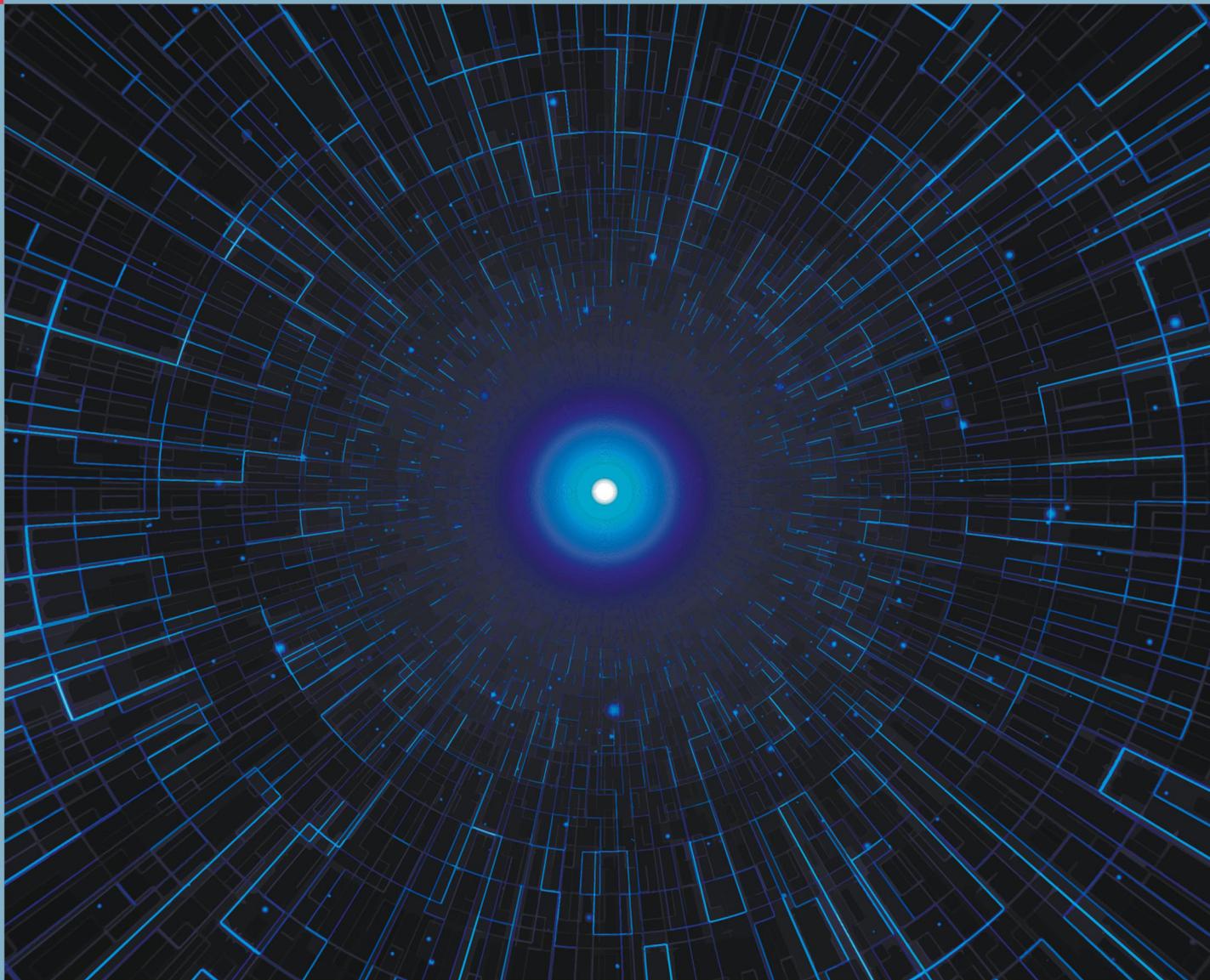


CERTIFIED TEST AUTO- MATION PROFESSIONAL (CTAP™ 2.0) COURSEWARE



Frank van der Kuur

**Certified Test Automation Professional
(CTAP™ 2.0)
-
Courseware**



Colophon

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About this courseware

The Courseware was created by experts from the industry who served as the author(s) for this publication. The input for the material is based on existing publications and the experience and expertise of the author(s). The material has been revised by trainers who also have experience working with the material. Close attention was also paid to the key learning points to ensure what needs to be mastered.

