

With JUNIT:  
you can run only  
feature files in parallel  
mode (not the scenario  
level parallel execution)

To run scenarios in parallel mode, then junit wont work. We need testng for that.

TestNG:  
supports parallel  
execution at  
scenario level

Open pom and add this dependencies-

```

69
70     <dependency>
71         <groupId>org.testng</groupId>
72         <artifactId>testng</artifactId>
73         <version>6.14.3</version>
74         <scope>test</scope>
75     </dependency>
76
77     <dependency>
78         <groupId>io.cucumber</groupId>
79         <artifactId>cucumber-testng</artifactId>
80         <version>${cucumber.version}</version>
81         <scope>test</scope>
82     </dependency>
83

```

Another plugin to be added-

```

115<plugin>
116    <groupId>org.apache.maven.plugins</groupId>
117    <artifactId>maven-surefire-plugin</artifactId>
118    <version>${maven.surefire.version}</version>
119    <configuration>
120        <!--<includes>
121            <include>**/ParallelRun.java</include>
122        </includes>-->
123        <parallel>methods</parallel>
124        <!--<threadCount>4</threadCount>-->
125        <useUnlimitedThreads>true</useUnlimitedThreads>
126    </configuration>
127</plugin>
128
129<plugin>

```

Slight changes in folder structure for testing-

Create a package called parallel in "src/test/java".

And move the step def into it. settings will be as below.



Move the hooks also to parallel package.

Note-

Whatever feature files are present, they should be present under same package where step def is located.

runner files and step def needs to be under same package as per the cucumber documentation, so runner can pick the step def and app features correctly.

Parallel folder created for features in src/test/resources-

```

> LoginPageSteps.java
v src/test/resources
  v appFeatures
    acc.feature
    AccountPage.feature
    LoginPage.feature
  > config
  v parallel
    acc.feature
    AccountPage.feature
    LoginPage.feature
  cucumber.properties

```

We can give any name; not necessary the name should match the one with the step def.

### Three main folders-

Src/main/java – for page factory, driver factory, page class, utility, page class.

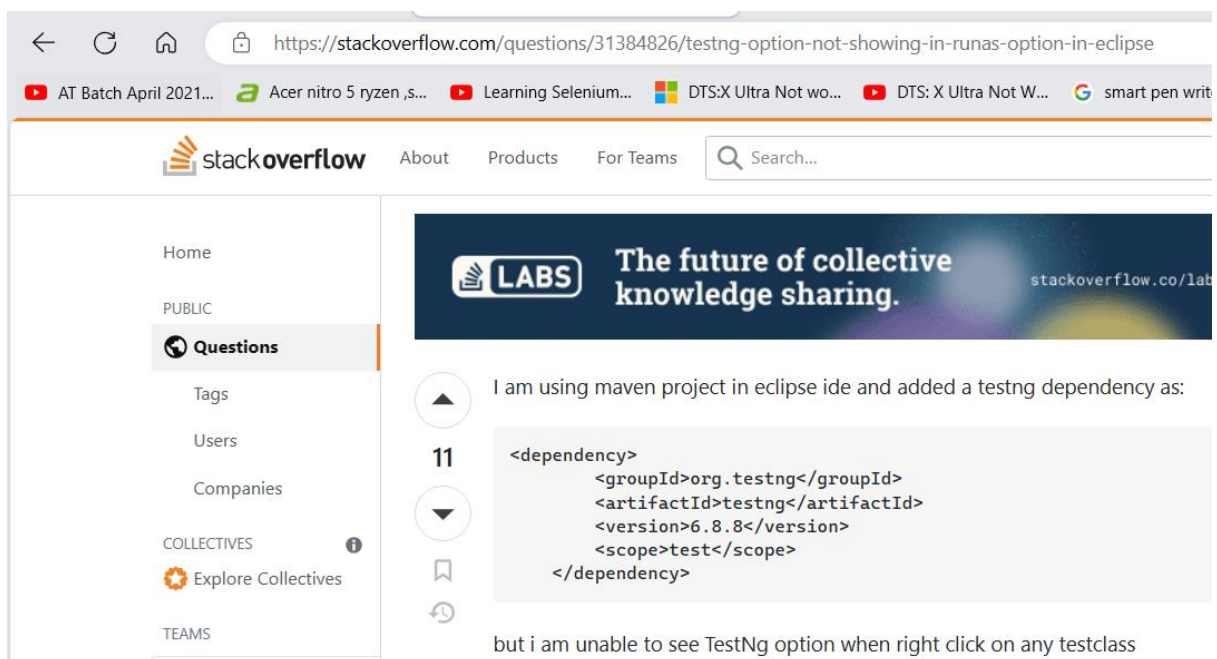
Src/test/java – step def and runner and hooks. All should be under same folder or package in this module.

Src/test/resources – a folder which will have all the app features.

