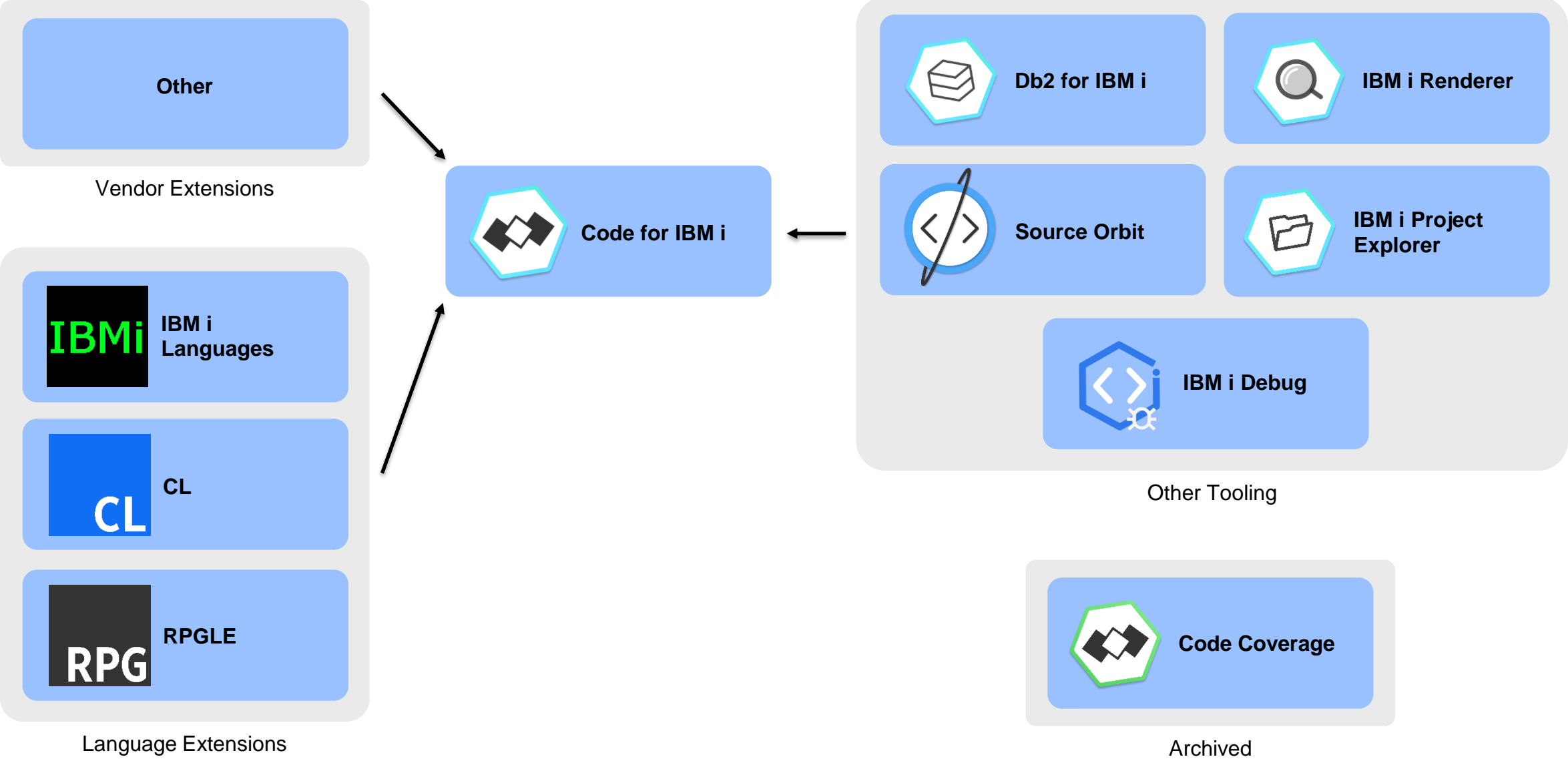


# IBM i Unit Testing Now in VS Code!



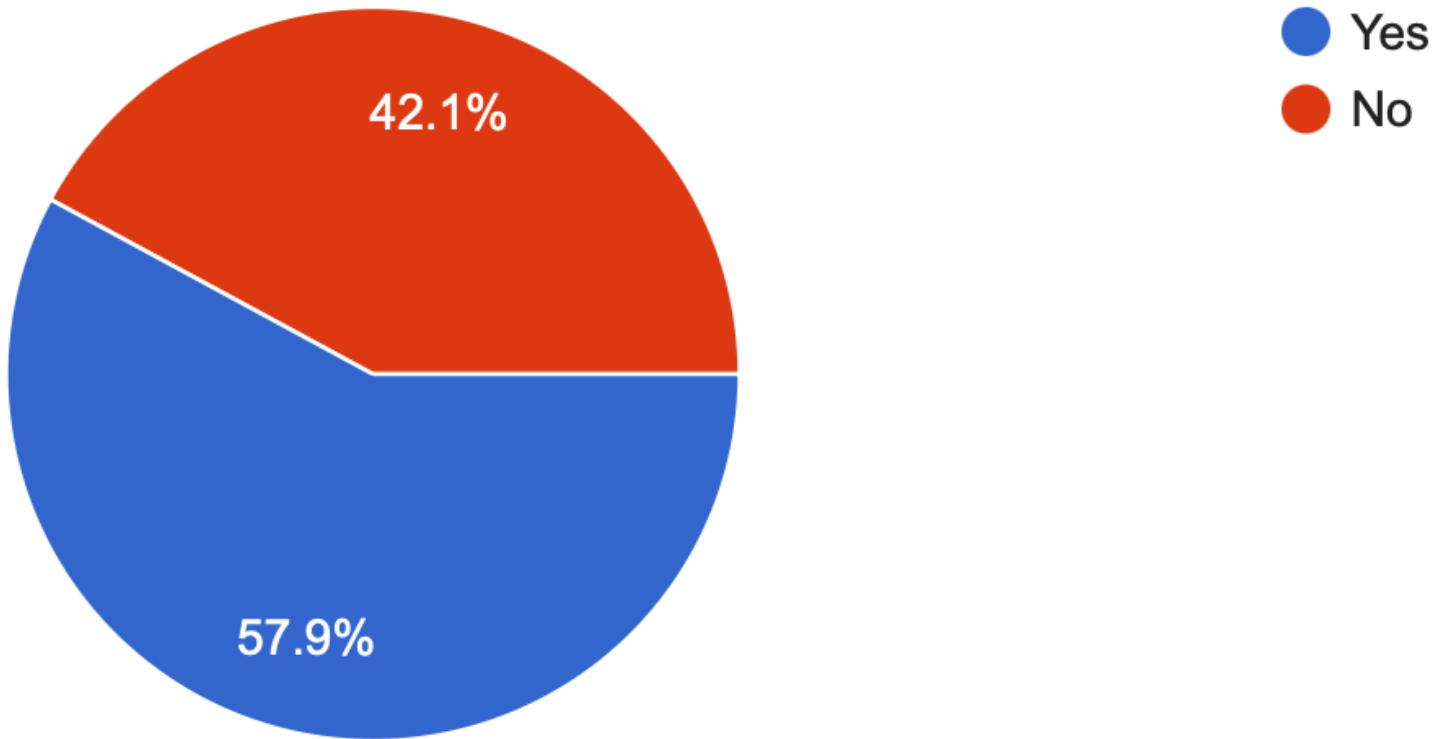
# What is missing in the VS Code stack?



# We did a survey...

Have you done unit testing with IBM i before?

