Static Testing Tools and White-box test design

Static Testing

Rubocop

Linting and style enforcement. Rules are defined in `./server/.rubocop.yml`.

```
# analyze project
bundle exec rubocop

# Run analyzer and make rubocop automatically fix linting issues
bundle exec rubocop -a
```

Successful rubocop:

```
bundle exec rubocop
Inspecting 114 files
.....................................................................................
.................................

114 files inspected, no offenses detected
.rubocop.yml: Style/SpaceInsideArrayLiteralBrackets has the wrong namespace -
replace it with Layout/SpaceInsideArrayLiteralBrackets
```

Linting errors highlighted by rubocop

```
bundle exec rubocop
Inspecting 114 files
.....C.....................................................................
..................................

Offenses:

app/controllers/api/v1/auth_controller.rb:10:19: C: [Correctable]
Layout/SpaceInsideReferenceBrackets: Do not use space inside reference
brackets.
    code = params[ :code ]
                  ^
app/controllers/api/v1/auth_controller.rb:10:25: C:
Layout/SpaceInsideReferenceBrackets: Do not use space inside reference
brackets.
    code = params[ :code ]
                        ^
app/controllers/api/v1/auth_controller.rb:18:19: C: [Correctable]
Style/StringLiterals: Prefer single-quoted strings when you don't need string
interpolation or special symbols.
      redirect_to "https://munchora.pro/home"
                  ^^^^^^^^^^^^^^^^^^^^^^^^^^

114 files inspected, 3 offenses detected, 2 offenses autocorrectable
.rubocop.yml: Style/SpaceInsideArrayLiteralBrackets has the wrong namespace -
replace it with Layout/SpaceInsideArrayLiteralBrackets
```

SonarQube

SonarQube (https://www.sonarsource.com/) a *static code analysis tool* that automatically inspects code for bugs, vulnerabilities, code smells, and test coverage without running the program.

SonarQube can be run through the use of Docker (https://medium.com/@index23/start-sonarqube-server-and-run-analyses-locally-with-docker-4550eb7112a3)

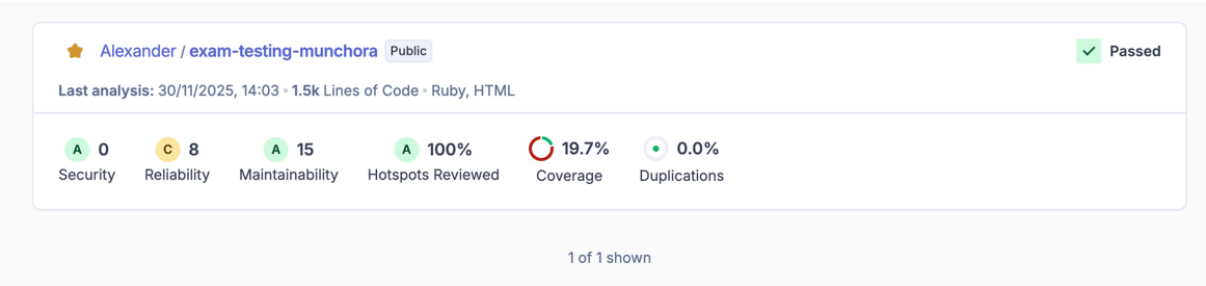
```
cd ./server
docker-compose -f docker-compose-sonar-qube.yml up
```

