# 2CSDE80 STQA Lab-2 Task
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## Aim: To perform a comparative analysis of software testing tools

## 1. Open-source software testing tools comparative study

| Features | Katalon Studio | Selenium | Appium | Robotium | Cucumber |
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| **Test development platform** | Cross-platform | Cross-platform | Cross-platform | Test automation framework for android | Cross-platform |
| **Application under test** | Windows desktop, Web, Mobile Apps, API/Web services | Web apps | Mobile apps(iOS and Android), firefox OS | Mobile android apps | For Behavioral Driven Development |
| **Scripting languages** | Java/Groovy | Java, C#, Perl, Python, JavaScript, Ruby, PHP | Java, Python, Ruby, C#, JavaScript, and PHP | Java | Ruby, Java, .Net |
| **Programming skills** | Not required. Recommended for advanced test scripts | Advanced skills needed to integrate various tools | Any programming language(core java, C#, python) | Holdover Java and ActivityInstrumenta tionTestCase2 to define Andriod activities | To learn BDD basic knowledge of Java, Selenium, test driven development and IDEs like eclipse, IntelliJ is needed |
| **Learning curves** | Medium | High | Medium | Medium | Easy |
| **Ease of installation** | Easy to set up and run | Require installing and integrating | Easy to use | Must have Android Development Tool | Easy to install, comes with Eclipse |

| and use | | various tools | | installed in Eclipse IDE | Plugin |
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| **Image-based testing** | Built-in support | Require installing additional libraries | Requires installing additional libraries and APIs | Not clear | Need third-party provider like Applitools |
| **DevOps/ALM integrations** | Many | No (require additional libraries) | Many | Many | Not clear |
| **Test Analytics** | Katalon TestOps | No | Appium or espresso + UI automator | Not clear | Cuke_sniffer-Static |
| **Product support** | Community, Business support service, Dedicated staff | Open-source community | Open-source community | Open-source community | Open-source community |
| **License Type** | Proprietary | Open-source (Apache 2.0) | Open-source (Apache 2.0) | Open-source (Apache 2.0)d | MIT license |
| **Cost** | Freemium | Free | Free | Free | Free |
| **Pros** | <ul><li>No licensing and maintenance fees required (paid dedicated support services is available if needed).</li><li>Integrating necessary</li></ul> | <ul><li>Open source, no licensing and maintenance fees.</li><li>Large and active development and user community to keep pace with software technologies.</li><li>Open for</li></ul> | <ul><li>it can test outside the target application such as sending a message, making a call, etc.</li><li>The biggest strength of Appium is its large and vibrant community that offers steady support and commits.</li><li>It supports</li></ul> | <ul><li>It is suitable for grey box testing which means minimal knowledge of the app is enough to test it.</li><li>It automatically tests multiple devices simultaneously.</li><li>Robotium integrates well with Gradle, Maven, Ant and supports automatic delays, timings and views.</li></ul> | <ul><li>Focuses on defining 'behavior' rather than defining 'tests'</li><li>Enhances communication among the members of a cross-functional product team</li><li>Enables you to understand how the system should perform from the developer's and customer's perspective</li></ul> |

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| | frameworks and features for quick test cases creation and execution.<br>● Built on top of the Selenium framework but eliminating the need for advanced programming skills required for Selenium. | integration with other tools and frameworks to enhance its capability | other platforms such as iOS and Windows. It means developers can use the same code to test Android and iOS devices. | | |
| **Cons** | ● Emerging solutions with a quickly growing communit y.<br>● The feature set is still evolving. | ● Testing teams need to have good programming skills and experience to set up and integrate Selenium with other tools and frameworks.<br>● New teams need to invest time upfront for | ● Starting to test with Appium is relatively complex as you have to first download, install, and configure the settings.<br>● Android and iOS devices that are connected and available for the test are also a necessity.<br>● It is relatively | ● Robotium cannot simultaneously test multiple applications.<br>● Notification handling of mobile devices is not possible. It cannot pull and open a notification.<br>● The screenshot feature is not available.<br>● Inconsistent failure handling is a challenge. | ● Testers must have prior experience in TDD (Test-driven Development) to work in BDD<br>● BDD approach may be ineffective if the requirements are not correctly analyzed<br>● testers must have sufficient technical skills |

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| | • Lack of choices for scripting languages: only Java/Groovy is supported. | setup and integration.<br>• Slow support from the community. | slow on execution owing to the dependency on WebDriver. | |