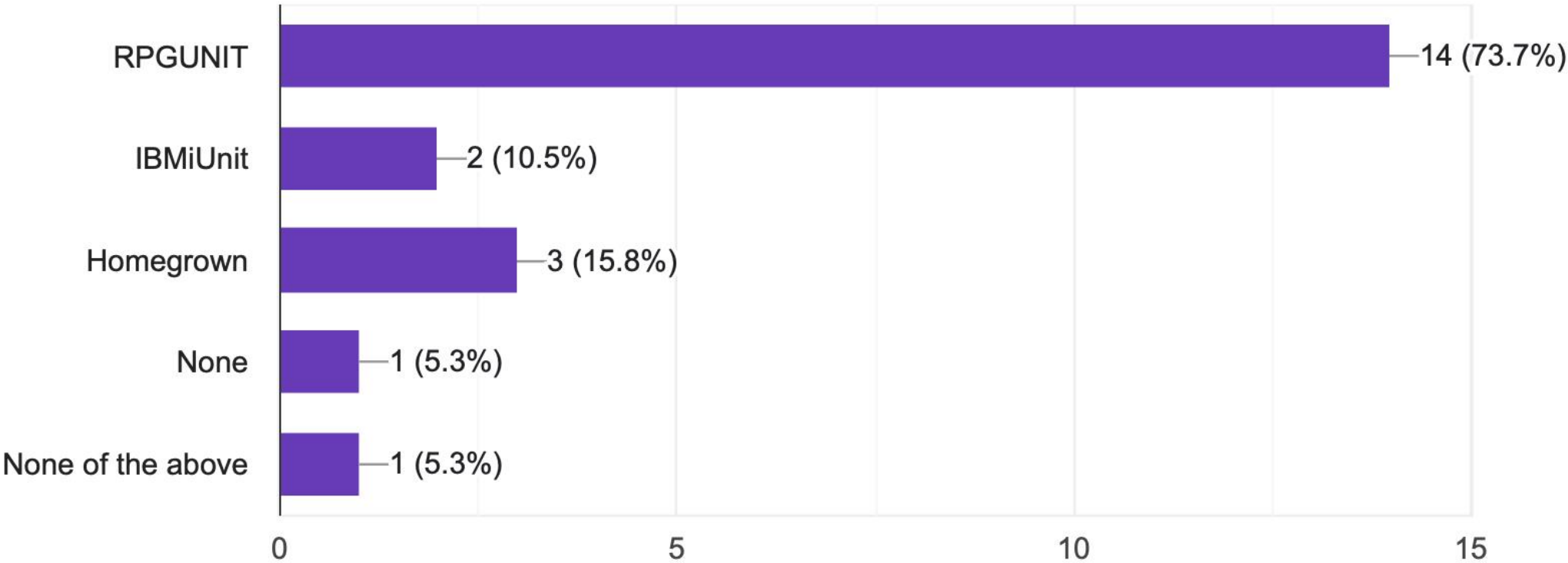
19 responses



# We did a survey...

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

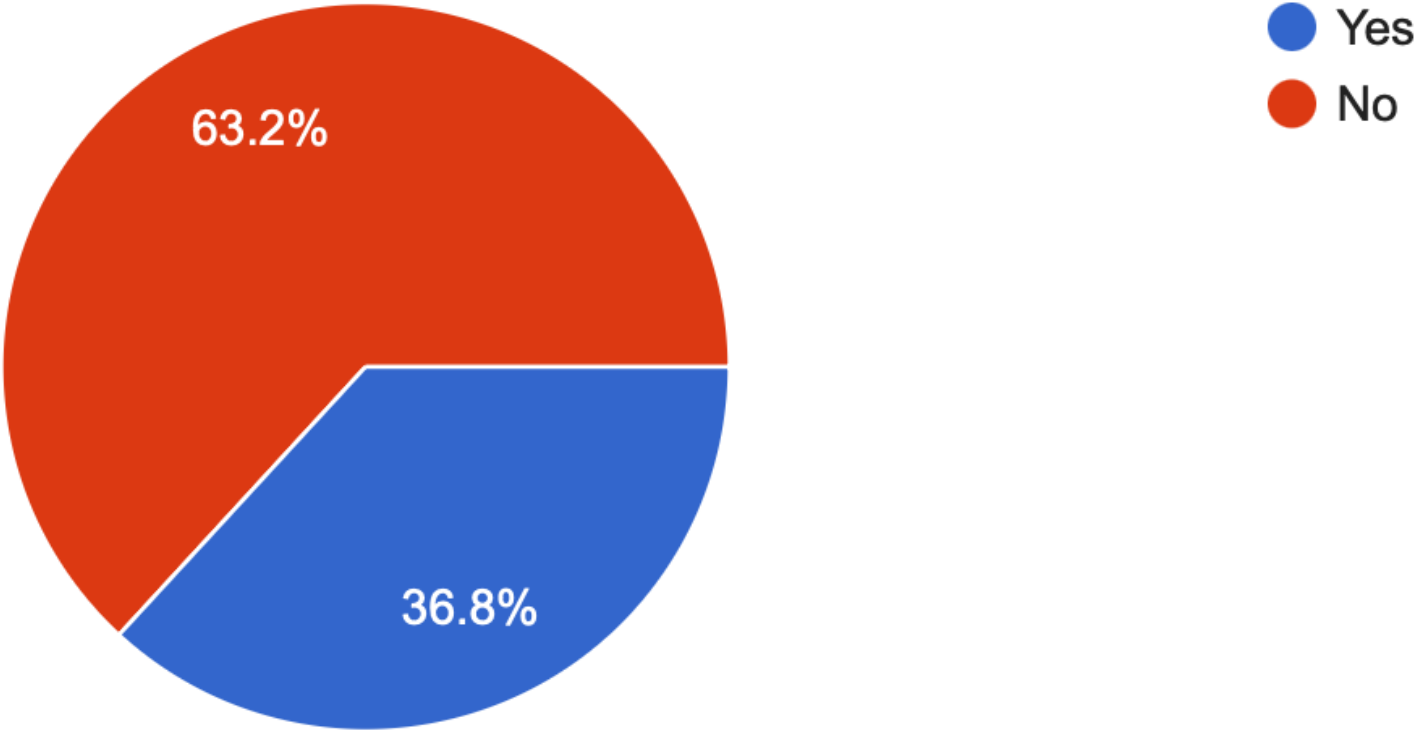
19 responses



