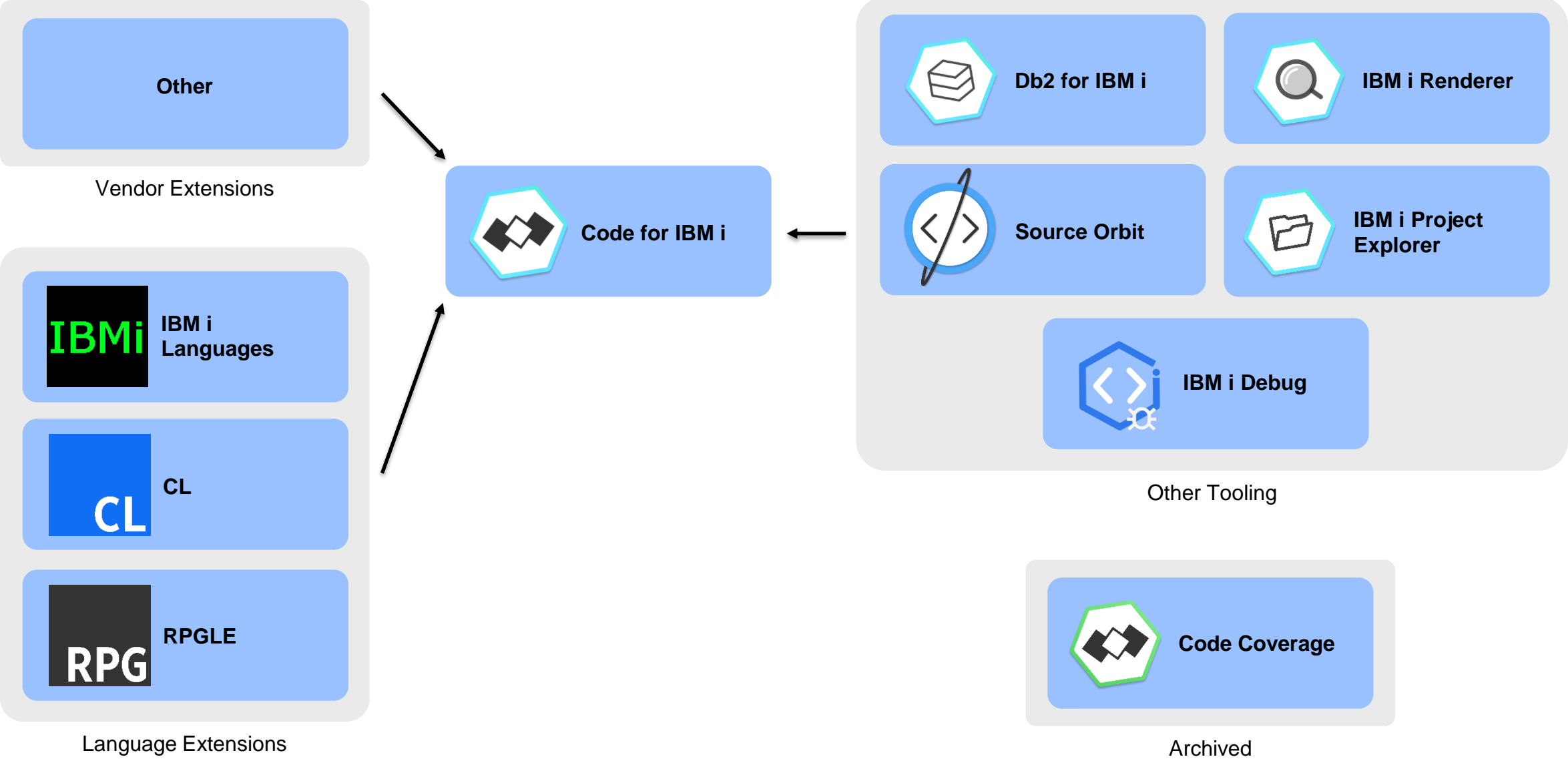


# IBM i Unit Testing Now in VS Code!



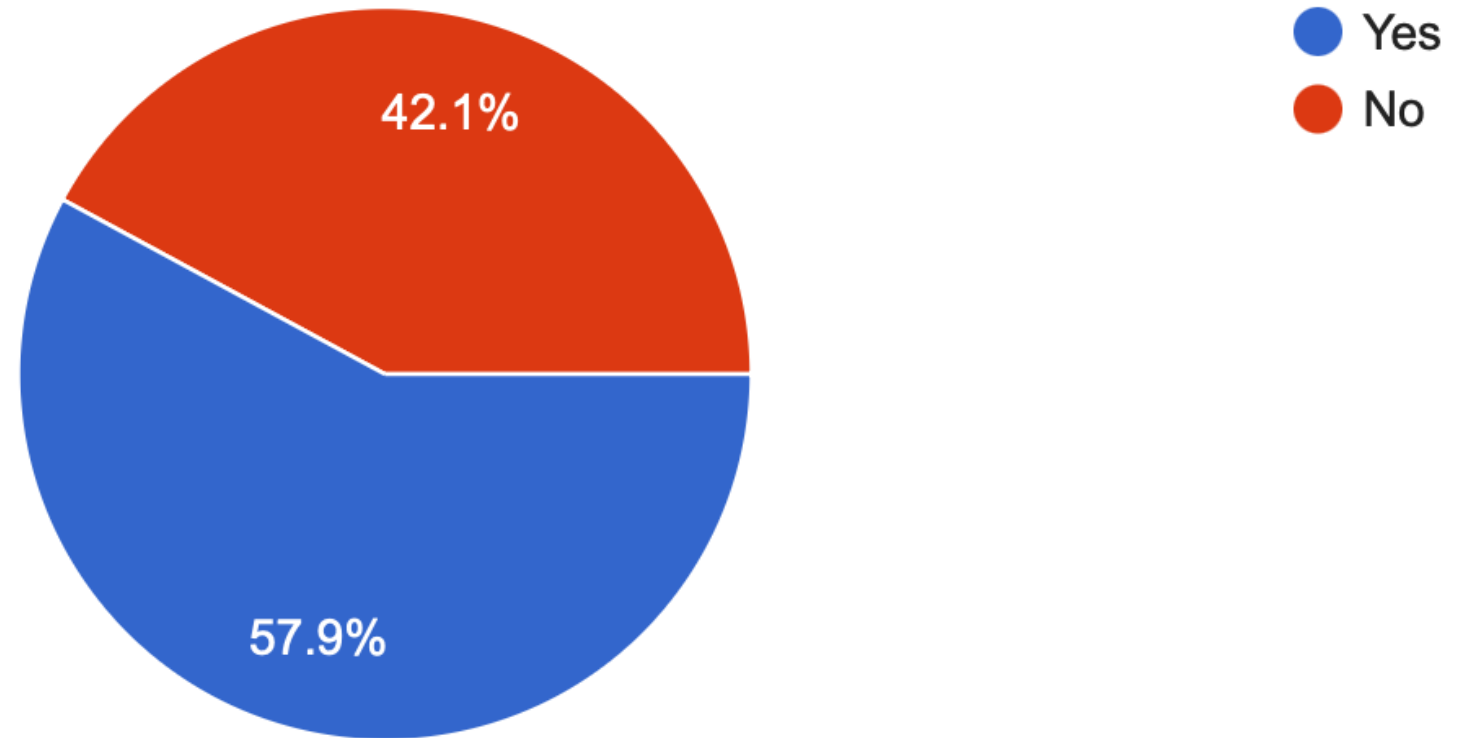
# What is missing in the VS Code stack?



# We did a survey...

Have you done unit testing with IBM i before?