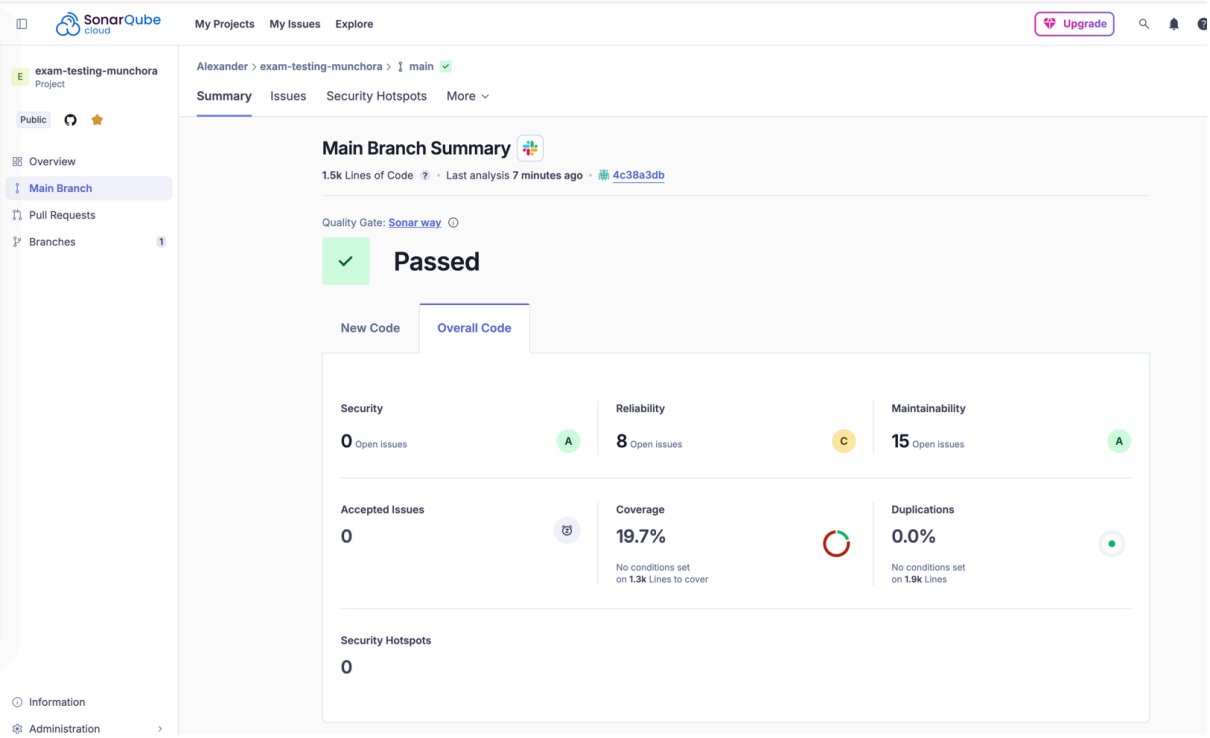
Go to **SonarQube dashboard** on `http://localhost:9000` - default credentials are login: `admin` password: `admin`

Use following command to scan project with *SonnarScanner*:

```
docker run \
    --rm \
    -v "$(pwd):/usr/src" \
    --network="host" \
    -e SONAR_HOST_URL="http://localhost:9000" \
    -e SONAR_SCANNER_OPTS="-Dsonar.projectKey=server -Dsonar.sources=./ -
Dsonar.test=test -Dsonar.javascript.lcov.reportPaths=test/coverage/lcov.info" \
    -e SONAR_TOKEN="${SONAR_TOKEN}" \
    sonarsource/sonar-scanner-cli
```

Sonarqube do also provide a cloud based solution which can be included in CI pipeline:





White Box Design Techniques

Focuses on the code and the structural elements.