# We did a survey...

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

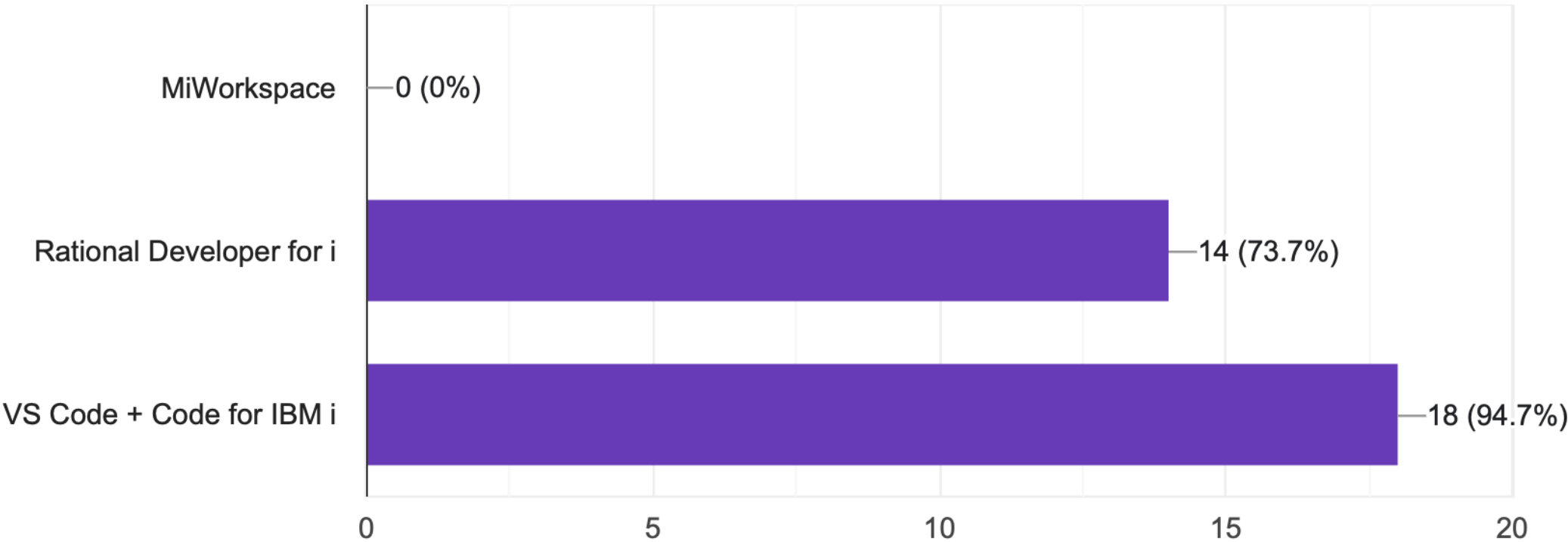
19 responses



# We did a survey...

Which IDEs for IBM i have you used?

