Task 1: Evaluate some metrics (20 points)

Size

1. 22539 LOC
2. HTMLEditor.java 2144 LOC
3. After inspecting CurrentNote.java, it looks like Metrics does not count blank lines or comments. After deleting all blank lines, CurrentNote.java had 29 lines compared to the metric's 28. There was only one comment line, leading to the 28 LOC metric gave.

Cohesion

1. It is a number to determine how much cohesion exist between methods in the class. Henderson-Sellers defines Lack of Cohesion in Methods as follows. Let:

M be the set of methods defined by the class
F be the set of fields defined by the class
r(f) be the number of methods that access field f, where f is a member of F
<r> be the mean of r(f) over F.

Then:
Lack of Cohesion in Methods = <r> - |M| / 1 - |M|

2. CharTablePanel.java

Looking at the class, it doesn't seem like any of the methods interact with each other, or use similar variables. They all exist separately and independently, thus have no cohesion.

Complexity

Make sure you do this after 1-3 so as to not distort those answers!!!

1. Mean: 2.241 Average: 2.851 Max: 42
2. ProjectPackager.java has a mean of 5.667
3. In AltHTMLWriter, I changed an if statement in emptyTag(). Before , it was an if statement with 4 conditions. This is a complex rating of 5, 1 for each condition, and 1 for the method. I changed it to have three boolean variables, two each with two conditions, and the third comparing the two booleans. The if statement then just takes the third condition. This changes it to a complexity rating of 2, reducing it by 3.

Package-level Coupling

1. Afferent coupling is the number of classes in other packages that depend on classes within the package, so dependence inward. Efferent coupling is the opposite, it is the number of classes in other packages that classes in the package depend on, so it is outward dependence.

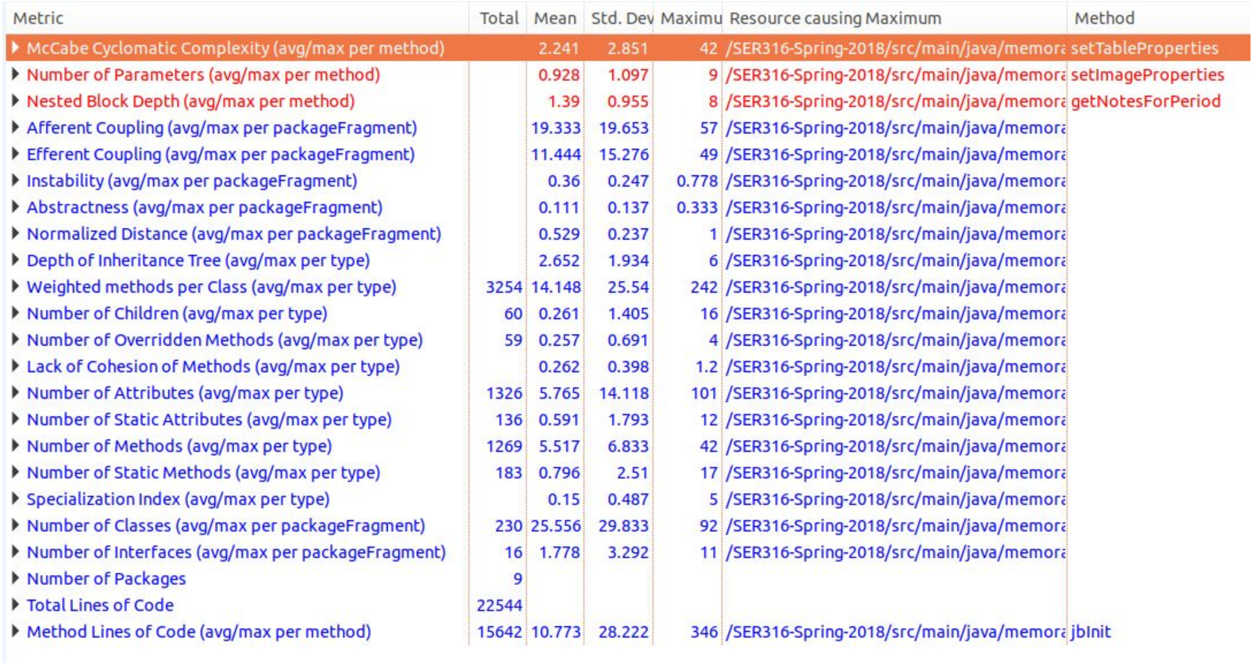
2. Main.java.memoranda.java with 57
3. Main.java.memoranda.ui with 49