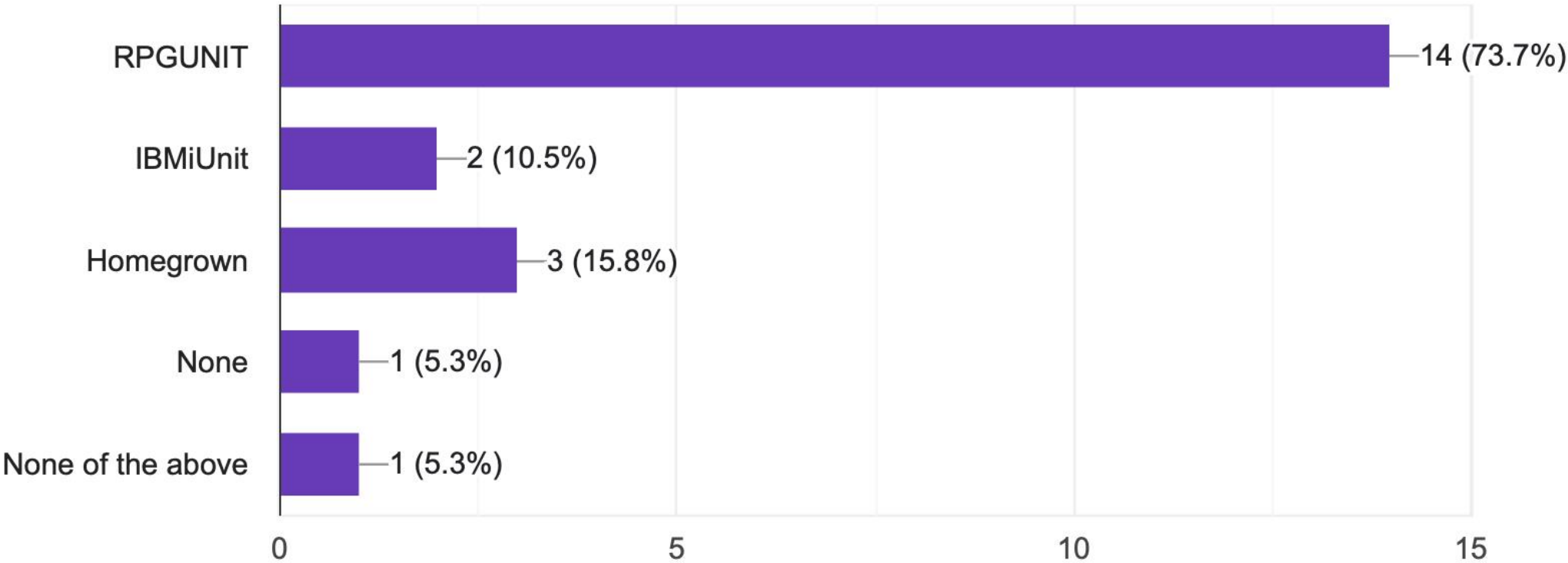
19 responses



# We did a survey...

## What framework did you use for IBM i testing?

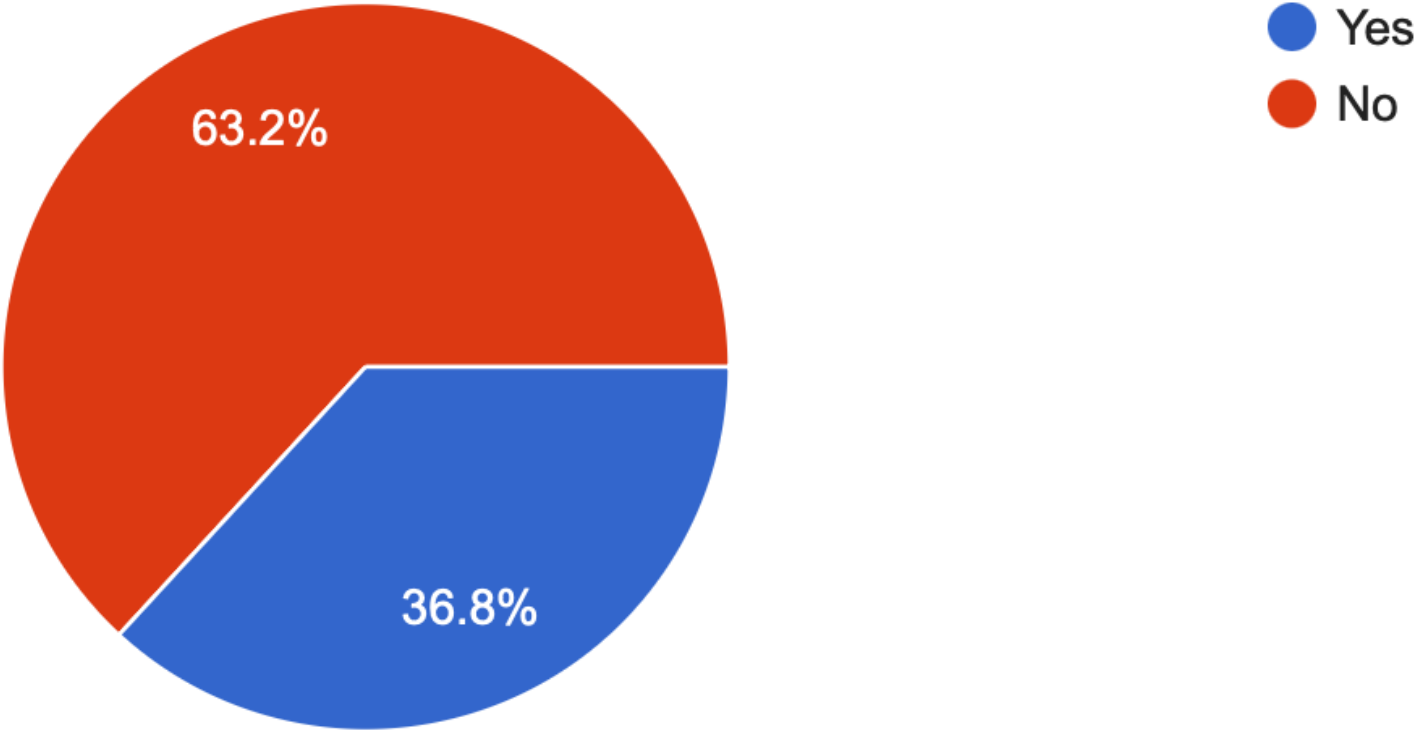
19 responses