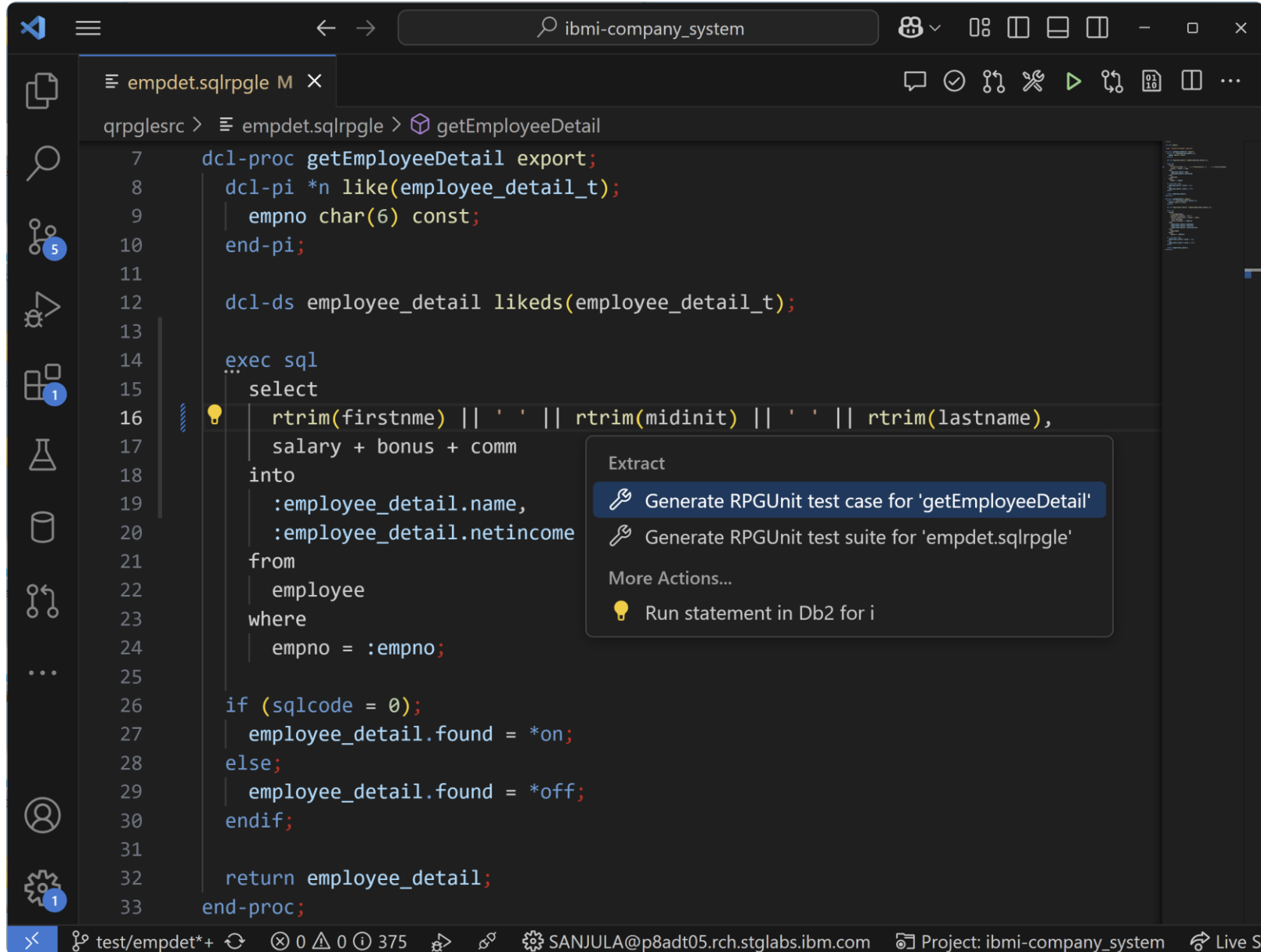
19 responses



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



# Generating test stubs



The screenshot shows a code editor window titled 'empdet.sqlrpgle M'. The code is in RPG/SQL format and defines a procedure 'getEmployeeDetail'. The code includes declarations for a pointer, a character constant, and a dataset, followed by an SQL select statement and conditional logic to return the employee detail.

