

Scripting techniques in Automation

Ranjit Shewale (jcrvs@hotmail.com)

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Abstract

This article details the various automation scripting techniques and their pros and cons. It also comments on the impact of testing technique on the costs, programming skills and maintenance

Disclaimer

The author has not referred to any automation project costs documentation or cost benefit analysis in order to comment on the costs. The readers are recommended to consume the information at their own understanding and risk.

Document layout

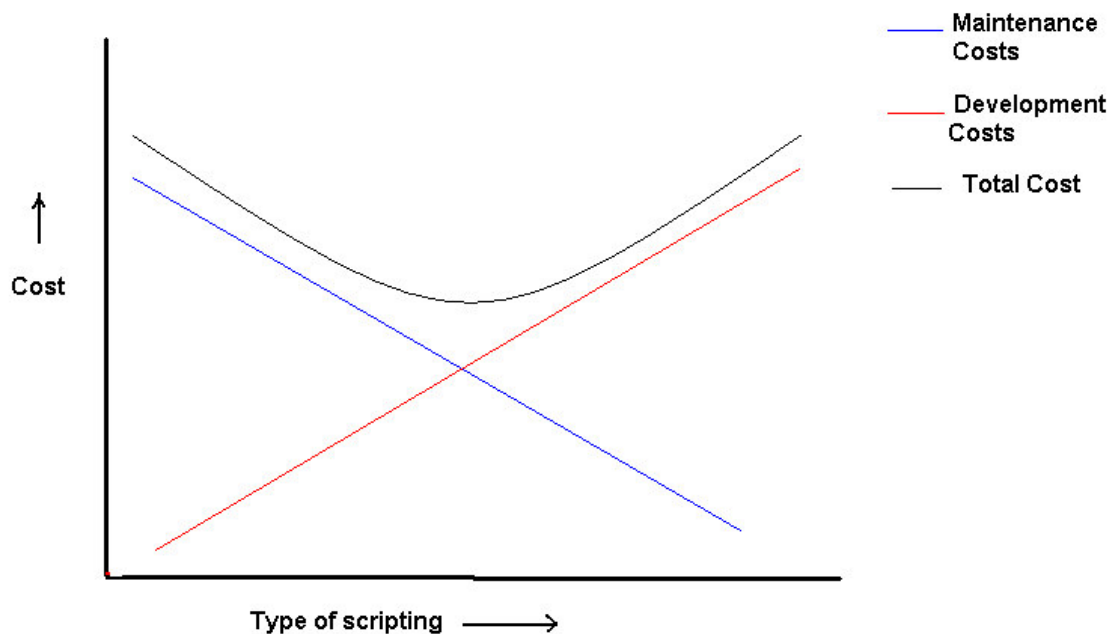
The document briefs on the costs in automation, then on each scripting technique, it's pros and cons is outlined.

For the pros and cons, the following approach is used for comments:

- first comment: Is the approach structured?
- second comment: What is the test case defined by?
- third comment: on development costs,
- fourth comment: on programming skills needed,
- fifth comment: on planning and management,
- sixth script: where is the test data located?
- seventh comment: on script maintenance and cost,
- any other comments

Costs

The costs associated with test scripting are due to the development effort and the maintenance efforts. The approach of scripting used during test automation has effect on the costs



With fragile and easy techniques as 'record and playback' the developments costs are low but the maintenance costs are high and hence the overall costs are high. With advanced techniques as keyword driven testing, the maintenance costs are low but the development costs are high and hence the overall costs are high. The test manager has to choose wisely the technique to minimize the costs.

Various scripting techniques

The various test automation scripting techniques are as follows

1. Linear
2. Structured
3. Shared
4. Data driven
5. Keyword driven

Linear scripting

Linear scripting approach is a simple record and playback used by a test engineer to automate a test flow/ test case of a system. It can contain some redundant functions etc that may not be required at times.

Pros and cons of Linear scripting

1. A non-structured way of programming

2. Test case is defined by script
3. Very low development costs
4. Programming skills required by testers are negligible
5. No planning is required
6. Data is hard coded in scripts
7. Script are fragile, and hence maintenance costs are high
8. No sharing of scripts done and hence efforts may be repeated

Structured scripting

Structured scripting uses control structures in the scripts. These control structures enable testers to control the flow of the test script/ test case. The control structures are typically 'if-else', 'switch', 'for', 'while' conditions/ statements that help in implementing decision making in script, in perform some tasks iteratively and capacity to call other common functions that house commonly needed functionality

Pros and cons of Structured scripting

1. A structured approach to scripting
2. Test case is defined by script
3. Programming costs are slightly increased relatively to liner scripting
4. Intermediate programming skills are required by tester
5. Planning is required to some extent
6. Data is hard code in scripts
7. Script maintenance required is less since they are robust, maintenance costs are relatively lower than liner scripting.
8. Knowledge of scripting language is required in addition to programming knowledge

Shared scripting

Shared scripting is one of techniques in which the scripts representing a application behavior is shared amongst other scripts. This means that the application under test common functionality is scripted as shared scripts and these scripts are then called by other scripts. This makes the scripts modular in terms of common functionality. Such scripts due to the functionality can also cross the AUT boundary and can be used in other software applications as well.

Pros and Cons of Shared scripting

1. Scripts are structured
2. Test case is defined by script
3. Development costs are reduced relative to structured scripting since the effort duplication is eliminated
4. Intermediate programming skills are required by tester

5. More planning is required due to modularity of scripts
6. Data is hard coded in scripts
7. Script maintenance and maintenance costs are relatively lower than linear scripting

Data driven scripting

This technique separates data from the scripts and stores it into external repository as disk in form of files. So the script contains just the programmed code. This may be needed when the data needs to be varied over the test run. This the script need not be modified if it is data that undergoes a change. At times the expected data can also be stored in the data files that have test data.

Pros and Cons of Data driven scripting

1. Scripts are programmed in a structured manner
2. Test case is defined by test data/ script
3. Development costs required are relatively high as compared to the shared scripting due to parameterization and programming efforts
4. Intermediate to high programming skills are required by tester
5. More planning is needed
6. Data is isolated into data tables or external files
7. Script maintenance is as low
8. Recommended to be used where positive and negative data testing needs to be performed

Keyword driven testing

It is an approach in which the control to check and execute operations in maintained with external data files. So the test data and the operations/sequence of the test is planned in external data file and extra library is need to interpret this data in addition to the conventional script. It is an extension of data driven testing.

Pros and Cons of Keyword driven testing

1. Combines the data driven, shared and structured scripting approach
2. Test case is defined by data
3. Development costs are high since more efforts are needed for test planning and development
4. High programming skills are required by tester
5. Initial planning and management efforts are very high
6. Data exists in external files
7. Maintenance costs are low
8. Extra framework or library is needed and hence more programming skills as well needed by tester

Comments on development costs

- As the scripting approach changes from liner to keyword driven scripts, the development costs are increases.

Comments on maintenance costs

- As the scripting approach changes from liner to keyword driven scripts, the maintenance costs decreases.

Comments on Programming skills

- As the scripting approach changes from liner to keyword driven scripts, the proficiency required in programming for a tester increases.

Comments on planning and management required

- As the scripting approach changes from liner to keyword driven scripts, the amount of planning required to manage the automation project increases.

References

1. Software Test Automation: Effective use of test execution tools by Dorothy Graham and Mark Fewster