Statistical Code Review

Code Metrics

Tool used: Spotbugs, CodeMetrics, MetricsReloaded, SonarQube, Intellj IDEA Analyze Code

In-depth analysis of issues

- ## Malicious code vulnerabilities

setNextHandler(Handler) may expose internal representation by storing an externally mutable object into Handler.next

Class:
Handler (com.attendace.dao) line 8

Method:
setNextHandler
(com.attendace.dao.Handler.setNextHandler(Handler))

Field:
next

Priority:
🟨 Medium Confidence Malicious code vulnerability

Problem classification:
Malicious code vulnerability (Storing reference to mutable object)
EI_EXPOSE_REP2 (May expose internal representation by incorporating reference to mutable object)
Notes:

Field com.attendace.dao.Handler.next
Local variable named handler
FindReturnRef (EI|EI2|MS)

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new Request(RequestDao, RequestType, Map) may expose internal representation by storing an externally mutable object into Request.data

Class:
Request (com.attendace.dao) line 16

Method:
Request<init> (new
com.attendace.dao.Request(RequestDao, RequestType, Map))

Field:
data

Priority:
🟨 Medium Confidence Malicious code vulnerability

Problem classification:
Malicious code vulnerability (Storing reference to mutable object)
EI_EXPOSE_REP2 (May expose internal representation by incorporating reference to mutable object)
Notes:

Field com.attendace.dao.Request.data
Local variable named data
FindReturnRef (EI|EI2|MS)

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getData() may expose internal representation by returning Request.data

Class:
Request (com.attendace.dao) line 28

Method:
getData (com.attendace.dao.Request.getData())

Field:
data

Priority:
🟨 Medium Confidence Malicious code vulnerability

Problem classification:
Malicious code vulnerability (Method returning array may expose internal representation)
EI_EXPOSE_REP (May expose internal representation by returning reference to mutable object)
Notes:

Field com.attendace.dao.Request.data
FindReturnRef (EI|EI2|MS)

Public static getConnection() may expose internal representation by returning DbConnection.connection

Class:
DbConnection (com.attendace.datasource) line 26

Method:
getConnection
(com.attendace.datasource.DbConnection.getConnection())

Field:
connection

Priority:
🟨 Medium Confidence Malicious code vulnerability

Problem classification:
Malicious code vulnerability (Mutable static field)
MS_EXPOSE_REP (Public static method may expose internal representation by returning a mutable object or array)
Notes:

Field com.attendace.datasource.DbConnection.connection
FindReturnRef (EI|EI2|MS)

- ## Dodgy code

Redundant nullcheck of selectedRow, which is known to be non-null

Class:
AdminInterfaceController (com.attendace.view) line 579

Method:
handleModify
(com.attendace.view.AdminInterfaceController.handleModify(ActionEvent))

Priority:
🟨 Medium Confidence Dodgy code

Problem classification:
Dodgy code (Redundant comparison to null)
RCN_REDUNDANT_NULLCHECK_OF_NONNULL_VALUE (Redundant nullcheck of value known to be non-null)
Notes:

Redundant null check at AdminInterfaceController.java:[line 579]
Value loaded from selectedRow
Return value of
javafx.scene.control.TableView$TableViewSelectionModel.getSelectedItem(
) of type Object
FindNullDeref (NP|RCN)

4 similar issues in the class AdminInterfaceController.