The objective of the courseware is to provide maximum support to the trainer and to the student, during his or her training. The material has a modular structure and according to the author(s) has the highest success rate should the student opt for examination. The Courseware is also accredited for this reason, wherever applicable.

In order to satisfy the requirements for accreditation the material must meet certain quality standards. The structure, the use of certain terms, diagrams and references are all part of this accreditation. Additionally, the material must be made available to each student in order to obtain full accreditation. To optimally support the trainer and the participant of the training assignments, practice exams and results are provided with the material.

Direct reference to advised literature is also regularly covered in the sheets so that students can find additional information concerning a particular topic. The decision to leave out notes pages from the Courseware was to encourage students to take notes throughout the material.

Although the courseware is complete, the possibility that the trainer deviates from the structure of the sheets or chooses to not refer to all the sheets or commands does exist. The student always has the possibility to cover these topics and go through them on their own time. It is recommended to follow the structure of the courseware and publications for maximum exam preparation.

The courseware and the recommended literature are the perfect combination to learn and understand the theory.

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IT Management	IT Service Management	FitSM, ISM®, ISO/IEC20000, IT4IT®, ITIL®, VerISM®, SAF, TRIM, XLA®
	Data Management	Data literacy, Data visualization, DMBOK
	IT Asset Management	HAM, ITAM, SAM
	IT Security Management	BIO, ISO/IEC27001, NIS2
	Test Management	CTAP
	Application Management	ASL
	Other	eCF, IT-CMF, Scrum
Project Management	Project Management	Half Double, ICB, ISO/IEC21500, P3.express, PM2, PMBOK Guide, Praxis, PRINCE2
	Agile	Agile, Agile PM
	Other	PMO
Business Management	Operations Management	Lean, Lean Six Sigma, OBM, OMC, RASCI
	Contract Management	CATS CM, CATS RVM, IACCM World
	Business Information Management	BiSL, DID
	Artificial Intelligence	AI, Generative AI
	Outsourcing	OPBOK
Enterprise Architecture	Enterprise Architecture	BIAN, TOGAF
	Modeling	ArchiMate, BPMN
	Software Architecture	ISAQB
	Other	Open Agile Architecture

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Self-Reflection of understanding Diagram

‘What you do not measure, you cannot control.’ – Tom Peters

Fill in this diagram to self-evaluate your understanding of the material. This is an evaluation of how well you know the material and how well you understand it. In order to pass the exam successfully you should be aiming to reach the higher end of Level 3. If you really want to become a pro, then you should be aiming for Level 4. Your overall level of understanding will naturally follow the learning curve. So, it’s important to keep track of where you are at each point of the training and address any areas of difficulty.

Based on where you are within the Self-Reflection of Understanding diagram you can evaluate the progress of your own training.

Level of Understanding	Before Training (Pre-knowledge)	Training Part 1 (1st Half)	Training Part 2 (2nd Half)	After studying / reading the book	After exercises and the Practice exam
Level 4 <i>I can explain the content and apply it .</i>					
Level 3 <i>I get it!</i> <i>I am right where I am supposed to be.</i>					Ready for the exam!
Level 2 <i>I almost have it but could use more practice.</i>					
Level 1 <i>I am learning but don't quite get it yet.</i>					

(Self-Reflection of Understanding Diagram)

Write down the problem areas that you are still having difficulty with so that you can consolidate them yourself, or with your trainer. After you have had a look at these, then you should evaluate to see if you now have a better understanding of where you actually are on the learning curve.

