

Code Smell	Symptoms (how to find?)	Treatment (Refactoring technique)
Comments	If you find comments that explain the inner behaviour of the code With the exception of comments where we have no influence over making them readable	Remove any comments that explain the code's behaviour, and refactor using the <b>proper naming convention</b> .
Duplicate Code	If you find code that appears in same or multiple areas	If the same code is found in two or more methods in the same class use <b>Extract method</b> or do <b>Substitute algorithm</b>
Dead Code	If you find variable, parameter, field, method or class that is no longer used or block statements that may not even reach	<b>Delete</b> unused code and unneeded files and remove blocks that may not even reach during execution
Large Class	If you find a class that has too many variables, fields, methods and a class that has too many responsibilities	<b>Extract/Move</b> class/method/variable by following SRP
Long Method	If you find a method that has a large number of lines (more than 5) and if it accomplishes more than one task	<b>Extract/Move method</b> - If a method performs multiple tasks, it should be extracted into the same or different classes based on SRP.
Primitive Obsession	If you are using primitives/pre-defined types to define domain objects	<b>Introduce Parameter Object or Replace Data Value with Object</b> by having all set of validations in setter methods
Long Parameter List	If you find a method that has 5 or more parameters	<b>Introduce parameter object:</b> Extract these parameter variables to class and pass object reference
Data Clumps	If you have identical groups of variables as a parameters	
Message Chains	If you find a method chain that involves multiple object types	<b>Hide delegate or Follow Law of Demeter:</b> Method chain should occur only with same or near by objects
Divergent Change	If you find yourself changing the same class for different reasons. A class contains more than one responsibility	<b>Extract Class</b>
Shotgun Surgery	If you have to make a small change in a class, you have to go and change several classes at the same time.	<b>Inline Method</b> - If multiple methods operate on similar data <b>Inline Class</b> - If two classes responsibility are same
Switch Case	If you have a complex switch or sequence of if/else statements occurs more than one place which does different behaviour.	If the switch case is only used to take care of one behaviour then its ok to have it else <b>Replace with Polymorphism</b> if it does more than one behaviour
Temporary Field	If you introduce temporary variables in the Class which are used only by one method or in a limited situation.	Replace temp variable with <b>method parameter</b> If you are creating a temp variable to just store some values from Method parameter object to pass that to another method as a parameter- <b>Remove temp variables and Pass that object directly to that method</b>
Flaky Locator Strategy	If you are using the fragile or unreliable locators	<b>Locator order-of-preference is:</b> 1. ID (if unique) 2. Name (if unique) 3. Class name 4. CSS Selector 5. XPath without text or indexing for anchors 6. Link text / partial link text 7. XPath with text and/or indexing
Indecent Exposure	If you have exposed the page classes variables or methods which returns webelement	<b>Narrow Scope</b> -> Encapsulate those variables and methods by changing its access modifier to <b>private</b>
Ineffective Wait	If you are using static wait or hardcoded wait which lets the test to pause even after the desired element is visible	<b>Wait intelligently</b> -> Use dynamic wait like explicit or fluent wait in Selenium
Multiple Points of Failure	If you have the assertions within the framework	<b>Move assertions</b> to appropriate tests
Hardcoded Data	If you have hardcoded the test data that directly used in application under test	Have the data in a <b>separate data sheet or properties file</b> so that you can replace the entire file according to the environment. Have the secrets in <b>environment variable/secret vault</b> . Have the data in <b>cloud storage</b> if in case you are running the tests in pipeline