Once all done, right click on project – maven – update project.

Note-

Testng will not be there.



← ↻ 🏠 <https://stackoverflow.com/questions/31384826/testng-option-not-showing-in-runas-option-in-eclipse>

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▲ 11 ▼

I am using maven project in eclipse ide and added a testng dependency as:

```
<dependency>
  <groupId>org.testng</groupId>
  <artifactId>testng</artifactId>
  <version>6.8</version>
  <scope>test</scope>
</dependency>
```

but i am unable to see TestNg option when right click on any testclass

That dependency alone is hardly enough. You need to install [TestNG Eclipse plugin](#) to be able to use it as you describe.

I am working on TestNG in Eclipse, I have added maven dependency using maven:

```
<dependency>
<groupId>org.testng</groupId>
<artifactId>testng</artifactId>
<version>7.1.0</version>
</dependency>
```

When I tried to run my test file present in src/java/test folder, I can't see anything in RunAs, then I followed below steps:

Goto Help->Install new Software-> Click on Add button->

1. Name= TestNG
2. Location=<https://dl.bintray.com/testng-team/testng-eclipse-release/7.1.0/>

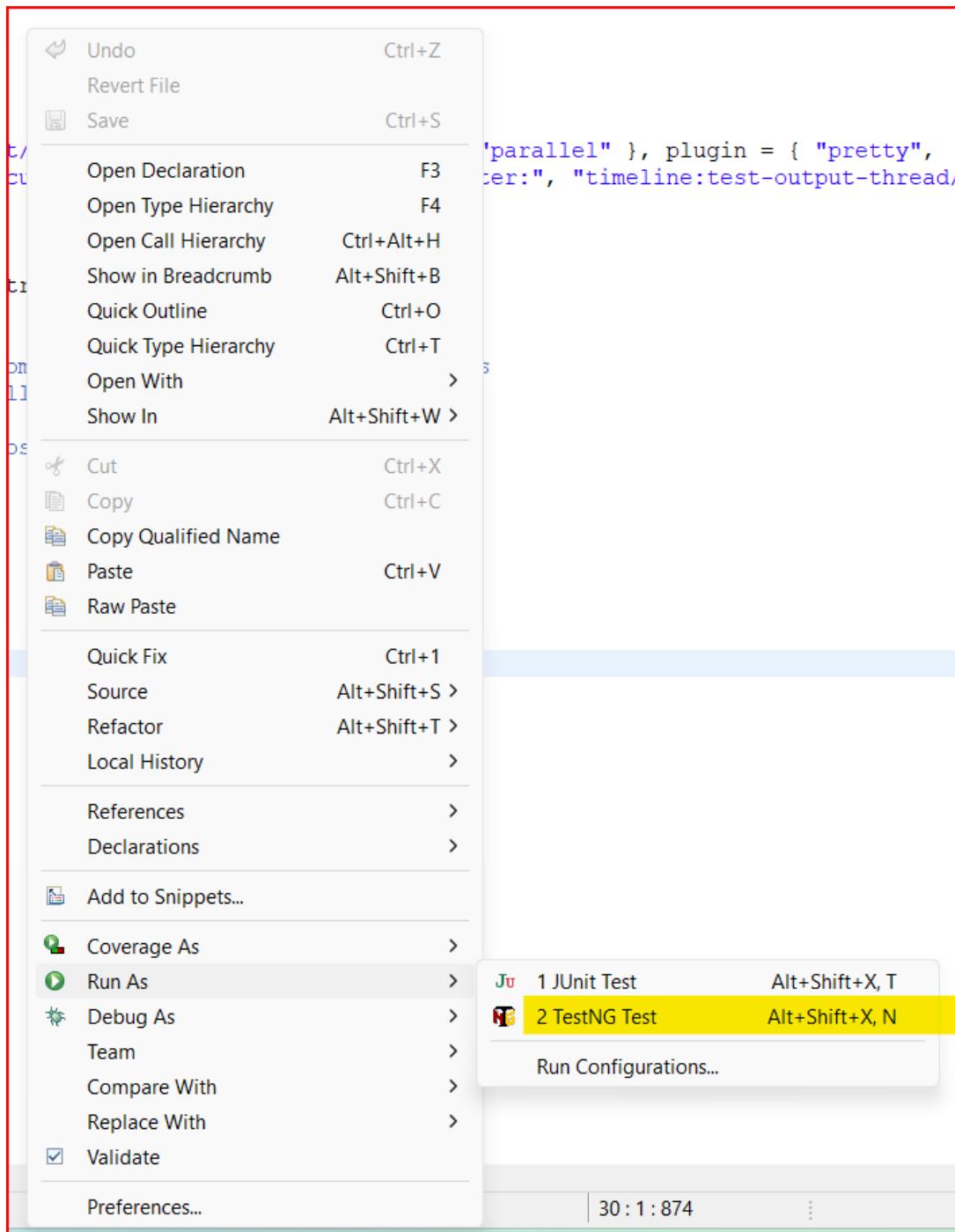
**NOTE:** 7.1.0 is my TestNG version, you can change this to your version.