Troubleshooting

Problem areas:

Topic:

Part 1

Part 2

**You have gone
through the book
and studied.**

**You have answered
the questions and
done the practice
exam.**

Timetable

Day 1

Course Introduction
Test Automation Introduction
Understanding the Use-Cases
Areas of Application
What to Test Where
Test Automation Approaches

Day 2

Test Automation and the SUT
Test Data Management
Test Script Development
Continuous & Zero-Touch Testing

Day 3

Test Automation Architecture
AI for Test Automation
Selection of Tools
Test Automation Roles
Prepare for the Exam

Syllabus
Certified Test Automation Professional (CTAP)
Foundation



Version 2.1

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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 need 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 requires that test 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 one team or project and are difficult to transfer to other teams or projects. A too technical approach is frequently suggested, limited to a focus on tools and 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 in a manner that inside the organization a reliable quality level of test automation is reached. This demands more attention to detail and 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
- Reusability of test automation
- Leverage industry best practice from a vast amount of professionals over many years
- Have a common language within your team and organization in relation to test automation
- Guaranteed 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 academic. Who all believe that how to automate our testing has common approaches that should always be followed, regardless of your background, type of tooling and industry.

CTAP stands for Certified Test Automation Professional. The shared ambition of the consortium members and its founders is get professionals who are active within the testing domain to have been certified in CTAP, and therefore can benefit from the common understood best practice in Test Automation. Also ensuring a proper execution, enabling higher quality software and reusability of test automation. The Foundation level is the first level which is filled in. 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. Facilitate access to Test Automation learning materials and certification for individuals who want to increase 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 advise on content-related matters and is responsible to audit the Test Automation certification based on market standards.

The CTAP consortium 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 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 24 of the 40 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 https://www.vanharen.net/standards/ctap-certified-test-automation-professional for other available languages.
Exam format:	Online
Type of questions:	Multiple choice. Candidates are advised to read the questions carefully.
Are there also negative questions included in the exam?	Yes. Candidates are advised to read the questions carefully.

Levels

The Agile Consortium Agile 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 (sub) learning objectives are elaborated out in appendix A.

Boundary conditions

The following boundary conditions are applicable related 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 demo's.
- 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:
 - o Able to teach the theory to the students.
 - o Are working in the field of Test Automation.
 - o Has didactic skills. Pass the exam with a score above 10% of the overall average score of people who attended the exam.

Exam requirements and specifications

Module	Exam Requirements	Exam Specification	Weight %	Ref.
1	Introduction (fundamenten)		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 (algemeen)		30%	
2.1		In which cases test automation is applicable		D,E
2.2		Which trends are recognized inside the test automation		D,E
3	Tooling & Scripting (tooling)			
3.1		Different kinds of test tools		D,E
3.2		Selection of test tools		D,E
3.3		Introduction to scripting		D,E
3.4		Implementation of test tooling		D,E
3.5		Scripting		D,E
4	Establishment of test automation (opzetten)		10%	
4.1		The evolution of test automation		A
5	Architecture (architectuur)		15%	
5.1		Manual vs automated testing		A
5.2		Future-proof development of test automation		A
5.3		Test automation and development methods		A
5.4		Test automation functions		A
5.5		Test data Management		A
6	About CTAP		0%	
6.1		About CTAP		
6.2		The CTAP Learning journey		

Key terms and concepts

The following terms are relevant to the CTAP certification

Definition	Description
Agile	A method of software development that focuses on short iterations and collaboration.
Architecture	A description of a system from different perspectives to guide its design and evolution.
Artificial Intelligence	Artificial intelligence (AI) simulates human intelligence in machines that learn from experience and solve complex problems. AI development involves steps like data collection, training a model, and testing predictions to ensure accuracy.
Architecture Principle	A statement reflecting a belief that guides the design of one or more systems.
Capture & playback tool	A test tool that records input during manual test execution to generate test scripts that can later be executed automatically.
Data Generation	The process of defining test data to test an application.
Data-driven testing	A form of testing in which test cases use test data (input and output) defined in a separate file.
DevOps	Integrating software development and operations so that the entire lifecycle responsibility falls under one team.
Driver	A software component that calls and/or controls other software components.
Dynamic Test	A test in which the program code of the system under test is executed.
Feature	A description of a functionality understood by the user organization.
Functional Test	A test based on functional requirements.
Event-driven testing	A form of testing in which test cases are defined (recorded) in terms of the events that occur when using the system under test.
Behavior-driven testing	A form of testing in which test cases are expressed in a pseudo-language close to natural language.
Reusability	The reuse of developed automated components in other test types or test forms.
Repeatability	Executing automated tests repeatedly without significant adjustments.
Keyword-driven testing	Testing based on test cases expressed in keywords, where the keywords represent actions to be performed.

