Experiment

Comparison of three notations for the scenario-based testing of models
Scenario-based Testing

- Testing requirements via scenarios
- Scenario test
  - Test precondition(s)
    • Fulfilled → continue
    • Not fulfilled → scenario test fails immediately
  - Test condition(s)
    • Fulfilled → continue
    • Not fulfilled → scenario test fails immediately
  - Test expression(s)
    • Fulfilled → scenario test passes
    • Not fulfilled → scenario test fails
Notations

• Semi-structured natural-language
  – Gherkin-inspired
• Diagrammatic
  – UML sequence diagram
• Fully-structured textual
  – Epsilon script

• For the testing of Ecore-based models
Semi-structured Natural-Language

Scenario:
- Given "..."
- And "..."
- When "..."
- And "..."
- Then "..."
- And "..."

   Test precondition(s)
   Test condition(s)
   Test expression(s)
Diagrammatic

Test precondition(s)

Test condition(s)

Test expression(s)
@TestSuite
operation testSuite() {
  @TestCase
  operation testCase() {
    @TestScenario
    $pre ...
    operation testScenario() {
      if (...) {
        assertTrue(...);
      } else {
        assertTrue(false);
      }
    }
  }
}

- Test precondition(s)
- Test condition(s)
- Test expression(s)
Scenario:

When "all supertype classes of ClassB are abstract"
Then "in ClassJ there shall be at least one attribute of type EnumA with an upper bound multiplicity of -1"
Scenario:
When "all supertype classes of ClassB are abstract"
Then "in ClassJ there shall be at least one attribute of type EnumA with an upper bound multiplicity of -1"

Q: Does the scenario test fail if in ClassJ the attribute attA has a multiplicity of 1..1?
Scenario:
When "all supertype classes of ClassB are abstract"
Then "in ClassJ there shall be at least one attribute of type EnumA with an upper bound multiplicity of -1"

Q: Does the scenario test fail if in ClassJ both attributes have a multiplicity of 1..*?
Example
Task x.1
Q: Does the scenario test fail if in ClassA the navigability of reference refH is inverted?
Q: Does the scenario test fail if in ClassA the navigability of reference refH is inverted and in ClassH the attribute attD is deleted?
@TestSuite
operation testSuite() {
  @TestCase
  operation testCase() {
    @TestScenario
    $pre Model!EClass.all().selectOne(x|x.name="ClassH").eStructuralFeatures.size() = 3
    operation testScenario() {
      if (Model!EClass.all().selectOne(x|x.name="ClassB").closure(x|x.eSuperTypes).forAll(x|x.abstract=true)) {
        assertTrue(Model!EClass.all().selectOne(x|x.name="ClassJ").eStructuralFeatures.exists(x|isTypeOf(EAttribute) and x.eType.name="EnumA" and x.upperBound=-1));
        assertTrue(Model!EClass.all().selectOne(x|x.name="ClassB").eStructuralFeatures.selectOne(x|x.name="refK").eType.eStructuralFeatures.selectOne(x|x.name="refH").eType.name = "ClassA");
      } else {
        assertTrue(false);
      }
    }
  }
}
}
Q: Does the scenario test pass if in ClassA the navigability of reference refH is inverted and in ClassH the attribute attD is deleted?
Q: Does the scenario test pass if ClassE has ClassG as its supertype class?

```java
@TestSuite
operation testSuite() {
    @TestCase
    operation testCase() {
        @TestScenario
        $pre Model!EClass.all().selectOne(x|x.name="ClassH").eStructuralFeatures.size() = 3
        operation testScenario() {
            if (Model!EClass.all().selectOne(x|x.name="ClassB").closure(x|x.eSuperTypes).forAll(x|x.abstract=true)) {
                assertTrue(Model!EClass.all().selectOne(x|x.name="ClassJ").eStructuralFeatures.exists(x|x.isTypeOf(EAttribute) and x.eType.name="EnumA" and x.upperBound=-1));
                assertTrue(Model!EClass.all().selectOne(x|x.name="ClassB").eStructuralFeatures.selectOne(x|x.name="refK").eType.eStructuralFeatures.selectOne(x|x.name="refH").eType.name = "ClassA";
            } else {
                assertTrue(false);
            }
        }
    }
}
```
Your Exercise

- 6 tasks
  - 2 tasks per notation
    - 1 passing scenario test
    - 1 failing scenario test
  - Per task
    - 1 Ecore model under test
    - 1 scenario test description (in one notation)
    - 5 questions (yes / no / don't know) → please no guessing :-)
      - Plus: mention the line number(s) / message number(s) responsible for failing a scenario test
      - Plus for task x.2: mention the line number(s) / message number(s) responsible for failing the scenario test in the first place
      - Each question must be answered independently
  - Write down your start + end time per task!!!