

Software Verification

Static Analysis

T1-T4

Team 2

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2017.06.02

UPDATE

T1

마감 하루 전

Category Partitioning Testing Tool

JDepend / FindBugs / CheckStyle / Code

JDepend

Selected object(s)

Package	CC(concr.cl.)	AC(abstr.cl.)	Ca(aff.)	Ce(eff.)	A	I	D	Cycle!
Default	16	0	0	1	0.00	1.00	0.00	
org.apache.poi.xssf.usermodel	0	0	1	0	0.00	0.00	1.00	

Packages with cycle

Package	CC(concr.cl.)	AC(abstr.cl.)	Ca(aff.)	Ce(eff.)	A	I	D	Cycle!

Depends upon - efferent dependencies

Package	CC(concr.cl.)	AC(abstr.cl.)	Ca(aff.)	Ce(eff.)	A	I	D	Cycle!
org.apache.poi.xssf.usermodel	0	0	1	0	0.00	0.00	1.00	

Used by - afferent dependencies

Package	CC(concr.cl.)	AC(abstr.cl.)	Ca(aff.)	Ce(eff.)	A	I	D	Cycle!
Default	16	0	0	1	0.00	1.00	0.00	

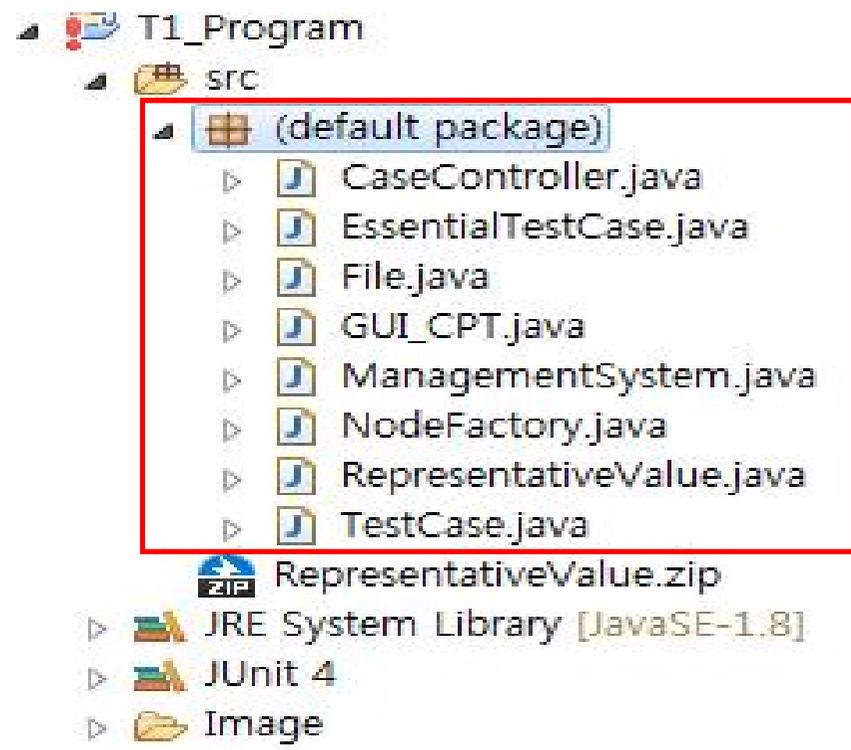
JDepend

패키지 하나에 모든 클래스가 다 들어 있기 때문에 의존성을 판단하기 쉽지 않다.

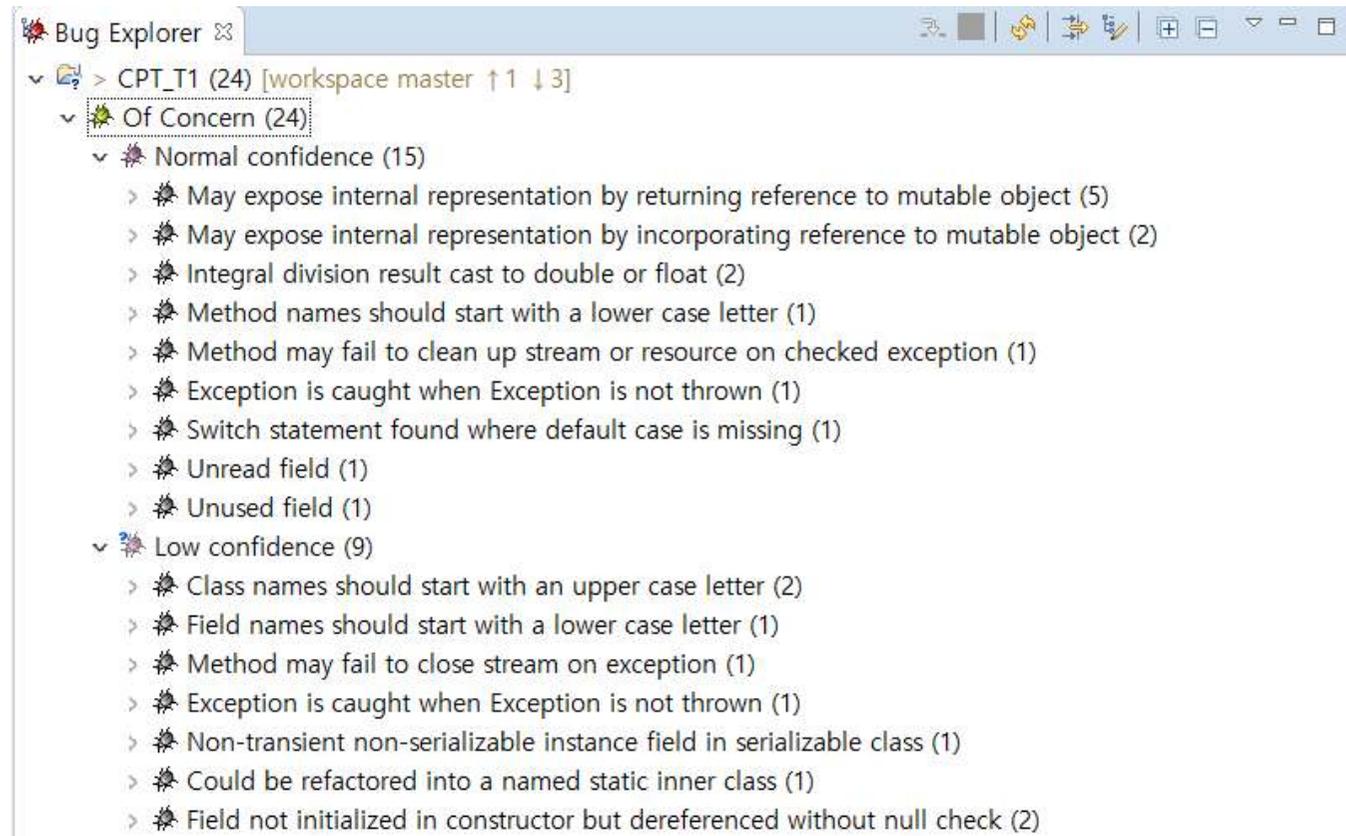
항목 I에 의하면 변화에 대해 매우 안정적이지 않은 것으로 나왔다.