Model-driven testing	A form of testing in which test cases are expressed in structured models that can be automatically interpreted.
Non-functional Test	A test based on quality requirements regarding non-functional requirements such as performance.
OTAP	Development- Test- Acceptance- Production environment.
Transferability	The transfer of automated tests to other users than the original test engineer or to other technology.
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 determine that no faults have been introduced or revealed in unchanged areas of the software component as a result of those changes.
Stub	A minimal implementation of a software component, used to develop or test a component that calls this software component or depends on it in any other way.
Synthetic Test Data	Data generated specifically for testing purposes.
Static Test	A review or inspection of documentation, program code, or object code.
Test Analyst	The person who defines tests at a functional level.
Test Architect	The person who sets the outlines of the test project.
Test Automation	The use of software to perform or support test activities.
Test Automation Framework	A set of software components that can be used when programming automated tests, including conventions for their use.
Test Policy	Recording the main principles on how to handle testing and test automation. Indicating how test automation is organizationally positioned.
Test Consultant	The person who advises the project and line organization on test vision and policy.
Test Data	Data needed to make a test work or that arises during the execution of a test.
Test Data Engineer	The person who ensures that the necessary test data is made available in any way while complying with regular laws and regulations.
Test Data Management	Ensuring that good test data is available to support the test process.

Test Data Strategy	The approach and elaboration on how test data is used, developed, and managed within an organization.
Test Engineer	The person who defines tests at a technical level.
Test Management	Planning, budgeting, monitoring, and controlling test activities.
Test Run	The execution of one or more test cases on the system under test.
Test Type	A group of test activities that are organized and managed together. A test type is linked to responsibilities in a project such as unit testing, system testing, functional acceptance testing, chain testing, user acceptance testing, administrator acceptance testing, and production acceptance testing.
Test Suite	A collection of related test cases.
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.
Tester	The person who executes the defined tests.
Test Vision	Describing the objectives of test automation within an organization.
Test Form	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.
Testware	Those products created to perform the test process such as a test plan, test cases, test scripts, and test data.
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 run.

Recommended literature

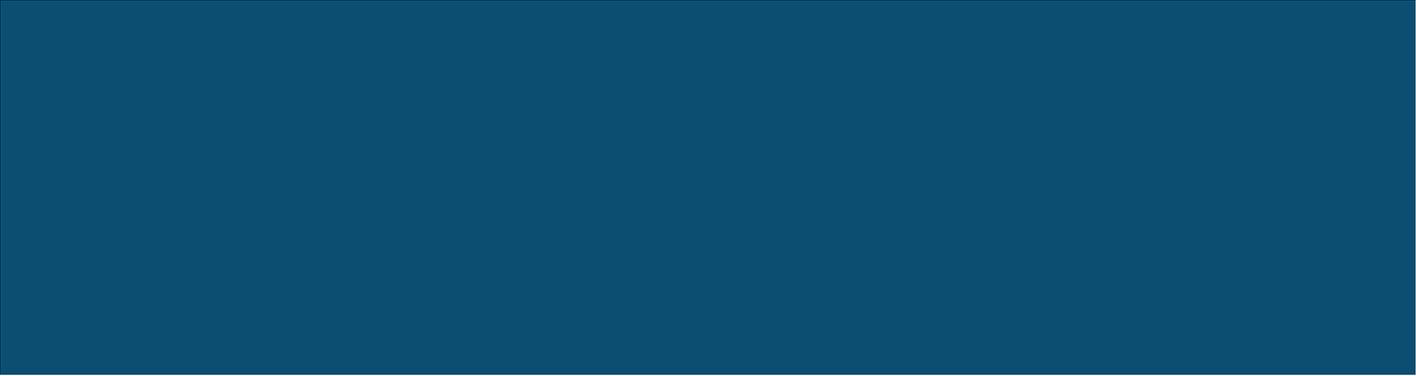
ID.	Source	Form
[A]	'Testautomatisering wendbaar organiseren' – Rooyen, van J, Mersie, MJ, – 2020	Core literature
[B]	Geautomatiseerd software testen. Egbert Bouman	Core literature
[C]	'Automate your testing, sleep while you are working, blz 143-144,' M. Siteur - 2005	Core literature
[D]	'Quality for DevOps teams' – Marselis et al, 2020	Core literature
[E]	'Artificial intelligence and software testing' - Smith et al, 2022	Core Literature

