

1)The program is a password manager tool that allow to safely save them so the user can have all his password in one place avoiding the necessity of remembering all of them. It also allows to generate secure passwords. The code is distributed on modules including encryption, data model, user interface and utilities.

2)Static testing is a powerful tool to verify software, it consists on test the code without the necessity of run the program as it is executed on the source code instead of the binary code. It is important as cover some aspect that the dynamic test do not cover (like the indentation rules) as it is complementary with the dynamic testing instead of replacing it.





PMD:

1)For the configuration of the tool we let the default configuration as we use on the exercise but disabling the “DataflowAnomalyAnalysis” as it is the only error that we have with priority 5 (and even though the errors of this type make the program less easy to read and understand as they do unnecessary assignments this might not be considered a bug). This tool helps to find faults on the code as it point to region of the code that do not follow patterns or standards and introduce risk to have faults.




2)Result of the PMD report before fixing the 5 bugs:

Priority 1




jpass/crypt/Cbc.java

Rule	Violation	Line
VariableNamingConventions 	Only variables that are final should contain underscores (except for underscores in standard prefix/suffix), '_buffer' is not final.	63
VariableNamingConventions 	Only variables that are final should contain underscores (except for underscores in standard prefix/suffix), '_outBuffer' is not final.	73
VariableNamingConventions 	Only variables that are final should contain underscores (except for underscores in standard prefix/suffix), '_outBufferUsed' is not final.	78
VariableNamingConventions 	Only variables that are final should contain underscores (except for underscores in standard prefix/suffix), '_overflowUsed' is not final.	88


jpass/crypt/IO/CryptInputStream.java

Rule	Violation	Line
VariableNamingConventions 	Only variables that are final should contain underscores (except for underscores in standard prefix/suffix), '_buffer' is not final.	71
VariableNamingConventions 	Only variables that are final should contain underscores (except for underscores in standard prefix/suffix), '_bufferUsed' is not final.	76
VariableNamingConventions 	Only variables that are final should contain underscores (except for underscores in standard prefix/suffix), '_lastBufferRead' is not final.	87


jpass/data/DataModel.java

Rule	Violation	Line
ClassWithOnlyPrivateConstructorsShouldBeFinal 	A class which only has private constructors should be final	43-174
ClassWithOnlyPrivateConstructorsShouldBeFinal 	A class which only has private constructors should be final	43-174
VariableNamingConventions 	Variables should start with a lowercase character, 'INSTANCE' starts with uppercase character.	45


jpass/ui/JPassFrame.java

Rule	Violation	Line
VariableNamingConventions 	Variables should start with a lowercase character, 'INSTANCE' starts with uppercase character.	75

















jpass/ui/MessageDialog.java

Rule	Violation	Line
ReturnEmptyCollectionRatherThanNull 	Return an empty collection rather than null.	276

jpass/ui/SearchPanel.java

Rule	Violation	Line
ConstructorCallsOverridableMethod 	Overridable method 'setVisible' called during object construction	116

jpass/ui/StatusPanel.java

jpass/ui/SearchPanel.java		
Rule	Violation	Line
ConstructorCallsOverridableMethod 	Overridable method 'setVisible' called during object construction	116
jpass/ui/StatusPanel.java		
Rule	Violation	Line
ConstructorCallsOverridableMethod 	Overridable method 'setProcessing' called during object construction	56
jpass/ui/SvgImageIcon.java		
Rule	Violation	Line
VariableNamingConventions 	Variables that are final and static should be all capitals, 'svgUniverse' is not all capitals.	49
jpass/ui/helper/FileHelper.java		
Rule	Violation	Line
AvoidThrowingRawExceptionTypes 	Avoid throwing raw exception types.	127
AvoidThrowingRawExceptionTypes 	Avoid throwing raw exception types.	175
AvoidThrowingRawExceptionTypes 	Avoid throwing raw exception types.	235
AvoidThrowingRawExceptionTypes 	Avoid throwing raw exception types.	306
AvoidThrowingRawExceptionTypes 	Avoid throwing raw exception types.	308
AvoidThrowingRawExceptionTypes 	Avoid throwing raw exception types.	348
jpass/util/ClipboardUtils.java		
Rule	Violation	Line
AvoidThrowingRawExceptionTypes 	Avoid throwing raw exception types.	71
AvoidThrowingRawExceptionTypes 	Avoid throwing raw exception types.	84
jpass/util/Configuration.java		
Rule	Violation	Line
VariableNamingConventions 	Variables should start with a lowercase character, 'INSTANCE' starts with uppercase character.	46
Priority 2		
jpass/ui/JPassFrame.java		
Rule	Violation	Line
SingleMethodSingleton 	Class contains multiple getInstance methods. Please review.	71-351
SingleMethodSingleton 	Class contains multiple getInstance methods. Please review.	71-351
AvoidUsingVolatile 	Use of modifier volatile is not recommended.	94
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3) Bugs selected to fix:

- VariableNamingConventions : Cbc.java (_buffer)**
 - Only variables that are final should contain underscores (except for underscores in standard prefix/suffix), '_buffer' is not final.
 - Solution: private byte[] _buffer = null; changed to private byte[] buffer = null;
- ClassWithOnlyPrivateConstructorsShouldBeFinal : DataModel.java**
 - A class which only has private constructors should be final
 - False positive, there might be cases where we don't want the class to be final as it might be extended (and class DataModel can be extended). Removed rule from pmd ruleset file.
- ReturnEmptyCollectionRatherThanNull: MessageDialog.java**
 - Return an empty collection rather than null.
 - Solution: changed return null on showPasswordDialog method from MessageDialog class to return new byte[]
- SingleMethodSingleton: JpassFrame.java**
 - Class contains multiple getInstance methods
 - Solution: Fixed letting only 1 getInstance method on JpassFrame and making other classes to call just the remaining get Instance Method
- AvoidThrowingRawExceptionTypes: FileHelper.java**
 - Avoid throwing raw exception types.
 - Solution: False positive, as could be an improvement to have specific exceptions if we create a specific exception for each one of the exception on our code and there are log of them it might take too much time and it is a trade off that we might not want to do. Removed rule from pmd ruleset file.

4)Report after bug fixing:

Priority 1		
jpass/crypt/Cbc.java		
Rule	Violation	Line
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VariableNamingConventions	Only variables that are final should contain underscores (except for underscores in standard prefix/suffix), '_outBufferUsed' is not final.	78
VariableNamingConventions	Only variables that are final should contain underscores (except for underscores in standard prefix/suffix), '_overflowUsed' is not final.	88
jpass/crypt/io/CryptInputStream.java		
Rule	Violation	Line
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VariableNamingConventions	Only variables that are final should contain underscores (except for underscores in standard prefix/suffix), '_bufferUsed' is not final.	76
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jpass/data/DataModel.java		
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Rule	Violation	Line
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jpass/ui/SearchPanel.java		
Rule	Violation	Line
ConstructorCallsOverridableMethod	Overridable method 'setVisible' called during object construction	116
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Rule	Violation	Line
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Priority 2		
jpass/ui/JPassFrame.java		
Rule	Violation	Line
AvoidUsingVolatile	Use of modifier volatile is not recommended.	94
AvoidUsingVolatile	Use of modifier volatile is not recommended.	94
jpass/ui/MessageDialog.java		

As can be seen in the new report the 5 bugs mentioned are not present anymore.




CHECKLIST

1) Is a testing tool that assures that the code written follows a determinate pattern or rules like indentation, spaces, good practices according to the project and more.

This tool can be easily configured with Maven by inserting its plugins.

2)Result of the Checklist report before fixing the 5 bugs:


Files

File			
	I	W	E
jpass/JPass.java	0	10	0
jpass/crypt/Aes256.java	0	18	0
jpass/crypt/Cbc.java	0	17	0
jpass/crypt/DecryptException.java	0	1	0
jpass/crypt/io/CryptInputStream.java	0	10	0
jpass/crypt/io/CryptOutputStream.java	0	5	0
jpass/data/DataModel.java	0	2	0
jpass/data/EntriesRepository.java	0	6	0
jpass/ui/CopiablePasswordField.java	0	1	0
jpass/ui/EntryDetailsTable.java	0	8	0
jpass/ui/EntryDialog.java	0	14	0
jpass/ui/GeneratePasswordDialog.java	0	8	0
jpass/ui/JPassFrame.java	0	32	0
jpass/ui/MessageDialog.java	0	19	0
jpass/ui/SearchPanel.java	0	5	0
jpass/ui/StatusPanel.java	0	4	0
jpass/ui/SvgImageIcon.java	0	18	0
jpass/ui/TextComponentFactory.java	0	2	0
jpass/ui/action/AbstractMenuAction.java	0	1	0
jpass/ui/action/CloseListener.java	0	2	0
jpass/ui/action/MenuActionType.java	0	31	0
jpass/ui/action/TableListener.java	0	4	0
jpass/ui/action/TextComponentAction.java	0	3	0
jpass/ui/action/TextComponentActionType.java	0	16	0
jpass/ui/action/TextComponentPopupListener.java	0	11	0
jpass/ui/action/Worker.java	0	2	0
jpass/ui/helper/EntryHelper.java	0	12	0
jpass/ui/helper/FileHelper.java	0	29	0
jpass/util/ClipboardUtils.java	0	3	0
jpass/util/Configuration.java	0	4	0
jpass/util/CryptUtils.java	0	3	0
jpass/util/DateUtils.java	0	6	0
jpass/util/SpringUtilities.java	0	15	0
jpass/util/StringUtils.java	0	3	0
jpass/xml/bind/Entries.java	0	6	0
jpass/xml/bind/Entry.java	0	8	0
jpass/xml/converter/XmlConverter.java	0	2	0