# We did a survey...

## Have you used IBM i Code Coverage? (CODECOV)

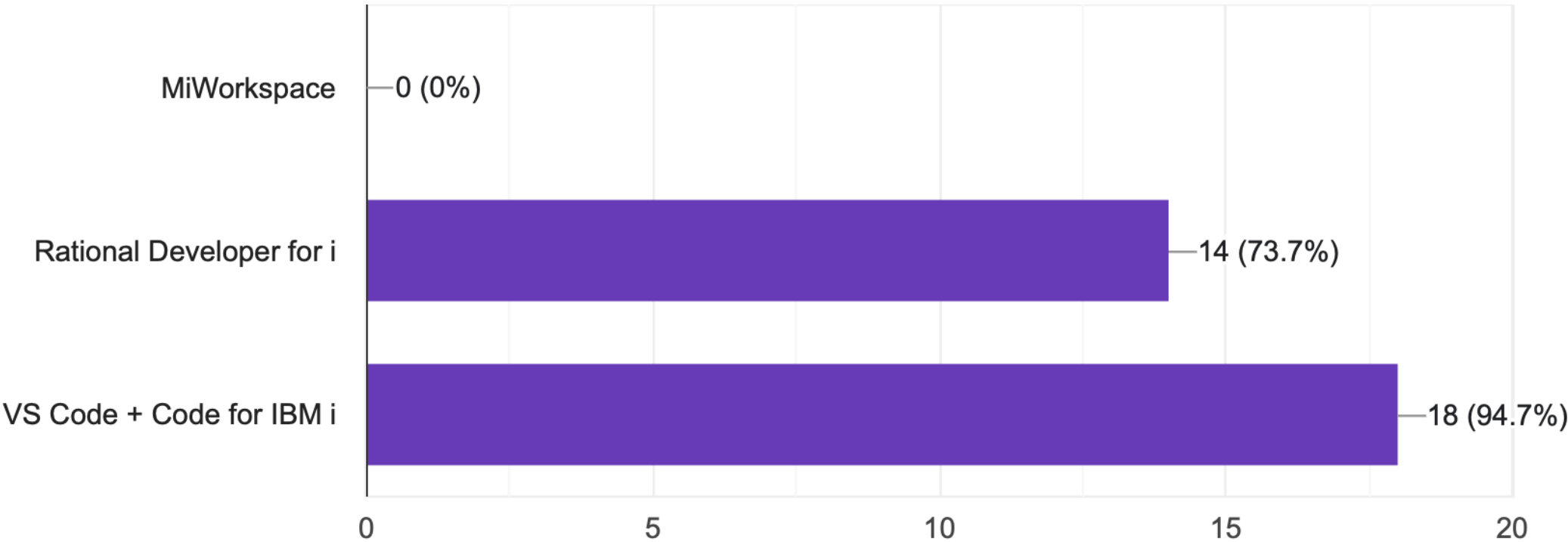
19 responses



# We did a survey...

Which IDEs for IBM i have you used?