Attachment A: (sub) learning objectives

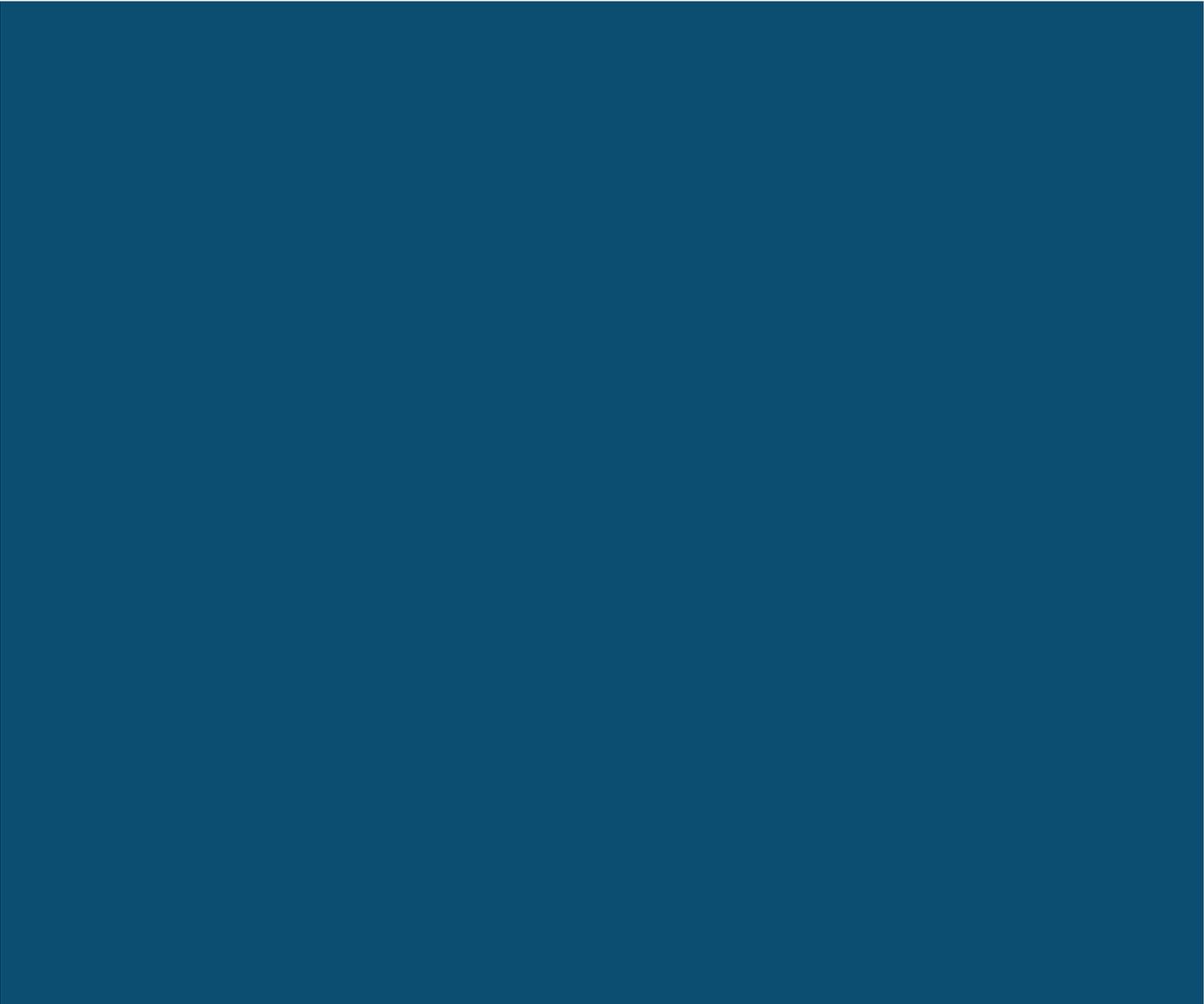
Module	Exam Spec	LO	Learning Objective
1	Introduction (fundamenten)		
1.1	Why is test automation important for the current development methods	1.1.1	Recall the definitions of Test Automation
1.1	Why is test automation important for the current development methods	1.1.2	Understand common situations that make test automation complex and therefore can affect achieving goals, advantages and business value
1.1	Why is test automation important for the current development methods	1.1.3	Be able to indicate what is meant by test automation
1.1	Why is test automation important for the current development methods	1.1.4	Understand the characteristics of the different areas of application
1.1	Why is test automation important for the current development methods	1.1.5	Understand the difference between test automation and automated testing
1.2	What are the purposes of test automation	1.2.1	Understand why test automation is growing ever more important
1.2	What are the purposes of test automation	1.2.2	Understand the considerations for (not) automating a process or part of an application
1.2	What are the purposes of test automation	1.2.3	Understand which goals test automation can and cannot support
1.3	Advantages and disadvantages of test automation	1.3.1	Understand the (dis)advantages of test automation
1.3	Advantages and disadvantages of test automation	1.3.2	Understand the impact on test automation for off-the-self v.s. custom made software
1.3	Advantages and disadvantages of test automation	1.3.3	Understand how to apply test automation to GUI & non-GUI applications
1.3	Advantages and disadvantages of test automation	1.3.4	Understand how the underlying technique of the SUT impacts test automation
1.3	Advantages and disadvantages of test automation	1.3.5	Indicate the business value of test automation
2	Test automation (algemeen)		
2.1	In which cases test automation is applicable	2.1.1	Understanding the Test Automation Pyramid
2.1	In which cases test automation is applicable	2.1.2	Recall the different layers of the test pyramid, their scope and the difference between the layers
2.1	In which cases test automation is applicable	2.1.3	Determine the best layer in the test automation pyramid for a common testcases to be performed

