



An approach to assuring quality of automatic program analysis tool



Contents

- **Introduction**
 - Existing approaches
- **Acceptance testing framework**
 - Implementation details
 - Demo
- **Report history server**
 - Implementation details
 - Demo
- **Usage**

Introduction

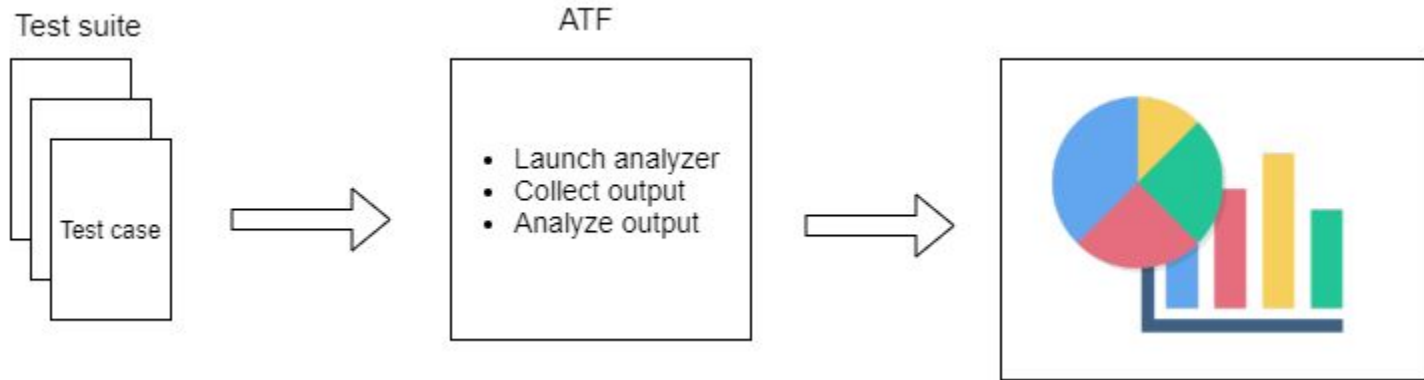


Existing approaches

- NIST SAMATE Juliet test suite
- c-testsuite
- Scanstud

Acceptance testing framework

Implementation details





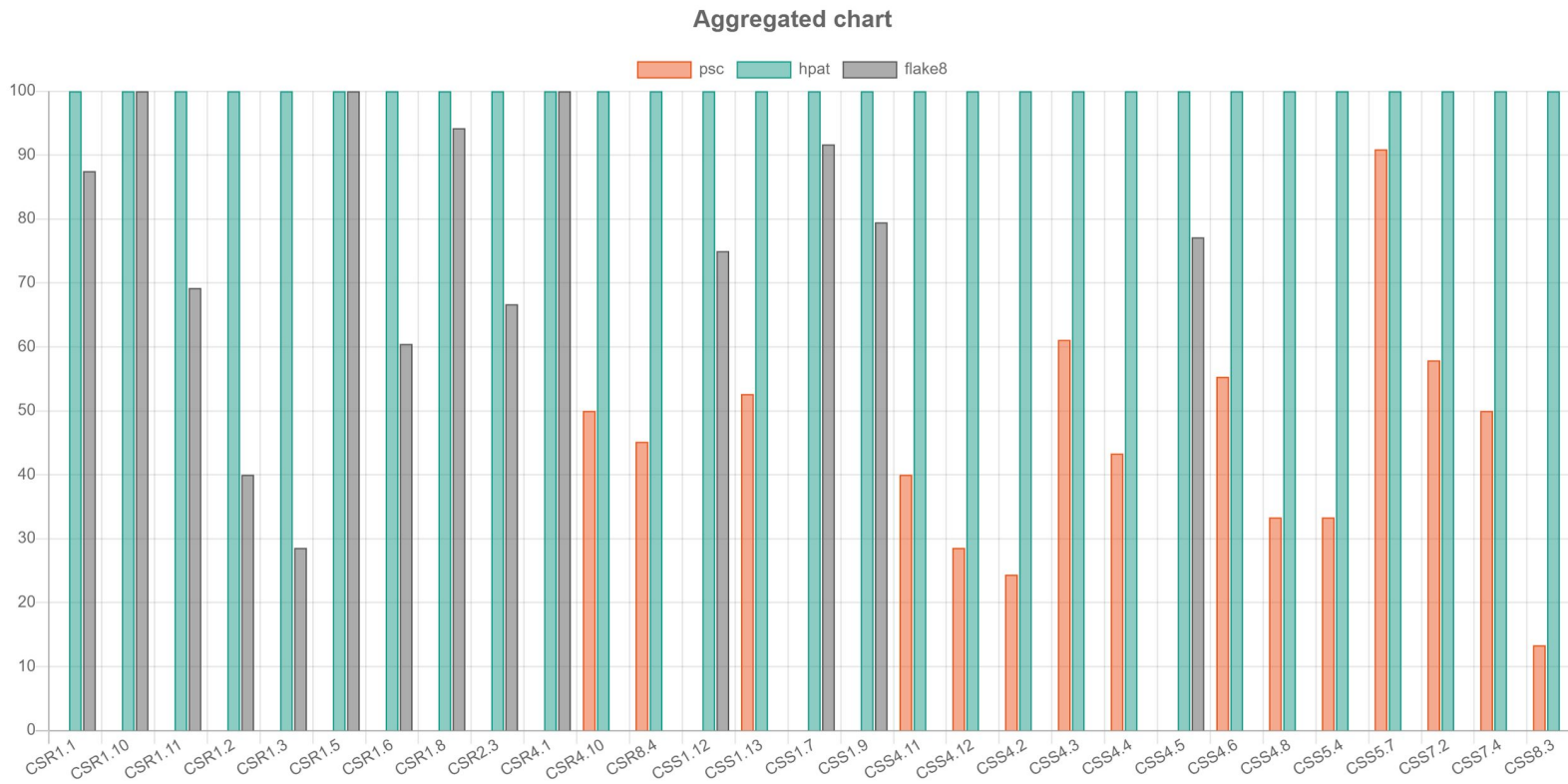
Test case

```
#!/usr/bin/env python
# -*- coding: utf-8 -*-
```

```
sample_dict = {'default_key': 1}
sample_key = 'sample_key'
sample_value = sample_dict[sample_key]
```