- ## Security

- ## Cyclomatic complexity

Class	OCavg	OCmax	WMC	
com.attendace.Main	1.00	1	1	
com.attendace.controller.AttendanceController	1.00	1	6	
com.attendace.controller.AttendanceControllerTest	1.00	1	2	
com.attendace.controller.CourseController	1.00	1	8	
com.attendace.controller.CourseControllerTest	1.00	1	5	
com.attendace.controller.DegreeController	1.00	1	3	
com.attendace.controller.DegreeControllerTest	1.00	1	2	
com.attendace.controller.StaffController	1.00	1	7	
com.attendace.controller.StaffControllerTest	1.00	1	3	
com.attendace.controller.TopicController	1.00	1	3	
com.attendace.controller.TopicControllerTest	1.00	1	2	
com.attendace.controller.UserController	1.00	1	7	
com.attendace.controller.UserControllerTest	1.00	1	6	
com.attendace.dao.Handler	2.00	3	4	
com.attendace.dao.HandlerTest	1.00	1	4	
com.attendace.dao.Request	1.00	1	4	
com.attendace.dao.handlers.Dao_attendance	2.43	6	17	
com.attendace.dao.handlers.Dao_attendanceTest	1.00	1	7	
com.attendace.dao.handlers.Dao_course	2.62	7	21	
com.attendace.dao.handlers.Dao_courseTest	1.00	1	7	
com.attendace.dao.handlers.Dao_course_staff_join	2.60	4	13	
com.attendace.dao.handlers.Dao_degree	2.43	6	17	
com.attendace.dao.handlers.Dao_staff	2.62	7	21	
com.attendace.dao.handlers.Dao_staffTest	1.00	1	7	
com.attendace.dao.handlers.Dao_user	2.62	7	21	
com.attendace.dao.handlers.Dao_userTest	1.00	1	6	
com.attendace.dao.handlers.DefaultHandler	1.00	1	2	
com.attendace.dao.requests.RequestDao	n/a	n/a	0	
com.attendace.dao.requests.RequestType	n/a	n/a	0	
com.attendace.datasource.DbConnection	2.00	2	4	
com.attendace.engine.MainEngine	2.00	3	4	
com.attendace.localisation.Translator	1.00	1	2	
com.attendace.model.AttendanceModel	1.00	1	8	
com.attendace.model.CourseModel	1.00	1	12	
com.attendace.model.DegreeModel	1.00	1	3	
com.attendace.model.DegreeModel	1.00	1	3	
com.attendace.model.StaffModel	1.00	1	5	
com.attendace.model.TopicModel	1.00	1	2	
com.attendace.model.UserModel	1.00	1	4	
com.attendace.testingfolder.TestOperation	1.00	1	1	
com.attendace.testingfolder.TestOperationTest	1.00	1	1	
com.attendace.utils.CryptoUtils	1.00	1	2	
com.attendace.utils.CryptoUtilsTest	1.00	1	2	
com.attendace.utils.LoginUtils	3.00	3	3	
com.attendace.utils.UserUtils	2.00	2	4	
com.attendace.view.AdminCreationInterfaceController	2.33	6	14	
com.attendace.view.AdminInterfaceController	3.56	22	57	
com.attendace.view.AttendanceListController	3.00	3	3	
com.attendace.view.Classes.AttendanceContainer	1.33	2	4	
com.attendace.view.Classes.CourseContainer	1.00	1	3	
com.attendace.view.LoginInterfaceController	1.29	2	9	
com.attendace.view.MainInterfaceController	1.30	3	13	
Package	v(G)avg	v(G)tot		
com.attendace	1.00	1		
com.attendace.controller	1.00	54		
com.attendace.dao	1.20	12		
com.attendace.dao.handlers	2.35	169		
com.attendace.datasource	3.00	6		
com.attendace.engine	3.00	6		
com.attendace.localisation	1.00	2		
com.attendace.model	1.00	34		
com.attendace.testingfolder	1.00	2		
com.attendace.utils	1.86	13		
com.attendace.view	3.02	121		
com.attendace.view.Classes	1.17	7		
Module	v(G)avg	v(G)tot		
demo	1.84	427		
Project	v(G)avg	v(G)tot		
project	1.84	427		

