APPROACHES FOR TEST AUTOMATION SOLUTIONS (TAS)

WHAT IS A TEST CASE?

TEST CASE

- ▸ Sequence of actions that are executed against an SUT.

- ▸ Can be documented in test procedures.

- ▸ Test data.

- ▸ Include verification steps to verify the expected result.

APPROACHES TO CREATE A SEQUENCE OF ACTIONS(TEST CASE)

▸ TAE implements test case directly into automated test scripts.

▸ TAE design test procedures and transform them into automated scripts.

▸ TAE uses tools to generate automated test scrips/test procedures.

Reference:
TAE : Test Automation Engineer - ISTQB Advanced Level Test Automation Engineer

▸ Capture/Playback approach.

▸ Linear scripting approach.

▸ Structured scripting approach.

▸ Data-driven approach.

▸ Keyword-driven approach.

▸ Process-driven approach.

CAPTURE/PLAYBACK APPROACH

▸ Capture interaction with the SUT while performing the sequence of actions.

▸ **Pros**:

  ▸ Easy to setup and use.

▸ **Cons**:

  ▸ Scripts = hard to maintain.

  ▸ Depends strongly on the SUT version.

  ▸ Can start only when the SUT is available.

LINEAR SCRIPTING APPROACH

▸ Start with manual test procedures.

▸ Run manually (by a test analyst) while the test tool records a sequence of actions.

▸ Recorded scripts may be edited (e.g: adding comments).

▸ Replay using the tool.

▸ **Pros**:

  ▸ No preparation to start automating features.

  ▸ Programming skills are not require (but are usually helpful).

▸ **Cons**:

  ▸ Effort to automate each test procedures (number of actions).

  ▸ Duplicated code.

  ▸ Non-modular and hard to maintain if the SUT changed.

STRUCTURED SCRIPTING APPROACH

WHAT'S THE DIFFERENCE WITH THE LINEAR SCRIPTING APPROACH?

STRUCTURED SCRIPTING APPROACH

▸ **Main difference:**

   ▸ Introduction of script library.

▸ Reusable scripts (same sequence of actions).

▸ **Pros**:

   ▸ Code maintenance.

   ▸ Reduce the effort to add more test cases.

▸ **Cons**:

   ▸ Initial effort to create the shared scripts is hard.

   ▸ Programming skills will be required.

DATA-DRIVEN APPROACH

▸ Builds on the structured scripting approach.

▸ Inputs are extracted from the scripts

  ▸ Data files

▸ Main test script can be reused multiple times.

  ▸ Main test scripts is called control script.

▸ **Pros**:

  ▸ Easy to add more scenarios (Ej: boundary values analysis)

    ▸ Adding scenarios without changing the sourceCode.

▸ **Cons**:

  ▸ Data files needs to be maintained.

  ▸ Often negative testing may be missed.

KEYWORD–DRIVEN APPROACH

▸ Adaptation of data-driven approach.

▸ Actions words.

▸ High level instructions.

  ▸ eg: SendEmail();

▸ Special Keywords can be used for verification steps.

▸ **Pros**:

  ▸ Each keyword represent a number of actions.

  ▸ Easy to maintain, read and write because the complexity is hidden in the keywords.

▸ **Cons**:

  ▸ Implementation of each keyword.

PROCESS–DRIVEN APPROACH

▸ Adaptation of keyword-driven approach.

▸ Scenarios

  ▸ Parametrized using the test data.

▸ High level instructions. (business language).

▸ **Pros**:

  ▸ Test procedures are defined from a workflow perspective.

▸ **Cons**:

  ▸ Complex to maintain if the SUT changes constantly

  ▸ Test data is required.

IMPORTANT: NOT EVERYTHING SHOULD BE AUTOMATED

▸ Consider:

    ▸ Frequency of use.

    ▸ Complexity to automate.

    ▸ Maturity of test process.

    ▸ Stage of the software lifecycle.

    ▸ Test Environment.

    ▸ Parallel Effort.

    ▸ Design for **testability**.

TESTABILITY

▸ Parts:

    ▸ Observability

        ▸ Interfaces that give insights into the system.