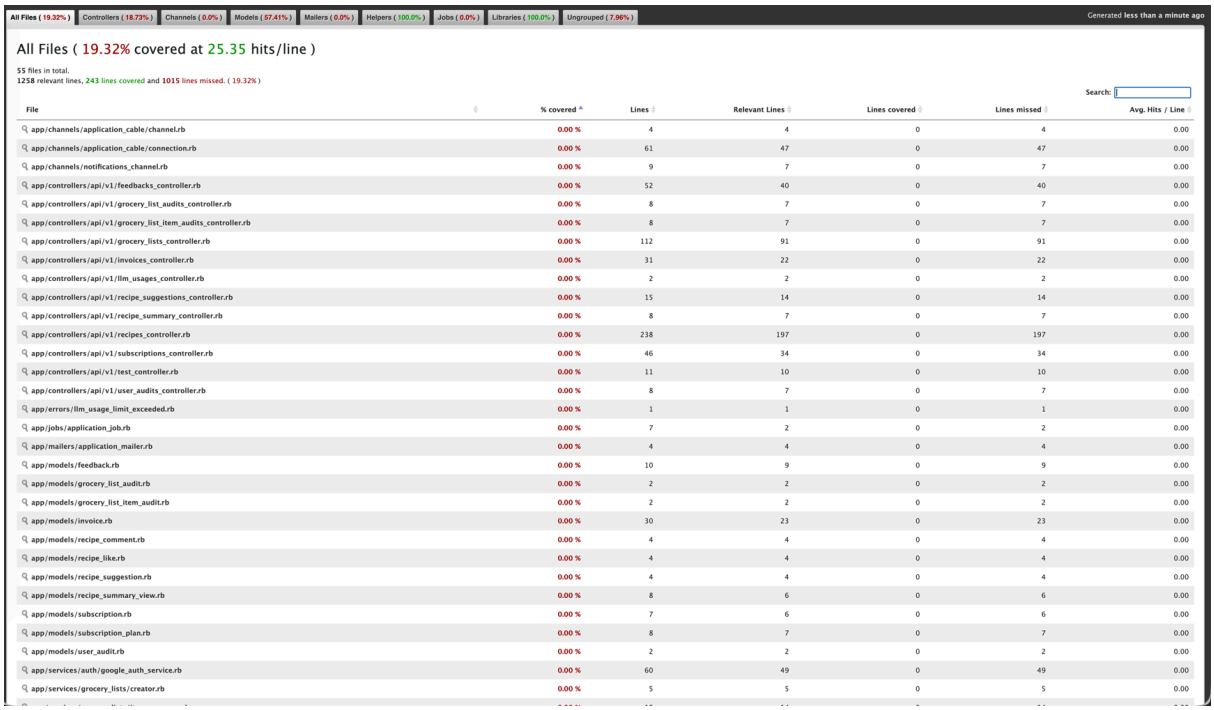
Statement Coverage: Measures whether each line of code has been executed by the test suite at least once. **decision coverage**: Measures whether **each decision (true/false outcome) of every conditional statement** has been exercised at least once.

The code coverage is collected by *rspec* and *simplecov*, so whenever test command `bundle exec rspec` is executed a coverage report is generated in JSON and HTML located at `./server/coverage/index.html` showing line-by-line coverage and totals.

Default *simplecov* measures coverage by line coverage which can be an issue with ternary operator/one line conditionals `number.odd? ? "odd" : "even"`

it can be set to use branch coverage instead:

```
SimpleCov.start do
  enable_coverage :branch
end
```



User creation | User #initialize

Test cases 100% statement coverage

```
#1. first_name="John", last_name="Doe", email="john@doe.com", provider=nil,
uid=nil, password="secret123"
    # TRUE path provider.blank? & TRUE :password is_a?(String)

#2. first_name="John", last_name="Doe", email="john@doe.com",
provider="google", uid="abc123", password=nil
    # TRUE branch of both provider.present? and uid.present?
```

Test cases 100% decision coverage

```
#1. first_name="John", last_name="Doe", email="john@doe.com", provider=nil,
uid=nil, password="secret123"
    # TRUE path for provider.blank? and TRUE for :password is_a?(String)

#2. first_name="John", last_name="Doe", email="john@doe.com", provider=nil,
uid=nil, password=1234
    # FALSE branch of :pasword is_a?(String)

#3. first_name="John", last_name="Doe", email="john@doe.com",
provider="google", uid=nil, password=nil
    # FALSE branch of uid.present? when provider.present?

#3. first_name="John", last_name="Doe", email="john@doe.com",
provider="google", uid="abc123", password=nil
    # TRUE branch of both provider.present? and uid.present?
```