항목 AC에 의하면 인터페이스나 추상클래스가 존재하지 않기 때문에 확장이 어려워 보인다.

JDepend



FindBugs



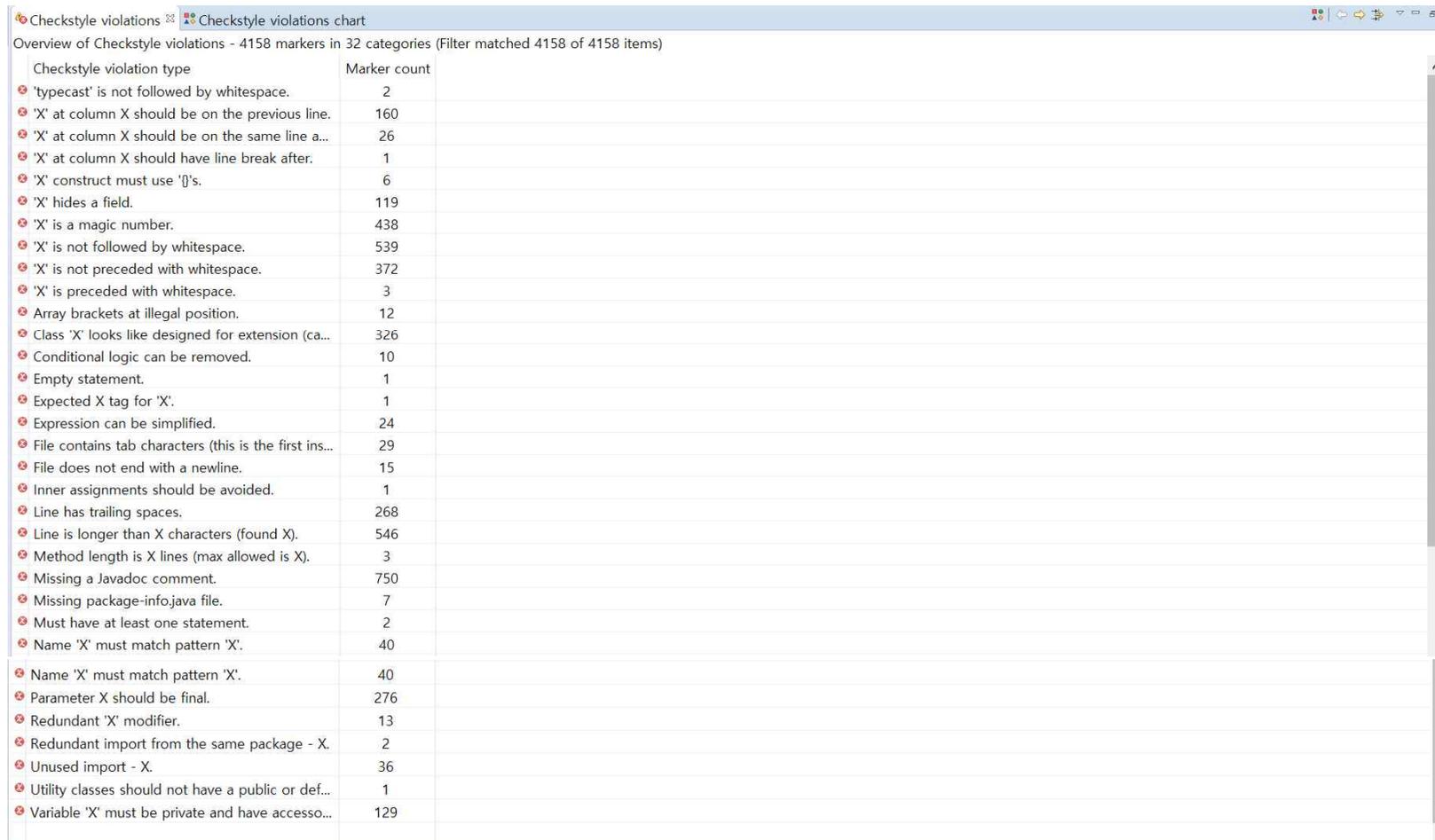
FindBugs

FindBugs를 사용한 정적 분석 결과,

총 24개의 Bug를 발견하였으며,

이 중 Low 등급은 9개, Normal 등급은 15개, High 등급은 없었다.

CheckStyle



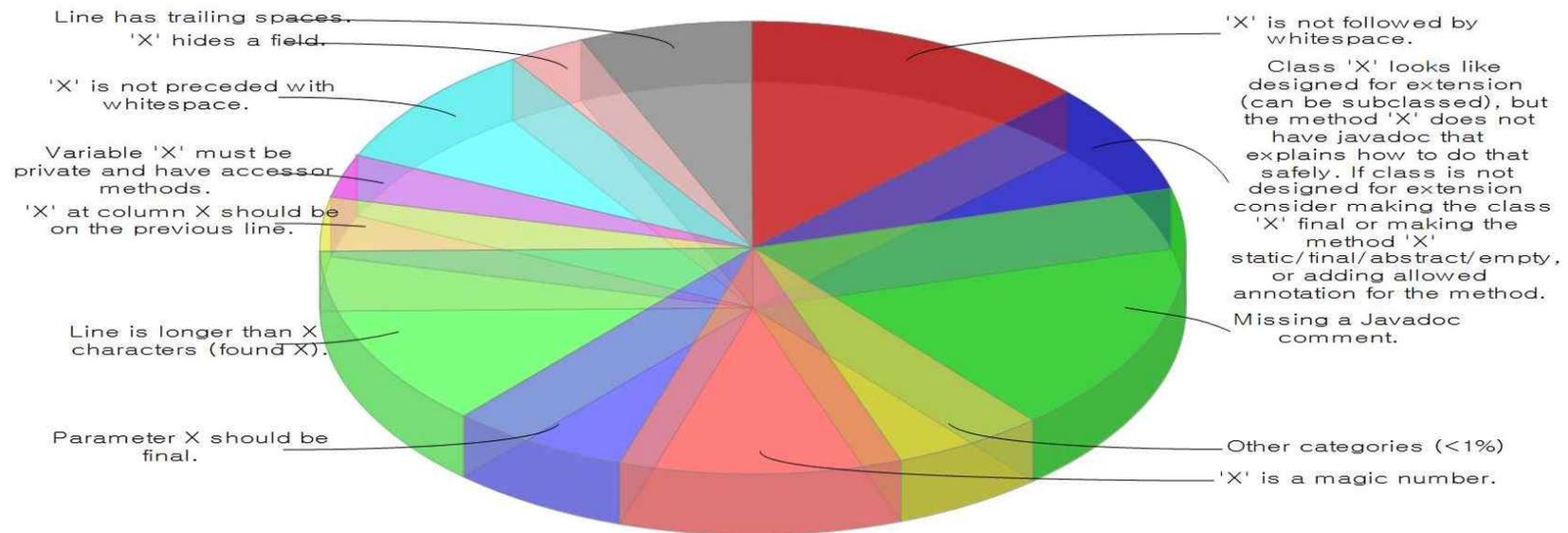
Checkstyle violations - 4158 markers in 32 categories (Filter matched 4158 of 4158 items)