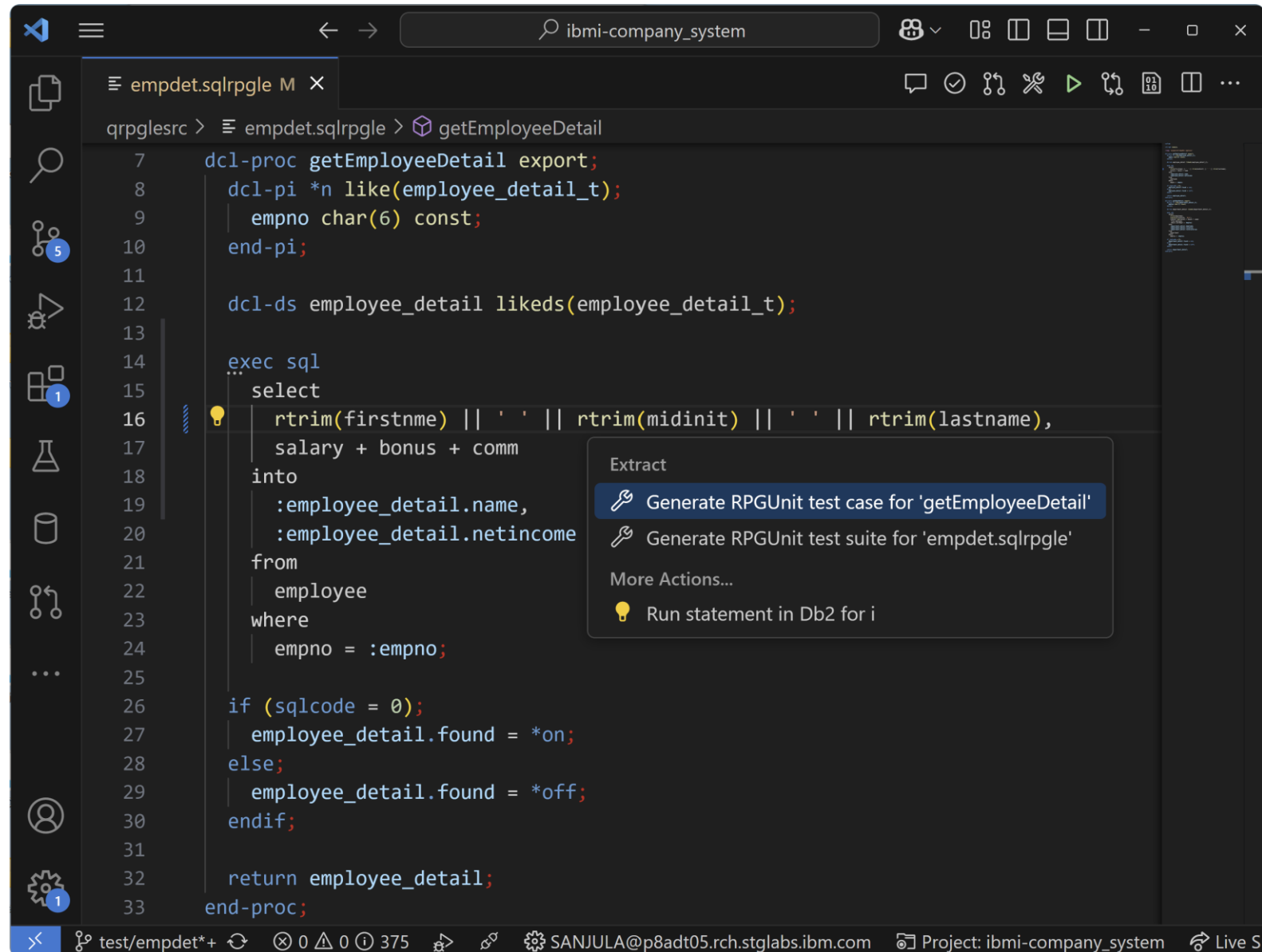
19 responses



# Let's look at the new IBM i Testing Extension



# Generating test stubs



The screenshot shows an IBM i development environment with a code editor displaying the following code:

```
7 dcl-proc getEmployeeDetail export;  
8 dcl-pi *n like(employee_detail_t);  
9   empno char(6) const;  
10 end-pi;  
11  
12 dcl-ds employee_detail likeds(employee_detail_t);  
13  
14 exec sql  
15   select  
16     rtrim(firstname) || ' ' || rtrim(midinit) || ' ' || rtrim(lastname),  
17     salary + bonus + comm  
18   into  
19     :employee_detail.name,  
20     :employee_detail.netincome  
21   from  
22     employee  
23   where  
24     empno = :empno;  
25  
26 if (sqlcode = 0);  
27   employee_detail.found = *on;  
28 else;  
29   employee_detail.found = *off;  
30 endif;  
31  
32 return employee_detail;  
33 end-proc;
```

