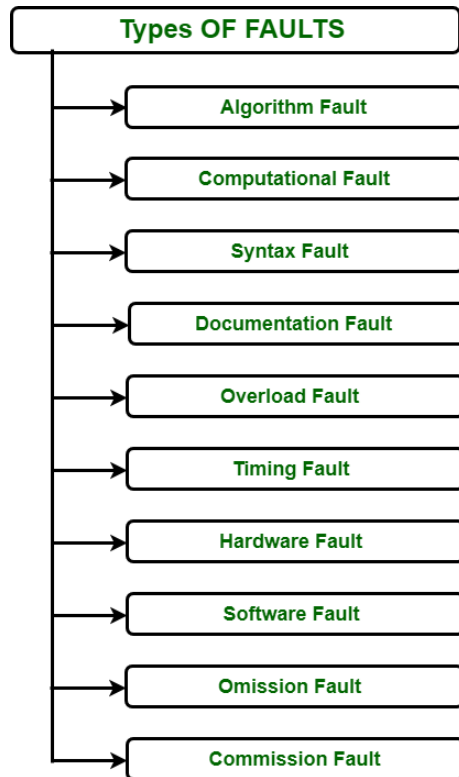Task 2&3:

Fault models could include operands and operators being miscunted or not implemented correctly, such as using parentheses out of order or not considering all tokens. It is most likey to be a algorithmic fault or syntax.

Another example would be internal/external methods not being counter properly or an incorrect implementation of code. There are several ways that faults can occur. This would most likely be a software fault.

Types OF FAULTS

- Algorithm Fault
- Computational Fault
- Syntax Fault
- Documentation Fault
- Overload Fault
- Timing Fault
- Hardware Fault
- Software Fault
- Omission Fault
- Commission Fault

The new testcases improve the functionality of the program due to the test engine, My new blackbox example code was able to test some functionality of the code that white box testing would require much more time to test each functionality of this code, this allowed me to test the entire program example and see where my faults could occur in another test program.

New output below

File Edit Navigate Search Project Run Design Window Help

BBtest.java   4253c1a [422Rep]   ExternalMetReferenceC...   checkstyle-metadata.pr...   checkstyle-metadata.xml   *CheckStylePro/pom.xml

```
15        <exclude>**/*.java</exclude>
```

Overview Dependencies Dependency Hierarchy Effective POM pom.xml

Tasks   Git Staging   JUnit   Console

Finished after 1.591 seconds

Runs:	35/35	Errors:	3	Failures:	5

CheckingUnit [Runner: JUnit 5] (0.044 s)
    testgetDefaultTokens() (0.040 s)
    testgetAcceptableTokens() (0.002 s)
    testgetRequiredTokens() (0.001 s)
CommentCheckUnit [Runner: JUnit 5] (0.013 s)
    testgetDefaultTokens() (0.001 s)
    testIfCommentNodesRequired() (0.006 s)
    testgetAcceptableTokens() (0.002 s)
    testgetRequiredTokens() (0.001 s)
FirstCheckUnit [Runner: JUnit 5] (0.847 s)
    testBlackBoxOperators() (0.562 s)
    testBlackBoxOperands() (0.093 s)
    testgetDefaultTokens() (0.006 s)
    testBlackBoxEffort() (0.081 s)
    testBlackBoxLength() (0.020 s)
    testBlackBoxDifficulty() (0.029 s)
    testBlackBoxVolume() (0.014 s)
    testgetAcceptableTokens() (0.002 s)
    testgetRequiredTokens() (0.002 s)
    testBlackBoxVocab() (0.015 s)
CastCheckUnit [Runner: JUnit 5] (0.051 s)
    testgetDefaultTokens() (0.043 s)
    testgetAcceptableTokens() (0.003 s)
    testgetRequiredTokens() (0.001 s)
FirstCheckBlackBoxDriver [Runner: JUnit 5] (0.322 s)
    testUniqueOperators() (0.014 s)
    testHalsteadEffort() (0.010 s)
    testHalsteadLength() (0.003 s)
    testExternalMethodRefs() (0.121 s)
    testHalsteadVolume() (0.016 s)
    testHalsteadOperators() (0.006 s)
    testMaintainabilityIndex() (0.008 s)
    testHalsteadDifficulty() (0.004 s)
    testHalsteadVocabulary() (0.002 s)