jpass/JPass.java

Severity	Category	Rule	Message	Line
 Warning	whitespace	EmptyLineSeparator	'package' should be separated from previous line.	29
 Warning	Imports	CustomImportOrder	Extra separation in import group before 'jpass.ui.JPassFrame'	37
 Warning	imports	CustomImportOrder	Wrong lexicographical order for 'java.util.logging.Level' import. Should be before 'jpass.util.Configuration'.	39
 Warning	imports	CustomImportOrder	Wrong lexicographical order for 'java.util.logging.Logger' import. Should be before 'jpass.util.Configuration'.	40
 Warning	imports	CustomImportOrder	Wrong lexicographical order for 'javax.swing.JDialog' import. Should be before 'jpass.util.Configuration'.	41
 Warning	imports	CustomImportOrder	Wrong lexicographical order for 'javax.swing.JFrame' import. Should be before 'jpass.util.Configuration'.	42
 Warning	naming	AbbreviationAsWordInName	Abbreviation in name 'JPass' must contain no more than '1' consecutive capital letters.	50
 Warning	sizes	LineLength	Line is longer than 100 characters (found 105).	55
 Warning	javadoc	MissingJavadocMethod	Missing a Javadoc comment.	58
 Warning	sizes	LineLength	Line is longer than 100 characters (found 101).	76

jpass/crypt/Aes256.java

Severity	Category	Rule	Message	Line
 Warning	whitespace	EmptyLineSeparator	'package' should be separated from previous line.	31
 Warning	javadoc	SummaryJavadoc	First sentence of Javadoc is missing an ending period.	66
 Warning	javadoc	SummaryJavadoc	First sentence of Javadoc is missing an ending period.	71
 Warning	javadoc	SummaryJavadoc	First sentence of Javadoc is missing an ending period.	82
 Warning	naming	MemberName	Member name '_expandedKey' must match pattern '^[a-z][a-z0-9][a-zA-Z0-9]*\$'.	85
 Warning	javadoc	SummaryJavadoc	First sentence of Javadoc is missing an ending period.	87
 Warning	naming	MemberName	Member name '_tmp' must match pattern '^[a-z][a-z0-9][a-zA-Z0-9]*\$'.	90
 Warning	naming	MemberName	Member name '_sBox' must match pattern '^[a-z][a-z0-9][a-zA-Z0-9]*\$'.	95
 Warning	naming	AbbreviationAsWordInName	Abbreviation in name '_invSBox' must contain no more than '1' consecutive capital letters.	151

3) Bugs selected to fix:

1. EmptyLineSeparator (Jpass.java):

- There is missing a line to separate the project information commented from the package.
- There should be an empty line separating the jPass package from the information commented

2. CustomImportOrder (Jpass.java):

- The import is separated by a line from the other imports
- Remove the line between them so all the imports are in sequence

3. SummaryJavadoc (Aes256.java):

- a) The first sentence should contain a dot(.) at the end.
- b) Insert a dot at the end of the first sentence of the comment

4. AbbreviationAsWordInName (Aes256.java):

- a) Abbreviation name should not contain more than 1 consecutive capital letters (_invSBox).
- b) Solution: "_invSbox".

5. LineLength (Aes256.java):

- a) The length of the line should contain less than 100 characters
- b) The solution is to break down it down to two lines, so the lines contain less than 100 characters.

4) Report after fixing bug:

From the new report as we can see in the image bellow it was solved 2 warnings in the Jpass.java and 3 warnings in the Aes256.java class making 5 warnings corrected.

JPass

Project Documentation

Project Information

Project Reports

CPD

PMD

Checkstyle

Built by:

Checkstyle Results

The following document contains the results of [Checkstyle](#) 10.3.3 with C:\Users\alexa\Desktop\jpass-master\rulesets\checkstyle-rules.xml ruleset.

Summary

Files			
	Info	Warnings	Errors
37	0	336	0

Files

File			
	I	W	E
jpass/JPass.java	0	8	0
jpass/crypt/Aes256.java	0	15	0
jpass/crypt/Cbc.java	0	17	0
jpass/crypt/DecryptException.java	0	1	0
jpass/crypt/io/CryptInputStream.java	0	10	0
jpass/crypt/io/CryptOutputStream.java	0	5	0
jpass/data/DataModel.java	0	2	0
jpass/data/EntriesRepository.java	0	6	0
jpass/ui/CopiablePasswordField.java	0	1	0
jpass/ui/EntryDetailsTable.java	0	8	0
jpass/ui/EntryDialog.java	0	14	0
jpass/ui/GeneratePasswordDialog.java	0	8	0
jpass/ui/JPassFrame.java	0	32	0
jpass/ui/MessageDialog.java	0	19	0
jpass/ui/SearchPanel.java	0	5	0
jpass/ui/StatusPanel.java	0	4	0
jpass/ui/SvgImageIcon.java	0	18	0
jpass/ui/TextComponentFactory.java	0	2	0
jpass/ui/action/AbstractMenuAction.java	0	1	0
jpass/ui/action/ChangeListener.java	0	2	0