Checkstyle violation type	Marker count
* 'typecast' is not followed by whitespace.	2
* 'X' at column X should be on the previous line.	160
* 'X' at column X should be on the same line a...	26
* 'X' at column X should have line break after.	1
* 'X' construct must use '[]'s.	6
* 'X' hides a field.	119
* 'X' is a magic number.	438
* 'X' is not followed by whitespace.	539
* 'X' is not preceded with whitespace.	372
* 'X' is preceded with whitespace.	3
* Array brackets at illegal position.	12
* Class 'X' looks like designed for extension (ca...	326
* Conditional logic can be removed.	10
* Empty statement.	1
* Expected X tag for 'X'.	1
* Expression can be simplified.	24
* File contains tab characters (this is the first ins...	29
* File does not end with a newline.	15
* Inner assignments should be avoided.	1
* Line has trailing spaces.	268
* Line is longer than X characters (found X).	546
* Method length is X lines (max allowed is X).	3
* Missing a Javadoc comment.	750
* Missing package-info.java file.	7
* Must have at least one statement.	2
* Name 'X' must match pattern 'X'.	40
* Name 'X' must match pattern 'X'.	40
* Parameter X should be final.	276
* Redundant 'X' modifier.	13
* Redundant import from the same package - X.	2
* Unused import - X.	36
* Utility classes should not have a public or def...	1
* Variable 'X' must be private and have accesso...	129

CheckStyle

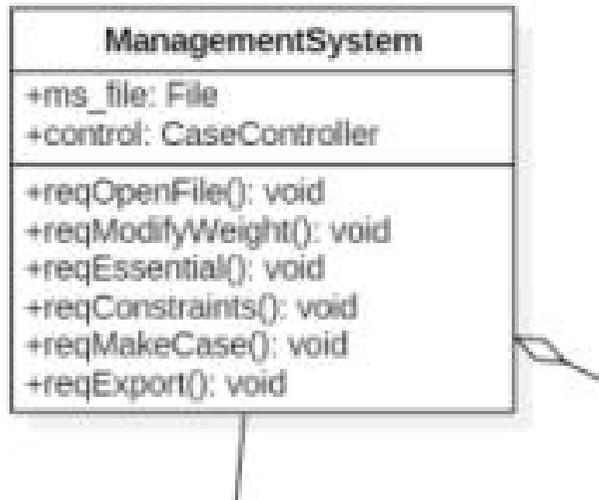
T1의 프로젝트는 총 32개 종류의 CheckStyle을 위반하였으며,
위배된 코드의 총 개수는 4158개이다

CheckStyle

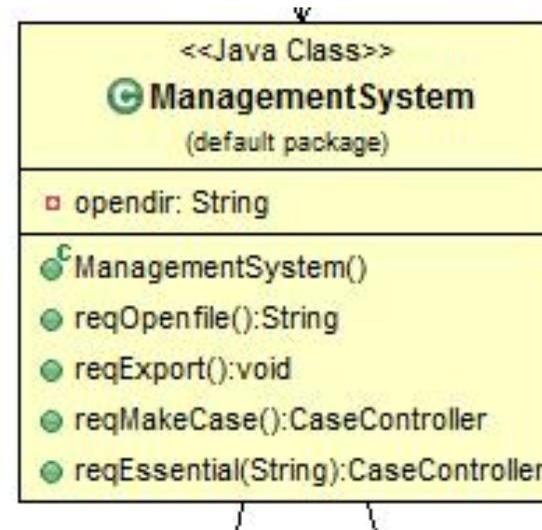


1. Missing a javadoc comment → 18%
2. Line is longer than X characters (found X) → 13.1%
3. 'X' is not followed by whitespace → 13.0%

Code Review



Stage2040_T1.pdf
ClassDiagram

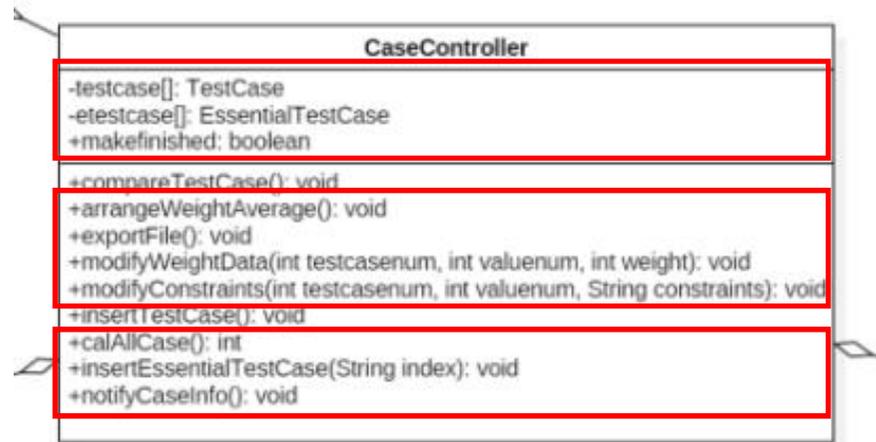


Eclipse Plugin ObjectAid
2017.5.25

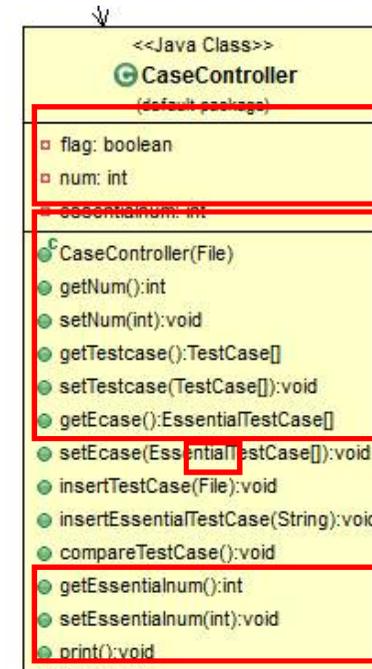
문서에 정의된 함수(예 - reqContrainits())를 사용하지 않았다.

문서에는 생성자가 정의 되어있지 않다.

Code Review



Stage2040_T1.pdf
ClassDiagram



Eclipse Plugin ObjectAid
2017.5.25

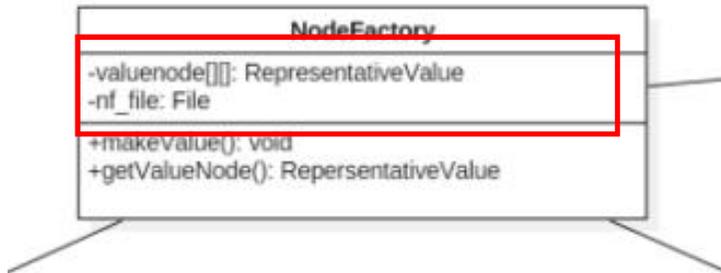
문서에서 정의한 변수들을 사용하지 않았다.

문서에서 정의한 함수들과 input의 형식이 맞지않는다.