Module	Exam Spec	LO	Learning Objective
2.2	Which trends are recognized inside the test automation	2.2.1	Understand what static and dynamic testing is
2.2	Which trends are recognized inside the test automation	2.2.2	Understand basic concepts about continuous- and zero touch testing
2.2	Which trends are recognized inside the test automation	2.2.3	Apply common test automation definition approaches
3	Tooling & Scripting (tooling)		
3.1	Different kinds of test tools	3.1.1	Understand how different areas of application can enhance each other
3.1	Different kinds of test tools	3.1.2	Determine test automation solutions for common challenges
3.1	Different kinds of test tools	3.1.3	Understand the difference between Whitebox and Blackbox testing
3.2	Selection of test tools	3.2.1	Recall the steps and considerations for performing tool selection
3.3	Introduction to scripting	3.3.2	Apply variation in test scripting
3.4	Implementation of test tooling	3.4.1	Understand how the maturity of the organization and process effect tool selection
3.4	Implementation of test tooling	3.4.2	Understand how the four relevant aspects (cornerstones) of TA effect tool selection
3.4	Implementation of test tooling	3.4.3	Understand common practices for setting up continuous testing
3.5	Scripting	3.5.1	Understand what test script development entails
3.5	Scripting	3.5.2	Apply common conventions to create stable, maintainable and reusable test scripts
3.5	Scripting	3.5.3	Understand how to decouple the SUT from integrated software
3.5	Scripting	3.5.4	Apply post- & pretest scenarios to test automation
3.5	Scripting	3.5.5	Scripting with respect to codeless test automation
3.5	Scripting	3.5.6	Indicate how within scripting low code and high code applications should be taken into account
3.5	Scripting	3.5.7	Understand common ways to manage (sub)sets for test execution
4	Setting up Testautomation (opzetten)		
4.1	The evolution of test automation	4.1.1	Indicate which generations of test automation can be distinguished

