Hierarchy Of Classes & Interfaces Of WebDriver Interface In Selenium WebDriver

POSTED ON: [April 2, 2017](http://makeseleniumeasy.com/2017/04/02/hierarchy-of-selenium-classes-and-interfaces/)[COMMENTS: 49](http://makeseleniumeasy.com/2017/04/02/hierarchy-of-selenium-classes-and-interfaces/#comments)CATEGORIZED IN: [Selenium Topics](http://makeseleniumeasy.com/category/selenium-topics/) WRITTEN BY: [Amod Mahajan](http://makeseleniumeasy.com/author/makeseleniumeasy/)

*This post is updated with Selenium 4 changes in WebDriver hierarchy.*

*There are many important classes and interfaces in Selenium WebDriver. In this post we will see hierarchy of classes and interface related to WebDriver interface.*

*Understanding “Why” of a line of code is very much important and if you copy code from others without understanding, that is more harmful. I see people will downcast a WebDriver reference to TakesScreenshot type to capture a screen shot and downcast a WebDriver reference to JavascriptExecutor to execute a Javascript query but not able to explain the reason behind it. So in this post, I will try to explain the hierarchy of WebDriver so that you can easily understand when to up cast and downcast or if it is needed at all.*

*Let’s start with some basic concepts of java :-*

1. We can not create an object of interface, i.e. we can not instantiate an interface.
2. Interface has abstract methods means they do not have body, only declaration. ***Note – From JDK 1.8 there are many changes in Interface. WebDriver interface has no static or default methods as of now.***
3. When we create an object of a class and store it or assign it a reference of its super class or interface then it is called Up casting. We can not do reverse i.e a child type reference can not hold super type object.

*Below is a Java Program which demonstrates behavior when up casting is done and why need to down cast.*

*Table of Contents*

* [Java Program](http://makeseleniumeasy.com/2017/04/02/hierarchy-of-selenium-classes-and-interfaces/#Java_Program)
* [Output](http://makeseleniumeasy.com/2017/04/02/hierarchy-of-selenium-classes-and-interfaces/#Output)
* [Output](http://makeseleniumeasy.com/2017/04/02/hierarchy-of-selenium-classes-and-interfaces/#Output-2)
* [WebDriver Hierarchy Diagram](http://makeseleniumeasy.com/2017/04/02/hierarchy-of-selenium-classes-and-interfaces/#WebDriver_Hierarchy_Diagram)
* [Interface SearchContext](http://makeseleniumeasy.com/2017/04/02/hierarchy-of-selenium-classes-and-interfaces/#Interface_SearchContext)
* [Interface WebDriver](http://makeseleniumeasy.com/2017/04/02/hierarchy-of-selenium-classes-and-interfaces/#Interface_WebDriver)
* [Class RemoteWebDriver](http://makeseleniumeasy.com/2017/04/02/hierarchy-of-selenium-classes-and-interfaces/#Class_RemoteWebDriver)
* [Browser’s specific classes](http://makeseleniumeasy.com/2017/04/02/hierarchy-of-selenium-classes-and-interfaces/#Browser%E2%80%99s_specific_classes)
* [Author: Amod Mahajan](http://makeseleniumeasy.com/2017/04/02/hierarchy-of-selenium-classes-and-interfaces/#Author_Amod_Mahajan)

**Java Program**



|  |  |
| --- | --- |
| 1  2  3  4  5  6  7  8  9  10  11  12  13  14  15  16  17  18  19  20  21  22  23  24  25  26  27  28  29  30  31  32  33  34  35  36  37  38  39 | package SpecialConcepts;    class SuperClass1 {  public void super\_print() {  System.out.println("Super Print");  }    public void super\_show() {  System.out.println("Super Show");  }  }    public class SubClass1 extends SuperClass1 {    public void sub\_print() {  System.out.println("Sub Print");  }    public void sub\_show() {  System.out.println("Sub Show");  }    public static void main(String[] args) {    /\* Child class object up cast to super class reference. Using super class reference , sub class object can not use methods  of sub class despite of being object of that class. Up casting restricts access or visibility of methods downwards \*/  SuperClass1 superClass1 = new SubClass1();  superClass1.super\_print();  superClass1.super\_show();    /\* To access sub class methods, super class reference needs to be downcast to sub class reference. Note here we can down cast  to a up cast reference only. \*/  SubClass1 subClass1 = (SubClass1)superClass1;  subClass1.sub\_print();  subClass1.sub\_show();      }  } |

**Output**



|  |  |
| --- | --- |
| 1  2  3  4 | Super Print  Super Show  Sub Print  Sub Show |

*There is an important point. If a super class method is overridden in sub class then up cast reference will use overridden method without downcast.*



|  |  |
| --- | --- |
| 1  2  3  4  5  6  7  8  9  10  11  12  13  14  15  16  17  18  19 | package SpecialConcepts;    class SuperClass2 {  public void print() {  System.out.println("Super Print");  }  }    public class SubClass2 extends SuperClass2 {    public void print() {  System.out.println("Sub Print");  }    public static void main(String[] args) {  SuperClass2 superClass1 = new SubClass2();  superClass1.print();  }  } |

**Output**



|  |  |
| --- | --- |
| 1 | Sub Print |

**WebDriver Hierarchy Diagram**

Diagram

Description automatically generated

*Let’s understand above diagram in details:*

**Interface SearchContext**

***SearchContext****is the top most interface in WebDriver hierarchy. This interface consists of two methods****findElement​(By by)****and****findElements(By by)****. This interface is extended by both WebDriver and WebElement interfaces.*

**Interface WebDriver**

***WebDriver****is an interface which extends****SearchContext****interface. As per*[*official document*](https://www.javadoc.io/doc/org.seleniumhq.selenium/selenium-api/latest/org/openqa/selenium/WebDriver.html)*:- WebDriver is a remote control interface that enables introspection and control of user agents (browsers). The methods in this interface fall into three categories:*

* Control of the browser itself
* Selection of WebElement and WebElements
* Debugging aids

*Currently, you will need to instantiate implementations of this interface directly. It is hoped that you write your tests against this interface so that you may “swap in” a more fully featured browser when there is a requirement for one ( i.e. Up cast to WebDriver). Most implementations of this interface follow*[*W3C WebDriver specification*](https://w3c.github.io/webdriver/)

*WebDriver interface has multiple inner interfaces which contains methods related o specific events.*

1. **ImeHandler** – An interface for managing input methods.
2. **Navigation**– An interface for provide mechanism to access browser history.
3. **Options**– An interface for managing stuff you would do in a browser menu
4. **TargetLocator**– Used to locate a given frame or window.
5. **Timeouts**– An interface for managing timeout behavior for WebDriver instances.
6. **Window**– An interface to manage browser window actions like maximize, minimize etc.