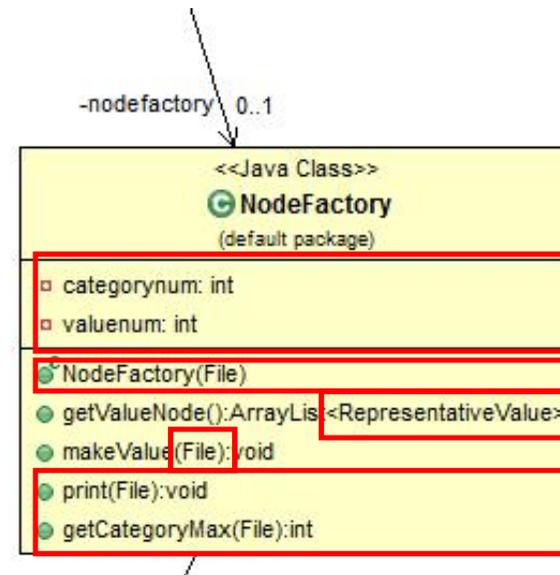
문서에서 정의한 함수들이 존재하지 않는다.

문서에서 정의하지 않은 함수들을 사용했다.

Code Review



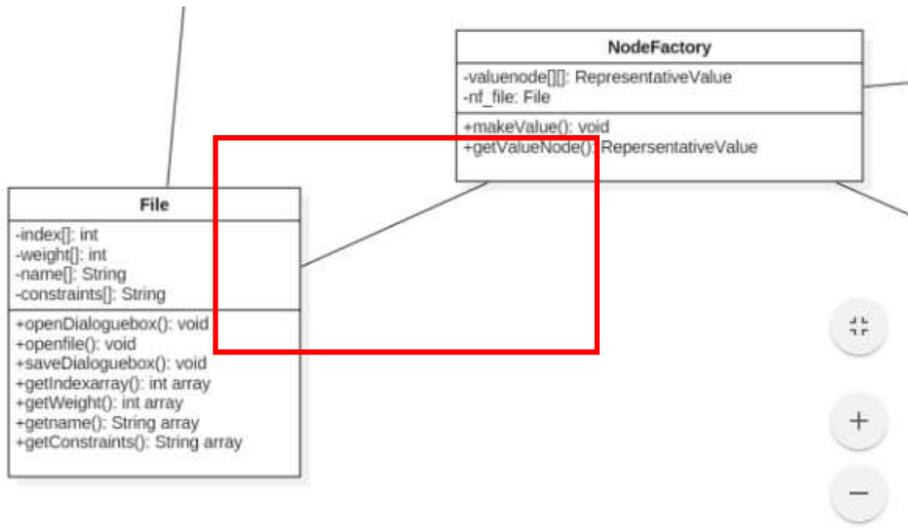
Stage2040_T1.pdf
ClassDiagram



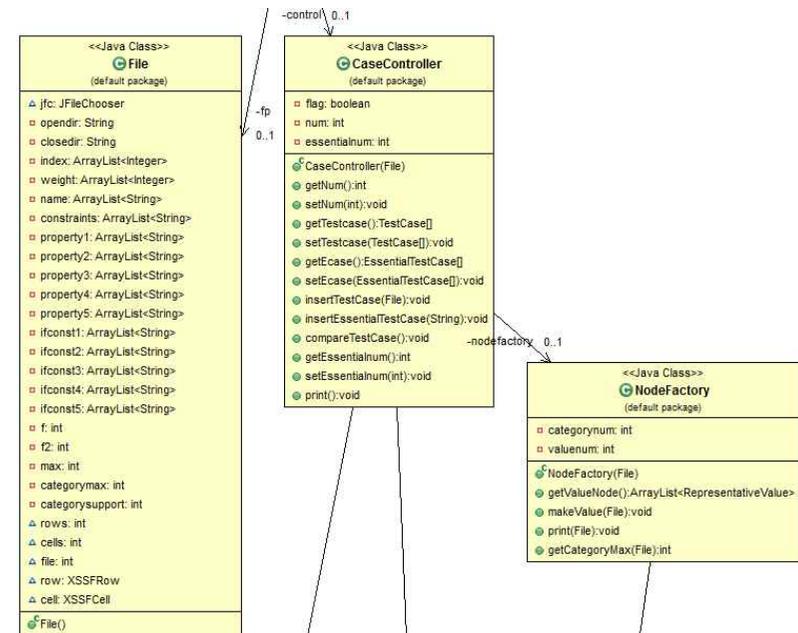
Eclipse Plugin ObjectAid
2017.5.25

문서에서 정의하지 않은 함수들을 사용했다.

Code Review



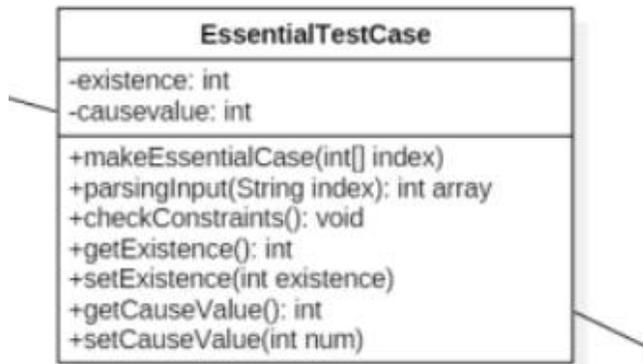
Stage2040_T1.pdf
ClassDiagram



Eclipse Plugin ObjectAid
2017.5.25

문서와 다르게 구현상에는 File과 NodeFactory의 관계가 존재하지 않는다.

Code Review



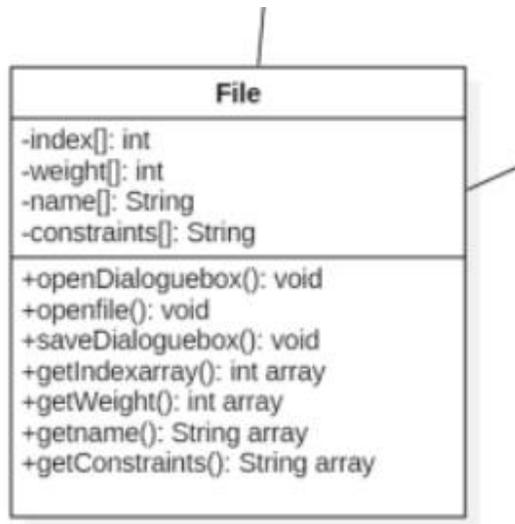
Stage2040_T1.pdf
ClassDiagram



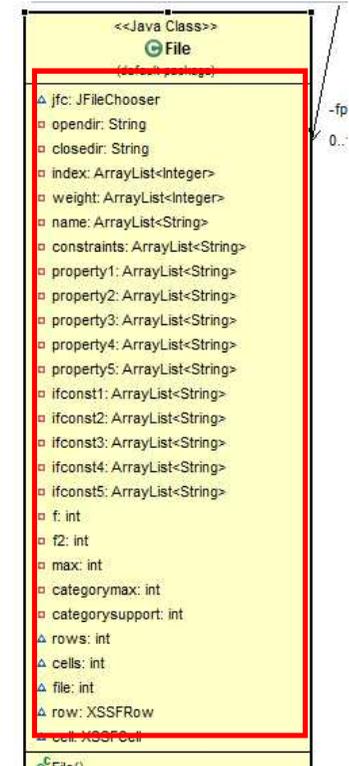
Eclipse Plugin ObjectAid
2017.5.25

전체적으로 문서에서 정의되지 않은 새로운 변수와 함수들이 추가되었다.