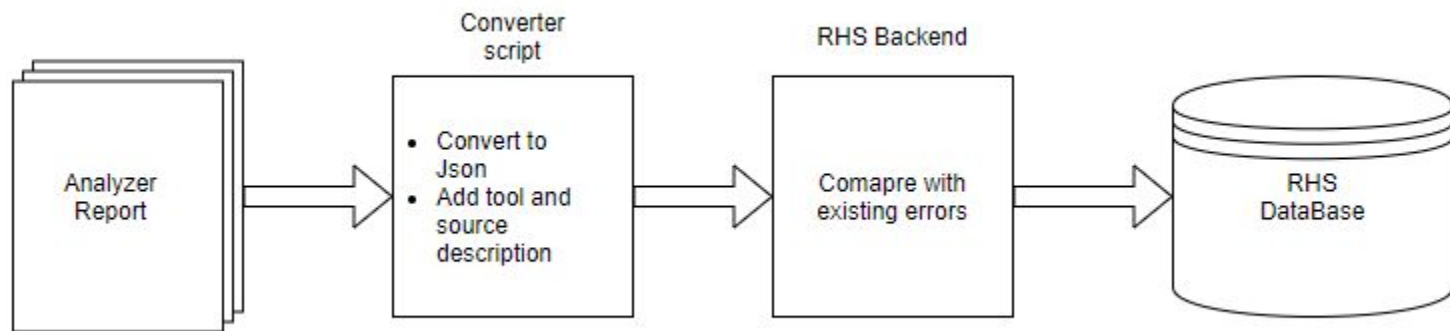
```
"test_id": "T0040",
"description": "Obtain value from dictionary 'sample_dict' by operator '[' may raise KeyError.",
"kind": "CSS4.3",
"line": 6,
"pos": 16,
"python_version": [],
"positive": true
```

Demo



Report History Server (RHS)

Implementation details



Main page

Main Branch

Profile: hpat

Project Version	2.0.4	2.0.5	2.0.6								
"HEAD" of "sql-injection-demo"	~	🔗	FP	Q	TP	Σ	🔗	FP	Q	TP	Σ
		gone	0	0	0	0	gone	0	0	1	1
		stay	0	10	11	21	stay	0	10	10	20
		in	0	0	0	0	in	0	0	6	6
"HEAD" of "django-shop"	~	🔗	FP	Q	TP	Σ	🔗	FP	Q	TP	Σ
		gone	0	0	0	0	gone	0	88	0	88
		stay	0	4101	0	4101	stay	0	4013	0	4013
		in	0	0	0	0	in	1	13	232	246
"HEAD" of "algorithms"	~	🔗	FP	Q	TP	Σ	🔗	FP	Q	TP	Σ
		gone	3	0	6	9	gone	0	0	1470	1470
		stay	10	3	6450	6463	stay	11	3	4989	5003
		in	1	0	9	10	in	0	792	1461	2253
"HEAD" of "uvloop"	~	🔗	FP	Q	TP	Σ	🔗	FP	Q	TP	Σ
		gone	0	0	0	0	gone	0	0	267	267
		stay	3	0	1624	1627	stay	3	0	1357	1360
		in	0	0	0	0	in	0	0	266	266

django-shop : 4/30/2020, 3:22:43 PM

HPAT : 11/16/2020, 1:50:31 PM hpat

django-shop : 4/30/2020, 3:22:43 PM

HPAT : 12/4/2020, 12:55:41 PM hpat

88 GONE problems

4013 SAME problems

246 NEW problems

File

Inspection

Kind

Severity

Status

PyUseCompreh

« < 1 > »