It will show you TestNG -> Check it and install it -> Restart Eclipse. Now you can see TestNGTest option in your Run As option.

For more information, check **README** file in GitHub Repo: <https://github.com/cbeust/testng-eclipse>

[TestNG option not showing in RunAs option in Eclipse - Stack Overflow](#)

Run as testng-



You may get this exception when you run first time-

```
Exception in thread "main" java.lang.UnsupportedClassVersionError:
org/testng/remote/RemoteTestNG has been compiled by a more recent version
of the Java Runtime (class file version 55.0), this version of the Java
Runtime only recognizes class file versions up to 52.0
at java.lang.ClassLoader.defineClass1(Native Method)
at java.lang.ClassLoader.defineClass(ClassLoader.java:763)
at
java.security.SecureClassLoader.defineClass(SecureClassLoader.java:142)
at java.net.URLClassLoader.defineClass(URLClassLoader.java:468)
at java.net.URLClassLoader.access$100(URLClassLoader.java:74)
at java.net.URLClassLoader$1.run(URLClassLoader.java:369)
at java.net.URLClassLoader$1.run(URLClassLoader.java:363)
```

```

at java.security.AccessController.doPrivileged(Native Method)
at java.net.URLClassLoader.findClass(URLClassLoader.java:362)
at java.lang.ClassLoader.loadClass(ClassLoader.java:424)
at sun.misc.Launcher$AppClassLoader.loadClass(Launcher.java:349)
at java.lang.ClassLoader.loadClass(ClassLoader.java:357)
at sun.launcher.LauncherHelper.checkAndLoadMain(LauncherHelper.java:495)

```

To solve this error we need to upgrade the java version to 11.

How to do.

Go to google and search for download jdk 11.

Click on oracle link and download.

Install the required version.

Open this pc.

Properties.

Advance system settings.

Environment variables.






Variable name will be JAVA\_HOME.

Replace the value - C:\Program Files\Java\jdk-11

Edit the path. Value should be %JAVA\_HOME%\bin

Now one other thing.

Go to this path

 > This PC > Acer (C:) > Program Files > Common Files > Oracle > Java > javapath					
	Name		Date modified	Type	Size
ersona	 java.exe		06-12-2022 15:04	Application	656 KB
—	 javac.exe		06-12-2022 15:04	Application	656 KB
★	 javaw.exe		06-12-2022 15:04	Application	656 KB
★	 jshell.exe		06-12-2022 15:04	Application	656 KB

Copy this path also in advance system settings inside path variable.

This path should also be present in path variable-

C:\Program Files\Common Files\Oracle\Java\javapath

Now open cmd.

Check java version and maven version. They should be mapped to the java version (latest one).

```

Command Prompt
Microsoft Windows [Version 10.0.22621.1848]
(c) Microsoft Corporation. All rights reserved.

C:\Users\karan>java -version
java version "11.0.18" 2023-01-17 LTS
Java(TM) SE Runtime Environment 18.9 (build 11.0.18+9-LTS-195)
Java HotSpot(TM) 64-Bit Server VM 18.9 (build 11.0.18+9-LTS-195, mixed mode)

C:\Users\karan>java -v
Unrecognized option: -v
Error: Could not create the Java Virtual Machine.
Error: A fatal exception has occurred. Program will exit.

C:\Users\karan>mvn -v
Apache Maven 3.9.2 (c9616018c7a021c1c39be70fb2843d6f5f9b8a1c)
Maven home: C:\Program Files\ApacheMaven\apache-maven-3.9.2-bin\apache-maven-3.9.2
Java version: 11.0.18, vendor: Oracle Corporation, runtime: C:\Program Files\Java\jdk-11
Default locale: en_IN, platform encoding: Cp1252
OS name: "windows 11", version: "10.0", arch: "amd64", family: "windows"

C:\Users\karan>mvn -version
Apache Maven 3.9.2 (c9616018c7a021c1c39be70fb2843d6f5f9b8a1c)
Maven home: C:\Program Files\ApacheMaven\apache-maven-3.9.2-bin\apache-maven-3.9.2
Java version: 11.0.18, vendor: Oracle Corporation, runtime: C:\Program Files\Java\jdk-11
Default locale: en_IN, platform encoding: Cp1252
OS name: "windows 11", version: "10.0", arch: "amd64", family: "windows"

C:\Users\karan>

```

Open eclipse.

Sometimes eclipse will not be compatible with java 11 (eclipse neon especially). Download the latest version of eclipse.