    ▸ Control(ability)

        ▸ Interfaces to perform actions on the SUT.

    ▸ Clear defined architecture.

        ▸ Clear and understandable interfaces giving control and visibility on all test levels.

METRICS

METRICS

▸ What do you want to measure?

▸ Internal.

▸ External.

INTERNAL METRICS – TAS

▸ **Tool scripting metrics.**

   ▸ SonarQ.

   ▸ Scripting standars.

▸ **Speed and efficiency of TAS components.**

   ▸ SUT not performing the same functionality in the same time is a problem.

   ▸ Could increase the load time of the SUT.

▸ **Automation code defect density.**

   ▸ Good practices.

   ▸ Not less importante than SUT.

EXTERNAL METRICS

▸ **Time to execute automated test.**

▸ **Ratio of failures to defects.**

    ▸ Number of automated test that fails for a given defect.

▸ **Effort to maintain automated tests**

    ▸ Keep tests in sync with the SUT.

    ▸ % of tests that needs maintenance.

▸ **Effort to build automated tests**

    ▸ Good practices.

    ▸ Scripting approach.

    ▸ Effort required to run the test manually.

EXTERNAL METRICS

▸ **Automation benefits**

   ▸ Number of defect founded earlier.

   ▸ Cost and time.

   ▸ Number of hours of manual test effort saved.

   ▸ Increase in coverage.

▸ **Effort to analyze automated test incidents.**

   ▸ Analyze failures.

   ▸ Logging.

      ▸ Expected and actual behavior

      ▸ Actions performed.

▸ **Number of automated tests.**

   ▸ Shows the progression made.

   ▸ NOTE: Not indicated test coverage (Excluding unit tests)

EXTERNAL METRICS

▸ **Pass and Fail test cases.**

    ▸ Number of test passed and failed

    ▸ Failures should be analyzed.

        ▸ Problem with the SUT, TAS or Environment.

▸ **False fail and false pass.**

        ▸ False alarms (problem with the TAS)

        ▸ Reduce confidence in the TAS.

        ▸ Could be Dangerous.

▸ **Unit test code coverage.**

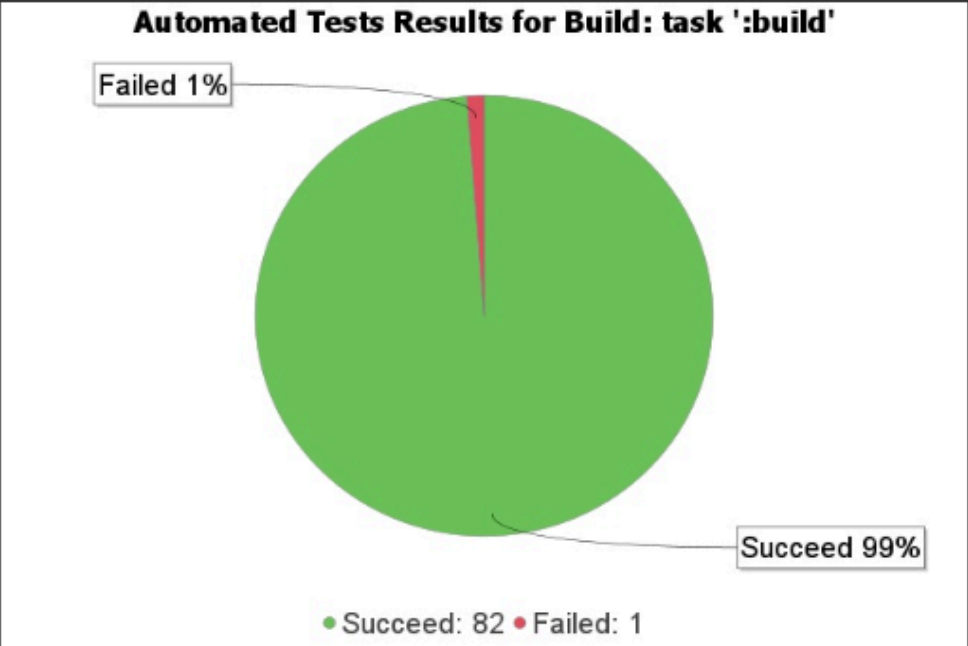   ▸ Coverage.