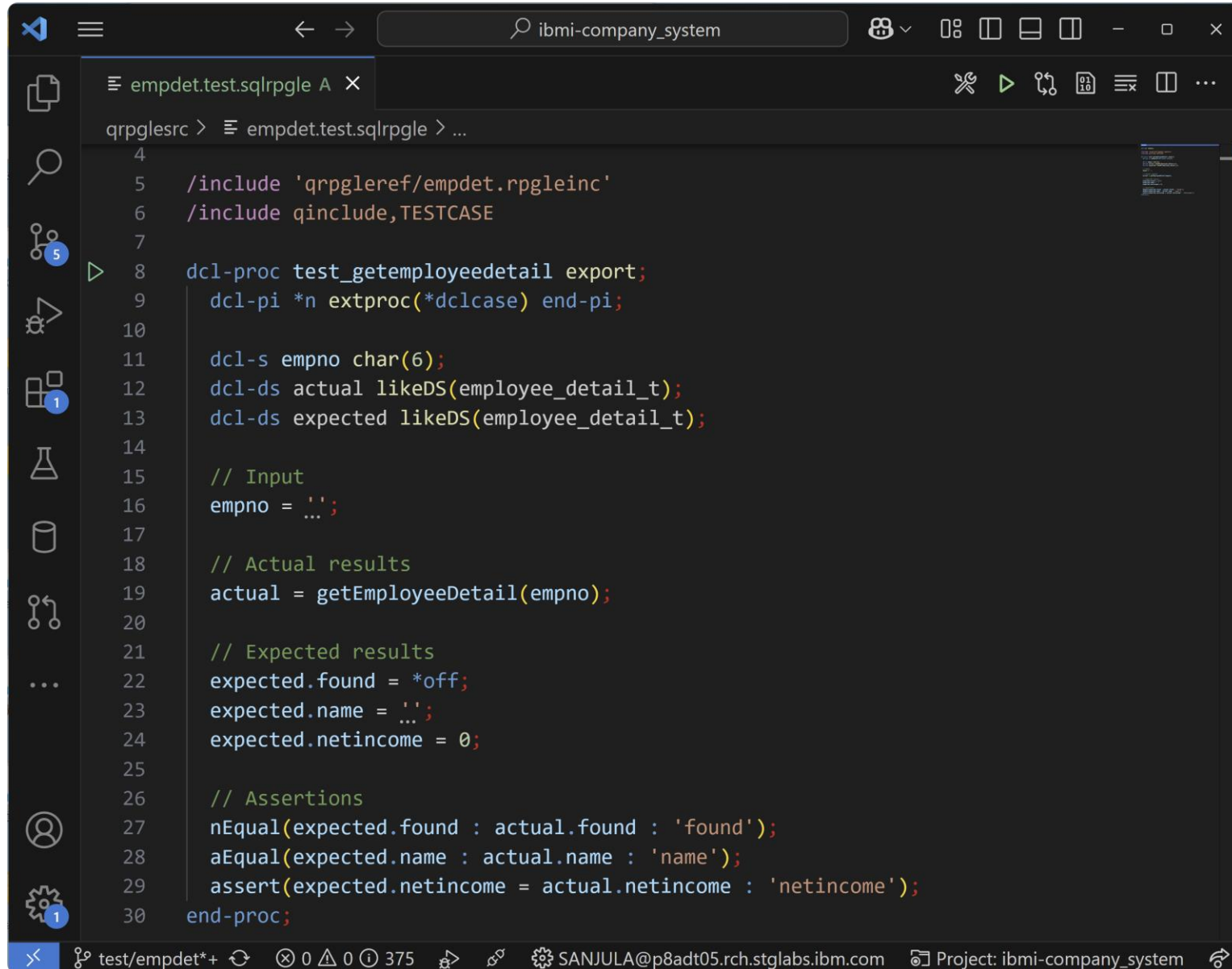
A context menu is open over the code, showing the following options:

- Extract
  - Generate RPGUnit test case for 'getEmployeeDetail'
  - Generate RPGUnit test suite for 'empdet.sqlrpgle'
- More Actions...
  - Run statement in Db2 for i

The status bar at the bottom indicates the current file is 'test/empdet\*+' and the project is 'ibmi-company\_system'.

