

# Software Verification

<정적 분석 보고서>

T2

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# 1. Checkstyle

## Coding Style Check Results

Summary	
Total files checked	11
Files with errors	11
Total errors	3759
Errors per file	342

구글 스타일 기준 전체 3759개의 에러

File:	C:\Users\shlee322\projects\konkuk-dslab\src\main\java\Controller\CloneChecker.java
Line Number	Error Message
1	Package name 'Controller' must match pattern '^[a-z]+(\.[a-z][a-z0-9]*)*\$'.
2	'import' should be separated from previous statement.
4	Import statement for 'Model.*' is in the wrong order. Should be in the 'THIRD_PARTY_PACKAGE' group, expecting not assigned imports on this line.
4	Using the '*' form of import should be avoided - Model.*.
8	'member def type' have incorrect indentation level 3, expected level should be 2.
9	'member def type' have incorrect indentation level 3, expected level should be 2.
10	'member def type' have incorrect indentation level 3, expected level should be 2.
11	'member def type' have incorrect indentation level 3, expected level should be 2.
11	Array brackets at illegal position.
12	'member def type' have incorrect indentation level 3, expected level should be 2.
12	Array brackets at illegal position.
13	'member def type' have incorrect indentation level 3, expected level should be 2.
14	'member def type' have incorrect indentation level 3, expected level should be 2.

3759개의 에러를 모두 적기에는 문서가 지저분해질 것을 우려하여 별도 첨부

# 2. Findbug

## Metrics

1819 lines of code analyzed, in 11 classes, in 3 packages.

Metric	Total	Density*
High Priority Warnings	13	7.15
Medium Priority Warnings	31	17.04
<b>Total Warnings</b>	<b>44</b>	<b>24.19</b>

Warning Type	Number
<a href="#">Bad practice Warnings</a>	12
<a href="#">Correctness Warnings</a>	3
<a href="#">Experimental Warnings</a>	1
<a href="#">Malicious code vulnerability Warnings</a>	2
<a href="#">Performance Warnings</a>	18
<a href="#">Dodgy code Warnings</a>	8
<b>Total</b>	<b>44</b>

## Bad practice Warnings

Code	Warning
DMI	removeAll used to clear a collection in Controller.CloneChecker.cmpOperation(FileSet)
ES	Comparison of String parameter using == or != in Controller.MainController.checkSingal(String)
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Bad practice Warnings 만 표기, 더 자세한 내용은 별도 첨부

## 3. Jdepend

Summary									
Package	Total Classes	Abstract Classes	Concrete Classes	Afferent Couplings	Efferent Couplings	Abstractness	Instability	Distance	
Controller	3	0	3	1	7	0	0.88	0.12	
Model	7	0	7	1	3	0	0.75	0.25	
View	1	0	1	1	6	0	0.86	0.14	
java.awt	No stats available: package referenced, but not analyzed.								
java.awt.event	No stats available: package referenced, but not analyzed.								
java.io	No stats available: package referenced, but not analyzed.								
java.lang	No stats available: package referenced, but not analyzed.								
java.util	No stats available: package referenced, but not analyzed.								
javax.swing	No stats available: package referenced, but not analyzed.								