Failure Trace

java.lang.AssertionError
at Tests.FirstCheckUnit.testBlackBoxEffort(FirstCheckUnit.java:87)
at java.base/java.util.ArrayList.forEach(ArrayList.java:1511)
at java.base/java.util.ArrayList.forEach(ArrayList.java:1511)

Project Explorer

checkstylePro
    CastingCheck.java
    Checkstyle.java
    CommentCheck.java
    FirstChecker.java
    LoopingCheck.java
    checkstyle-metadata.properties
    checkstyle-metadata.xml
    messages.properties
Tests
    CastCheckUnit.java
    CheckingUnit.java
    CommentCheckUnit.java
    ExternalMethodRefsBlackBox.java
    FirstCheckBlackBoxDriver.java
    FirstCheckUnit.java
    LoopCheckUnit.java
    uniqueOperandBlackBox.java
    CommentCheckTest.java
    EmptyTest.java
    ExampleCode.java
    Jchecks.java
JRE System Library [JavaSE-18]
Plug-in Dependencies
META-INF
build.properties
Other Projects

Outline

artifactId
version
name
description
build
dependencies
    dependency
        groupId
        artifactId
        version

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1:02 PM
12/11/2022

Project Explorer

checkstylePro
- CastingCheck.java
- Checkstyle.java
- CommentCheck.java
- FirstChecker.java
- LoopingCheck.java
- checkstyle-metadata.properties
- checkstyle-metadata.xml
- messages.properties
- Tests
  - CastCheckUnit.java
  - CheckingUnit.java
  - CommentCheckUnit.java
  - ExternalMethodRefsBlackBox.java
  - FirstCheckBlackBoxDriver.java
  - FirstCheckUnit.java
  - LoopCheckUnit.java
  - uniqueOperandBlackBox.java
  - CommentCheckTest.java
  - EmptyTest.java
  - ExampleCode.java
  - Jchecks.java
- JRE System Library [JavaSE-18]
- Plug-in Dependencies
- META-INF
- build.properties
Other Projects

Outline
- artifactId
- version
- name
- description
- build
- dependencies
  - dependency
    - groupId
    - artifactId
    - version

BBtest.java   4253c1a [422Rep]   ExternalMetReferenceC...   checkstyle-metadata.pr...   checkstyle-metadata.xml

```
15        <exclude>**/*.java</exclude>
```

Overview Dependencies Dependency Hierarchy Effective POM pom.xml

Tasks   Git Staging   JUnit ×   Console

Finished after 1.591 seconds

Runs: 35/35   Errors: 3   Failures: 5

testgetRequiredTokens() (0.001 s)
FirstCheckUnit [Runner: JUnit 5] (0.847 s)
  testBlackBoxOperators() (0.562 s)
  testBlackBoxOperands() (0.093 s)
  testgetDefaultTokens() (0.006 s)
  testBlackBoxEffort() (0.081 s)
  testBlackBoxLength() (0.020 s)
  testBlackBoxDifficulty() (0.029 s)
  testBlackBoxVolume() (0.014 s)
  testgetAcceptableTokens() (0.002 s)
  testgetRequiredTokens() (0.002 s)
  testBlackBoxVocab() (0.015 s)
CastCheckUnit [Runner: JUnit 5] (0.051 s)
  testgetDefaultTokens() (0.043 s)
  testgetAcceptableTokens() (0.003 s)
  testgetRequiredTokens() (0.001 s)
FirstCheckBlackBoxDriver [Runner: JUnit 5] (0.322 s)
  testUniqueOperators() (0.014 s)
  testHalsteadEffort() (0.010 s)
  testHalsteadLength() (0.003 s)
  testExternalMethodRefs() (0.121 s)
  testHalsteadVolume() (0.016 s)
  testHalsteadOperators() (0.006 s)
  testMaintainabilityIndex() (0.008 s)
  testHalsteadDifficulty() (0.004 s)
  testHalsteadVocabulary() (0.002 s)
  testUniqueOperands() (0.088 s)
  testHalsteadOperands() (0.001 s)
LoopCheckUnit [Runner: JUnit 5] (0.013 s)
  testgetDefaultTokens() (0.002 s)
  testgetAcceptableTokens() (0.001 s)
  testgetRequiredTokens() (0.002 s)
  testBlackBoxLoops() (0.003 s)

Failure Trace
java.lang.AssertionError
at Tests.FirstCheckUnit.testBlackBoxEffort(FirstCheck
at java.base/java.util.ArrayList.forEach(ArrayList.java
at java.base/java.util.ArrayList.forEach(ArrayList.java

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