

# **forklift operator assessment test study guide Handbook**

**forklift operator assessment test study guide** is an essential resource for individuals preparing to demonstrate their skills and knowledge necessary for safe and efficient forklift operation. Whether you're seeking certification for the first time or renewing your license, understanding the key components of the assessment test can significantly improve your chances of success. This comprehensive study guide covers the main topics, test formats, preparation tips, and safety considerations to help you excel in your forklift operator assessment.

## **Understanding the Forklift Operator Assessment Test**

### **What Is the Forklift Operator Assessment?**

The forklift operator assessment is a certification process designed to evaluate a candidate's ability to operate a forklift safely and effectively. It typically includes a written knowledge test and a practical skills demonstration. The goal is to ensure operators are familiar with safety procedures, operational controls, and equipment maintenance.

### **Why Is the Assessment Important?**

Proper assessment helps prevent accidents, protects workers, and ensures compliance with Occupational Safety and Health Administration (OSHA) regulations or relevant local standards. Certified operators demonstrate competence, reducing liability and fostering a safer work environment.

## **Key Components of the Assessment Test**

### **Written Knowledge Test**

This portion assesses your understanding of forklift safety, operational principles, and regulations. Topics covered include:

- Basic forklift terminology
- Pre-operational inspections
- Load handling procedures
- Stability principles

- Workplace safety standards
- Regulations and compliance

## **Practical Skills Test**

The hands-on component evaluates your ability to operate the forklift confidently and safely. Common tasks include:

- Performing pre-operational checks
- Starting and shutting down the forklift
- Turning, steering, and maneuvering in confined spaces
- Loading and unloading pallets or materials
- Stacking and unstacking loads
- Parking and securing the forklift properly

## **Preparing for the Forklift Operator Assessment Test**

### **Review the Study Materials**

Gather official manuals, safety standards, and training handouts relevant to forklift operation. Many organizations provide study guides or online resources tailored to their certification process.

### **Practice the Written Exam**

Use practice tests to familiarize yourself with question formats and common topics. Focus on understanding safety regulations, signage, and operational principles.

### **Gain Hands-On Experience**

Practical training is crucial. If possible, attend a certified forklift training course. Practice operating the forklift daily under supervision to build confidence and competence.

### **Learn Safety Protocols**

Safety is paramount in forklift operation. Study OSHA or local safety standards, including load limits, proper stacking techniques, and hazard recognition.

### **Understand the Equipment**

Become familiar with the specific make and model of forklift you will operate during the test. Know

the controls, gauges, and safety features.

## Study Tips for Success

- Break down study sessions into manageable topics
- Use visual aids such as diagrams and videos
- Join study groups or training classes for peer learning
- Ask experienced operators for tips and insights
- Simulate the practical test conditions during practice

## Common Mistakes to Avoid During the Test

- Ignoring safety protocols or rushing through procedures
- Failing to perform thorough pre-operational inspections
- Overloading loads beyond capacity
- Driving at unsafe speeds or on uneven surfaces
- Not maintaining clear visibility or proper load balance

## Safety Tips for Forklift Operation

### Pre-Operational Checks

Always inspect the forklift before use. Check for leaks, tire condition, brake function, horn, lights, and fluid levels.

### Proper Load Handling

Ensure loads are within the forklift's capacity, evenly distributed, and secure. Keep loads low while moving to maintain stability.

### Speed and Maneuvering

Drive at safe speeds, especially in tight spaces. Use horn signals when approaching intersections or blind spots.

### Workplace Awareness

Stay alert to pedestrian traffic, obstacles, and floor conditions. Use mirrors and cameras if available.

## Parking and Shutdown

Park on level surfaces, set the brake, lower the forks, and turn off the engine when not in use.

## Post-Assessment Steps

### Review Your Results

Understand areas of strength and improvement. If you do not pass, review the feedback and continue practicing before retaking the test.

### Renewal and Continuing Education

Many certifications require periodic renewal. Keep updated with new safety standards and operational techniques through ongoing training.

## Conclusion

A thorough understanding and preparation for the forklift operator assessment test are vital for ensuring safety and competence in the workplace. By studying the key topics, gaining practical experience, and adhering to safety protocols, candidates can confidently pass the assessment and become certified forklift operators. Remember, safety and skill go hand in hand?invest in your training to build a safer, more productive work environment.