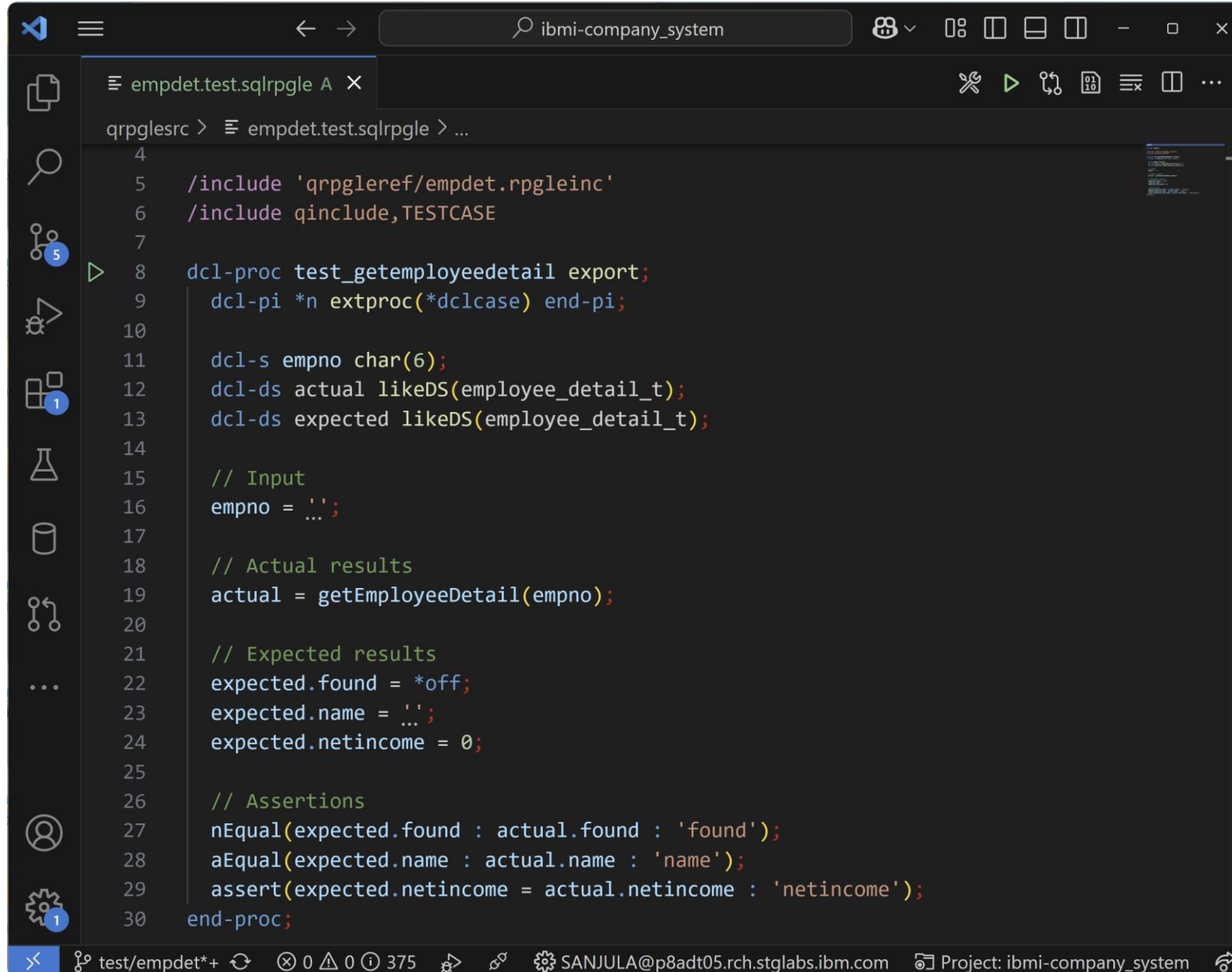
```
7 dcl-proc getEmployeeDetail export;  
8 dcl-pi *n like(employee_detail_t);  
9 | empno char(6) const;  
10 end-pi;  
11  
12 dcl-ds employee_detail likeds(employee_detail_t);  
13  
14 exec sql  
15 | select  
16 | rtrim(firstname) || ' ' || rtrim(midinit) || ' ' || rtrim(lastname),  
17 | salary + 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;
```