Lines of code per method

Class	CLOC	JLOC	LOC
com.attendace.Main	0	0	6
com.attendace.controller.AttendanceController	0	0	44
com.attendace.controller.AttendanceControllerTest	0	0	11
com.attendace.controller.CourseController	1	0	61
com.attendace.controller.CourseControllerTest	3	0	33
com.attendace.controller.DegreeController	1	0	13
com.attendace.controller.DegreeControllerTest	0	0	14
com.attendace.controller.StaffController	1	0	54
com.attendace.controller.StaffControllerTest	0	0	15
com.attendace.controller.TopicController	1	0	13
com.attendace.controller.TopicControllerTest	0	0	13
com.attendace.controller.UserController	0	0	53
com.attendace.controller.UserControllerTest	0	0	29
com.attendace.dao.Handler	2	0	21
com.attendace.dao.HandlerTest	0	0	48
com.attendace.dao.Request	3	0	19
com.attendace.dao.handlers.Dao_attendance	8	0	142
com.attendace.dao.handlers.Dao_attendanceTest	0	0	58
com.attendace.dao.handlers.Dao_course	10	0	209
com.attendace.dao.handlers.Dao_courseTest	0	0	68
com.attendace.dao.handlers.Dao_course_staff_join	8	0	81
com.attendace.dao.handlers.Dao_degree	10	0	128
com.attendace.dao.handlers.Dao_staff	13	0	169
com.attendace.dao.handlers.Dao_staffTest	0	0	55
com.attendace.dao.handlers.Dao_user	13	0	167
com.attendace.dao.handlers.Dao_userTest	0	0	54
com.attendace.dao.handlers.DefaultHandler	6	6	17
com.attendace.dao.requests.RequestDao	0	0	8
com.attendace.dao.requests.RequestType	0	0	9
com.attendace.datasource.DbConnection	6	0	34
com.attendace.engine.MainEngine	0	0	57
com.attendace.localisation.Translator	0	0	11
com.attendace.model.AttendanceModel	0	0	34
com.attendace.model.CourseModel	0	0	50
com.attendace.model.DegreeModel	0	0	14
com.attendace.model.StaffModel	0	0	24
com.attendace.model.TopicModel	0	0	9
com.attendace.model.UserModel	0	0	19
com.attendace.testingfolder.TestOperation	0	0	5
com.attendace.testingfolder.TestOperationTest	0	0	8
com.attendace.utils.CryptoUtils	2	0	10
com.attendace.utils.CryptoUtilsTest	0	0	14
com.attendace.utils.LoginUtils	1	0	19
com.attendace.utils.UserUtils	4	0	35
com.attendace.view.AdminCreationInterfaceController	9	0	135
com.attendace.view.AdminInterfaceController	23	0	541
com.attendace.view.AttendanceListController	0	0	21
com.attendace.view.Classes.AttendanceContainer	0	0	27
com.attendace.view.Classes.CourseContainer	0	0	21
com.attendace.view.LoginInterfaceController	0	0	71
com.attendace.view.MainInterfaceController	1	0	153

Package	CLOC	CLOC(rec)	JLOC	JLOC(rec)	LOC	LOC(rec)	LOCp	LOCp(rec)	LOCt	LOCt(rec)	NCLOC	NCLOCp	NCLOCp(rec)	NCLOCt	NCLOCt(rec)
	0	201	n/a	6	372	4,393	372	3,896	0	497	372	372	3,710	0	494
com	n/a	120	n/a	6	n/a	3,291	n/a	2,794	n/a	497	n/a	n/a	2,689	n/a	494
com.attendace	0	120	0	6	9	3,291	9	2,794	0	497	9	9	2,689	0	494
com.attendace.controller	0	7	0	0	419	419	278	278	141	141	412	274	274	138	138
com.attendace.dao	0	67	0	6	101	1,381	45	1,054	56	327	99	43	996	56	327
com.attendace.dao.handlers	0	62	6	6	1,261	1,261	990	990	271	271	1,205	934	934	271	271
com.attendace.dao.requests	0	0	0	0	19	19	19	19	0	0	19	19	19	0	n/a
com.attendace.datasource	0	6	0	0	38	38	38	38	0	0	32	32	32	0	n/a
com.attendace.engine	0	0	0	0	72	72	72	72	0	0	72	72	72	0	n/a
com.attendace.localisation	0	0	0	0	14	14	14	14	0	0	14	14	14	0	n/a
com.attendace.model	0	0	0	0	156	156	156	156	0	0	156	156	156	0	n/a
com.attendace.testingfolder	0	0	0	0	17	17	6	6	11	11	17	6	6	11	11
com.attendace.utils	0	7	0	0	100	100	82	82	18	18	93	75	75	18	18
com.attendace.view	0	33	0	0	1,014	1,085	1,014	1,085	0	0	984	984	1,055	0	n/a
com.attendace.view.Classes	0	0	0	0	71	71	71	71	0	0	71	71	71	0	n/a
fxml	0	81	n/a	n/a	730	730	730	730	0	0	649	649	649	0	n/a