Change in pom file.

```

18         <project.build.sourceEncoding>UTF-8</project.build.sourceEncoding>
19         <java.version>11</java.version>
20         <junit.version>4.13.1</junit.version>
21         <cucumber.version>6.9.0</cucumber.version>
22         <maven.compiler.version>3.8.1</maven.compiler.version>
23         <maven.surefire.version>2.22.2</maven.surefire.version>
24

```

Go and check the compiler version.

```

105<
106     <plugin>
107         <groupId>org.apache.maven.plugins</groupId>
108         <artifactId>maven-compiler-plugin</artifactId>
109         <version>${maven.compiler.version}</version>
110         <configuration>
111             <encoding>UTF-8</encoding>
112             <source>${java.version}</source>
113             <target>${java.version}</target>
114         </configuration>
115     </plugin>
116     <plugin>
117         <groupId>org.apache.maven.plugins</groupId>
118         <artifactId>maven-surefire-plugin</artifactId>
119         <version>${maven.surefire.version}</version>
120         <configuration>
121             <!--<includes>
122                 <include>*/ParallelRun.java</include>
123             </includes>-->
124             <parallel>methods</parallel>
125             <!--<threadCount>4</threadCount>-->
126             <useUnlimitedThreads>true</useUnlimitedThreads>
127         </configuration>
128     </plugin>

```

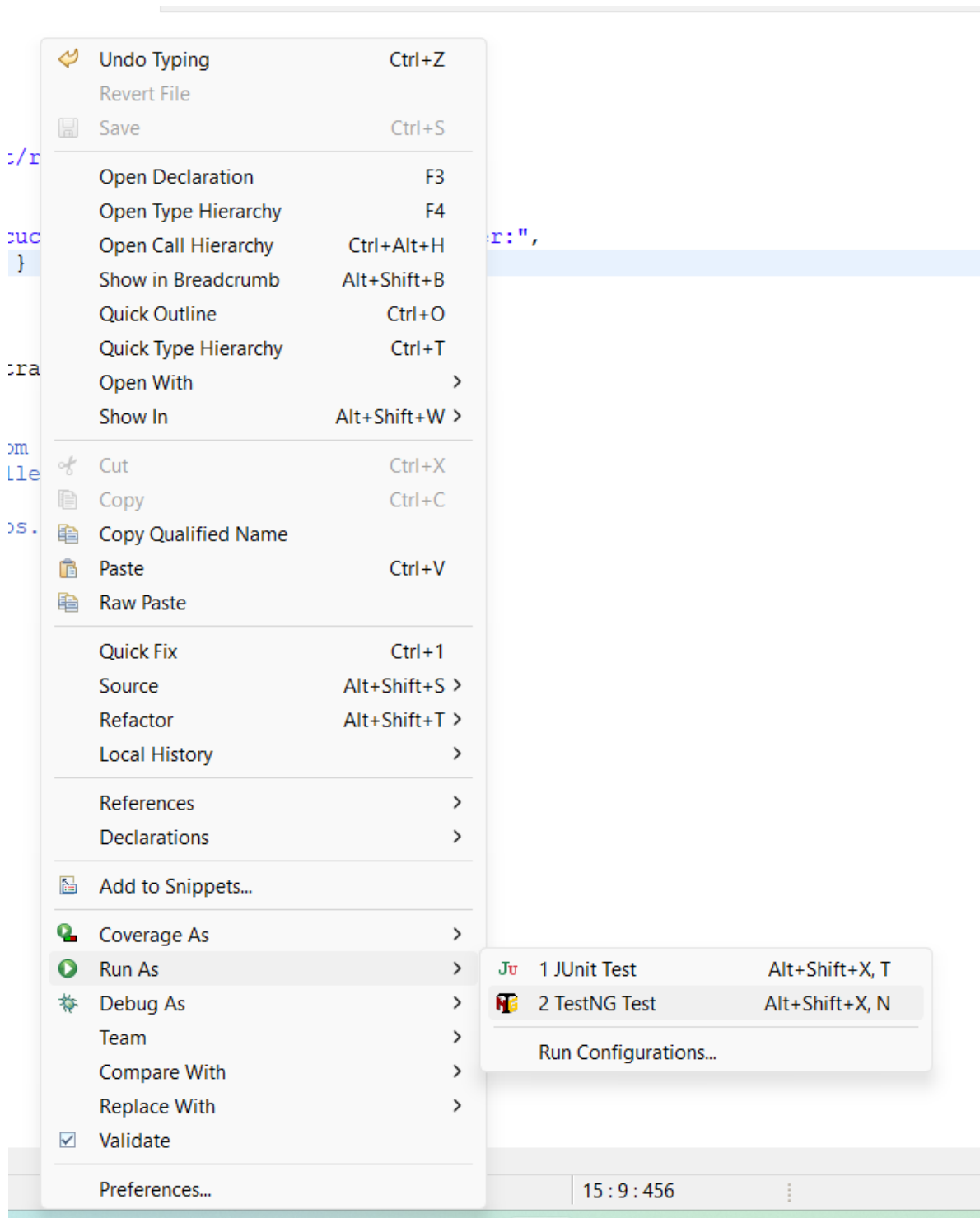
Run the code using testng now and check-

Delete all the test output folders.