**Class RemoteWebDriver**

*RemoteWebDriver is the fully implemented class i.e. non -abstract class which implements WebDriver interface. All implementations of WebDriver that communicate with the browser, or a RemoteWebDriver server shall use a common wire protocol. This wire protocol defines a RESTful web service using JSON over HTTP.*

*Note here that RemoteWebDriver has implementation to call RESTful Web Services of Selenium WebDriver which hits to respective browser server. It has no mechanism to perform any browser specific action.*

*It also implements other interfaces. JavascriptExecutor and TakesScreenshot are one of them. Implementing JavascriptExecutor ensures that driver can execute JavaScript commands by providing access to the mechanism to do so. Implementing TakesScreenshot ensures that a driver that can capture a screenshot and store it in different ways.*

**Browser’s specific classes**

*Then we have browser specific driver classes like ChromeDriver(), EdgeDriver(), FirefoxDriver() etc in hierarchy. These classes provides control on a browser running on the local machine. These class are provided as a convenience for easily testing the browsers. The control serves (which is started every time when we launch a browser ) which each instance communicates with will live and die with the instance.*

*So now we have a fair idea about hierarchy and basic understanding of each level in hierarchy. Let’s understand some important lines of code which we use always but may not know reason behind that.*



|  |  |
| --- | --- |
| 1  2  3 | WebDriver driver = new ChromeDriver();  TakesScreenshot takesScreenshot = (TakesScreenshot)driver;  File screenshot = takesScreenshot.getScreenshotAs(OutputType.FILE); |

*Why did we down cast WebDriver reference to TakesScreenshot?*

*Because earlier ChromeDriver() object was hold by WebDriver type i.e. up cast. TakesScreenshot interface comes down in WebDriver hierarchy. As we have seen in above program that a up cast object has no visibility of non-overridden method of sub class. To capture a screenshot we need to use getScreenshoAs() method of TakesScreenshot interface. So to use method we must need to down cast to either RemoteWebdriver or TakesScreenshot interface.*



|  |  |
| --- | --- |
| 1  2  3 | WebDriver driver = new ChromeDriver();  RemoteWebDriver remoteWebDriver  = (RemoteWebDriver)driver;  File screenshot1 = remoteWebDriver.getScreenshotAs(OutputType.FILE); |

*Similar concept applies when we need to execute any Javascript command then we need to downcast to JavascripExecutor or RemoteWebDriver.*



|  |  |
| --- | --- |
| 1  2  3 | WebDriver driver = new ChromeDriver();  JavascriptExecutor javascriptExecutor = (JavascriptExecutor)driver;  javascriptExecutor.executeScript("arguments[0].click()",driver.findElement(By.id("Some Id"))); |

*Remember here if we do not up cast , we no need to down cast.*



|  |  |
| --- | --- |
| 1  2  3 | ChromeDriver chromeDriver = new ChromeDriver();  File screenshot = chromeDriver.getScreenshotAs(OutputType.FILE);  chromeDriver.executeScript("arguments[0].click()",driver.findElement(By.id("Some Id"))); |

*You can download/clone above sample project from*[*here*](https://bitbucket.org/makeseleniumeasy/mse_readytouseseleniumjavacode/src/master/)*.*

*If you have any doubt, feel free to comment below.  
If you like my posts, please like, comment, share and subscribe.  
#ThanksForReading  
#HappyLearning*

*Find all Selenium related post*[*here*](http://makeseleniumeasy.com/home/seleniumbytopic/)*, all API manual and automation related posts*[*here*](http://makeseleniumeasy.com/api-testing/)*and find frequently asked Java Programs*[*here*](http://makeseleniumeasy.com/java-programs/)*.*

*Many other topics you can navigate through menu.*

A person wearing a helmet

Description automatically generated with medium confidence

**Author: Amod Mahajan**

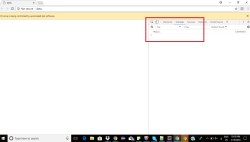
**Share this:**

* [Click to share on Twitter (Opens in new window)](http://makeseleniumeasy.com/2017/04/02/hierarchy-of-selenium-classes-and-interfaces/?share=twitter&nb=1)
* [Click to share on Facebook (Opens in new window)](http://makeseleniumeasy.com/2017/04/02/hierarchy-of-selenium-classes-and-interfaces/?share=facebook&nb=1)
* [Click to share on Google+ (Opens in new window)](http://makeseleniumeasy.com/2017/04/02/hierarchy-of-selenium-classes-and-interfaces/?share=google-plus-1&nb=1)

**Like this:**

Loading...

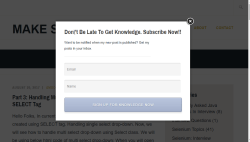
***Related***

[](http://makeseleniumeasy.com/2018/02/11/part-2-usages-of-javascripts-in-selenium-how-to-run-javascript-commands-in-selenium/)

[Part 2: Usages Of Javascripts In Selenium: How To Run Javascript Commands In Selenium](http://makeseleniumeasy.com/2018/02/11/part-2-usages-of-javascripts-in-selenium-how-to-run-javascript-commands-in-selenium/)

*February 11, 2018*

*In "Selenium Topics"*

[](http://makeseleniumeasy.com/2017/08/27/taking-screenshot-using-takesscreenshot-interface-in-selenium/)

[Taking Screenshot Using TakesScreenshot Interface In Selenium](http://makeseleniumeasy.com/2017/08/27/taking-screenshot-using-takesscreenshot-interface-in-selenium/)