Code Review



Stage2040_T1.pdf
ClassDiagram



Eclipse Plugin ObjectAid
2017.5.25

전체적으로 문서에서 정의되지 않은 새로운 변수와 함수들이 추가되었다.

문서에 누락된 내용이 상당수 존재하고, 함수명, 변수명 등의 차이가 심해 sequence diagram을 대조하는 것은 무의미 할 것으로 판단된다.

Code Review

Sequence Diagram

Class Diagram에서 일치하지 않는 부분들이 많아서 Sequence Diagram까지
보지 않아도 차이가 많을 것으로 예상됩니다.

T4
Priority
Category Partitioning Testing Tool

JDepend / FindBugs / CheckStyle / Code

JDepend

Dependencies								
Selected object(s)								
Package	CC(concr.cl.)	AC(abstr.cl.)	Ca(aff.)	Ce(eff.)	A	I	D	Cycle!
GUI	36	0	1	1	0.00	0.50	0.50	⚠
System	7	0	2	4	0.00	0.66	0.33	⚠
com.jtattoo.plaf.acryl	0	0	1	0	0.00	0.00	1.00	
org.apache.poi.hssf.usermodel	0	0	1	0	0.00	0.00	1.00	
org.apache.poi.ss.usermodel	0	0	1	0	0.00	0.00	1.00	
org.junit	0	0	1	0	0.00	0.00	1.00	
test	4	0	0	2	0.00	1.00	0.00	⚠

Packages with cycle								
Package	CC(concr.cl.)	AC(abstr.cl.)	Ca(aff.)	Ce(eff.)	A	I	D	Cycle!
GUI	36	0	1	1	0.00	0.50	0.50	⚠
System	7	0	2	4	0.00	0.66	0.33	⚠

Depends upon - efferent dependencies								
Package	CC(concr.cl.)	AC(abstr.cl.)	Ca(aff.)	Ce(eff.)	A	I	D	Cycle!
GUI	36	0	1	1	0.00	0.50	0.50	⚠
System	7	0	2	4	0.00	0.66	0.33	⚠
com.jtattoo.plaf.acryl	0	0	1	0	0.00	0.00	1.00	
org.apache.poi.hssf.usermodel	0	0	1	0	0.00	0.00	1.00	
org.apache.poi.ss.usermodel	0	0	1	0	0.00	0.00	1.00	
org.junit	0	0	1	0	0.00	0.00	1.00	

Used by - afferent dependencies								
Package	CC(concr.cl.)	AC(abstr.cl.)	Ca(aff.)	Ce(eff.)	A	I	D	Cycle!
GUI	36	0	1	1	0.00	0.50	0.50	⚠
System	7	0	2	4	0.00	0.66	0.33	⚠
test	4	0	0	2	0.00	1.00	0.00	⚠

JDepend

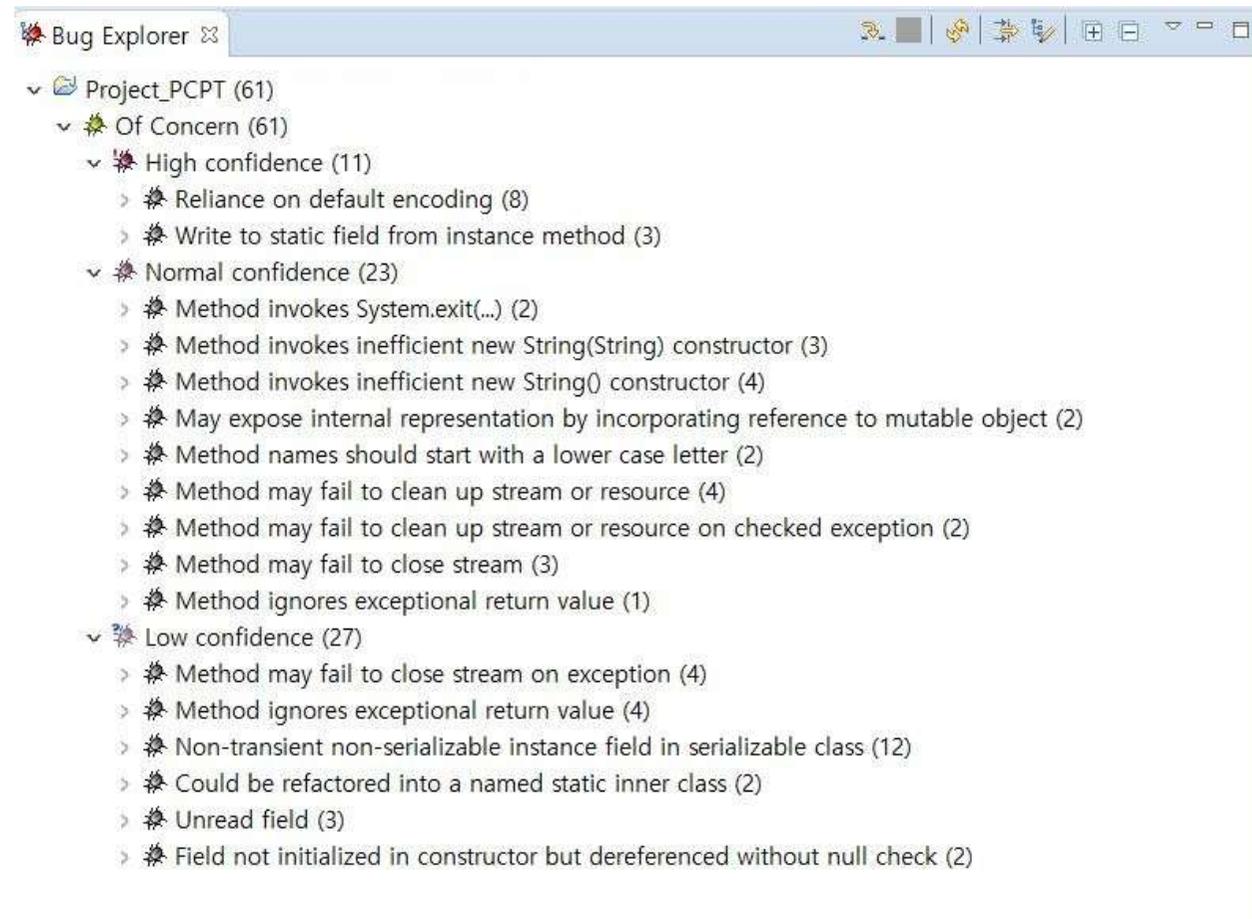
항목 I에 의하면 System 패키지는 안정성 0.66으로 **변화에 안정적이지 않다.**

항목 A와 Ce에 의하면 GUI 패키지는 구체적이지만 이 패키지의 클래스들은 **1개의 패키지에만 종속**하고 있기 때문에 이상적이지 않다.