Right click on project and update it using maven.

Run as testng-





Open the report of cucumber-

The screenshot displays the Cucumber Reports web interface in a browser. The URL is <https://reports.cucumber.io/reports/3296ac49-2ae6-4d59-94f1-3a82ce72340c>. The interface shows a summary of a test run with the following details:

- 6 PASSED** (indicated by a green bar) and **1 FAILED** (indicated by a red bar).
- 86% passed** (7 executed).
- a few seconds ago** (Last Run).
- 23.6 seconds** (Duration).
- Operating System: **Windows 10**.
- Java Version: **OpenJDK 64-Bit Server VM 17.0.1+12**.
- Cucumber Version: **cucumber-jvm 6.9.0**.

Below the summary, there is a list of features:

- ☒ classpath:parallel/AccountPage.feature
- ☒ classpath:parallel/LoginPage.feature

A **Delete Report** button is visible. At the bottom, there is a cookie consent banner that says: "By continuing to browse, you consent to our use of cookies. To know more, please refer to our Privacy Policy." with an **OK** button.

### Failed screenshot-

The screenshot displays the Cucumber Reports web interface in a browser, showing a failed test run. The URL is <https://reports.cucumber.io/reports/3296ac49-2ae6-4d59-94f1-3a82ce72340c>. The interface shows a summary of a test run with the following details:

- 6 PASSED** (indicated by a green bar) and **1 FAILED** (indicated by a red bar).
- 86% passed** (7 executed).
- a few seconds ago** (Last Run).
- 23.6 seconds** (Duration).
- Operating System: **Windows 10**.
- Java Version: **OpenJDK 64-Bit Server VM 17.0.1+12**.
- Cucumber Version: **cucumber-jvm 6.9.0**.

Below the summary, there is a list of features:

- ☒ classpath:parallel/AccountPage.feature
- ☒ classpath:parallel/LoginPage.feature

A **Delete Report** button is visible. At the bottom, there is a cookie consent banner that says: "By continuing to browse, you consent to our use of cookies. To know more, please refer to our Privacy Policy." with an **OK** button.

The failed test run is highlighted in red. The error message is:

```
at java.base/jdk.internal.reflect.NativeConstructorAccessorImpl.newInstance(NativeConstructorAccessorImpl.java:77)
at java.base/jdk.internal.reflect.DelegatingConstructorAccessorImpl.newInstance(DelegatingConstructorAccessorImpl.java:45)
at java.base/java.lang.reflect.Constructor.newInstanceWithCaller(Constructor.java:499)
at java.base/java.lang.reflect.Constructor.newInstance(Constructor.java:480)
at org.openqa.selenium.remote.http.W3CHTTPResponseCodec.createException(W3CHTTPResponseCodec.java:187)
at org.openqa.selenium.remote.http.W3CHTTPResponseCodec.decode(W3CHTTPResponseCodec.java:122)
at org.openqa.selenium.remote.http.W3CHTTPResponseCodec.decode(W3CHTTPResponseCodec.java:49)
at org.openqa.selenium.remote.http.HttpCommandExecutor.execute(HttpCommandExecutor.java:158)
at org.openqa.selenium.remote.service.DriverCommandExecutor.execute(DriverCommandExecutor.java:83)
at org.openqa.selenium.remote.RemoteWebDriver.execute(RemoteWebDriver.java:552)
at org.openqa.selenium.remote.RemoteWebDriver.findElement(RemoteWebDriver.java:323)
at org.openqa.selenium.remote.RemoteWebDriver.findElementByLinkText(RemoteWebDriver.java:380)
at org.openqa.selenium.By$ByLinkText.findElement(By.java:220)
at org.openqa.selenium.remote.RemoteWebDriver.findElement(RemoteWebDriver.java:315)
at com.pages.LoginPageObject.isForgotPasswordLinkPresent(LoginPageObject.java:35)
at parallel.LoginPageSteps.forgot_your_password_link_should_be_displayed(LoginPageSteps.java:42)
at ? forgot your password link should be displayed(classpath:parallel/LoginPage.feature:10)
```

Below the error message, there is a screenshot of a website. The website has a header with "SALE 70% OFF ALL PRODUCTS" and "GET SAVINGS NOW". The main content area shows "Your Logo" and a search bar. The footer has "WOMEN", "DRESSES", "T-SHIRTS", and "BLOG" links. The website is titled "Authentication".