*August 27, 2017*

*In "Selenium Topics"*

[Why Should We Upcast Browser Driver Class Object To WebDriver?](http://makeseleniumeasy.com/2018/02/08/why-do-we-up-cast-browser-driver-class-object-to-webdriver/)

*In interview a frequently asked interview question is "Why do we upcast browser class object to WebDriver? or why we do not upcast to RemoteWebDriver class instead of WebDriver?" and we give all sort of answers. First of all this question is asked with assumption that we do not have…*

*February 8, 2018*

*In "Selenium Topics"*

[Skip back to main navigation](http://makeseleniumeasy.com/2017/04/02/hierarchy-of-selenium-classes-and-interfaces/#site-navigation)

**49 thoughts on “**Hierarchy of Classes & Interfaces of WebDriver Interface in Selenium WebDriver**”**

1. Icon

   Description automatically generated**sudhir** says:

[MARCH 20, 2020 AT 5:08 PM](http://makeseleniumeasy.com/2017/04/02/hierarchy-of-selenium-classes-and-interfaces/#comment-2092)

*Amod..!! i have been into QA automation since very long but the way this blog has been articulated is very apt and in an understandable manner. Very information and impressive blog 🙂*

[Reply](http://makeseleniumeasy.com/2017/04/02/hierarchy-of-selenium-classes-and-interfaces/#comment-2092)

1. Icon

   Description automatically generated**Dharti** says:

[MAY 18, 2019 AT 11:08 AM](http://makeseleniumeasy.com/2017/04/02/hierarchy-of-selenium-classes-and-interfaces/#comment-1801)

*Thanks Amod. It’s great depth knowledge for Basic flow..*

[Reply](http://makeseleniumeasy.com/2017/04/02/hierarchy-of-selenium-classes-and-interfaces/#comment-1801)

1. Icon

   Description automatically generated[**Jain**](https://www.softwaretestingmaterial.com/how-to-locate-element-by-class-name-locator/) says:

[MARCH 19, 2019 AT 3:14 PM](http://makeseleniumeasy.com/2017/04/02/hierarchy-of-selenium-classes-and-interfaces/#comment-1669)

*Can u please explain findElement and By Class in the same manner and demystify it.. Thanks for the help*

[Reply](http://makeseleniumeasy.com/2017/04/02/hierarchy-of-selenium-classes-and-interfaces/#comment-1669)

1. Icon

   Description automatically generated[**prasad3ec**](http://gravatar.com/prasad3ec) says:

[FEBRUARY 20, 2019 AT 7:24 PM](http://makeseleniumeasy.com/2017/04/02/hierarchy-of-selenium-classes-and-interfaces/#comment-1599)

*thnaks, it was quick and useful.*

[Reply](http://makeseleniumeasy.com/2017/04/02/hierarchy-of-selenium-classes-and-interfaces/#comment-1599)

1. Icon

   Description automatically generated**Ayush Garg** says:

[JANUARY 25, 2019 AT 11:02 PM](http://makeseleniumeasy.com/2017/04/02/hierarchy-of-selenium-classes-and-interfaces/#comment-1570)

*Thank you Thank you Thank you for such a lovely post. Maaza aa gaya 🙂 Keep it up bro!.*

[Reply](http://makeseleniumeasy.com/2017/04/02/hierarchy-of-selenium-classes-and-interfaces/#comment-1570)

1. A person smiling for the camera

   Description automatically generated with medium confidence[**Gaurav Khurana**](http://www.udzial.com/) says:

[DECEMBER 19, 2018 AT 8:52 AM](http://makeseleniumeasy.com/2017/04/02/hierarchy-of-selenium-classes-and-interfaces/#comment-1399)

*Can you please explain this*

*“Keeping 2nd point in mind, We can upcast till WebDriver as we are not making it difficult to use important methods because of major concept of overriding in java. So, we do not upcast to RemoteWebDriver.”*

*If we upcast to RemoteWebDriver its a fully implemented class which has access to all methods that are there even at WebDriver level. So why we did not upcasted only at RemoteWebDriver level.*

*Anyhow WebDriver is an interface so it does not have any method implemented. If we could have upcasted til RemoteWebDriver. Was it not enough ?*

[Reply](http://makeseleniumeasy.com/2017/04/02/hierarchy-of-selenium-classes-and-interfaces/#comment-1399)

* 1. A person sitting on a blue motorcycle

     Description automatically generated with medium confidence**Amod Mahajan** says:

[DECEMBER 22, 2018 AT 10:02 PM](http://makeseleniumeasy.com/2017/04/02/hierarchy-of-selenium-classes-and-interfaces/#comment-1431)

*Yes you can do. There is no harm. Suppose if a new implemented class of WebDriver comes in to picture and has no connection from RemoteWebDriver. If you have upcasted till RemoteWebDriver, you can use the functionalities of new class. BUt if you would have upcasted till WebDriver, you can use functionalities of new class as well. Let me know if you get a point here.*

[Reply](http://makeseleniumeasy.com/2017/04/02/hierarchy-of-selenium-classes-and-interfaces/#comment-1431)

* 1. Icon

     Description automatically generated**helkost** says:

[JUNE 20, 2019 AT 3:13 AM](http://makeseleniumeasy.com/2017/04/02/hierarchy-of-selenium-classes-and-interfaces/#comment-1834)

*I’m late here, but I’ll throw an explanation I found online.*

*Firstly, unfortunately what he said seems wrong (I mean, the “why” is wrong). Method Override has nothing to do with using WebDriver in place of RemoteWebDriver (and there also is no override involved, either).*

*The whole explanation is this:*

*1) we make an upcast to WebDriver so we can achieve cross-browser compatibility.*

*In fact, if we instantiated a single browser object (which we can do, since those are classes too), we would then need to create a different object for any new browser we’d need to run our tests into.*

*ChromeDriver driver = new ChromeDriver();*

*InternetExplorerDriver driver2 = new InternetExplorerDriver();*

*etc…*

*Instead, using WebDriver we can achieve this purpose in a much simpler way:*

*WebDriver driver = new ChromeDriver();*

*driver.close();*

*driver = new FirefoxDriver();*

*This is an example of Polymorphysm. In fact, being WebDriver an interface, it has got, in form of signatures, all methods which are then implemented in their respective classes, like ChromeDriver, FirefoxDriver, and so on. Thus, whenever we create an object of one of these classes, the compiler automatically calls the right constructor to instantiate it.*