## 2. License tools for software testing:

| Features | UTF | TestComplete | Qmetry | Worksoft | Ranorex |
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| | HP UFT | TestComplete | QMETRY | WORKSOFT | Rx |
| Test development platform | Windows | Windows | Cross-platform | Codeless test automated platform | Cross-platform |
| Application under test | Windows desktop, Web Mobile apps, API.Web services | Windows desktop, Web Mobile apps, API.Web services | Web, web services/API's, mobile and Windows desktop | ERP applications, web apps, mobile apps | Web-based, desktop, and mobile applications. |
| Scripting languages | VBScript | JavaScript, Python, VBScript, Jscript, Delphi, C++, and C# | Java, Python, Typescript, Javascript | It is a codeless platform | VB.NET, C# |
| Programming skills | Not required. Recommended for advanced test scripts. | Not required. Recommended for advanced test scripts. | Should be proficient in Java, Python, Perl, Vb Script | It takes away the problem of finding people with the correct programming language since there are multiple such languages. | Doesn't use any ask for specific scripting languages, its build-in Microsft's >NET platform and thus should know the standard programming languages |
| Learning | Medium | Medium | Medium | Medium | Medium |

| curves | | | | | |
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| **Ease of installation and use** | Easy to set up and run | Easy to set up and run | Easy to setup and configure | Long process but easy to install | Can be installed under Ranorex agent, complex process and may need guidance |
| **Image-based testing** | Built-in support, image-based object recognition | Built-in support | UI and visual component validation via automated testing to ensure data integrity across channels and devices ensuring data integrity across devices and channels. | Built-in using LiveTouch test button | Recently integrated the feature in the software. |
| **DevOps/ALM integrations** | Many | Many | Many | Using add-on tool | Many |
| **Test Analytics** | No | No | Yes | Using Worksoft Analyze | Yes, in the Ranorex studio |
| **Product support** | Dedicated staff, Community | Dedicated staff, Community | Free trial and then for Dedicated staff, Community | Dedicated staff, Community | Based on SharpDevelop, an open-source tool |
| **License Type** | Proprietary | Proprietary | Proprietary | Proprietary | Node-lock and floating |
| **Cost** | Seat based is $2000/6mo | License and maintenance | $25/mo/user | $6000/user | $3590 per workstation for studio license |
| **Pros** | <ul><li>Mature, comprehensive automated testing features integrated into a single system.</li><li>Dedicated user support plus an established large user community.</li><li>Requiring only basic programming</li></ul> | <ul><li>Mature, comprehensive automated testing features integrated into a single system.</li><li>Many scripting languages to choose from.</li><li>Only basic programming skills are needed.</li></ul> | <ul><li>Well suited for micro-services type of applications</li><li>Ensures data integrity across devices and channels</li><li>Automatic test component generation</li></ul> | <ul><li>The biggest feature is the fact that it's codeless. It takes away the problem of finding people with the correct programming language since there are multiple such languages.</li><li>It saves time in introducing people to the solution because they don't need programming knowledge, they just need to be able to think logically.</li><li>This makes it</li></ul> | <ul><li>Multi-Platform Testing Ranorex enables you to test applications on multiple platforms i.e. web, desktop, mobile, etc. A lot of its competitors do not have this feature.</li><li>Test Without Coding The recorder feature in Ranorex applies a keyword-driven testing method that allows users to test their GUI's without having to write a script.</li></ul> |

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| | skills to get started with test creation and execution | | | vastly usable by more people who are not even acquainted with IT at all. | • User-Friendly UI Ranorex has the friendliest user interface with easy-to-use test automation tools. |
| **Cons** | • Costly solution: license and maintenance fees are considerably high.<br>• Possible high costs for upgrades and additional modules.<br>• Supporting only VBScript | • Like UFT, considerable licensing and maintenance fees are needed for TestComplete.<br>• Additional fees for extra modules and add-ons. | • Paid cost<br>• Should know the languages | • Performance on the web UI part, especially with some of the more comprehensive Fiori features, like the complex tables that are being used, could be improved. In those cases we have noticed a lot of execution-time increase with regards to the Certify solution.<br>• Pricing is a bit high and we would like to have the availability of a trial environment for beginners and training would be great to have an easier to expand and use by more and more consultants.<br>• Better automation capability would be helpful. | • Paid License As opposed to a lot of its open-source competitors like Selenium, Katalon Studio, Watir, etc. Ranorex is a paid licensed tool.<br>• Limited Support Languages As opposed to Selenium, Ranorex studio supports only two scripting languages i.e. C# and VB.NET for coding<br>• Lacks macOS Support Ranorex lacks integration with macOS. It's built on .NET which cannot run on macOS unless it's using the Mono project which in itself is not supported by Ranorex. |

## Conclusion:

Software testing tools are needed to improve applications or software.
This is why we have so many tools available in the market, some of which are open source and paid.
The significant difference between open source and payment tools is that open source tools have limited functions, while commercial or payment tools have no limitations. The choice of tools depends on the user's requirements, whether it is paid or free.
 software testing tools can be classified according to license (paid or commercial, open-source), technology use, test type, etc.