### Report getting generated-

```

> target
v test-output
  > Default suite
  > junitreports
  > old
    bullet_point.png
    collapseall.gif
    emailable-report.html
    failed.png
    index.html
    jquery-3.6.0.min.js
    navigator-bullet.png
    passed.png
    skipped.png
    testng.css
    testng-failed.xml
    testng-reports.css
    testng-reports.js
    testng-reports1.css
    testng-reports2.js
    testng-results.xml

```

But extent spark html and extent spark pdf are not getting generated, not sure why. For Naveen it was working.

To run with maven and also with Jenkins we use the includes keyword-

```

117<!-- <plugin>
118    <groupId>org.apache.maven.plugins</groupId>
119    <artifactId>maven-surefire-plugin</artifactId>
120    <version>${maven.surefire.version}</version>
121    <configuration>
122        <!-- to run with jenkins and to run using maven use the below includes -->
123        <includes>
124            <include>**/ParallelRunner.java</include>
125        </includes>
126        <parallel>methods</parallel>
127        <!--<threadCount>4</threadCount>-->
128        <useUnlimitedThreads>true</useUnlimitedThreads>
129    </configuration>
130    </plugin>
132<!-- <plugin>

```

Open cmd.

Go to the project location.

```
E:\Naveen Java Training\Cucumber\CucumberPomSeriesByKaranJulySevenA>mvn verify|
```

```

Skipped: 0, Time elapsed: 89.31 s - in parallel.ParallelRunner
[INFO]
[INFO] Results:
[INFO]
[INFO] Tests run: 0, Failures: 0, Errors: 0, Skipped: 0
[INFO]
[INFO]
[INFO] --- jar:3.3.0:jar (default-jar) @ CucumberPOMSeriesByKaranJulySevenA ---
[INFO] Building jar: E:\Naveen Java Training\Cucumber\CucumberPomSeriesByKaranJulySevenA-0.0.1-SNAPSHOT.jar
[INFO] -----
[INFO] BUILD SUCCESS
[INFO] -----
[INFO] Total time: 01:43 min
[INFO] Finished at: 2023-07-10T22:26:56+02:00
[INFO] -----
[WARNING]
[WARNING] Plugin validation issues were detected in 3 plugin(s)
[WARNING]
[WARNING] * org.apache.maven.plugins:maven-compiler-plugin:3.8.1
[WARNING] * org.apache.maven.plugins:maven-surefire-plugin:2.22.2
[WARNING] * org.apache.maven.plugins:maven-resources-plugin:3.3.0
[WARNING]
[WARNING] For more or less details, use 'maven.plugin.validation' property with one o

```

Same old cucumber report-

Cucumber Reports

This report will self-destruct in a day. Keep your future reports forever.

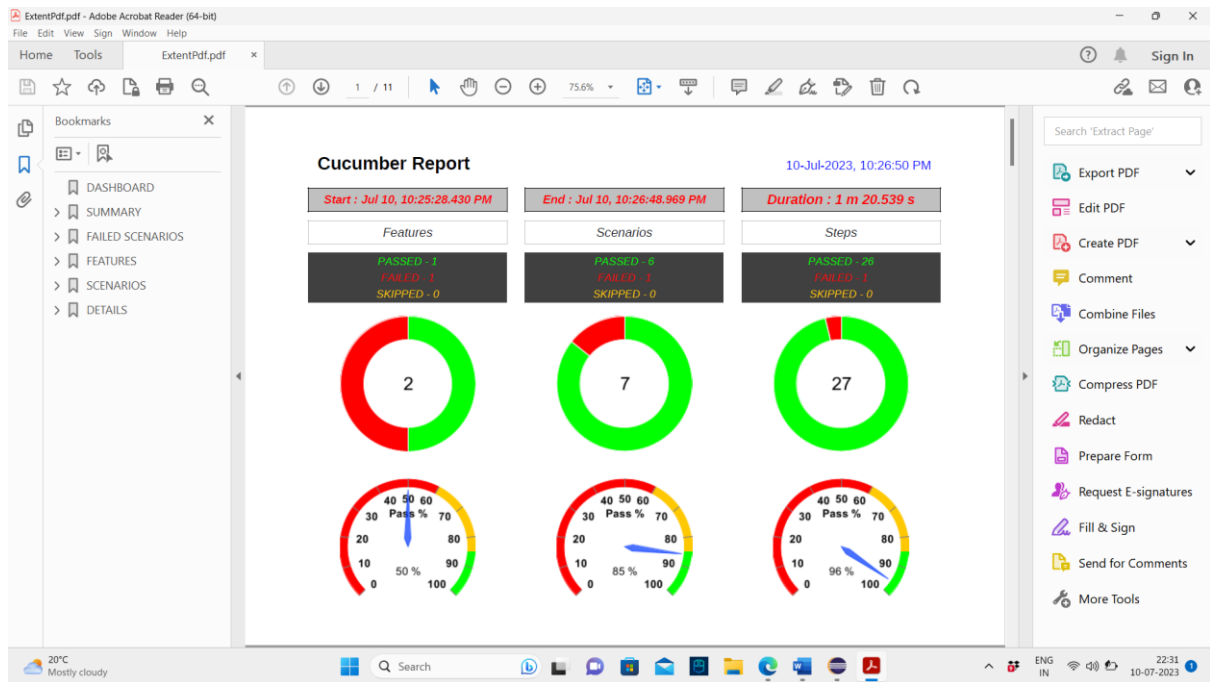
<b>86% passed</b> 7 executed	<b>a few seconds ago</b> Last Run	<b>1 minute, 20.9 seconds</b> Duration
Windows 11	Java HotSpot(TM) 64-Bit Server VM 11.0.18+9-LTS-195	cucumber-jvm 6.9.0