*2) why the upcast is to WebDriver and not RemoteWebDriver:*

*it seems that with WebDriver, we can simply run our tests on our Local Machine, while when we use RemoteWebDriver we run our tests on a Remote Machine, and we need to tell the new object created, where the Selenium Standalone Server is.*

*example of RemoteWebDriver use:*

*DesiredCapabilities capabilities = DesiredCapabilities.firefox();  
capabilities.setCapability(“marionette”, true);  
capabilities.setCapability(“networkConnectionEnabled”, true);  
capabilities.setCapability(“browserConnectionEnabled”, true);*

*WebDriver driver = new RemoteWebDriver(new URL(“http://localhost:4444”), capabilities);*

*I found these explanations online, but they make more sense to me than this one.*

*A nice effort though, and the pictures were very useful to me. I’m writing my thesis on Selenium WebDriver.*

Taking Screenshot Using TakesScreenshot Interface In Selenium

POSTED ON: [August 27, 2017](http://makeseleniumeasy.com/2017/08/27/taking-screenshot-using-takesscreenshot-interface-in-selenium/)[COMMENTS: 12](http://makeseleniumeasy.com/2017/08/27/taking-screenshot-using-takesscreenshot-interface-in-selenium/#comments)CATEGORIZED IN: [Selenium Topics](http://makeseleniumeasy.com/category/selenium-topics/) WRITTEN BY: [Amod Mahajan](http://makeseleniumeasy.com/author/admin/)

*Hello Folks,*

*In this post we will learn how to take screenshots in Selenium webdriver using selenium provide interface TakesScreenshot .*

*Table of Contents*

* [Why we need to take screenshot?](http://makeseleniumeasy.com/2017/08/27/taking-screenshot-using-takesscreenshot-interface-in-selenium/#Why_we_need_to_take_screenshot)
* [Taking screenshot of browser by using “TakesScreenshot” interface provided by Selenium:](http://makeseleniumeasy.com/2017/08/27/taking-screenshot-using-takesscreenshot-interface-in-selenium/#Taking_screenshot_of_browser_by_using_%E2%80%9CTakesScreenshot%E2%80%9D_interface_provided_by_Selenium)
* [Limitation of using TakesScreenshot  interface for capturing screenshot:](http://makeseleniumeasy.com/2017/08/27/taking-screenshot-using-takesscreenshot-interface-in-selenium/#Limitation_of_using_TakesScreenshot_interface_for_capturing_screenshot)
* [Author: Amod Mahajan](http://makeseleniumeasy.com/2017/08/27/taking-screenshot-using-takesscreenshot-interface-in-selenium/#Author_Amod_Mahajan)

**Why we need to take screenshot?**

*When we perform manual testing , for each step or important steps, we take screenshot and attach in test result report. Screenshots are proof of test case status. It gives information if test case has passed successfully or reasons if test case has failed.*

**Taking screenshot of browser by using “TakesScreenshot” interface provided by Selenium:**

* Selenium provides an interface named “TakesScreenshot” which helps automaton engineer to take screenshot during execution of automation script.
* “WebElement” interface extends “TakesScreenshot” and all browser driver classes like “ChromeDriver”, “FirefoxDriver”, “InternetExplorerDriver”, “EdgeDriver”  etc implements “TakesScreenshot”.
* TakesScreenshot interface has a method named “getScreenshotAs” which can capture a screenshot and store it in different ways in specified locations.
* This method can capture screenshot as below based on implementation provided by browser driver class:
  + Entire page
  + Current window
  + Visible portion of the current frame
  + The screenshot of the entire display containing the browser
* I will suggest you to must go throw [Hierarchy of Selenium Classes and Interface](http://makeseleniumeasy.com/2017/04/02/hierarchy-of-selenium-classes-and-interfaces/) before proceeding further in this post.
* To use “TakesScreenshot” interface, either we need to do up-casting or down casting depending upon reference of your browser driver class.
* If you write your browser driver class as below:

*ChromeDriver driver= new ChromeDriver();*

*You need to up-cast your driver to TakesScreenshot as below:*

*TakesScreenshot ts= driver;*

* If you write your browser driver class as below:

*WebDriver  driver= new ChromeDriver();*

*You need to down cast your driver to TakesScreenshot as shown below:*

*TakesScreenshot ts= (TakesScreenshot)driver;*

*Java Code:*

|  |  |
| --- | --- |
|  | package TakingScreenshot; |
|  |  |
|  | import java.io.File; |
|  |  |
|  | import org.apache.commons.io.FileUtils; |
|  | import org.openqa.selenium.OutputType; |
|  | import org.openqa.selenium.TakesScreenshot; |
|  | import org.openqa.selenium.WebDriver; |
|  | import org.openqa.selenium.chrome.ChromeDriver; |
|  |  |
|  | public class UsingTakesScreenshot { |
|  |  |
|  |  |
|  | public static String CaptureScreenShotWithTestStepName(WebDriver driver, String testStepsName) |
|  | { |
|  | try{ |
|  | // down casting WebDriver to use getScreenshotAs method. |
|  | TakesScreenshot ts= (TakesScreenshot)driver; |
|  | // capturing screen shot as output type file |
|  | File screenshotSRC= ts.getScreenshotAs(OutputType.FILE); |
|  | // Defining path and extension of image |
|  | String path=System.getProperty("user.dir")+"/ScreenCapturesPNG/"+testStepsName+System.currentTimeMillis()+".png"; |
|  | // copying file from temp folder to desired location |
|  | File screenshotDest= new File(path); |
|  | FileUtils.copyFile(screenshotSRC, screenshotDest); |
|  | return path; |
|  | }catch(Exception e) |
|  | { |
|  | System.out.println("Some exception occured." + e.getMessage()); |
|  | return ""; |
|  | } |
|  | } |
|  |  |
|  |  |
|  | public static void main(String[] args) { |
|  |  |
|  | System.setProperty("webdriver.chrome.driver","./exefiles/chromedriver.exe"); |
|  | WebDriver driver= new ChromeDriver(); |
|  |  |
|  | driver.get("http://makeseleniumeasy.com/"); |
|  |  |
|  | UsingTakesScreenshot.CaptureScreenShotWithTestStepName(driver, "URL Loading"); |
|  |  |
|  |  |
|  |  |
|  | } |
|  |  |
|  | } |