Module	JLOC	L(CSS)	L(Groovy)	L(HTML)	L(J)	L(JS)	L(JSP)	L(KT)	L(XML)	LOC	LOCp	LOCt	NCLOC	NCLOCp	NCLOCt
OTP1	n/a	0	0	0	0	0	0	0	0	690	0	0	674	0	0
demo	6	0	0	0	3,291	0	0	0	961	4,624	3,896	497	4,429	3,704	494

FileType	LOC	NCLOC
.gitignore (Gitignore)	4	4
Dockerfile	18	14
File type auto-detected by file content	0	0
Files supported via TextMate bundles	75	75
Java	3,291	3,177
Markdown	16	16
Properties	372	372
SQL	563	557
SonarQube for IDE property	8	8
Text	6	n/a
XML	961	880

Project	CLOC	JLOC	L(CSS)	L(Groovy)	L(HTML)	L(J)	L(JS)	L(JSP)	L(KT)	L(XML)	LOC	LOCp	LOCt	NCLOC	NCLOCp
project	217	6	0	0	0	3,291	0	0	0	961	5,314	3,896	497	5,103	3,704

- **Duplicate or unreachable code**
  - SonarQube detected 11.4% duplicated lines of code.

Unreachable Code:

File	Line	Project	Package	Lang			Member	Description
file://$PROJECT_DIRS/demo/src/main/java/com/attendace/controller/AttendanceControl	15	demo	com.attendace.controller	JAVA	28	15	attendanceModel	Field is never used.
file://$PROJECT_DIRS/demo/src/main/java/com/attendace/controller/AttendanceControl	35	demo	com.attendace.controller	JAVA	29	13	getAttendance	Method is never used.
file://$PROJECT_DIRS/demo/src/main/java/com/attendace/controller/AttendanceControl	40	demo	com.attendace.controller	JAVA	29	16	getAllAttendance	Method is never used.
file://$PROJECT_DIRS/demo/src/main/java/com/attendace/controller/AttendanceControl	45	demo	com.attendace.controller	JAVA	19	16	updateAttendance	Method is never used.
file://$PROJECT_DIRS/demo/src/main/java/com/attendace/controller/AttendanceControl	53	demo	com.attendace.controller	JAVA	19	16	removeAttendance	Method is never used.
file://$PROJECT_DIRS/demo/src/main/java/com/attendace/controller/CourseController.j	39	demo	com.attendace.controller	JAVA	19	12	updateCourse	Method is never used.
file://$PROJECT_DIRS/demo/src/main/java/com/attendace/controller/CourseController.j	48	demo	com.attendace.controller	JAVA	19	12	removeCourse	Method is never used.
file://$PROJECT_DIRS/demo/src/main/java/com/attendace/controller/CourseController.j	64	demo	com.attendace.controller	JAVA	29	9	getCourse	Method is never used.
file://$PROJECT_DIRS/demo/src/main/java/com/attendace/controller/CourseController.j	79	demo	com.attendace.controller	JAVA	30	16	getStaffsCourses	Method is never used.
file://$PROJECT_DIRS/demo/src/main/java/com/attendace/controller/StaffController.java	26	demo	com.attendace.controller	JAVA	18	10	loginStaff	Method is never used.
file://$PROJECT_DIRS/demo/src/main/java/com/attendace/controller/StaffController.java	62	demo	com.attendace.controller	JAVA	29	11	getAllStaff	Method is never used.
file://$PROJECT_DIRS/demo/src/main/java/com/attendace/controller/StaffController.java	67	demo	com.attendace.controller	JAVA	19	11	removeStaff	Method is never used.
file://$PROJECT_DIRS/demo/src/main/java/com/attendace/controller/UserController.java	16	demo	com.attendace.controller	JAVA	22	4	user	Field is never used.
file://$PROJECT_DIRS/demo/src/main/java/com/attendace/controller/UserController.java	71	demo	com.attendace.controller	JAVA	19	10	removeUser	Method is never used.
file://$PROJECT_DIRS/demo/src/main/java/com/attendace/dao/handlers/Dao_course_st	115	demo	com.attendace.dao.handlers	JAVA	44	4	data	Parameter <code>data</code> is not used
file://$PROJECT_DIRS/demo/src/main/java/com/attendace/datasource/DbConnection.jav	34	demo	com.attendace.datasource	JAVA	23	15	closeConnection	Method is never used.