    ▸ Be aligned with a goal.

REPORTING

WHY IS IMPORTANT?

IN YOUR OPINION, WHAT ELEMENTS SHOULD BE INCLUDED IN A GOOD REPORT?

▸ Consider:

 ▸ Testing type.

 ▸ Test details.

 ▸ Understandable.

 ▸ Logging.

 ▸ Environment.

 ▸ **Test Status.**

 ▸ Publish the report.

 ▸ Feedback from the team.

REPORTING

Automated Tests Results for Build: task ':build'

Failed 1%

Succeed 99%

• Succeed: 82 • Failed: 1

Site	URL	Status	Error Description
Auto Dealer Online - Make Model Page	https://www.auto-dealer-online.com/acura/ilx/	Failed	Status Code: 500 - Status Message: Internal Server Error

FAILED - checkDirect

Class Name: testCases.CheckListings

Test Name: checkDirect

Description: This LoadTimeMonitis check if the url that receive as a parameter display listings.

Groups: all, CheckListings

Error Message: The Placement: 740 - Autobytel with Url: https://www.autobytel.com/car-price-quotes/aweb-fas/?make=ford&model=f-150&series=&zipcode=01010&submit=1&awpop=2&aw-track=false doesn't display Listings

Execution Time: 00 h., 00 min., 30 sec. At 09/22/2020 - 12:13:19

Parameters:
   (class java.lang.String) 740 - Autobytel

   (class java.lang.String) https://www.autobytel.com/car-price-quotes/aweb-fas/?make=ford&model=f-150&series=&zipcode=01010&submit=1&awpop=2&aw-track=false

Current URL: https://www.autobytel.com/car-price-quotes/aweb-fas/?make=ford&model=f-150&series=&zipcode=01010&submit=1&awpop=2&aw-track=false

This site can't be reached

www.autobytel.com refused to connect.

Try:
- Checking the connection
- Checking the proxy and the firewall
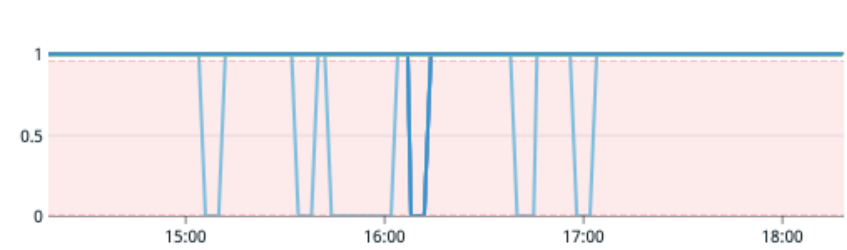
ERR_CONNECTION_REFUSED

REPORTING

☆ SEM Websites - Status ⌄   Edit Widgets ✚ | 4h | Past 4 Hours
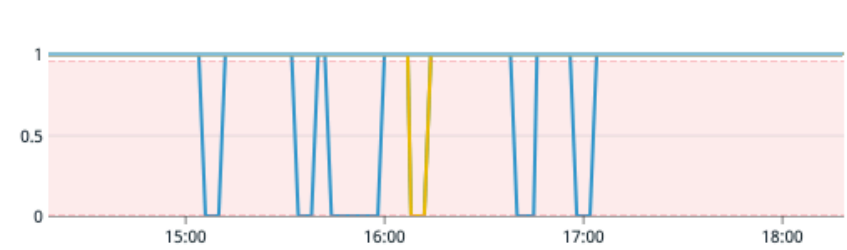
Add Template Variables ❓

Home Page Sites

Home Page Sit...

0.99

Site Status Home Page - Details.