[**view raw**](https://gist.github.com/anonymous/1fd4408e6c925a45879ef1fef7010e15/raw/549f08bce5d3391b475c8cb5ed6159bf615210b4/gistfile1.txt)[**gistfile1.txt**](https://gist.github.com/anonymous/1fd4408e6c925a45879ef1fef7010e15#file-gistfile1-txt)hosted with ❤ by [**GitHub**](https://github.com/)

*Output:  
Graphical user interface, application

Description automatically generated*

*Explanation of above code:*

* Since I have upcasted my ChromeDriver object to WebDriver, to capture screenshot I need to downcast my  ChromeDriver object to TakesScreenshot  interface.
* “OutputType” is an interface which provides you options to take screenshot in different type such as FILE, BASE64, BYTES and class. FILE is mostly used.
* When webdriver tales screenshot, it is stored in temp folder which is cleaned up as soon as execution is over. So we can not find it after execution. This is the reason we need to copy screenshot from temp folder to permanent folder.
* Above code will create a folder within project folder named “ScreenCapturesPNG”. Screenshot will be named by concatenating user provided name and UNIX time stamp.
* I created a reusable method to capture screenshot so that we can use it wherever we need and also you can pass customized name to screenshot.
* I am also returning path of screenshot, which we can use to attach screenshot in to a html report, extent report etc.

**Limitation of using TakesScreenshot  interface for capturing screenshot:**

* Above code will not able to capture screenshot when an alert is present. It will give you an exception stating “org.openqa.selenium.UnhandledAlertException”.
* This is a known defect whose details you can find [here](https://github.com/seleniumhq/selenium-google-code-issue-archive/issues/4412).
* I will share another way of taking screenshot which will work always.

*I hope you must have learnt something new from this post.*

*If you have any doubt, feel free to ask here.*

*If you like my posts, please like, comment, share and subscribe.*

*#ThanksForReading*

*#HappySelenium*

Capturing Screenshot Using Robot Class In Selenium

POSTED ON: [September 7, 2017](http://makeseleniumeasy.com/2017/09/07/capturing-screenshot-using-robot-class-in-selenium/)[COMMENTS: 9](http://makeseleniumeasy.com/2017/09/07/capturing-screenshot-using-robot-class-in-selenium/#comments)CATEGORIZED IN: [Selenium Topics](http://makeseleniumeasy.com/category/selenium-topics/) WRITTEN BY: [Amod Mahajan](http://makeseleniumeasy.com/author/admin/)

*Hello Folks,*

*In last post we have seen*[*Taking Screenshot Using TakesScreenshot Interface In Selenium.*](http://makeseleniumeasy.com/2017/08/27/taking-screenshot-using-takesscreenshot-interface-in-selenium/)*I have explained about its drawbacks as well.*

*Drawbacks of using TakesScreenshot interface for taking screenshot in selenium:*

* It will not take screen shot when an alert is open.  It will give you an exception stating “org.openqa.selenium.UnhandledAlertException”.
* It takes screenshot of visible area of browser. It will not capture address bar and tab opened.
* If your requirement is to take screenshot with URL, it will not be possible through above interface.

*Table of Contents*

* [Capturing screenshot in Selenium using Robot class:](http://makeseleniumeasy.com/2017/09/07/capturing-screenshot-using-robot-class-in-selenium/#Capturing_screenshot_in_Selenium_using_Robot_class)
* [Steps to capture screenshot using Robot class:](http://makeseleniumeasy.com/2017/09/07/capturing-screenshot-using-robot-class-in-selenium/#Steps_to_capture_screenshot_using_Robot_class)
* [Author: Amod Mahajan](http://makeseleniumeasy.com/2017/09/07/capturing-screenshot-using-robot-class-in-selenium/#Author_Amod_Mahajan)

**Capturing screenshot in Selenium using Robot class:**

* Java provides a class named “Robot” which is present in java.awt package.
* Using Robot class, we can control over the mouse and keyboard devices.
* Robot class generates native system input events for the purposes of test automation of applications where control of the mouse and keyboard is needed.
* Robot class will capture screenshot successfully if any alert is open.

**Steps to capture screenshot using Robot class:**

* Create an object of Robot class.
* Get the screen size as a Rectangle.
* Use createScreenCapture of Robot class and capture screenshot. It will be temp image.
* Define destination path for screenshot.
* Write temp file in to permanent file.

*Java code:*



|  |  |
| --- | --- |
| 1  2  3  4  5  6  7  8  9  10  11  12  13  14  15  16  17  18  19  20  21  22  23  24  25  26  27  28  29  30  31  32  33  34  35  36  37  38  39  40  41  42  43  44  45  46  47  48  49  50  51  52  53  54  55  56  57  58  59  60  61 | package TakingScreenshot;    import java.awt.Rectangle;  import java.awt.Robot;  import java.awt.Toolkit;  import java.awt.image.BufferedImage;  import java.io.File;    import javax.imageio.ImageIO;    import org.apache.commons.io.FileUtils;  import org.openqa.selenium.By;  import org.openqa.selenium.OutputType;  import org.openqa.selenium.TakesScreenshot;  import org.openqa.selenium.WebDriver;  import org.openqa.selenium.chrome.ChromeDriver;    public class CaptureScreenshotUsingRobot {      public static String CaptureScreenShotWithTestStepNameUsingRobotClass(String testStepsName)  {  **try**{    // Creating Robot class object  Robot robotClassObject = new Robot();    // Get screen size  Rectangle screenSize = new Rectangle(Toolkit.getDefaultToolkit().getScreenSize());    // Capturing screenshot by providing size              BufferedImage tmp = robotClassObject.createScreenCapture(screenSize);                // Defining destination file path              String path=System.getProperty("user.dir")+"/ScreenCapturesPNG/"+testStepsName+System.currentTimeMillis()+".png";                // To copy temp image in to permanent file              ImageIO.write(tmp, "png",new File(path));  **return** path;    }**catch**(Exception e)  {  System.out.println("Some exception occured." + e.getMessage());  **return** "";  }  }      public static void main(String[] args) throws InterruptedException {    System.setProperty("webdriver.chrome.driver","./exefiles/chromedriver.exe");  ChromeDriver driver= new ChromeDriver();    driver.get("http://makeseleniumeasy.com/");  CaptureScreenshotUsingRobot.CaptureScreenShotWithTestStepNameUsingRobotClass("URL Loading");        }    } |