An AI assistant 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



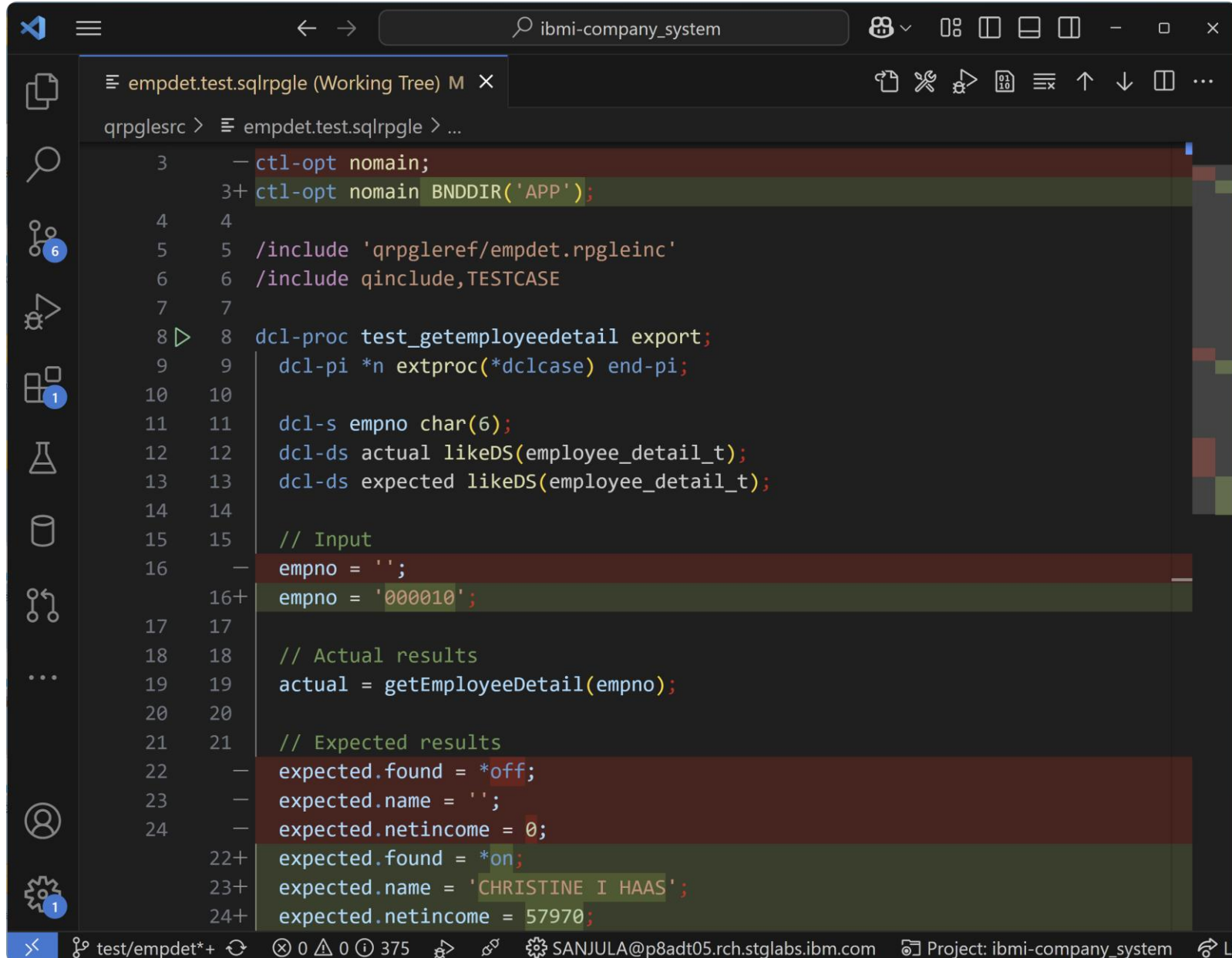
# Generating test stubs



The screenshot shows a code editor window for a project named 'ibmi-company\_system'. The active file is 'empdet.test.sqlrpgle'. The code is written in RPG and defines a test procedure 'test\_getemployeedetail'. It includes headers for 'qrpgle' and 'qinclude,TESTCASE'. The procedure uses 'dcl' to declare variables and data structures, sets input values, calls the 'getEmployeeDetail' function, and then performs assertions on the results. The IDE interface includes a sidebar with icons for Explorer, Search, Source Control, Run and Debug, Test Explorer, and Extensions. The status bar at the bottom shows the current file path, line numbers, and project information.

```
4  
5 /include 'qrpgle/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



```
empdet.test.sqlrpgle (Working Tree) M x
qrpglesrc > empdet.test.sqlrpgle > ...

3  - ctl-opt nomain;
3+  ctl-opt nomain BNDDIR('APP');
4  4
5  5  /include 'qrpgleref/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

1

EXPLORER

> OPEN EDITORS 1 unsaved

▼ IBMI-COMPANY\_SYSTEM

> .evfevent

> .github

> .logs

> .vscode

> qddssrc

> qrppleref

> qrpglesrc

> qsqlsrc

▼ qtestsrc

empdett.test.sqlrpgle

{} testing.json

.env

.gitignore

iproj.json

makefile

readme.md

Rules.mk

> PROJECT EXPLORER

{} testing.json 1

qtestsrc > {} testing.json > {} RPGUnit > {} RUCRTRPG

1 {

2     "RPGUnit": {

3         "RUCRTRPG": {

4             "tgtCcsid": 37,

5             "dbgView": "\*SOURCE",

6             "cOption": [

7                 "\*EVENTF"

8             ]

9     }

+

Activation group

Refer to the ACTGRP parameter in CRTSRVPGM command help.

actGrp

bndDir

bndSrvPgm

bOption

compileOpt

define

dltSplf

incDir

module

pOption

rpgPpOpt

text

tgtRls

< test/empdet

1 0

Project: ibmi-company\_system

Live Share

Pull Request #68

Ln 9, Col 13

Spaces: 4

UTF-8

CRLF

{ } JSON

1