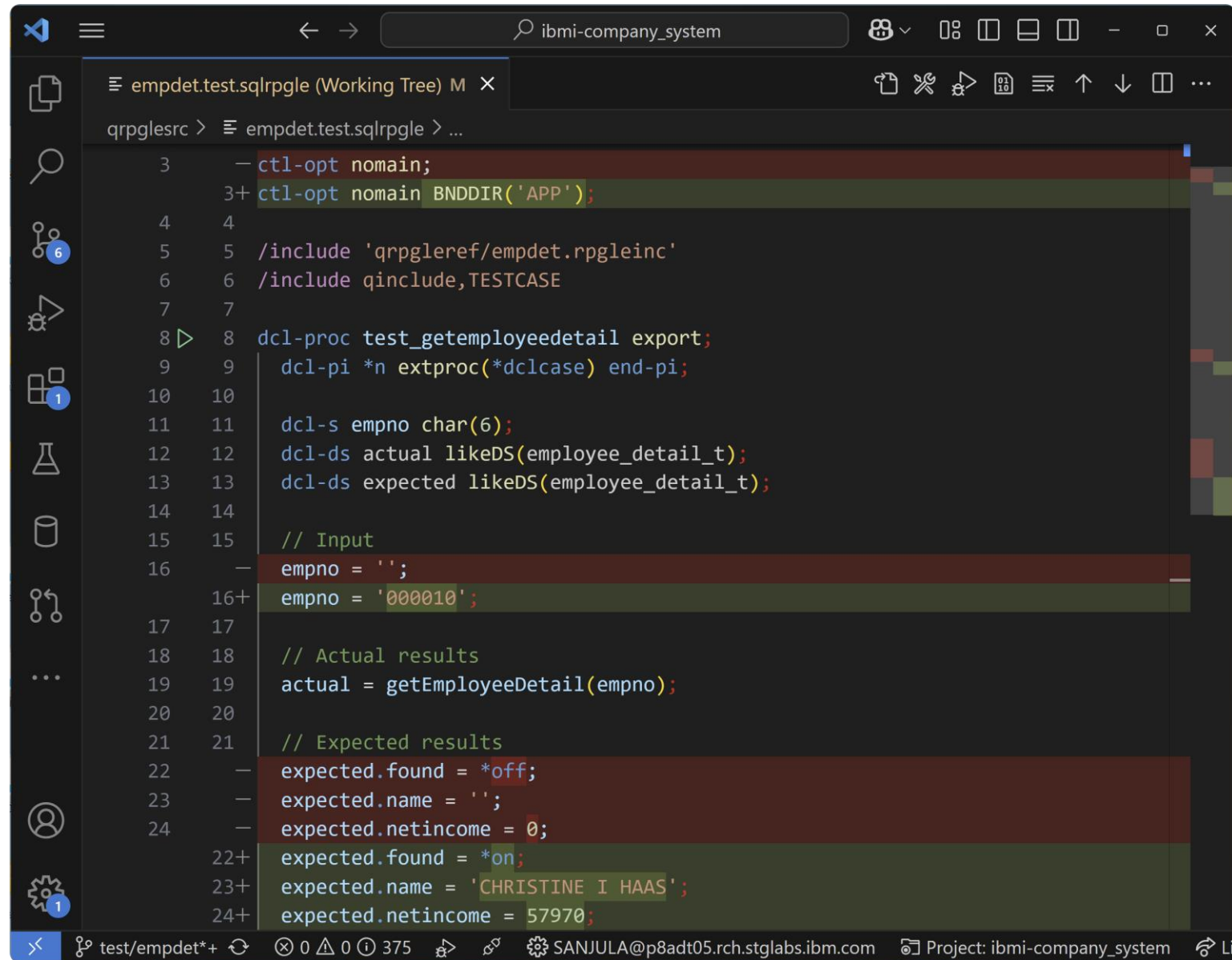


# Generating test stubs



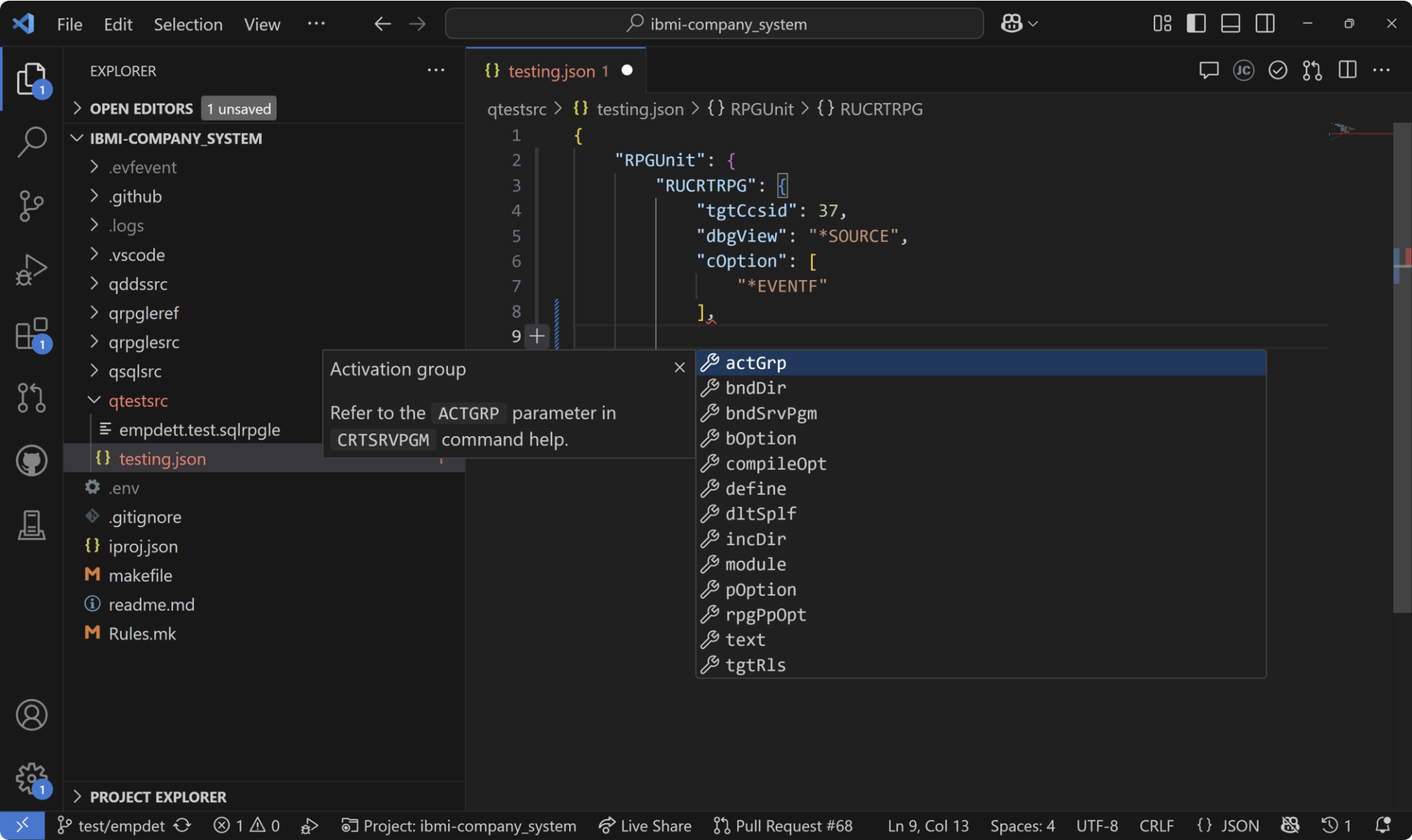
```
4  
5  /include 'qrpgleref/empdet.rpgleinc'  
6  /include qinclude,TESTCASE  
7  
8  dcl-proc test_getemployeedetail export;  
9      dcl-pi *n extproc(*dclcase) end-pi;  
10  
11      dcl-s empno char(6);  
12      dcl-ds actual likeDS(employee_detail_t);  
13      dcl-ds expected likeDS(employee_detail_t);  
14  
15      // Input  
16      empno = '..';  
17  
18      // Actual results  
19      actual = getEmployeeDetail(empno);  
20  
21      // Expected results  
22      expected.found = *off;  
23      expected.name = '..';  
24      expected.netincome = 0;  
25  
26      // Assertions  
27      nEqual(expected.found : actual.found : 'found');  
28      aEqual(expected.name : actual.name : 'name');  
29      assert(expected.netincome = actual.netincome : 'netincome');  
30  end-proc;
```