*Output:*

*You can see it takes screenshot of whole desktop. It gives extra information about screenshot such as URL, Time and date.*

*Graphical user interface, text, application, email

Description automatically generated*

*If you have any doubt, feel free to ask here.*

*If you like my posts, please like, comment, share and subscribe.*

*#ThanksForReading*

*#HappySelenium*

A picture containing transport

Description automatically generated

**Author: Amod Mahajan**

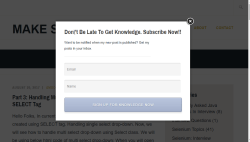
*My name is Amod Mahajan and I am an IT employee with 6+ years of experience in Software testing and staying in Bengaluru. My area of interest is Automation testing. I started from basics and went through so many selenium tutorials. Thanks to Mukesh Otwani as his tutorials are easy and cover basics to advance. I have habit of exploring concepts by deep diving. I used to make notes. I thought of sharing my knowledge through posts and now I am here. #KeepLearning #ShareLearning*

**Share this:**

* [Click to share on Twitter (Opens in new window)](http://makeseleniumeasy.com/2017/09/07/capturing-screenshot-using-robot-class-in-selenium/?share=twitter&nb=1)
* [Click to share on Facebook (Opens in new window)](http://makeseleniumeasy.com/2017/09/07/capturing-screenshot-using-robot-class-in-selenium/?share=facebook&nb=1)
* [Click to share on Google+ (Opens in new window)](http://makeseleniumeasy.com/2017/09/07/capturing-screenshot-using-robot-class-in-selenium/?share=google-plus-1&nb=1)

**Like this:**

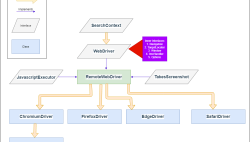
***Related***

[](http://makeseleniumeasy.com/2017/08/27/taking-screenshot-using-takesscreenshot-interface-in-selenium/)

[Taking Screenshot Using TakesScreenshot Interface In Selenium](http://makeseleniumeasy.com/2017/08/27/taking-screenshot-using-takesscreenshot-interface-in-selenium/)

*August 27, 2017*

*In "Selenium Topics"*

[](http://makeseleniumeasy.com/2017/04/02/hierarchy-of-selenium-classes-and-interfaces/)

[Hierarchy of Classes & Interfaces of WebDriver Interface in Selenium WebDriver](http://makeseleniumeasy.com/2017/04/02/hierarchy-of-selenium-classes-and-interfaces/)

*April 2, 2017*

*In "Selenium Topics"*

[Why Should We Upcast Browser Driver Class Object To WebDriver?](http://makeseleniumeasy.com/2018/02/08/why-do-we-up-cast-browser-driver-class-object-to-webdriver/)

*In interview a frequently asked interview question is "Why do we upcast browser class object to WebDriver? or why we do not upcast to RemoteWebDriver class instead of WebDriver?" and we give all sort of answers. First of all this question is asked with assumption that we do not have…*

*February 8, 2018*

*In "Selenium Topics"*

[Skip back to main navigation](http://makeseleniumeasy.com/2017/09/07/capturing-screenshot-using-robot-class-in-selenium/#site-navigation)

**9 thoughts on “**Capturing Screenshot Using Robot Class In Selenium**”**

1. Icon

   Description automatically generated[**sneha**](http://gravatar.com/gamyam334874388) says:

[JANUARY 7, 2020 AT 10:43 AM](http://makeseleniumeasy.com/2017/09/07/capturing-screenshot-using-robot-class-in-selenium/#comment-2003)

*Hi , When I’m trying I’m getting screenshot of my eclipse code . followed the same steps*

[Reply](http://makeseleniumeasy.com/2017/09/07/capturing-screenshot-using-robot-class-in-selenium/#comment-2003)

* 1. A person sitting on a blue motorcycle

     Description automatically generated with medium confidence**Amod Mahajan** says:

[JANUARY 7, 2020 AT 2:43 PM](http://makeseleniumeasy.com/2017/09/07/capturing-screenshot-using-robot-class-in-selenium/#comment-2005)

*It takes the screenshot of desktop. Make sure browser is open and not minimised .*

[Reply](http://makeseleniumeasy.com/2017/09/07/capturing-screenshot-using-robot-class-in-selenium/#comment-2005)

1. Icon

   Description automatically generated**Sehedi Hasan** says:

[AUGUST 21, 2019 AT 6:51 PM](http://makeseleniumeasy.com/2017/09/07/capturing-screenshot-using-robot-class-in-selenium/#comment-1920)

*Thank you very much this is fantastic.*

[Reply](http://makeseleniumeasy.com/2017/09/07/capturing-screenshot-using-robot-class-in-selenium/#comment-1920)

1. **Swapnali** says:

[DECEMBER 7, 2018 AT 3:50 PM](http://makeseleniumeasy.com/2017/09/07/capturing-screenshot-using-robot-class-in-selenium/#comment-1327)

*Unable to see code section*

[Reply](http://makeseleniumeasy.com/2017/09/07/capturing-screenshot-using-robot-class-in-selenium/#comment-1327)

* 1. A person sitting on a blue motorcycle

     Description automatically generated with medium confidence**Amod Mahajan** says:

[DECEMBER 11, 2018 AT 11:18 AM](http://makeseleniumeasy.com/2017/09/07/capturing-screenshot-using-robot-class-in-selenium/#comment-1367)