file://$PROJECT_DIRS/demo/src/main/java/com/attendace/model/AttendanceModel.java	10	demo	com.attendace.model	JAVA	11	15	AttendanceModel	Constructor is never used.
file://$PROJECT_DIRS/demo/src/main/java/com/attendace/model/AttendanceModel.java	16	demo	com.attendace.model	JAVA	15	11	getCourseId	- Method owner class is never instantiated OR - All instantiations are not reachable from the entry points.
file://$PROJECT_DIRS/demo/src/main/java/com/attendace/model/AttendanceModel.java	19	demo	com.attendace.model	JAVA	15	9	getUserId	- Method owner class is never instantiated OR - All instantiations are not reachable from the entry points.
file://$PROJECT_DIRS/demo/src/main/java/com/attendace/model/AttendanceModel.java	22	demo	com.attendace.model	JAVA	15	10	getStaffId	- Method owner class is never instantiated OR - All instantiations are not reachable from the entry points.
file://$PROJECT_DIRS/demo/src/main/java/com/attendace/model/AttendanceModel.java	25	demo	com.attendace.model	JAVA	19	19	getAttendanceStatus	- Method owner class is never instantiated OR - All instantiations are not reachable from the entry points.
file://$PROJECT_DIRS/demo/src/main/java/com/attendace/model/AttendanceModel.java	28	demo	com.attendace.model	JAVA	15	20	getCurrentAttendance	- Method owner class is never instantiated OR - All instantiations are not reachable from the entry points.
file://$PROJECT_DIRS/demo/src/main/java/com/attendace/model/AttendanceModel.java	31	demo	com.attendace.model	JAVA	16	19	setAttendanceStatus	- Method owner class is never instantiated OR - All instantiations are not reachable from the entry points.
file://$PROJECT_DIRS/demo/src/main/java/com/attendace/model/AttendanceModel.java	34	demo	com.attendace.model	JAVA	16	20	setCurrentAttendance	- Method owner class is never instantiated OR - All instantiations are not reachable from the entry points.
file://$PROJECT_DIRS/demo/src/main/java/com/attendace/model/CourseModel.java	16	demo	com.attendace.model	JAVA	11	11	CourseModel	Constructor is never used.
file://$PROJECT_DIRS/demo/src/main/java/com/attendace/model/CourseModel.java	23	demo	com.attendace.model	JAVA	18	13	getCourseName	- Method owner class is never instantiated OR - All instantiations are not reachable from the entry points.
file://$PROJECT_DIRS/demo/src/main/java/com/attendace/model/CourseModel.java	26	demo	com.attendace.model	JAVA	18	14	getCourseTopic	- Method owner class is never instantiated OR - All instantiations are not reachable from the entry points.
file://$PROJECT_DIRS/demo/src/main/java/com/attendace/model/CourseModel.java	29	demo	com.attendace.model	JAVA	18	13	getCourseDesc	- Method owner class is never instantiated OR - All instantiations are not reachable from the entry points.
file://$PROJECT_DIRS/demo/src/main/java/com/attendace/model/CourseModel.java	32	demo	com.attendace.model	JAVA	15	16	getMinAttendance	- Method owner class is never instantiated OR - All instantiations are not reachable from the entry points.
file://$PROJECT_DIRS/demo/src/main/java/com/attendace/model/CourseModel.java	35	demo	com.attendace.model	JAVA	15	16	getMaxAttendance	- Method owner class is never instantiated OR - All instantiations are not reachable from the entry points.
file://$PROJECT_DIRS/demo/src/main/java/com/attendace/model/CourseModel.java	38	demo	com.attendace.model	JAVA	16	6	getKey	- Method owner class is never instantiated OR - All instantiations are not reachable from the entry points.