### Forklift Operator Assessment Test Study Guide: An In-Depth Examination

In the ever-evolving landscape of industrial safety and warehouse management, the role of a forklift operator remains pivotal. Ensuring that operators are well-trained and competent is not just a regulatory requirement but a cornerstone of operational efficiency and safety. Central to this process is the forklift operator assessment test study guide, a comprehensive resource designed to prepare candidates for certification examinations and to uphold high standards within workplaces. This article offers an in-depth analysis of what such study guides entail, their importance, and how they can be effectively utilized to pass assessments and promote safety.

## Understanding the Importance of a Forklift Operator Assessment Test Study Guide

The primary purpose of a forklift operator assessment test study guide is to equip prospective operators with the knowledge and skills necessary to operate forklifts safely and efficiently. These guides serve multiple functions:

- Educational Resource: They consolidate essential safety protocols, operational procedures, and regulatory requirements into a structured format.
- Preparation Tool: They familiarize candidates with the format and content of the actual assessment tests.
- Safety Promoter: By emphasizing safety measures, they foster a culture of safety consciousness among operators.
- Legal Compliance: Proper preparation helps organizations ensure compliance with OSHA (Occupational Safety and Health Administration) and other relevant standards.

A well-designed study guide can significantly increase the likelihood of passing the assessment, reducing the risk of accidents and workplace injuries.

## Core Components of a Forklift Operator Assessment Test Study Guide

A comprehensive study guide covers a broad range of topics, each critical to safe and effective forklift operation. The key components include:

### 1. OSHA and Regulatory Standards

- OSHA Regulations: Overview of OSHA 29 CFR 1910 Subpart N, which governs powered industrial trucks.
- Employer Responsibilities: Training, evaluation, and safe operation mandates.
- Operator Responsibilities: Safe practices, pre-operation checks, and reporting hazards.

### 2. Forklift Types and Their Uses

- Types of Forklifts: Counterbalance, reach trucks, rough terrain, pallet jacks, etc.
- Operational Differences: Handling, capacity, and working environments.

### 3. Daily Inspection and Maintenance

- Pre-Operation Checks: Tires, brakes, steering, mast, hydraulics, lights, and warning devices.
- Defect Reporting Procedures

### 4. Operating Procedures and Safety Practices

- Starting and Stopping: Proper procedures.
- Load Handling: Picking, stacking, unstacking, and load stability.
- Driving Safely: Speed limits, horn usage, and blind spot awareness.
- Parking: Proper parking and securing the forklift.

## 5. Load Management

- Load Capacity: Understanding load charts.
- Center of Gravity: Ensuring stability.
- Handling Unusual Loads: Handling irregular shapes or fragile items.

## 6. Hazard Identification and Risk Prevention

- Common Hazards: Pedestrian interaction, uneven surfaces, overhead obstructions.
- Preventive Measures: Signage, barriers, and safety barriers.

## 7. Emergency Procedures

- Accident Response: First aid, reporting incidents.
- Fire Safety: Use of extinguishers, evacuation plans.

## Strategies for Effective Study and Preparation

To maximize success, candidates should adopt targeted study strategies aligned with the content of the study guide. These include:

- Active Reading: Engage with the material by highlighting key points and taking notes.
- Practice Tests: Use sample assessments to familiarize with question formats and time constraints.
- Visual Aids: Diagrams and videos can clarify complex procedures like load balancing and forklift controls.
- Hands-On Training: Complement theoretical knowledge with practical experience under supervision.
- Review Regulatory Documents: Familiarize with OSHA standards and company policies.

## Sample Questions and Practice Exercises

Incorporating practice questions into study routines enhances retention and comprehension. Here are illustrative examples:

- What is the first step before operating a forklift?

- a) Start the engine immediately
- b) Perform a pre-operation safety check
- c) Load the forklift with materials
- d) Notify your supervisor

Answer: b) Perform a pre-operation safety check

- Which of the following is a sign of a forklift in need of maintenance?