*Pls check now.*

[Reply](http://makeseleniumeasy.com/2017/09/07/capturing-screenshot-using-robot-class-in-selenium/#comment-1367)

1. Icon

   Description automatically generated**eshwar** says:

[SEPTEMBER 7, 2017 AT 10:22 PM](http://makeseleniumeasy.com/2017/09/07/capturing-screenshot-using-robot-class-in-selenium/#comment-229)

*Well the drawback with robot lib is you cannot get any screenshots when the tests run out on a grid*

[Reply](http://makeseleniumeasy.com/2017/09/07/capturing-screenshot-using-robot-class-in-selenium/#comment-229)

* 1. A person sitting on a blue motorcycle

     Description automatically generated with medium confidence**Amod Mahajan** says:

[SEPTEMBER 8, 2017 AT 6:07 PM](http://makeseleniumeasy.com/2017/09/07/capturing-screenshot-using-robot-class-in-selenium/#comment-230)

*Yes. Robot way works locally not on grid. We can check google group discussion on this.*

Part 10: Usages Of Javascripts In Selenium: How To Capture Screenshot Of Entire Web Page

POSTED ON: [March 19, 2018](http://makeseleniumeasy.com/2018/03/19/part-10-usages-of-javascripts-in-selenium-how-to-capture-screenshot-of-entire-web-page/)[COMMENTS: 0](http://makeseleniumeasy.com/2018/03/19/part-10-usages-of-javascripts-in-selenium-how-to-capture-screenshot-of-entire-web-page/#comments)CATEGORIZED IN: [Selenium Topics](http://makeseleniumeasy.com/category/selenium-topics/) WRITTEN BY: [Amod Mahajan](http://makeseleniumeasy.com/author/admin/)

*Hello Folks,*

*When we capture screenshot using “TakesScreenshot” interface in selenium webdriver, it captures only visible area of webpage in browser, not entire web page. Sometimes, you need to capture entire web page for test result proof or for validation at later stage. In this post, I will explain how can we capture a web page, page by page in selenium webdriver using javascript methods.*

*In last*[*post*](http://makeseleniumeasy.com/2018/03/19/part-9-usages-of-javascripts-in-selenium-how-to-scroll-page-by-page-in-selenium-webdriver-using-javascript/)*, we have learnt how to scroll a web page, page by page. We will use same concept and will call screen capture method after each scroll.*

*Java Code:*

|  |  |
| --- | --- |
|  | import java.io.File; |
|  |  |
|  | import org.apache.commons.io.FileUtils; |
|  | import org.openqa.selenium.JavascriptExecutor; |
|  | import org.openqa.selenium.OutputType; |
|  | import org.openqa.selenium.TakesScreenshot; |
|  | import org.openqa.selenium.WebDriver; |
|  | import org.openqa.selenium.chrome.ChromeDriver; |
|  |  |
|  | public class CaptureFullWebPage { |
|  |  |
|  | public static String CaptureScreenShotWithTestStepName(WebDriver driver, String testStepsName) |
|  | { |
|  | try{ |
|  | // down casting WebDriver to use getScreenshotAs method. |
|  | TakesScreenshot ts= (TakesScreenshot)driver; |
|  | // capturing screen shot as output type file |
|  | File screenshotSRC= ts.getScreenshotAs(OutputType.FILE); |
|  | // Defining path and extension of image |
|  | String path=System.getProperty("user.dir")+"/ScreenCapturesPNG/"+testStepsName+System.currentTimeMillis()+".png"; |
|  | // copying file from temp folder to desired location |
|  | File screenshotDest= new File(path); |
|  | FileUtils.copyFile(screenshotSRC, screenshotDest); |
|  | return path; |
|  | }catch(Exception e) |
|  | { |
|  | System.out.println("Some exception occured." + e.getMessage()); |
|  | return ""; |
|  | } |
|  | } |
|  |  |
|  | public static void main(String[] args) throws InterruptedException { |
|  |  |
|  | System.setProperty("webdriver.chrome.driver", "./exefiles/chromedriver.exe"); |
|  | WebDriver driver = new ChromeDriver(); |
|  |  |
|  | driver.manage().window().maximize(); |
|  |  |
|  | driver.get("http://www.makeseleniumeasy.com/"); |
|  |  |
|  | // Down casting driver to JavascriptExecutor |
|  | JavascriptExecutor js = (JavascriptExecutor) driver; |
|  |  |
|  | // It returns height of view part. You can say it as page height. When you click on page down key |
|  | // Page scroll by one page. |
|  | long pageHeight= (long)js.executeScript("return window.innerHeight"); |
|  | System.out.println("Page height: "+pageHeight); |
|  |  |
|  | // It is how much you can scroll. It is height if you scroll, you will reach to bottom of page. |
|  | long scrollableHeight= (long)js.executeScript("return document.body.scrollHeight"); |
|  | System.out.println("Total scrollable height: "+scrollableHeight); |
|  |  |
|  | // Finding number of pages. Adding 1 extra to consider decimal part. |
|  | int numberOfPages=(int) (scrollableHeight/pageHeight)+1; |
|  |  |
|  | System.out.println("Total pages: "+numberOfPages); |
|  |  |
|  |  |
|  | // Now scrolling page by page |
|  | for(int i=0;i<numberOfPages;i++) |
|  | { |
|  | CaptureFullWebPage.CaptureScreenShotWithTestStepName(driver, "Page "+(i+1)); |
|  | js.executeScript("window.scrollBy(0,"+pageHeight+")"); |
|  | Thread.sleep(2000); |
|  | } |
|  |  |
|  | } |
|  | } |

[**view raw**](https://gist.github.com/anonymous/00a44b0205e3814cb420c42b17a24e66/raw/ab3e4830fc0ff5fc5eee565d2660cb3af5896ae3/gistfile1.txt)[**gistfile1.txt**](https://gist.github.com/anonymous/00a44b0205e3814cb420c42b17a24e66#file-gistfile1-txt)hosted with ❤ by [**GitHub**](https://github.com/)

*Output:  
After running program successfully, you will see screenshots at specified location as below:*

*Text

Description automatically generated with medium confidence*

*That’s it guys in this post. We will see some more interesting thing about scroll in up coming posts.*