0.00	_status_code:_500_-_status_message:_internal_server_error,_https://www.auto-dealer-online.com/
0.00	_connection_refused:_https://www.autoweb.com/st-ub/,_https://www.autoweb.com/st-ub/
0.00	_connection_refused:_https://www.autoweb.com/cars/,_https://www.autoweb.com/cars/
0.00	_connection_refused:_https://www.autoweb.com/car-values,_https://www.autoweb.com/car-values
0.00	_connection_refused:_https://www.autoweb.com/dealers,_https://www.autoweb.com/dealers
0.00	_connection_refused:_https://www.autoweb.com/leads/,_https://www.autoweb.com/leads/
1.00	_ok,_https://dealers.car.com/
1.00	_ok,_https://dealers.autosite.com/
1.00	_ok,_https://new.autobytel.com/st-ub/
1.00	_ok,_https://uts.aws.abtl.io/api/collect/v1_a_7_et_arrival_forcenewsession_false
1.00	_ok,_https://www.tradeinexpert.com/
1.00	_ok,_https://uts.abtl.io/api/tracking/v1_a_1_et_test

Make Page Sites

Make Page Sites.

0.99

Site Status Make Page - Details.

0.00	_status_code:_500_-_status_message:_internal_server_error,_https://www.auto-dealer-online.com/acura/
0.00	_connection_refused:_https://www.autoweb.com/car-values/acura,_https://www.autoweb.com/car-values/acura
0.00	_connection_refused:_https://www.autoweb.com/cars/acura/,_https://www.autoweb.com/cars/acura
0.00	_connection_refused:_https://www.autoweb.com/st-ub/acura/,_https://www.autoweb.com/st-ub/acura/
1.00	_ok,_https://m.newcar-leases.com/acura/
1.00	_ok,_https://www.smartautosavings.com/acura/
1.00	_ok,_https://www.auto-price-finder.com/acura/
1.00	_ok,_https://www.usedcars.com/for-sale/acura/
1.00	_ok,_https://www.car-savings-event.com/acura/
1.00	_ok,_https://www.auto-price-saver.com/acura/
1.00	_ok,_https://dealers.car.com/st-ub/acura/
1.00	_ok,_https://www.autosite.com/cars/acura

Make Model Page Sites
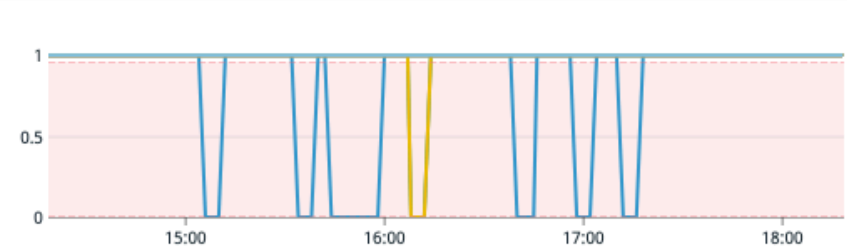
Make Model Pa...

0.99

Site Status MakeModel Page - Details.

0.00	_connection_refused:_https://www.autoweb.com/st-ub/acura/ilx/,_https://www.autoweb.com/st-ub/acura/ilx/
0.00	_connection_refused:_https://www.autoweb.com/car-values/acura/ilx,_https://www.autoweb.com/car-values/acura/ilx
0.00	_status_code:_500_-_status_message:_internal_server_error,_https://www.auto-dealer-online.com/acura/ilx/
0.00	_connection_refused:_https://www.autoweb.com/cars/acura/ilx/,_https://www.autoweb.com/cars/acura/ilx/
1.00	_ok,_https://www.autoweb.com/acura/ilx/
1.00	_ok,_https://www.tradeinexpert.com/acura/ilx/
1.00	_ok,_https://new.autobytel.com/acura/ilx/
1.00	_ok,_https://www.smartautosavings.com/acura/ilx/
1.00	_ok,_https://new.autobytel.com/st-ub/acura/ilx/
1.00	_ok,_https://www.autoweb.com/car-values/acura/ilx
1.00	_ok,_https://www.car-savings-event.com/acura/ilx/
1.00	_ok,_https://www.autosite.com/cars/acura/ilx/
1.00	_ok,_https://www.auto-price-saver.com/acura/ilx/