- a) Unusual noises during operation
- b) Smooth steering
- c) Adequate tire pressure
- d) Proper hydraulic function

Answer: a) Unusual noises during operation

- When approaching a blind corner, a forklift operator should:

- a) Speed up to clear quickly
- b) Sound the horn and proceed cautiously
- c) Turn off the forklift
- d) Continue without slowing down

Answer: b) Sound the horn and proceed cautiously

## Common Challenges in Using a Forklift Operator Assessment Test Study Guide

While study guides are invaluable, candidates often face obstacles in their preparation:

- Information Overload: The breadth of content can be overwhelming; focusing on key safety principles is essential.
- Outdated Material: Some guides may not reflect the latest regulations or equipment updates; always verify the source.
- Lack of Practical Application: Theoretical knowledge alone isn't enough; hands-on practice is crucial.
- Test Anxiety: Familiarity with test formats and practice exercises can reduce anxiety.

To mitigate these challenges, candidates should select reputable, updated study resources and seek practical training opportunities.

## The Role of Employers and Training Providers

Employers and certified training providers are responsible for delivering comprehensive instruction that complements the study guide material. They should:

- Provide updated study materials aligned with current regulations.
- Incorporate practical demonstrations and supervised operation.
- Conduct assessments that mirror the certification tests.
- Offer feedback and remedial training when necessary.

An integrated approach combining a robust forklift operator assessment test study guide with practical experience ensures a safe and competent workforce.

## Conclusion: The Path to Certification and Safety

The forklift operator assessment test study guide is more than just a preparatory resource; it is a vital tool that underpins workplace safety, compliance, and operational efficiency. By thoroughly understanding its components, employing effective study strategies, and integrating practical training, candidates can confidently approach their assessments and become responsible forklift operators.

Achieving certification through diligent study not only fulfills regulatory requirements but also fosters a safety-first culture that benefits entire organizations. As industries continue to prioritize safety and



efficiency, the importance of well-designed, comprehensive study guides will only grow, supporting the development of skilled, confident, and safety-conscious forklift operators worldwide.

**Question** What topics are typically covered in a forklift operator assessment test study guide? A forklift operator assessment test study guide generally covers topics such as safety procedures, load handling, forklift operation techniques, maintenance checks, and OSHA regulations to ensure safe and efficient operation. **Answer** How can a study guide help me prepare for the forklift operator assessment test? A study guide provides key information, practice questions, and safety tips that help familiarize you with test content, improve your knowledge, and boost confidence to pass the assessment successfully. Are there specific safety protocols I should focus on when studying for the forklift operator test? Yes, you should focus on safety protocols such as proper load stacking, operating at safe speeds, using seat belts, inspecting equipment before use, and understanding workplace hazard signs as outlined in the study guide. How important is practical experience versus studying with a guide for passing the forklift assessment? While practical experience is crucial for developing real-world skills, studying with a guide helps you understand safety regulations, operational procedures, and test formats, increasing your chances of passing the assessment. Where can I find reliable study guides or practice tests for the forklift operator assessment? Reliable study guides and practice tests can be found through OSHA resources, forklift manufacturer training materials, online safety training platforms, and industry-specific training websites.

**Related keywords:** forklift certification, forklift safety test, operator training manual, forklift skills evaluation, warehouse equipment certification, forklift driving exam, OSHA forklift requirements, forklift training materials, material handling assessment, forklift proficiency checklist

## MICROSOFT TEST MANAGER TUTORIAL

### **Microsoft Test Manager Tutorial:** A Comprehensive Guide to Efficient Test Management

In the world of software development, ensuring the quality and reliability of your applications is paramount. Microsoft Test Manager (MTM) is a powerful tool designed to streamline the testing process, enabling teams to plan, execute, and track testing efforts with ease. Whether you're a beginner or looking to enhance your testing workflows, this **Microsoft Test Manager tutorial** will provide you with a step-by-step guide to harnessing MTM's full potential for your projects.

### **Understanding Microsoft Test Manager**

Before diving into the tutorial, it's essential to grasp what Microsoft Test Manager is and how it

integrates into the broader Visual Studio ecosystem.

## What is Microsoft Test Manager?

Microsoft Test Manager is a test management tool integrated with Visual Studio Team Services (VSTS) and Azure DevOps. It provides an intuitive interface for managing test plans, creating and executing test cases, and tracking testing progress. MTM supports both manual and exploratory testing, making it versatile for various testing scenarios.