## 4. Pmd

### CloneChecker

Avoid using if statements without curly braces : 6개

These nested if statements could be combined : 4개

### FileManager

Avoid empty if statements : 1개

### MainController

Use equals() to compare strings instead of '==' or '!=' : 11개

The String literal "END" appears 6 times in this file; : 1개

The String literal "Line:" appears 4 times in this file; : 1개

### UserFile

12개 존재

### MainUI

Useless parentheses. : 2개

The String literal "consola" appears 6 times in this file; : 1개

자세한 사항은 별도 파일 첨부

## 5. JUnit & Test Code Coverage

### Test Summary

58	0	0	1.597s	100%
tests	failures	ignored	duration	

Packages **Classes**

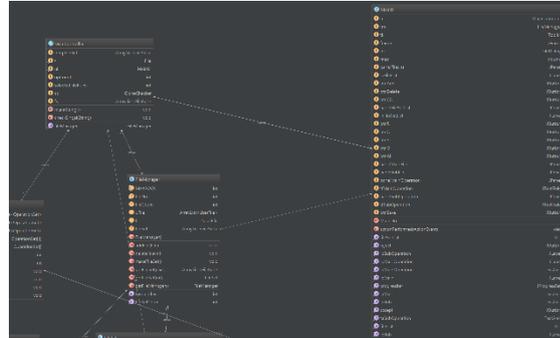
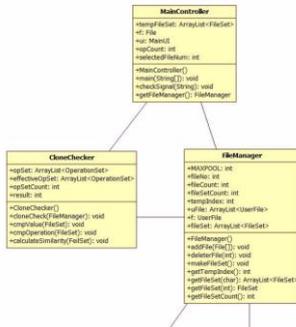
Class	Tests	Failures	Ignored	Duration	Success rate
<a href="#">Controller.FileManagerTest</a>	9	0	0	0.007s	100%
<a href="#">Model.BranchTest</a>	5	0	0	0s	100%
<a href="#">Model.FileSetTest</a>	15	0	0	0.012s	100%
<a href="#">Model.GlobalValueTest</a>	15	0	0	0.002s	100%
<a href="#">Model.UserFileTest</a>	14	0	0	1.576s	100%

COVERAGE	FILE	LINES	RELEVANT	COVERED	MISSED	HITS/LINE
0.0	...k-dslab/src/main/java/Controller/CloneChecker.java	403	238	0	238	0.0
0.0	...konkuk-dslab/src/main/java/Model/OperationSet.java	34	12	0	12	0.0
0.0	...dslab/src/main/java/Controller/MainController.java	166	105	0	105	0.0
0.0	...lee322/konkuk-dslab/src/main/java/View/MainUI.java	352	225	0	225	0.0
40.9	...322/konkuk-dslab/src/main/java/Model/UserFile.java	1288 +36	775 +23	317 +317	458 -294	32232.0 +32232
49.12	...uk-dslab/src/main/java/Controller/FileManager.java	118	57	28 +28	29 -28	716.0 +716
65.12	...e322/konkuk-dslab/src/main/java/Model/FileSet.java	110	43	28 +11	15 -11	2125.0 +2122
81.82	...2/konkuk-dslab/src/main/java/Model/LocalValue.java	30	11	9 +9	2 -9	916.0 +916
84.62	...ee322/konkuk-dslab/src/main/java/Model/Branch.java	33	13	11	2	1367.0 +1363
88.0	...22/konkuk-dslab/src/main/java/Model/Operation.java	119	50	44 +44	6 -44	1128.0 +1128
100.0	.../konkuk-dslab/src/main/java/Model/GlobalValue.java	108	41	41 +6	0 -6	27.0 +22

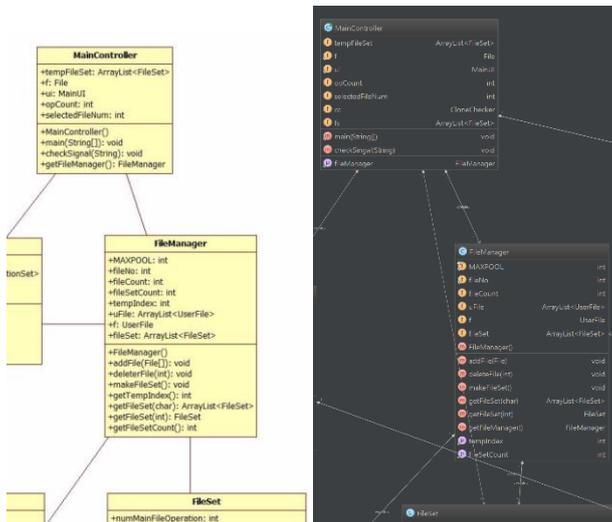
상세 내용은 <https://coveralls.io/builds/6515001>에서 확인가능 (전체 30.45%)