Worst quality

HTMLEditor.java. It has the highest Cyclomatic Complexity, with a mean of 3.179, and a max of 42!! It also has a high number of parameters, with an average of 1.088 prt method, but a max of 9. It also has a middle to high average of block depth, with 1.73, and a max of 7. It is a complex nested class full of if statements.

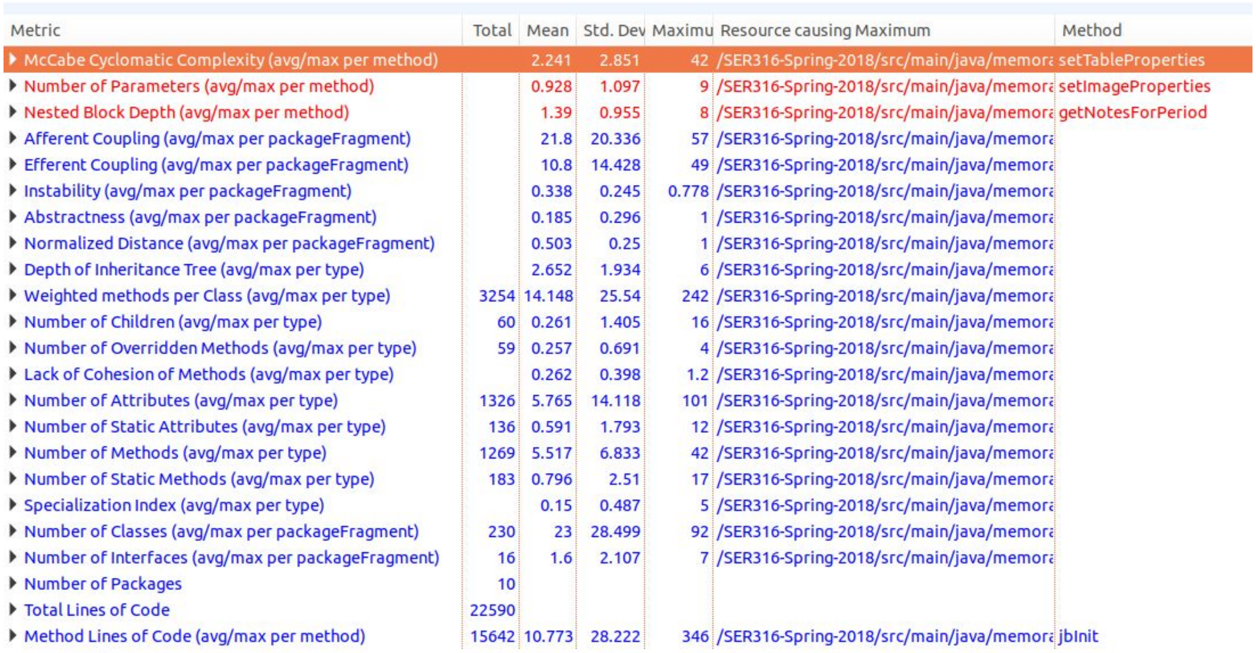
Task 2: Eclipse Refactorings (25 points)

1.