## Key Features of Microsoft Test Manager

- Test Planning: Create and organize test plans, test suites, and test cases.
- Test Execution: Execute manual tests and record results efficiently.
- Test Tracking: Monitor testing progress and generate detailed reports.
- Exploratory Testing: Conduct ad-hoc testing sessions with session-based testing capabilities.
- Integration: Seamlessly connects with Azure DevOps for continuous testing workflows.

## Setting Up Microsoft Test Manager

Getting started with MTM involves installing and configuring the tool for your environment.

### Prerequisites

- Visual Studio Enterprise or Professional edition (with test management features).
- Azure DevOps account or TFS (Team Foundation Server) setup.
- Appropriate permissions to access test management features.

## Installing Microsoft Test Manager

- Download the Visual Studio Installer from the official Microsoft website.
- Choose the edition that includes testing tools (e.g., Visual Studio Enterprise).
- During installation, select the "Testing Tools" workload to install MTM.
- Complete the installation and launch Visual Studio.
- Connect to your Azure DevOps project or TFS server within Visual Studio.

## Creating and Managing Test Plans

A well-structured test plan is the foundation of successful testing. MTM simplifies organizing your

testing efforts through test plans and suites.

## Creating a Test Plan

- Open Microsoft Test Manager from Visual Studio or the Azure DevOps portal.
- Navigate to the "Test Plans" section.
- Click "New Test Plan" and provide a descriptive name, description, and start/end dates.
- Associate the test plan with a specific build or release if needed.
- Save the test plan to begin adding test cases.

## Organizing Test Suites

Test suites help categorize test cases based on features, modules, or testing strategies.

- **Static Test Suites:** Manually organize test cases into logical groups.
- **Requirement-Based Test Suites:** Link test cases to specific requirements or user stories.
- **Query-Based Test Suites:** Dynamically generate test cases based on queries.

## Adding Test Cases

- Within your test suite, click "New Test Case" or import existing cases.
- Define the test case steps, expected results, and associated requirements.
- Assign priority, owner, and other metadata to facilitate management.
- Save the test case to include it in your suite.

## Executing Tests with Microsoft Test Manager

Once your test cases are organized, the next step is executing tests and recording results.

### Manual Test Execution

- Open the test plan and select the test suite to execute.
- Click "Run" on the test case you wish to execute.
- Follow the test steps as documented, marking each step as "Passed" or "Failed."
- If a test fails, record detailed bug information directly from the test runner.
- Complete the test run, and the results will be saved automatically.

## Using Action Recording and Data Collection

MTM allows capturing detailed logs and screenshots during test execution, aiding in defect analysis and reproducibility.

## Exploratory Testing

For ad-hoc testing, MTM offers session-based testing:

- Schedule a testing session with session details.
- Conduct testing while documenting observations and findings.
- Record bugs and issues discovered during the session.

## Tracking and Reporting Testing Progress

Effective test management requires insight into testing status and quality metrics.

## Monitoring Test Results

- Navigate to the "Test Results" section in MTM or Azure DevOps.
- Review individual test case outcomes and overall progress.
- Filter results by tester, status, or test plan for detailed analysis.

## Generating Reports

MTM provides various built-in reports to visualize testing status:

- Test Results Summary
- Test Case Progress and Trends
- Bugs and Defects Reports

## Integrating with Bug Tracking

During testing, bugs can be logged directly from MTM, linked to specific failed test cases, ensuring traceability and quick resolution.

## Advanced Tips and Best Practices

Maximize your testing efficiency with these expert tips:

## Automate Repetitive Tests

Integrate MTM with automated testing frameworks like MSTest, NUnit, or Selenium to run automated tests alongside manual efforts.

## Maintain Test Cases Regularly

Keep your test cases updated with application changes to ensure relevance and accuracy.

## Use Tags and Filters

Leverage tags and filters to quickly locate and execute specific test cases based on criteria like priority, feature, or owner.

## Collaborate Effectively

Encourage team collaboration by sharing test plans and results, and conducting regular review meetings to discuss testing progress.

## Conclusion

Microsoft Test Manager is an essential tool for teams aiming to implement structured and efficient testing workflows. From creating comprehensive test plans and organizing test suites to executing tests and tracking outcomes, MTM provides a centralized platform that enhances test visibility and quality assurance. By following this **Microsoft Test Manager tutorial**, you can streamline your testing process, improve defect detection, and deliver higher-quality software products. Remember to stay updated with the latest features and best practices to maximize your testing success with MTM.