## 6. Specification and code review

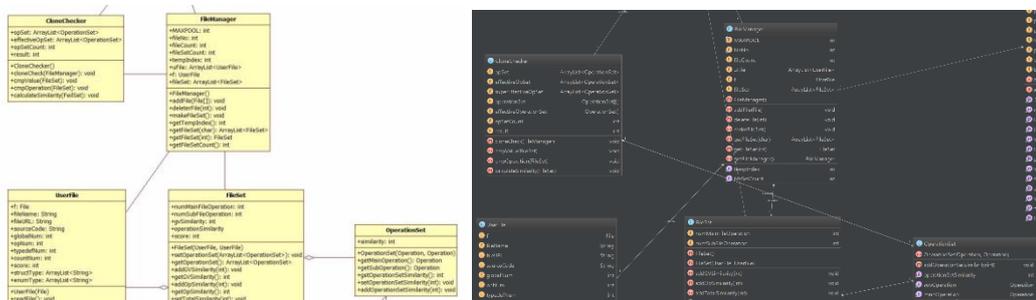
문서에 존재하지 않던 MainUI가 등장 (View는 생략해도 되는게 맞는지 확실하지 않아 표기)



문서에 존재하지 않던 MainController와 FileSet 사이의 관계가 있음



문서와 다르게 구현상에는 CloneChecker와 OperationSet의 관계가 있으며, CloneChecker와 FileManager와의 관계가 없다.



메소드와 변수들의 경우에도 문서에 누락된 내용이 상당수 존재합니다.

**MainController**

- tempFileSet: ArrayList<FileSet>
- f: File
- ui: MainUI
- opCount: int
- selectedFileNum: int
- cc: CloneChecker
- fs: ArrayList<FileSet>
- main(String[]): 문서에 누락 void
- checkSingal(String): void
- fileManager: FileManager
- getFileManager: 누락

**CloneChecker**

- opSet: ArrayList<OperationSet>
- effectiveOpSet: ArrayList<OperationSet>
- superEffectiveOpSet: ArrayList<OperationSet>
- operationSet: OperationSet[][]
- effectiveOperationSet: OperationSet[]
- opSetCount: 문서에 누락 int
- result: int
- cloneCheck(FileManager): void
- cmpValue(FileSet): void
- cmpOperation(FileSet): void
- calculateSimilarity(FileSet): void

**FileManager**

- MAXPOOL: int
- fileNo: int
- fileCount: int
- uFile: ArrayList<UserFile>
- f: UserFile
- fileSet: ArrayList<FileSet>
- FileManager(): void
- addFile(File): 문서에는 File[] void
- deleteFile(int): void
- makeFileSet(): void
- getFileSet(char): ArrayList<FileSet>
- getFileSet(int): FileSet
- getFileManager(): FileManager
- tempIndex: int
- fileSetCount: int
- getTempIndex: 누락
- tempIndex: 누락
- getFileSetCount: 누락

**UserFile**

- fileName: String
- fileURL: String
- sourceCode: String
- globalNum: int
- opNum: int
- typedNum: int
- countNum: int
- structType: ArrayList<String>
- enumType: ArrayList<String>
- UserFile(): void
- readFile(): void
- checkSyntax(): void
- checkGlobalValue(String): void
- checkOperation(Operation): void
- checkBranch(Operation): void
- checkParameter(Operation): void
- checkFunction(Operation): void
- calculateScore(): void
- globalValue: ArrayList<GlobalValue>
- fileName: String
- sourceCode: String
- score: int
- fileURL: String
- operation: ArrayList<Operation>
- getFileName: 누락
- getSourceCode: 누락
- getScore: 누락
- getGlobalValue: 누락
- getOperation: 누락