Module	Exam Spec	LO	Learning Objective
4.1	The evolution of test automation	4.1.2	Recall the generations of test automation and their characteristics
4.1	The evolution of test automation	4.1.3	Recall in which areas of application AI can support test automation and how
5	Architecture (Architectuur)		
5.1	Manual vs automated testing	5.1.1	Understand how and why test automation and manual testing complement each other
5.2	Future proof development of test automation	5.2.1	Understand the relevant aspects that should be embedded in the test automation architecture
5.2	Future proof development of test automation	5.2.2	Understand the 3 layer model
5.2	Future proof development of test automation	5.2.3	Recall the approach for implementing a test automation architecture
5.2	Future proof development of test automation	5.2.4	Recall how to set up a roadmap based on a growth model
5.2	Future proof development of test automation	5.2.5	Understand basic principles of error handling
5.2	Future proof development of test automation	5.2.6	Understand what frameworks are and how to implement those
5.3	Test automation and development methods	5.3.1	Understand how the Software Development Lifecycle (SDLC) affects the test automation approach
5.3	Test automation and development methods	5.3.2	Understand common test process approaches
5.4	Test automation functions	5.4.1	Recall which roles can commonly be distinguished in relation to test automation
5.4	Test automation functions	5.4.2	Understand the distribution of activities between roles
5.4	Test automation functions	5.4.3	Recall skills and the growth path of a test automation professional
5.5	Test data Management	5.5.1	Understand common ways to set up test data management
5.5	Test data Management	5.5.2	Determine and manage your test dataset
5.5	Test data Management	5.5.3	Understand common ways to make test data GDPR compliant
5.5	Test data Management	5.5.4	Recall the goals and benefits of automated test data management



SLIDE DECK



Welcome to Certified Test Automation Professional

Version 1.4



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COURSEWARE

COURSE INTRODUCTION

What will you learn during this
course?



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COURSEWARE

What is CTAP all about?



CTAP 2.0 covers a wide range of concepts you need to know when working with test automation. We **do not focus on** automating tests with a **specific tool**.

Instead, we teach you all **the fundamental aspects** that you need to know **to implement test automation successfully**, regardless of the toolset you are using.



Knowledge levels



Get the most out of the course



Focus on the course



Actively participate in the tasks



Ask questions, and join in the conversation



Course schedule

• Day 1: topics for day one

- Course Introduction
- Test Automation Introduction
- Understanding the Use-Cases
- Areas of Application
- What to Test Where
- Test Automation Approaches





Course schedule

- **Day 2: topics for day two**
 - Test Automation and the SUT
 - Test Data Management
 - Test Script Development
 - Continuous & Zero-Touch Testing

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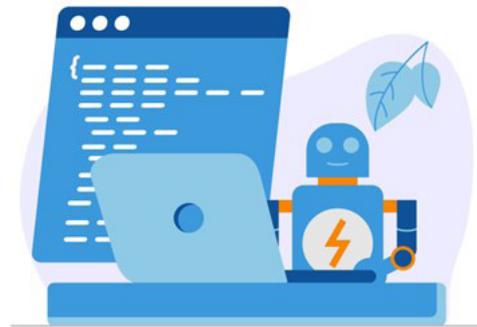
Course schedule

- **Day 3: topics for day three**
 - Test Automation Architecture
 - AI for Test Automation
 - Selection of Tools
 - Test Automation Roles
 - Prepare for the Exam

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WHAT IS TEST AUTOMATION?

What is and isn't included in test automation?