Metric	Total	Mean	Std. Dev	Maximu	Resource causing Maximum	Method
McCabe Cyclomatic Complexity (avg/max per method)		2.241	2.851	42	/SER316-Spring-2018/src/main/java/memora	setTableProperties
Number of Parameters (avg/max per method)		0.928	1.097	9	/SER316-Spring-2018/src/main/java/memora	setImageProperties
Nested Block Depth (avg/max per method)		1.39	0.955	8	/SER316-Spring-2018/src/main/java/memora	getNotesForPeriod
Afferent Coupling (avg/max per packageFragment)		19.333	19.653	57	/SER316-Spring-2018/src/main/java/memora	
Efferent Coupling (avg/max per packageFragment)		11.444	15.276	49	/SER316-Spring-2018/src/main/java/memora	
Instability (avg/max per packageFragment)		0.36	0.247	0.778	/SER316-Spring-2018/src/main/java/memora	
Abstractness (avg/max per packageFragment)		0.111	0.137	0.333	/SER316-Spring-2018/src/main/java/memora	
Normalized Distance (avg/max per packageFragment)		0.529	0.237	1	/SER316-Spring-2018/src/main/java/memora	
Depth of Inheritance Tree (avg/max per type)		2.652	1.934	6	/SER316-Spring-2018/src/main/java/memora	
Weighted methods per Class (avg/max per type)	3254	14.148	25.54	242	/SER316-Spring-2018/src/main/java/memora	
Number of Children (avg/max per type)	60	0.261	1.405	16	/SER316-Spring-2018/src/main/java/memora	
Number of Overridden Methods (avg/max per type)	59	0.257	0.691	4	/SER316-Spring-2018/src/main/java/memora	
Lack of Cohesion of Methods (avg/max per type)		0.262	0.398	1.2	/SER316-Spring-2018/src/main/java/memora	
Number of Attributes (avg/max per type)	1326	5.765	14.118	101	/SER316-Spring-2018/src/main/java/memora	
Number of Static Attributes (avg/max per type)	136	0.591	1.793	12	/SER316-Spring-2018/src/main/java/memora	
Number of Methods (avg/max per type)	1269	5.517	6.833	42	/SER316-Spring-2018/src/main/java/memora	
Number of Static Methods (avg/max per type)	183	0.796	2.51	17	/SER316-Spring-2018/src/main/java/memora	
Specialization Index (avg/max per type)		0.15	0.487	5	/SER316-Spring-2018/src/main/java/memora	
Number of Classes (avg/max per packageFragment)	230	25.556	29.833	92	/SER316-Spring-2018/src/main/java/memora	
Number of Interfaces (avg/max per packageFragment)	16	1.778	3.292	11	/SER316-Spring-2018/src/main/java/memora	
Number of Packages	9					
Total Lines of Code	22544					
Method Lines of Code (avg/max per method)	15642	10.773	28.222	346	/SER316-Spring-2018/src/main/java/memora	jbInit

7.



Metric	Total	Mean	Std. Dev	Maximu	Resource causing Maximum	Method
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Number of Parameters (avg/max per method)		0.928	1.097	9	/SER316-Spring-2018/src/main/java/memora	setImageProperties
Nested Block Depth (avg/max per method)		1.39	0.955	8	/SER316-Spring-2018/src/main/java/memora	getNotesForPeriod
Afferent Coupling (avg/max per packageFragment)		21.8	20.336	57	/SER316-Spring-2018/src/main/java/memora	
Efferent Coupling (avg/max per packageFragment)		10.8	14.428	49	/SER316-Spring-2018/src/main/java/memora	
Instability (avg/max per packageFragment)		0.338	0.245	0.778	/SER316-Spring-2018/src/main/java/memora	
Abstractness (avg/max per packageFragment)		0.185	0.296	1	/SER316-Spring-2018/src/main/java/memora	
Normalized Distance (avg/max per packageFragment)		0.503	0.25	1	/SER316-Spring-2018/src/main/java/memora	
Depth of Inheritance Tree (avg/max per type)		2.652	1.934	6	/SER316-Spring-2018/src/main/java/memora	
Weighted methods per Class (avg/max per type)	3254	14.148	25.54	242	/SER316-Spring-2018/src/main/java/memora	
Number of Children (avg/max per type)	60	0.261	1.405	16	/SER316-Spring-2018/src/main/java/memora	
Number of Overridden Methods (avg/max per type)	59	0.257	0.691	4	/SER316-Spring-2018/src/main/java/memora	
Lack of Cohesion of Methods (avg/max per type)		0.262	0.398	1.2	/SER316-Spring-2018/src/main/java/memora	
Number of Attributes (avg/max per type)	1326	5.765	14.118	101	/SER316-Spring-2018/src/main/java/memora	
Number of Static Attributes (avg/max per type)	136	0.591	1.793	12	/SER316-Spring-2018/src/main/java/memora	
Number of Methods (avg/max per type)	1269	5.517	6.833	42	/SER316-Spring-2018/src/main/java/memora	
Number of Static Methods (avg/max per type)	183	0.796	2.51	17	/SER316-Spring-2018/src/main/java/memora	
Specialization Index (avg/max per type)		0.15	0.487	5	/SER316-Spring-2018/src/main/java/memora	
Number of Classes (avg/max per packageFragment)	230	23	28.499	92	/SER316-Spring-2018/src/main/java/memora	
Number of Interfaces (avg/max per packageFragment)	16	1.6	2.107	7	/SER316-Spring-2018/src/main/java/memora	
Number of Packages	10					
Total Lines of Code	22590					
Method Lines of Code (avg/max per method)	15642	10.773	28.222	346	/SER316-Spring-2018/src/main/java/memora	jbInit