*If you have any doubt, feel free to comment below.  
If you like my posts, please like, comment, share and subscribe.  
#ThanksForReading  
#HappySelenium*

A picture containing transport

Description automatically generated

*Table of Contents*

* [Author: Amod Mahajan](http://makeseleniumeasy.com/2018/03/19/part-10-usages-of-javascripts-in-selenium-how-to-capture-screenshot-of-entire-web-page/#Author_Amod_Mahajan)

**Author: Amod Mahajan**

*My name is Amod Mahajan and I am an IT employee with 6+ years of experience in Software testing and staying in Bengaluru. My area of interest is Automation testing. I started from basics and went through so many selenium tutorials. Thanks to Mukesh Otwani as his tutorials are easy and cover basics to advance. I have habit of exploring concepts by deep diving. I used to make notes. I thought of sharing my knowledge through posts and now I am here. #KeepLearning #ShareLearning*

Part 9: Usages Of Javascripts In Selenium: How To Scroll Page By Page In Selenium WebDriver Using Javascript

POSTED ON: [March 19, 2018](http://makeseleniumeasy.com/2018/03/19/part-9-usages-of-javascripts-in-selenium-how-to-scroll-page-by-page-in-selenium-webdriver-using-javascript/)[COMMENTS: 0](http://makeseleniumeasy.com/2018/03/19/part-9-usages-of-javascripts-in-selenium-how-to-scroll-page-by-page-in-selenium-webdriver-using-javascript/#comments)CATEGORIZED IN: [Selenium Topics](http://makeseleniumeasy.com/category/selenium-topics/) WRITTEN BY: [Amod Mahajan](http://makeseleniumeasy.com/author/admin/)

*Hello Folks,*

*In last post, we have learnt to scroll a web page by pixels. In this post, we will see how to scroll a web page , page by page.*

*Table of Contents*

* [What is page in Web page?](http://makeseleniumeasy.com/2018/03/19/part-9-usages-of-javascripts-in-selenium-how-to-scroll-page-by-page-in-selenium-webdriver-using-javascript/#What_is_page_in_Web_page)
  + [Author: Amod Mahajan](http://makeseleniumeasy.com/2018/03/19/part-9-usages-of-javascripts-in-selenium-how-to-scroll-page-by-page-in-selenium-webdriver-using-javascript/#Author_Amod_Mahajan)

**What is page in Web page?**

*Follow below steps:*

1. Open browser and load url “**http://www.makeseleniumeasy.com/**“.
2. Wait till page is loaded.
3. Now press Key “Page Down” and notice how much page is scrolled down. You have scrolled web page by a page.
4. If you keep pressing “Page Down” key, you will reach bottom of page.

*The same we can achieve using javascript in selenium webdriver.*

*Java code:*

1. First we need to get page height of one page.
2. Then we need to get how much is scroll-able height. Generally it will be “Height of a page\* No of pages”.
3. Now get number of pages. It will be number of times of pressing “Page Down” key to get bottom of page.

*Java Code:*

|  |  |
| --- | --- |
|  | import org.openqa.selenium.JavascriptExecutor; |
|  | import org.openqa.selenium.WebDriver; |
|  | import org.openqa.selenium.chrome.ChromeDriver; |
|  |  |
|  | public class ScrolPageByPage { |
|  |  |
|  | public static void main(String[] args) throws InterruptedException { |
|  |  |
|  | System.setProperty("webdriver.chrome.driver", "./exefiles/chromedriver.exe"); |
|  | WebDriver driver = new ChromeDriver(); |
|  |  |
|  | driver.manage().window().maximize(); |
|  |  |
|  | driver.get("http://www.makeseleniumeasy.com/"); |
|  |  |
|  | // Down casting driver to JavascriptExecutor |
|  | JavascriptExecutor js = (JavascriptExecutor) driver; |
|  |  |
|  | // It returns height of view part. You can say it as page height. When you click on page down key |
|  | // Page scroll by one page. |
|  | long pageHeight= (long)js.executeScript("return window.innerHeight"); |
|  | System.out.println("Page height: "+pageHeight); |
|  |  |
|  | // It is how much you can scroll. It is height if you scroll, you will reach to bottom of page. |
|  | long scrollableHeight= (long)js.executeScript("return document.body.scrollHeight"); |
|  | System.out.println("Total scrollable height: "+scrollableHeight); |
|  |  |
|  | // Finding number of pages. Adding 1 extra to consider decimal part. |
|  | int numberOfPages=(int) (scrollableHeight/pageHeight)+1; |
|  |  |
|  | System.out.println("Total pages: "+numberOfPages); |
|  |  |
|  |  |
|  | // Now scrolling page by page |
|  | for(int i=0;i<numberOfPages;i++) |
|  | { |
|  | js.executeScript("window.scrollBy(0,"+pageHeight+")"); |
|  | Thread.sleep(2000); |
|  | } |
|  |  |
|  | } |
|  | } |

[**view raw**](https://gist.github.com/anonymous/ca693142d9f8e1078e8b23ff31ca6184/raw/1366bf60f687ba8ac8fd4c081956688657df55df/gistfile1.txt)[**gistfile1.txt**](https://gist.github.com/anonymous/ca693142d9f8e1078e8b23ff31ca6184#file-gistfile1-txt)hosted with ❤ by [**GitHub**](https://github.com/)

*Output:  
When you run the program, you will notice page is scrolled down page by page till it reaches to bottom of the web page.*

*That’s it guys in this post. We will see some more interesting thing about scroll in up coming posts.*

*If you have any doubt, feel free to comment below.  
If you like my posts, please like, comment, share and subscribe.  
#ThanksForReading  
#HappySelenium*

A picture containing transport

Description automatically generated

**Author: Amod Mahajan**

*My name is Amod Mahajan and I am an IT employee with 6+ years of experience in Software testing and staying in Bengaluru. My area of interest is Automation testing. I started from basics and went through so many selenium tutorials. Thanks to Mukesh Otwani as his tutorials are easy and cover basics to advance. I have habit of exploring concepts by deep diving. I used to make notes. I thought of sharing my knowledge through posts and now I am here. #KeepLearning #ShareLearning*