항목 AC에 의하면 **인터페이스나 추상클래스가 존재하지 않기** 때문에 확장이 어려워 보인다.

항목 Ce에 의하면 System 패키지의 클래스들은 4개의 **패키지에 의존**하고있다.

FindBugs



FindBugs

FindBugs를 사용한 정적 분석 결과,

총 61개의 Bug를 발견하였으며,

이 중 Low 등급은 27개, Normal 등급은 23개, High 등급은 11개이다.

CheckStyle

Checkstyle violations Checkstyle violations chart

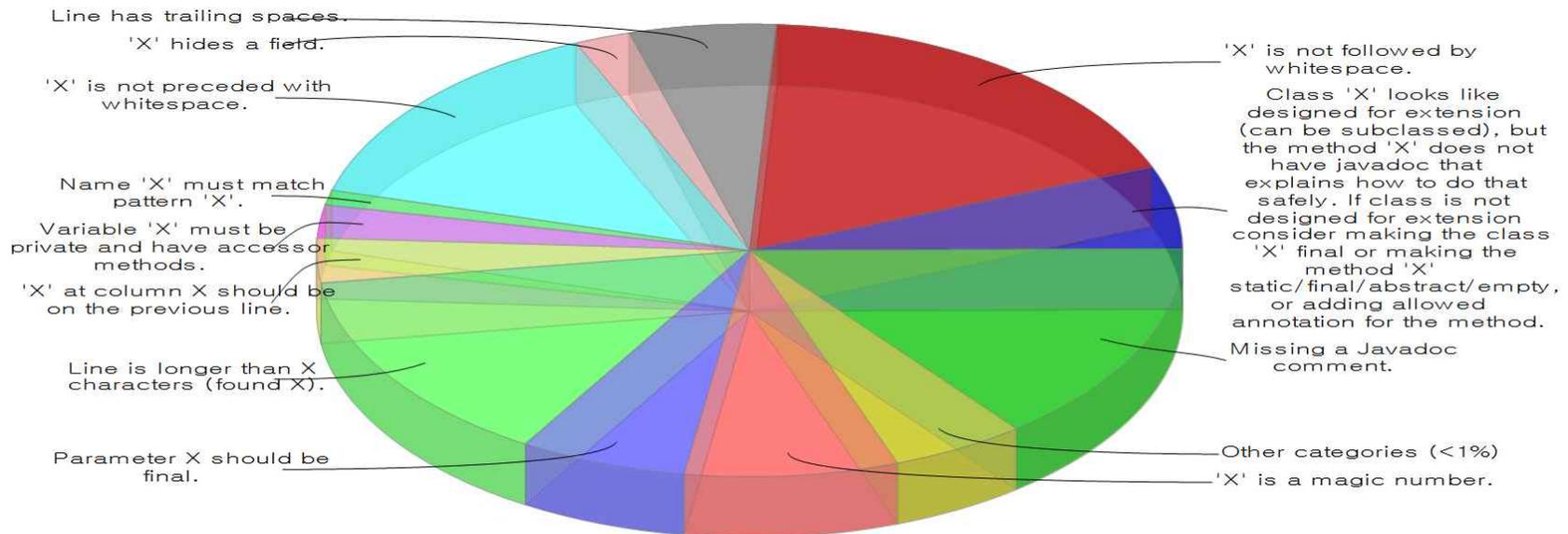
Overview of Checkstyle violations - 6248 markers in 35 categories (Filter matched 6248 of 6248 items)

Checkstyle violation type	Marker count
'X' at column X should be on the previous line.	199
'X' at column X should be on the same line a...	40
'X' at column X should have line break after.	15
'X' construct must use '()'s.	6
'X' hides a field.	130
'X' is a magic number.	498
'X' is not followed by whitespace.	1123
'X' is not preceded with whitespace.	884
'X' is preceded with whitespace.	5
'X' should be on a new line.	2
Array brackets at illegal position.	13
Class 'X' looks like designed for extension (ca...	369
Conditional logic can be removed.	10
Empty statement.	1
Expected X tag for 'X'.	4
Expression can be simplified.	24
File contains tab characters (this is the first ins...	43
File does not end with a newline.	16
First sentence should end with a period.	1
Inner assignments should be avoided.	1
Line has trailing spaces.	343
Line is longer than X characters (found X).	877
Method length is X lines (max allowed is X).	4
Missing a Javadoc comment.	909
Missing package-info.java file.	10
Must have at least one statement.	8
Name 'X' must match pattern 'X'.	66
Parameter X should be final.	390
Redundant 'X' modifier.	13
Redundant import from the same package - X.	2
Unused import - X.	46
Using the '*' form of import should be avoid...	25
Utility classes should not have a public or def...	2
Variable 'X' must be private and have accesso...	147

CheckStyle

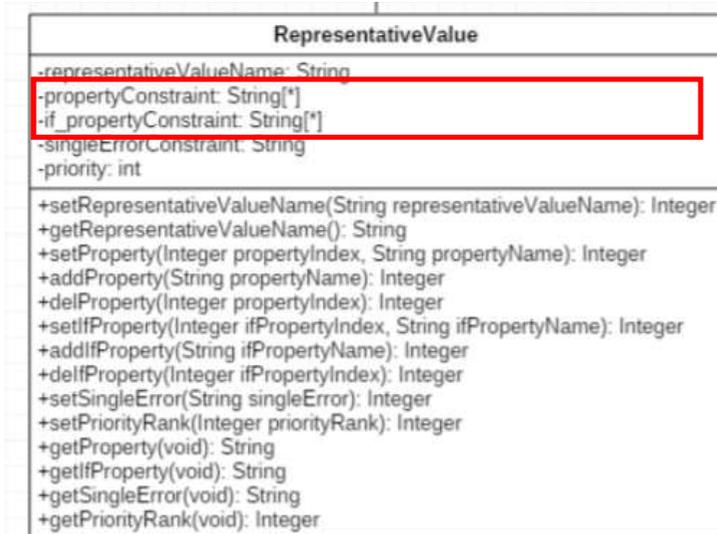
T4의 프로젝트는 총 35개 종류의 CheckStyle을 위반하였으며,
위배된 코드의 총 개수는 6248개이다

CheckStyle



1. 'X' is not followed by whitespace → 18%
2. Missing a javadoc comment → 18%
3. Line is longer than X characters (found X) → 13.1%