8. The number of packages changed by 1, of course. Also, the Afferent Coupling and Efferent Coupling average both went down.

Metric	Before	After
Afferent	19.33 / 19.653 / 57	21.8 / 20.336 / 57
Efferent	11.444 / 15.267 / 49	10.8 / 14.428 / 49

I am not sure which is better to have

Instability went down

Metric	Before	After
Instability	0.36 / 0.247 / 0.778	0.338 / 0.245 / 0.778

Having an instability per package fragment is a good thing.

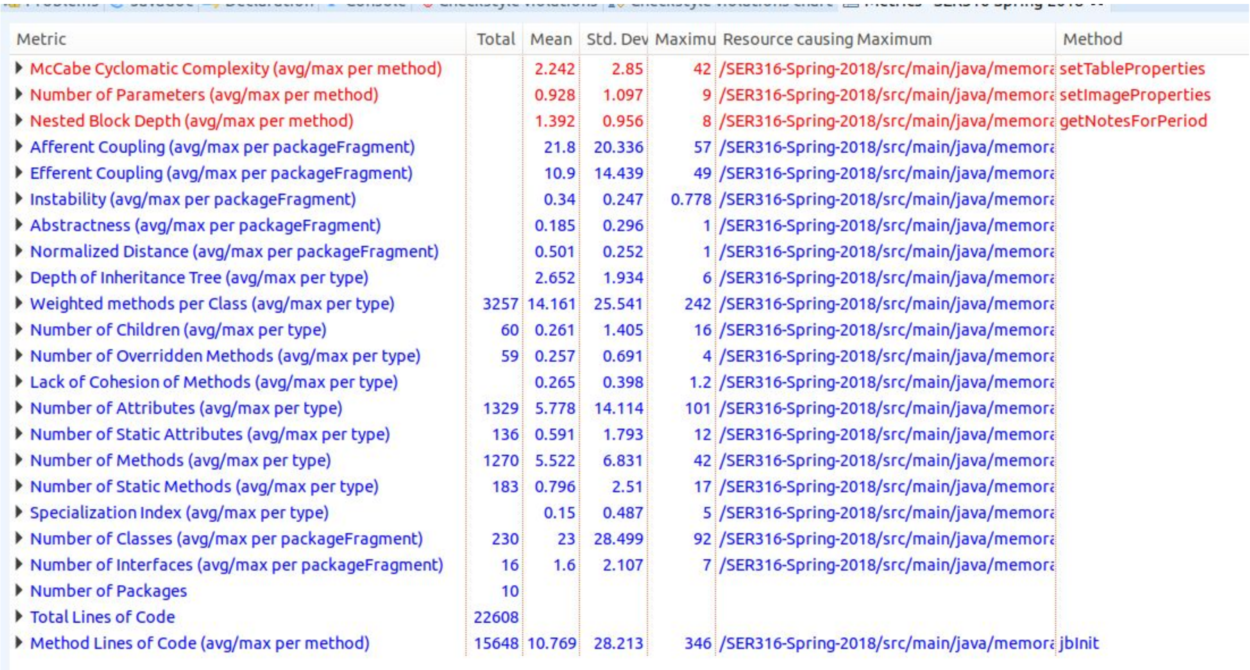
Task 3: Find Code Smells and Refactor (25points)