# Writing Tests



```
3      - ctl-opt nomain;  
3+    ctl-opt nomain BNDDIR('APP');  
4      4  
5      5 /include 'qrpqleref/empdet.rpgleinc'  
6      6 /include qinclude,TESTCASE  
7      7  
8      8 dcl-proc test_getemployeedetail export;  
9      9   dcl-pi *n extproc(*dclcase) end-pi;  
10     10  
11     11   dcl-s empno char(6);  
12     12   dcl-ds actual likeDS(employee_detail_t);  
13     13   dcl-ds expected likeDS(employee_detail_t);  
14     14  
15     15   // Input  
16     -   empno = '';  
16+    empno = '000010';  
17     17  
18     18   // Actual results  
19     19   actual = getEmployeeDetail(empno);  
20     20  
21     21   // Expected results  
22     -   expected.found = *off;  
23     -   expected.name = '';  
24     -   expected.netincome = 0;  
22+    expected.found = *on;  
23+    expected.name = 'CHRISTINE I HAAS';  
24+    expected.netincome = 57970;
```

# Configuring tests



# Running unit tests

TEST EXPLORER

Filter (e.g. text, !exclude, @tag)

1/1 9.3s

ibmi-company\_system 68ms

qrpglesrc 68ms

empdet.test.sqlrpgle 68ms

test\_getemployeedetail 68ms

RPGUNIT

empdet.test.sqlrpgle M X

qrpglesrc > empdet.test.sqlrpgle > test\_getemployeedetail

8 dcl-proc test\_getemployeedetail export;

9 dcl-pi \*n extproc(\*dclcase) end-pi;

10

11 dcl-s empno char(6);

12 dcl-ds actual likeDS(employee\_detail\_t);

13 dcl-ds expected likeDS(employee\_detail\_t);

14

15 // Input

16 empno = '000010';

PROBLEMS 375 COMMENTS DB2 FOR I DEBUG CONSOLE OUTPUT TERMINAL TEST RESULTS

WORKSPACE

ibmi-company\_system (1) [ Deployment Successful ]

> empdet.test.sqlrpgle (1) [ Compilation Successful ]

✓ test\_getemployeedetail 0.068s

EXECUTION

Deployments: 1 successful | 0 failed (1)

Compilations: 1 successful | 0 failed | 0 skipped (1)

RESULTS

Test Files: 1 passed | 0 failed | 0 errored (1)

Test Cases: 1 passed | 0 failed | 0 errored (1)

Assertions: 3

Duration: 0.068s

PASS

IBM i Testing

✓ test\_getemployeede...

< test/empdet\*+ 0 0 375 SANJULA@p8adt05.rch.stglabs.ibm.com Project: ibmi-company\_system Live Share Deploy New job (1) Pul

# Running tests

TEST EXPLORER

Filter (e.g. text, !exclude, @tag)

6/16

17.3s

examples 35ms

- cbl.test.cbllc
  - TEST\_TRUE
  - TEST\_FALSE
  - TEST\_FAIL0
  - TEST\_FAIL1
- rpgsqlstmf.test.sqlrpgle 26ms
  - testWhatever\_1 25ms
  - testWhatever\_2 1.0ms
- rpgstmf.test.rpgle 3.0ms
  - testWhatever\_1 3.0ms
  - testWhatever\_2 0.0ms
- sub 6.0ms
- RPGUNIT

rpgstmf.test.rpgle

```
222 // =====
223 // RPGUnit test case.
224 // =====
225 dcl-proc testWhatever_1 export;
226   dcl-pi *n extproc(*dclcase) end-pi;
227
228   print('Executing:      * testWhatever_1()');
229
230   // Run
231   assert(sds.pgmName = 'TEMPLATE': 'Name of the test suite should be 'TEMPLATE');
232
233   // Place your assertions here.
234
235 end-proc;
```

PROBLEMS

DB2 FOR I

DEBUG CONSOLE

OUTPUT

TERMINAL

PORTS

IBM I JOB LOG

TEST RESULTS

WORKSPACE

examples (4) [ Deployment Successful ]

> rpgstmf.test.rpgle (2) [ Compilation Skipped ]

X testWhatever\_1 0.003s

Failure (line 231): Name of the test suite should be 'TEMPLATE'

✓ testWhatever\_2 0s

> rpgsqlstmf.test.sqlrpgle (2) [ Compilation Skipped ]

✓ testWhatever\_1 0.025s

✓ testWhatever\_2 0.001s

> cbl.test.cbllc (4) [ Compilation Failed ]

CPFA0A9: Object not found. Object is EN\_US.UTF-8.