[Delete Report](#)

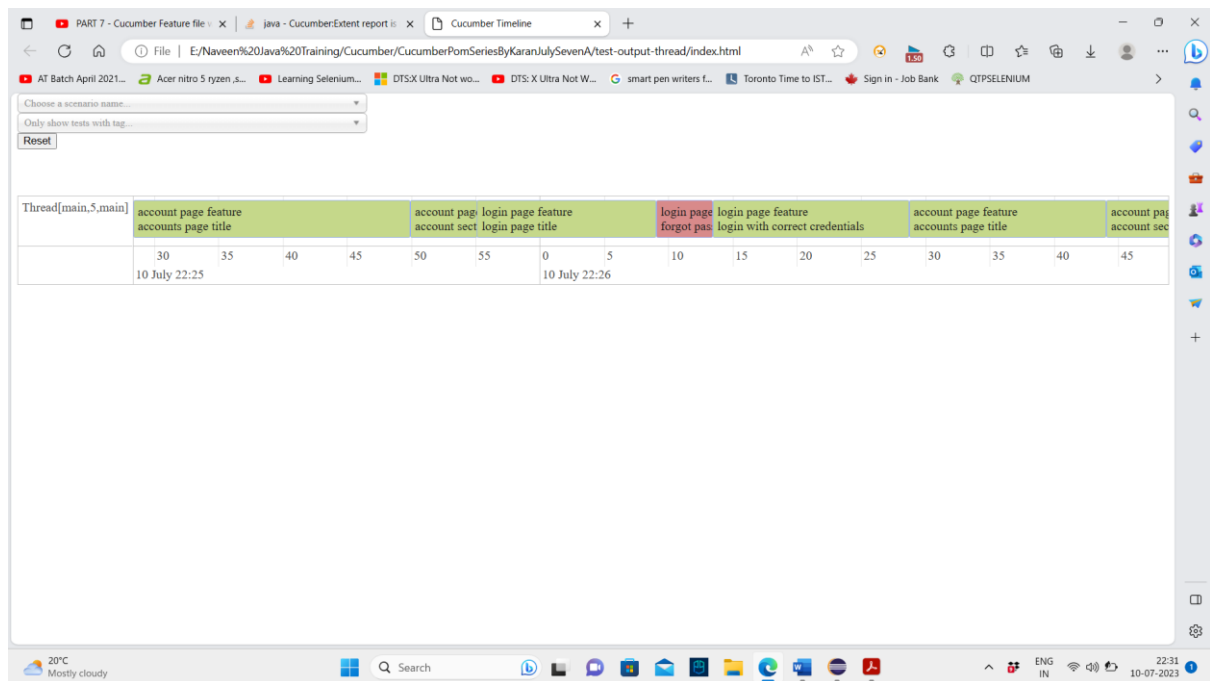
- file:///E:/Naveen%20Java%20Training/Cucumber/CucumberPomSeriesByKaranJulySevenA/src/test/resources/parallel/AccountPage.feature
- file:///E:/Naveen%20Java%20Training/Cucumber/CucumberPomSeriesByKaranJulySevenA/src/test/resources/parallel/LoginPage.feature
- file:///E:/Naveen%20Java%20Training/Cucumber/CucumberPomSeriesByKaranJulySevenA/src/test/resources/parallel/acc.feature

By continuing to browse, you consent to our use of cookies. To know more, please refer to our Privacy Policy.