Microsoft Test Manager tutorial: A Comprehensive Guide to Streamlining Your Testing Process

Microsoft Test Manager (MTM) is a powerful tool integrated within the Azure DevOps suite, designed to facilitate efficient test planning, management, and execution. Whether you are a QA professional, a developer, or a project manager, mastering MTM can significantly enhance your testing workflows, improve defect detection rates, and ensure higher quality software releases. This tutorial aims to provide an in-depth overview of Microsoft Test Manager, guiding you through its features, setup, best practices, and real-world applications.

Introduction to Microsoft Test Manager

Microsoft Test Manager is a dedicated testing management environment that helps teams plan, execute, and track testing activities seamlessly. Originally part of Visual Studio Test Professional, MTM is now integrated within Azure DevOps, offering a unified platform for Agile testing, exploratory testing, and manual test case management.

### Key Features of Microsoft Test Manager

- Test Planning: Create and organize test plans, test suites, and test cases.
- Test Execution: Run manual tests, record results, and capture screenshots.
- Test Management: Track defects, manage test configurations, and generate reports.
- Integration: Seamlessly connect with Azure DevOps for continuous integration and automated testing workflows.
- Exploratory Testing: Record exploratory sessions with detailed notes and recordings.

### Setting Up Microsoft Test Manager

Before diving into testing, proper setup of MTM is essential.

#### Prerequisites

- A valid Azure DevOps account with appropriate permissions.
- Installed Visual Studio Test Professional or access via Azure DevOps.
- Access to a test environment or lab machines.

### Installation and Configuration

- Download and Install: Download Microsoft Test Manager from the Visual Studio downloads page or via Azure DevOps.
- Connect to Azure DevOps: Launch MTM and connect it to your Azure DevOps project by signing in with your credentials.
- Configure Test Environments: Set up test machines, configurations, and network environments to align with your testing needs.

### Tips for Effective Setup

- Organize your test plans hierarchically for easier management.
- Maintain a clear mapping between test environments and real-world configurations.

- Regularly update test artifacts to ensure they reflect current application versions.

## Creating and Managing Test Plans

Test planning is the foundation of effective testing.

### Creating a Test Plan

- In MTM, navigate to the "Test Plans" section.
- Click "New Test Plan" and provide a descriptive name, start/end dates, and any relevant details.
- Assign ownership and stakeholders.

### Organizing Test Suites

- Static Test Suites: Manually added test cases grouped logically.
- Requirement-based Suites: Linked to user stories or requirements for traceability.
- Query-based Suites: Dynamic grouping based on queries.

### Best Practices

- Break down large test plans into smaller, manageable suites.
- Link test cases to user stories or bugs for better traceability.
- Regularly review and update test plans to reflect current project scope.

## Designing and Managing Test Cases

Creating effective test cases is critical to uncovering defects early.

### Writing Test Cases

- Clear, concise steps with expected results.
- Use descriptive titles and tags for easy filtering.
- Include preconditions and postconditions.

### Reusing Test Cases

- Modularize test steps for reuse across different test cases.
- Attach relevant documentation, screenshots, or scripts.

## Organizing Test Cases

- Group related test cases into shared test suites.
- Use labels and tags for categorization.

## Tips for Effective Test Cases

- Prioritize test cases based on risk and impact.
- Keep test cases up-to-date with application changes.
- Incorporate exploratory testing notes within test cases or as separate sessions.

## Test Execution and Result Recording

Executing tests efficiently and accurately recording results is vital.

### Running Manual Tests

- Select a test case from your test suite.
- Follow each step, observing the actual behavior.
- Record outcomes: Passed, Failed, Blocked, or Not Applicable.
- Capture screenshots or record videos if needed.

### Recording Defects

- Link defects directly to failed test cases.
- Provide detailed descriptions, steps to reproduce, and severity.
- Attach logs or screenshots to aid debugging.

### Managing Test Runs

- Use test configurations to run multiple test cases under different environments.
- Schedule and assign test runs to team members.
- Monitor real-time progress and results.



## Pros and Cons of Test Execution Features

### Pros:

- Streamlined process for manual testing.
- Rich media capture for detailed documentation.
- Easy defect linkage and traceability.

### Cons:

- Manual process can be time-consuming for large test suites.
- Limited automation capabilities within MTM itself.