file://$PROJECT_DIRS/demo/src/main/java/com/attendace/model/CourseModel.java	41	demo	com.attendace.model	JAVA	18	6	getKey	- Method owner class is never instantiated OR - All instantiations are not reachable from the entry points.
file://$PROJECT_DIRS/demo/src/main/java/com/attendace/model/CourseModel.java	44	demo	com.attendace.model	JAVA	16	18	setCourseAvailable	- Method owner class is never instantiated OR - All instantiations are not reachable from the entry points.
file://$PROJECT_DIRS/demo/src/main/java/com/attendace/model/CourseModel.java	47	demo	com.attendace.model	JAVA	19	18	getCourseAvailable	- Method owner class is never instantiated OR - All instantiations are not reachable from the entry points.
file://$PROJECT_DIRS/demo/src/main/java/com/attendace/model/CourseModel.java	50	demo	com.attendace.model	JAVA	16	22	setAttendanceAvailable	- Method owner class is never instantiated OR - All instantiations are not reachable from the entry points.
file://$PROJECT_DIRS/demo/src/main/java/com/attendace/model/CourseModel.java	53	demo	com.attendace.model	JAVA	19	22	getAttendanceAvailable	- Method owner class is never instantiated OR - All instantiations are not reachable from the entry points.
file://$PROJECT_DIRS/demo/src/main/java/com/attendace/model/StaffModel.java	19	demo	com.attendace.model	JAVA	15	10	getStaffId	Method is never used.
file://$PROJECT_DIRS/demo/src/main/java/com/attendace/view/AdminInterfaceControll	146	demo	com.attendace.view	JAVA	19	11	modifyStaff	Field is never used.
file://$PROJECT_DIRS/demo/src/main/java/com/attendace/view/AdminInterfaceControll	155	demo	com.attendace.view	JAVA	19	13	modifyStudent	Field is never used.
file://$PROJECT_DIRS/demo/src/main/java/com/attendace/view/AdminInterfaceControll	164	demo	com.attendace.view	JAVA	19	12	modifyCourse	Field is never used.
file://$PROJECT_DIRS/demo/src/main/java/com/attendace/view/AdminInterfaceControll	178	demo	com.attendace.view	JAVA	19	11	modifyAtten	Field is never used.
file://$PROJECT_DIRS/demo/src/main/java/com/attendace/view/AdminInterfaceControll	181	demo	com.attendace.view	JAVA	19	10	saveButton	Field is never used.
file://$PROJECT_DIRS/demo/src/main/java/com/attendace/view/AdminInterfaceControll	184	demo	com.attendace.view	JAVA	19	12	cancelButton	Field is never used.
file://$PROJECT_DIRS/demo/src/main/java/com/attendace/view/Classes/AttendanceCont	49	demo	com.attendace.view.Classes	JAVA	18	7	getMenu	Method is never used.

Corrective Actions

All issues, from SpotBugs and SonarQube were distributed among project members for refactoring, specifically those areas where each person has worked on the project before.

Maintainability issues were brought down from 230 to 15 (7, excluding testcase maintainability issues)

Hotspot issues were manually resolved due to most being about removing "printstacktrace" before entering production.

One security issue, regarding the use of a SQL password field in the open, and it being compromised. This was considered an "Accepted Issue" due to the nature of the project. If the project was for an actual company, the SQL password access would not be out in the public, neither would the password be as simple.

New Code 3 failed	Overall Code				
Security		**Reliability**		**Maintainability**	
0 Open issues	A	**0** Open issues	A	**15** Open issues	A
Accepted issues		**Coverage**		**Duplications**	
1		32.7%		11.4%	
Valid issues that were not fixed		On **1.6k** lines to cover.		On **3.6k** lines.	
Security Hotspots					
0	A				