**FileSet**

- numMainFileOperation: int
- numSubFileOperation: int
- FileSet(): void
- FileSet(UserFile, UserFile): void
- addGVSimilarity(int): void
- addOpSimilarity(int): void
- addTotalSimilarity(int): void
- addCheckTime(): void
- subFile: UserFile
- GVSimilarity: int
- mainFile: UserFile
- operationSet: ArrayList<OperationSet>
- checkTime: int
- opSimilarity: int
- score: int
- maxScore: int
- fileSetName: String
- totalSimilarity: int
- setOperationSet: 누락
- getOperationSet: 누락
- 등 문서에 있는
- getter/setter 전부 누락
- gvSimilarity 로 되어있음 (소문자)
- operationSimilarity로 정의됨
- 문서에 누락 됨

**OperationSet**

- OperationSet(Operation, Operation): void
- addOperationSetSimilarity(int): void
- operationSetSimilarity: int
- subOperation: Operation
- mainOperation: Operation

OperationSet	
+similarity: int	
+OperationSet(Operation, Operation)	
+getMainOperation(): Operation	
+getSubOperation(): Operation	
+getOperationSetSimilarity(): int	
+setOperationSetSimilarity(int): void	
+addOperationSetSimilarity(int): void	

심하게 다름

GlobalValue	
GlobalValue	
GlobalValue()	
setHeader(String)	void
globalValueType	int
time	boolean
stdio	boolean
windows	boolean
string	boolean
globalValueName	String
globalValue	GlobalValue
stdlib	boolean
conio	boolean
useCount	int

getter/setter 누락  
name, string 등 변  
수 누락

Operation	
Operation	
numLocalValue	int
localIndex	int
score	int
Operation()	
addNumFunction()	void
addLocalValue(int, String)	void
addBranch()	void
addLineNum()	void
name	String
source	String
branch	ArrayList<Branch>
numFunction	int
lineNum	int
function	int[]
localValue	ArrayList<LocalValue>
returnType	int
parameterArray	int[]
parameter	String
score	int

자이가 심함...

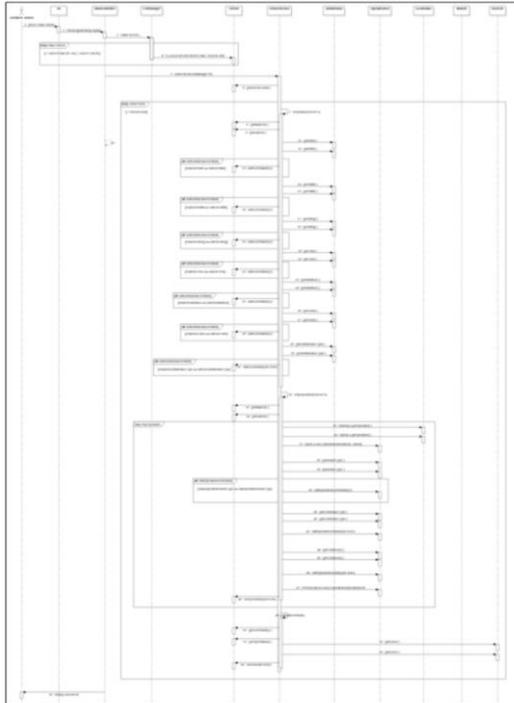
Branch	
Branch	
parent	String
Branch()	
addComplexity()	void
type	String
complexity	int

메소드 상당수 누락

LocalValue	
LocalValue	
parent	String
name	String
LocalValue()	
setLocalValueName(String)	
getLocalValueName()	ng
localValueType	int

type getter/setter 누락  
문서에는 type이라 명시됨

메소드, 변수명 등의 차이가 심해 sequence diagram 을 대조하는 건 무의미 할 것으로 판단 됩니다. 또한 핵심 기능인 2040 의 [그림 4] Clone Check sequence diagram 의 해상도가 좋지 못해 확인에 어려움이 있습니다.



[그림4] Clone Check