# 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\_getemployeeedetail 68ms

RPGUNIT

empdet.test.sqlrpgle M X

qrpglesrc > empdet.test.sqlrpgle > test\_getemployeeedetail

8 dcl-proc test\_getemployeeedetail 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\_getemployeeedetail 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\_getemployeeede...

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

# Running tests

TEST EXPLO... 17.3s

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

6/16

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

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 ]

✗ 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) TGTCSSID(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 < exam...

✓ testWhatever\_2 rpgsqlstmf.test.sqlrpgle < exam...

✓ testWhatever\_2 rpgstmf.test.rpgle < sub < exam...

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 Visual Studio Code interface with the following components:

- TEST EXPLORER:** Shows a list of test suites. The 'rpgstmf.test.rpgle' suite is selected, showing two test cases: 'testWhatever\_1' (failed, 3.0ms) and 'testWhatever\_2' (passed, 1.0ms). A 'Run Test with Coverage' button is visible.
- TEST COVERAGE:** Shows the coverage for 'rpgstmf.test.rpgle' as 60.00%.
- Code Editor:** Displays the source code for 'rpgstmf.test.rpgle'. The code includes comments, setup and teardown procedures, and test cases. The test cases are marked with red 'X' icons, indicating failure.
- 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, 'testWhatever\_2' passed.
- STATUS BAR:** Shows the current file is 'main\*', the encoding is UTF-8, and the language is RPGLE.

```
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
189 end-proc;
190
191 // =====
192 // Tear down test suite.
193 // =====
194 dcl-proc tearDownSuite export;
```

Test Results Summary:

Test Case	Status	Duration
testWhatever_1	Failed	0.003s
testWhatever_2	Passed	0.001s

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



# 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**