CSS 4.6: Create a sequence through comprehension instead of repeated logical op
Considering code readability, do not use more than three "for" statements in a
comprehension. **PyUseComprehensionInspection**

```
27
28 def forwards(apps, schema_editor):
29     field_mappings = {}
30     for key, maps in FIELD_MAPPINGS.items():
31         field_mappings[key] = dict(maps)
32     migrate_glossary(apps, field_mappings)
33
34
35 def backwards(apps, schema_editor):
```

TRUE_POSITIVE (232)
UNKNOWN (8)
QUESTIONABLE (5)
FALSE_POSITIVE (1)

shop/migrations/0003_glossary_fields.py:31:8

1

? UN

TP

! FP

? QS

Reports

Report History Server Reports

 Petr Privalov 00549251 ▾

« < 1 2 ... 58 59 > »

10 ▾

Actions	ID	Project Version	Tool Version	Tool Profile	Analyze Start Time	Analyze End Time	Created	Updated
<input type="checkbox"/> View Stats CSV	... f595fbb27726	"trunk" of "httpd"	"dev/workspace" of "HCppAnalyzer"	hcat	12/7/2020, 10:20:48 AM	12/7/2020, 10:20:51 AM	12/7/2020, 10:21:13 AM	12/7/2020, 10:21:13 AM
<input type="checkbox"/> View Stats CSV	... fb19ef7844dc	"master" of "sqlite"	"dev/workspace" of "HCppAnalyzer"	hcat	12/7/2020, 10:12:01 AM	12/7/2020, 10:12:03 AM	12/7/2020, 10:20:39 AM	12/7/2020, 10:20:39 AM
<input type="checkbox"/> View Stats CSV	... 3c2b1d3a6423	"v1.2.11" of "zlib"	"dev/workspace" of "HCppAnalyzer"	hcat	12/7/2020, 10:11:50 AM	12/7/2020, 10:11:51 AM	12/7/2020, 10:11:59 AM	12/7/2020, 10:11:59 AM
<input type="checkbox"/> View Stats CSV	... 4de644043c0b	"trunk" of "httpd"	"test_cmake_copy" of "HCppAnalyzer"	hcat	12/5/2020, 12:35:58 AM	12/5/2020, 12:36:10 AM	12/5/2020, 12:37:13 AM	12/5/2020, 12:37:13 AM
<input type="checkbox"/> View Stats CSV	... e89c956155d8	"trunk" of "httpd"	"HCAT-171_reproduce" of "HCppAnalyzer"	hcat	12/5/2020, 12:35:56 AM	12/5/2020, 12:36:07 AM	12/5/2020, 12:37:12 AM	12/5/2020, 12:37:12 AM
<input type="checkbox"/> View Stats CSV	... 4a41b494debf	"trunk" of "httpd"	"HCAT-151_False_positive_for_template_class_dtor_outside_of_template_declaration_and_CSR_3.4.1" of "HCppAnalyzer"	hcat	12/5/2020, 12:35:56 AM	12/5/2020, 12:36:07 AM	12/5/2020, 12:37:12 AM	12/5/2020, 12:37:12 AM
<input type="checkbox"/> View Stats CSV	... 948f862dc782	"trunk" of "httpd"	"Test_For_Failed_Build" of "HCppAnalyzer"	hcat	12/5/2020, 12:35:54 AM	12/5/2020, 12:36:05 AM	12/5/2020, 12:37:11 AM	12/5/2020, 12:37:11 AM
<input type="checkbox"/> View Stats CSV	... 399f267f52cc	"trunk" of "httpd"	"HCAT-150_False_positive_CSR_3.11.1" of "HCppAnalyzer"	hcat	12/5/2020, 12:35:54 AM	12/5/2020, 12:36:05 AM	12/5/2020, 12:37:11 AM	12/5/2020, 12:37:11 AM
<input type="checkbox"/> View Stats CSV	... eb0af432c038	"trunk" of "httpd"	"dev/agorelova/169" of "HCppAnalyzer"	hcat	12/5/2020, 12:35:33 AM	12/5/2020, 12:35:37 AM	12/5/2020, 12:36:37 AM	12/5/2020, 12:36:37 AM
<input type="checkbox"/> View Stats CSV	... 63ee770d5239	"master" of "sqlite"	"test_cmake_copy" of "HCppAnalyzer"	hcat	12/5/2020, 12:25:32 AM	12/5/2020, 12:25:35 AM	12/5/2020, 12:35:37 AM	12/5/2020, 12:35:37 AM

Statistics

Report settings

Group by fields:

☒ inspection ☐ file ☐ kind ☐ severity ☒ status

Result table

« < 1 > »

10 ▼

	status	inspection	Count
<input type="checkbox"/>	FALSE_POSITIVE	ReferenceCodestyleChecker	10
<input type="checkbox"/>	TRUE_POSITIVE	CycleHasBracesChecker	192
<input type="checkbox"/>	TRUE_POSITIVE	LongLineChecker	41
<input type="checkbox"/>	UNKNOWN	ConditionHasBracesChecker	3106

Usage



How do we use ATF and RHS

- Code analysis tool CI integration
 - For each MR
 - For new version
- Release actions