1. Change is in main.java.memoranda.ui.htmleditor class HTMLEditor.java. This class is very large and complex, and contains many classes within. I could move all of them if this were a full refactoring, but for the sake of the assignment, I moved the class

ParaBreakAction out of HTMLEditor.java and put it in its own class, ParaBreakAction.java

2. I could not find a smell between classes in time.

3. **AFTER:**



Metric	Total	Mean	Std. Dev	Maximu	Resource causing Maximum	Method
McCabe Cyclomatic Complexity (avg/max per method)		2.242	2.85	42	/SER316-Spring-2018/src/main/java/memora	setTableProperties
Number of Parameters (avg/max per method)		0.928	1.097	9	/SER316-Spring-2018/src/main/java/memora	setImageProperties
Nested Block Depth (avg/max per method)		1.392	0.956	8	/SER316-Spring-2018/src/main/java/memora	getNotesForPeriod
Afferent Coupling (avg/max per packageFragment)		21.8	20.336	57	/SER316-Spring-2018/src/main/java/memora	
Efferent Coupling (avg/max per packageFragment)		10.9	14.439	49	/SER316-Spring-2018/src/main/java/memora	
Instability (avg/max per packageFragment)		0.34	0.247	0.778	/SER316-Spring-2018/src/main/java/memora	
Abstractness (avg/max per packageFragment)		0.185	0.296	1	/SER316-Spring-2018/src/main/java/memora	
Normalized Distance (avg/max per packageFragment)		0.501	0.252	1	/SER316-Spring-2018/src/main/java/memora	
Depth of Inheritance Tree (avg/max per type)		2.652	1.934	6	/SER316-Spring-2018/src/main/java/memora	
Weighted methods per Class (avg/max per type)	3257	14.161	25.541	242	/SER316-Spring-2018/src/main/java/memora	
Number of Children (avg/max per type)	60	0.261	1.405	16	/SER316-Spring-2018/src/main/java/memora	
Number of Overridden Methods (avg/max per type)	59	0.257	0.691	4	/SER316-Spring-2018/src/main/java/memora	
Lack of Cohesion of Methods (avg/max per type)		0.265	0.398	1.2	/SER316-Spring-2018/src/main/java/memora	
Number of Attributes (avg/max per type)	1329	5.778	14.114	101	/SER316-Spring-2018/src/main/java/memora	
Number of Static Attributes (avg/max per type)	136	0.591	1.793	12	/SER316-Spring-2018/src/main/java/memora	
Number of Methods (avg/max per type)	1270	5.522	6.831	42	/SER316-Spring-2018/src/main/java/memora	
Number of Static Methods (avg/max per type)	183	0.796	2.51	17	/SER316-Spring-2018/src/main/java/memora	
Specialization Index (avg/max per type)		0.15	0.487	5	/SER316-Spring-2018/src/main/java/memora	
Number of Classes (avg/max per packageFragment)	230	23	28.499	92	/SER316-Spring-2018/src/main/java/memora	
Number of Interfaces (avg/max per packageFragment)	16	1.6	2.107	7	/SER316-Spring-2018/src/main/java/memora	
Number of Packages	10					
Total Lines of Code	22608					
Method Lines of Code (avg/max per method)	15648	10.769	28.213	346	/SER316-Spring-2018/src/main/java/memora	jbInit

4.There is no significant change due to my change in refactoring code smells. No metric went down, and a couple went up slightly, such as Abstractness. This is most likely due to the fact that I did not fix any code, I just moved classes out of a large class.

Describe the smell:

The smell I found was large class. This class, HTMLEditor.java, was a large class that contained many classes within it. To remedy this, I moved one class out to its own. This allowed the HTMLEditor to be smaller. Many more classes could be moved out, but I only moved one to make grading easier.