: CRTCBMOD MODULE(\*PGMID) SRCSTMF('/home/SANJULA/builds/examples/cbl.test.cbllc') OPTION(\*EVENTF) DBGVIEW(\*SOURCE) TGTRLS(\*CURRENT) INCDIR('/home/SANJULA/builds/examples') DEFINE(\*NONE) TGTCCSID(37)

CPFA0A9: Object not found. Object is EN\_US.UTF-8.

CPFA0A9: Object not found. Object is EN\_US.UTF-8.

CPFA0A9: Object not found. Object is EN\_US.UTF-8.

CPD4090: Printer device PRT01 not found. Output queue changed to QPRINT i

n library QGPL.

CPFA0A9: Object not found. Object is EN\_US.UTF-8.

IBM i Testing

- TEST\_TRUE cbl.test.cbllc < examples
- TEST\_FALSE cbl.test.cbllc < examples
- TEST\_FAIL0 cbl.test.cbllc < examples
- TEST\_FAIL1 cbl.test.cbllc < examples
- TEST\_TRUE cbl.test.cbllc < sub < examples
- TEST\_FALSE cbl.test.cbllc < sub < examples
- TEST\_FAIL0 cbl.test.cbllc < sub < examples
- TEST\_FAIL1 cbl.test.cbllc < sub < examples
- testWhatever\_1 Name of the test suite should b...
- testWhatever\_1 Name of the test suite should b...
- testWhatever\_2 rpgstmf.test.rpgle < examples
- testWhatever\_1 rpgsqlstmf.test.sqlrpgle < examp...
- testWhatever\_2 rpgsqlstmf.test.sqlrpgle < examp...
- testWhatever\_2 rpgstmf.test.rpgle < sub < examp...

main\*

0 0

SANJULA@p8adt05.rch.stglabs.ibm.com

Live Share

Deploy

New job (1)

Ln 239, Col 45

Spaces: 2

UTF-8

CRLF

{ } RPGLE

1

# Generating code coverage

The screenshot displays the IBM i development environment with the following components:

- TEST EXPLORER:** A tree view on the left showing test suites. Under 'examples', 'rpgstmf.test.rpgle' is selected, showing two test cases: 'testWhatever\_1' (3.0ms, failed) and 'testWhatever\_2' (1.0ms, passed).
- TEST COVERAGE:** A section below the test explorer showing 'rpgstmf.test.rpgle' with a 60.00% coverage bar.
- Code Editor:** The main area shows the source code of 'rpgstmf.test.rpgle'. The code includes setup and teardown procedures, a test suite setup, and two test cases. The first test case, 'testWhatever\_1', is highlighted in red, indicating a failure. The second test case, 'testWhatever\_2', is highlighted in green, indicating a pass.
- TEST RESULTS:** A panel at the bottom right showing the results of the test run. It lists the test cases and their status: 'testWhatever\_1' failed and 'testWhatever\_2' passed.
- Terminal:** A panel at the bottom left showing the output of the test run, including the test case names and their durations.

```
165 // =====
166 // Set up test suite. Executed once per RUCALLTST.
167 // =====
168 dcl-proc setUpSuite export;
169   dcl-pi *n extproc(*dclcase) end-pi;
170
171   dcl-s rc char(1);
172
173   runCmd('OVRPRTF FILE(QSYSPRT) TOFILE(*FILE) +
174         SPLFNAME(PROC_FLOW) OVRSCOPE(*JOB)');
175   monitor;
176     openPrinter();
177     print('Executing:  setUpSuite()');
178   on-error;
179     // ignore errors ...
180   endmon;
181
182   // ... but try to remove the override.
183   monitor;
184     runCmd('DLTOVR FILE(QSYSPRT) LVL(*JOB)');
185   on-error;
186     dsply '*** Failed to delete QSYSPRT override! ***' rc;
187   endmon;
188 end-proc;
189
190
191 // =====
192 // Tear down test suite.
193 // =====
194 dcl-proc tearDownSuite export;
```

Test Cases: 1 passed | 1 failed | 0 errored (2)  
Duration: 0.004s

# Important Links

## **IBM i Testing**

Documentation

<https://codefori.github.io/docs/developing/testing/overview/>

GitHub Repository

<https://github.com/IBM/vscode-ibmi-testing>

## **RPGUNIT**

Documentation

<https://irpgunit.sourceforge.io/help/>

GitHub Repository

<https://github.com/tools-400/irpgunit>

## **VS Code**

Documentation

<https://code.visualstudio.com/docs/editor/testing>



# Sanjula Ganepola - IBM i Unit Testing Now in VS Code!

Please take the last minute of this session to complete the evaluation. A direct link to the evaluation can be found using the QR code to the right.





**IBM i**