Code Review

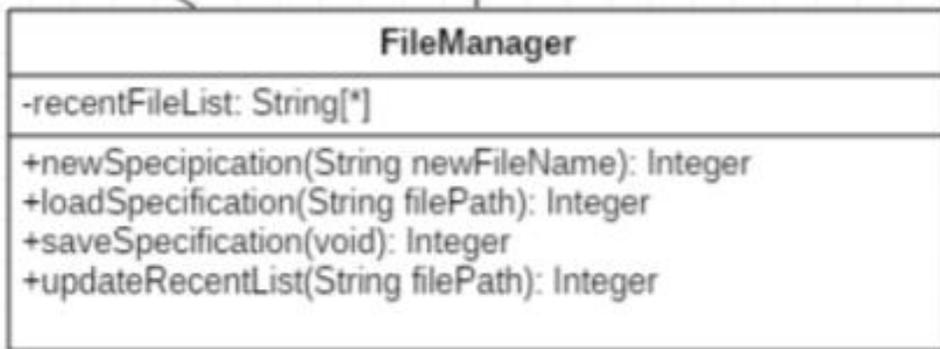
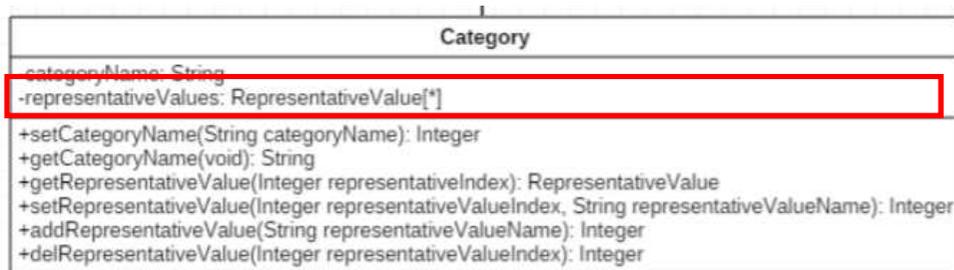


Stage2040_T4.pdf
ClassDiagram

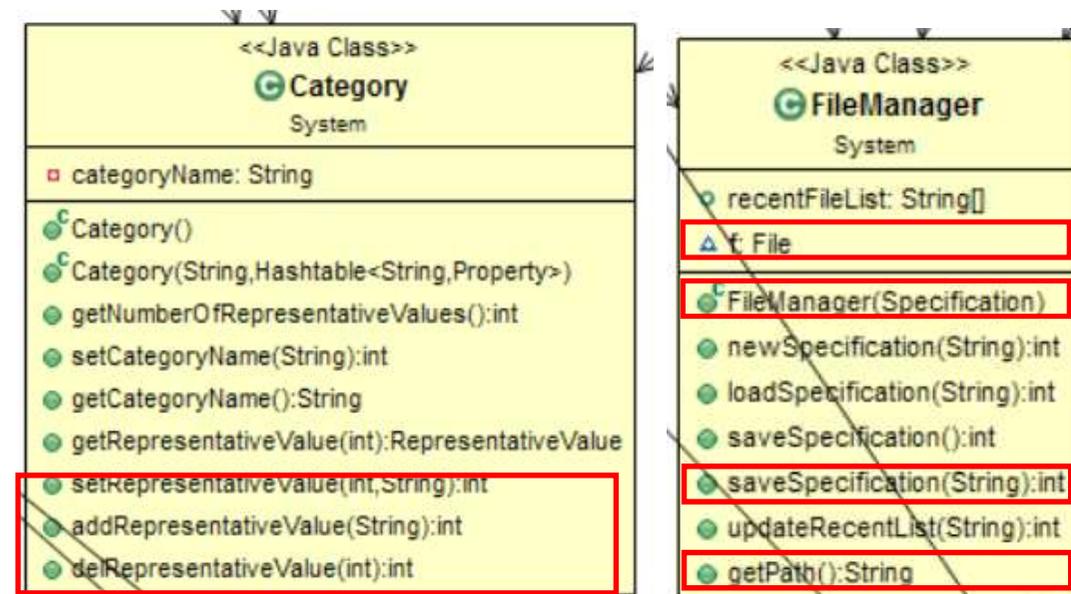


Eclipse Plugin ObjectAid
2017.5.25

Code Review



Stage2040_T4.pdf
ClassDiagram



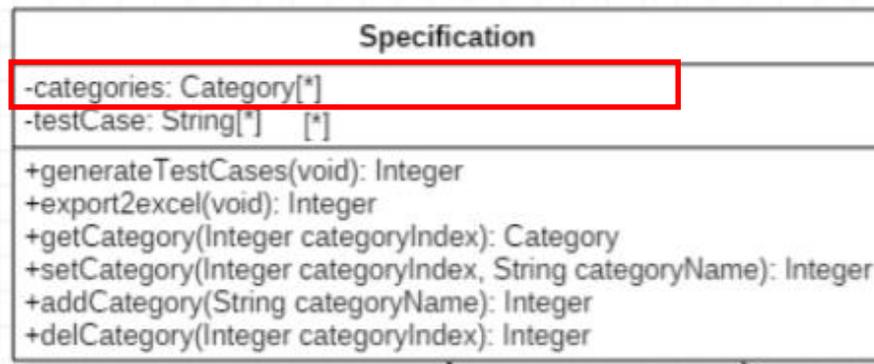
Eclipse Plugin ObjectAid
2017.5.25

Code Review

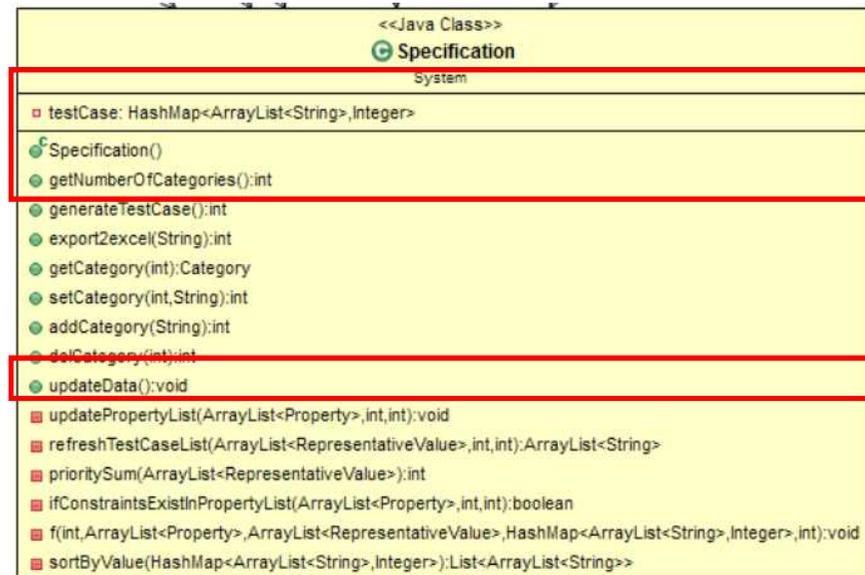
RepresentativeValue, Category, FileManager

- 문서에 정의된 변수가 존재하지 않는다.
(예 - if_propertyConstraint, propertyConstraint).
- 문서에 정의되지 않은 메소드를 정의하고 사용하였다.
(예- getNumberOfPropertyConstraints())