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In this module

LO nr.	Learning objective	K-level
1.1.1	Recall the definitions of test automation	K1
1.1.3	Be able to indicate what is meant by test automation	K1
1.1.4	Understand the characteristics of the different areas of application (introduction)	K2
1.1.5	Understand the difference between test automation and automated testing	K2
4.1.1	Indicate which generations of test automation can be distinguished	K1
4.1.2	Recall the generations of test automation and their characteristics	K1



Definitions



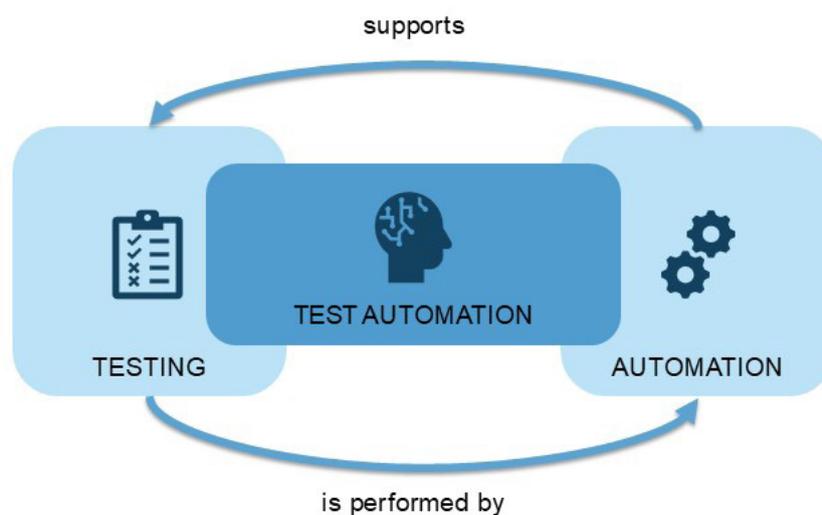
Automated testing is the process of unattended testing of an IT system. Inputs are provided by a tool instead of a person. The tool validates the system based on expectations and reports the results.



Test automation is the use of software to perform or support testing activities.



Test Automation vs. Automated Testing

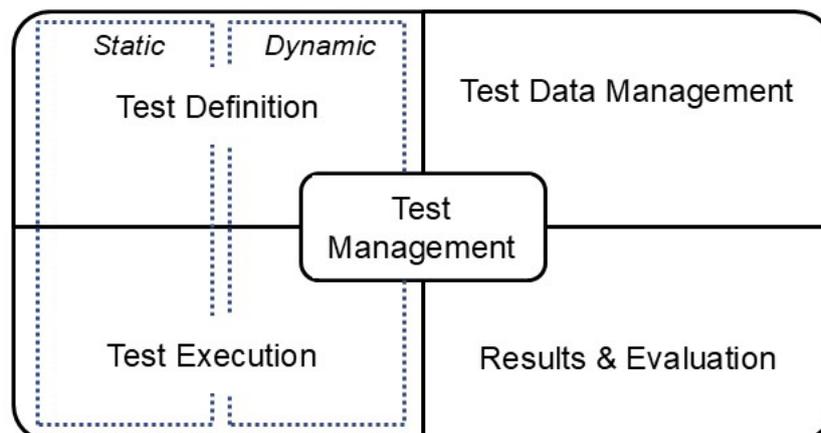


What's the Big Difference?

- Test automation **includes** automated testing, but it covers more than just the unattended execution of tests
- Test automation is also about supporting test-related activities such as:
 - Test management
 - Test design
 - Automation of activities that support the test process
 - Test data management
 - Performing pre- or post-conditions related to the test process
 - Etc.



Areas of Application Overview



Quiz: Test Automation Introduction

Let's do a little quiz.



Who will be the winner of this round?



Which of the following best describes automated testing?

- A: The process of validating IT system responses based on predefined expectations
- B: The use of software tools to support testing activities by a human tester
- C: The process where a tool tests and validates an IT system based on a predefined plan without human intervention
- D: The use of automated scripts to enhance manual testing capabilities