## Integrating Automated Testing with Microsoft Test Manager

While MTM excels at manual testing, integration with automated testing frameworks enhances overall efficiency.

### Integration with Visual Studio Test Automation

- Use Visual Studio Test tools to develop automated test scripts.
- Link automated tests to test cases in MTM.
- Run automated tests as part of continuous integration pipelines.

### Benefits of Integration

- Reduces manual effort.
- Ensures consistency between manual and automated testing.
- Facilitates comprehensive test coverage.

### Limitations

- Setup can be complex for beginners.
- Requires scripting knowledge for automation.

## Reporting and Tracking

Effective reporting provides insights into testing progress and quality metrics.

### Built-in Reports

- Test Run Summary
- Test Results Trend
- Defect Status and Age
- Requirements Traceability Matrix

### Custom Reports

- Use Azure DevOps Analytics or Power BI for tailored dashboards.
- Export data for external analysis.

### Best Practices

- Regularly review reports to identify bottlenecks.
- Use metrics to prioritize testing efforts.
- Maintain up-to-date dashboards for stakeholder visibility.

### Best Practices for Using Microsoft Test Manager

- Plan Early: Incorporate testing early in the development lifecycle.
- Maintain Test Artifacts: Keep test cases and plans updated with application changes.
- Leverage Linkages: Connect requirements, test cases, defects, and build versions.
- Automate Where Possible: Use automation to handle repetitive and regression testing.
- Collaborate: Engage team members through shared test plans and results.
- Review Regularly: Conduct test reviews and retrospectives for continuous improvement.

### Common Challenges and How to Overcome Them

#### Challenge: Managing Large Test Suites

Solution: Break down into smaller, manageable suites; use query-based suites for dynamic grouping.

#### Challenge: Keeping Test Cases Up-to-date

Solution: Establish a review cycle aligned with development sprints; assign ownership.

Challenge: Integration Complexity

Solution: Invest in automation and continuous integration pipelines; use documentation and training.

Challenge: Limited Automation within MTM

Solution: Use external automation tools integrated with Azure DevOps, such as Selenium or Coded UI.

## Conclusion

Microsoft Test Manager is a robust tool that, when used effectively, can significantly boost your testing efficiency, coverage, and traceability. Its comprehensive features for test planning, execution, defect management, and reporting make it indispensable for teams adopting Agile and DevOps practices. While there are challenges, especially around automation and managing large test repositories, with proper setup, training, and best practices, MTM can become a cornerstone of your software quality assurance process.

By following this tutorial, you should now have a clear understanding of how to leverage Microsoft Test Manager to streamline your testing operations, improve collaboration, and ultimately deliver higher quality software to your users. Remember, continuous learning and adaptation are key to maximizing the benefits of MTM in your projects.

**Question** What are the main features of Microsoft Test Manager (MTM)? Microsoft Test Manager (MTM) provides features such as test planning, manual test execution, test case management, bug tracking integration, and collaboration tools to streamline the testing process within Visual Studio and Azure DevOps. **Answer** How do I create and organize test plans in Microsoft Test Manager? In MTM, you can create test plans by navigating to the 'Test Plans' hub, clicking 'New Test Plan,' and defining its name and details. You can then add test suites and test cases to organize tests based on requirements, features, or test types for better management. Can I automate tests using Microsoft Test Manager, and how is it integrated with other tools? While MTM primarily supports manual testing, it integrates seamlessly with Visual Studio and Azure DevOps, enabling automation through test scripts and frameworks like MSTest, Selenium, or CodedUI. Automated tests can be linked to test cases for comprehensive test management. What are the best practices for using Microsoft Test Manager effectively? Best practices include maintaining detailed and reusable test cases, organizing tests into logical suites, utilizing shared steps for common actions, integrating with bug tracking, and regularly updating test plans based on project changes to ensure thorough testing coverage. Is Microsoft Test Manager suitable for Agile development environments? Yes, MTM is well-suited for Agile teams as it supports iterative testing, easy

integration with Azure DevOps Agile tools, and flexible test planning, allowing teams to adapt testing activities to sprint cycles and continuous delivery workflows.

**Related keywords:** Microsoft Test Manager, TFS testing, test planning, test case management, automated testing, test execution, bug tracking, test lab management, test reporting, test automation tools

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