Code Review



Stage2040_T4.pdf
ClassDiagram



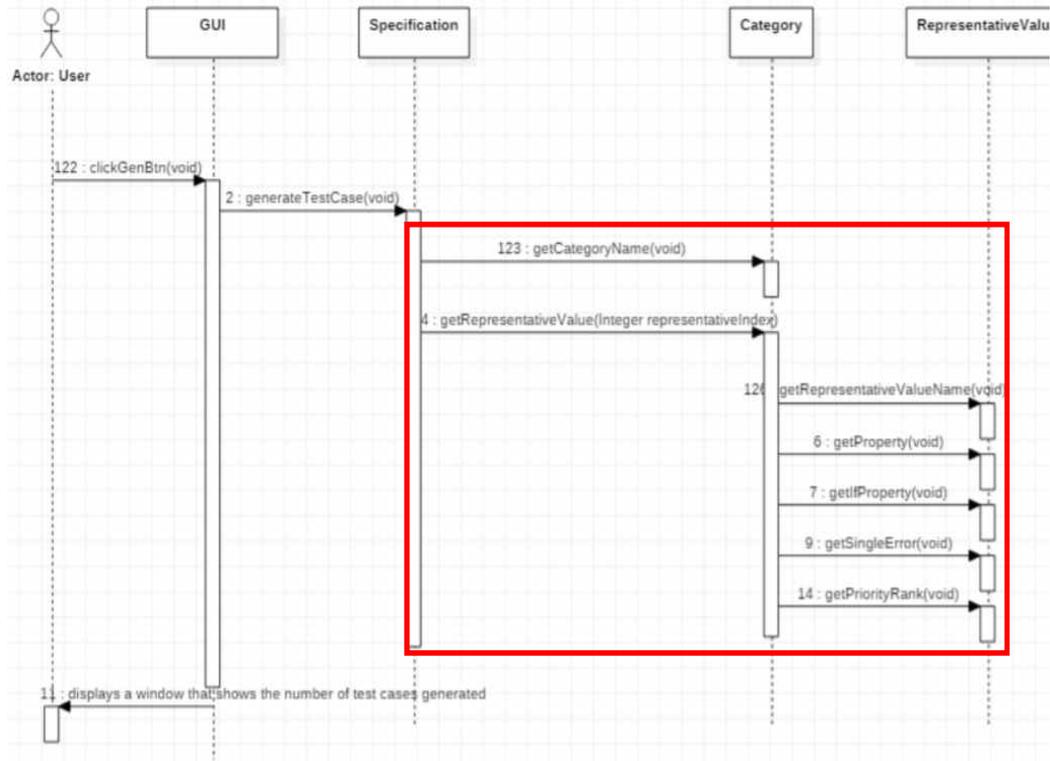
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2017.5.25

Code Review

Specification

문서에 정의된 변수가 존재하지 않으며, 존재하는 변수 또한 자료형이 다르다.
(예- testcase : String[*] -> HashMap<ArrayList<String>, Integer>)

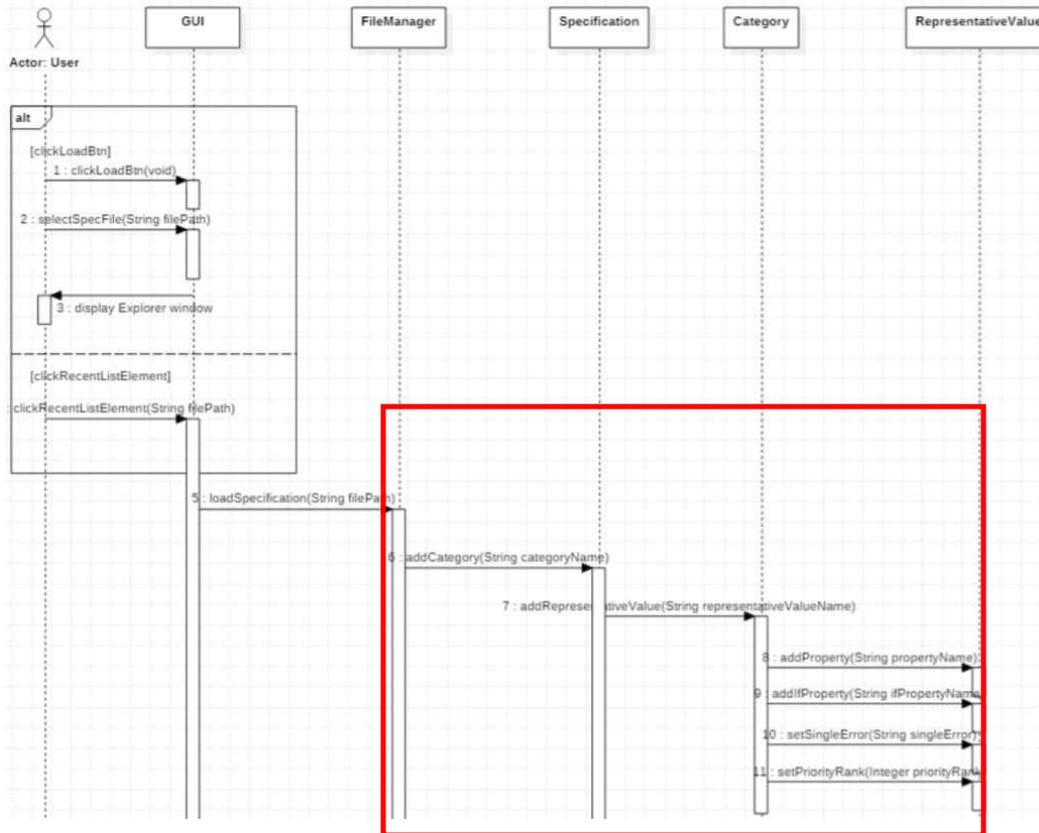
Code Review



```
public int generateTestCase() {
    boolean isExist=false;
    for(int i=0;i<getNumberOfCategories();i++){
        if(getCategory(i).getNumberOfRepresentativeValues()!=0){
            isExist=true;
            break;
        }
    }
    if(this.getNumberOfCategories()!=0 && isExist){
        testCase = new HashMap<ArrayList<String>, Integer>();
        ArrayList<Property> propertyList = new ArrayList<Property>();
        ArrayList<RepresentativeValue> testCaseList = new ArrayList<RepresentativeValue>();
        f(0, propertyList, testCaseList, testCase, 0);

        /*
        //for debugging----- //
        System.out.println("testcase num=" + testCase.size()); //
        System.out.println(testCase); //
        ----- //
        */
        return testCase.size();
    }else{
        return -1;
    }
}
```

Code Review



```
for(int i=0;i<sub.length;i++){
    if(i==0){
        categories = sub[i].split("/");
        for(int j=0;j<categories.length;j++){
            spec.addCategory(categories[j]);
        }
    }
    else{
        values = sub[i].split("/");
        for(int j=0;j<values.length;j++){
            temp = values[j].split("\f");
            spec.getCategory(i-1).addRepresentativeValue(temp[0]);
            if(temp[1].length()!=0){
                properties = temp[1].split(",");
                for(int k=0;k<properties.length;k++){
                    spec.getCategory(i-1).getRepresentativeValue(j).addProperty(properties[k]);
                }
            }
            ifPropertybuff.append(i-1+" "+j+": "+temp[2]+"/");
            spec.getCategory(i-1).getRepresentativeValue(j).setSingleError(Integer.parseInt(temp[3]));
            spec.getCategory(i-1).getRepresentativeValue(j).setPriorityRank(Integer.parseInt(temp[4]));
        }
    }
}
```

Code Review

Sequence Diagram

전체적으로 문서와 매핑이 되지만 중간중간에 설명이 부족한 함수나 일치하지 않는 Sequence Diagram 들이 보인다.

Thank you