Now pdf report generated-



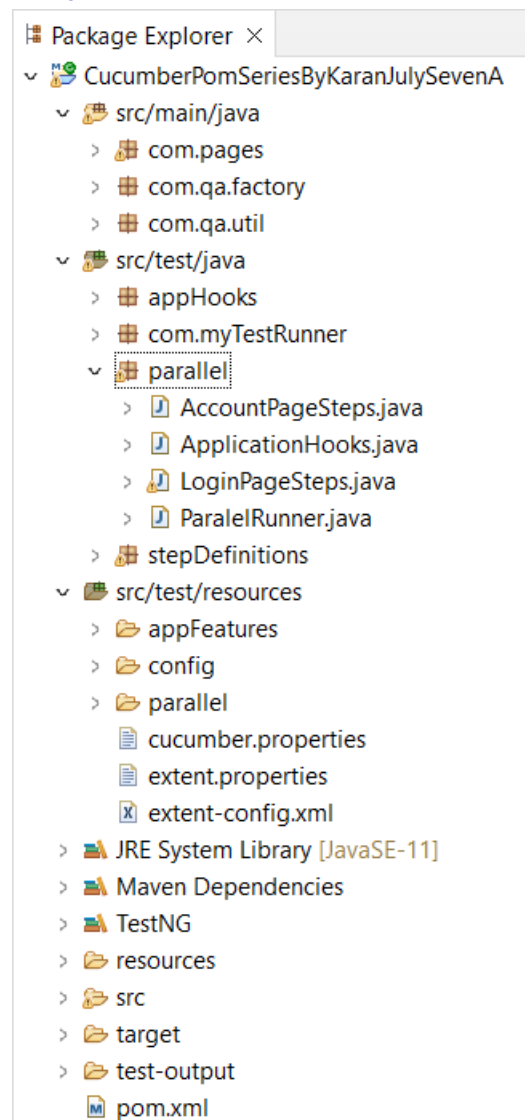
## Thread report-



## Three output folders created after running from maven-

- > test output
- > test-output
- > test-output-thread

## Project structure-



## Codes from this chapter-

Runner file-

```
package parallel;
```

```
import org.junit.runner.RunWith;
import org.testng.annotations.DataProvider;
```

```
import io.cucumber.junit.Cucumber;
import io.cucumber.junit.CucumberOptions;
import io.cucumber.testng.AbstractTestNGCucumberTests;
```

```
@RunWith(Cucumber.class)
@CucumberOptions(features = { "src/test/resources/parallel" },
glue = { "parallel" },
plugin = { "pretty",
           "com.aventstack.extentreports.cucumber.adapter.ExtentCucumberAdapter:",
           "timeline:test-output-thread/" }
)
```

```

)

public class ParallelRunner extends AbstractTestNGCucumberTests {

    /**
     * we need to override a method from abstracttestngcumbertests class
     * parallel=true means run in parallel, else it will run one by one.
     *
     * @return 2d array containing all scenarios.
     */
    @Override
    @DataProvider(parallel = true)
    public Object[][] scenarios() {
        return super.scenarios();
    }
}

```

#### Pom file-

```

<?xml version="1.0" encoding="UTF-8"?>

<project xmlns="http://maven.apache.org/POM/4.0.0"
    xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
    xsi:schemaLocation="http://maven.apache.org/POM/4.0.0
http://maven.apache.org/xsd/maven-4.0.0.xsd">
    <modelVersion>4.0.0</modelVersion>

    <groupId>CucumberPOMSeriesByKaranJulySeven</groupId>
    <artifactId>CucumberPOMSeriesByKaranJulySevenA</artifactId>
    <version>0.0.1-SNAPSHOT</version>

    <name>CucumberPOMSeries</name>
    <!-- FIXME change it to the project's website -->
    <url>http://www.example.com</url>

    <properties>

        <project.build.sourceEncoding>UTF-
8</project.build.sourceEncoding>
        <java.version>11</java.version>
        <junit.version>4.13.1</junit.version>
        <cucumber.version>6.9.0</cucumber.version>
        <maven.compiler.version>3.8.1</maven.compiler.version>
        <maven.surefire.version>2.22.2</maven.surefire.version>

    </properties>

    <dependencies>

        <dependency>
            <groupId>io.cucumber</groupId>
            <artifactId>cucumber-java</artifactId>
            <version>${cucumber.version}</version>
            <scope>test</scope>
        </dependency>

```

```

<dependency>
  <groupId>io.cucumber</groupId>
  <artifactId>cucumber-junit</artifactId>
  <version>${cucumber.version}</version>
  <scope>test</scope>
</dependency>

<dependency>
  <groupId>junit</groupId>
  <artifactId>junit</artifactId>
  <version>${junit.version}</version>
  <scope>test</scope>
</dependency>

<dependency>
  <groupId>org.seleniumhq.selenium</groupId>
  <artifactId>selenium-java</artifactId>
  <version>3.141.59</version>
</dependency>

<dependency>
  <groupId>io.github.bonigarcia</groupId>
  <artifactId>webdrivermanager</artifactId>
  <version>4.2.2</version>
</dependency>

<!--
  https://mvnrepository.com/artifact/tech.grasshopper/extentreports-
  cucumber6-adapter -->
  <dependency>
    <groupId>tech.grasshopper</groupId>
    <artifactId>extentreports-cucumber6-
adapter</artifactId>
    <version>2.17.0</version>
  </dependency>

  <dependency>
    <groupId>org.testng</groupId>
    <artifactId>testng</artifactId>
    <version>6.14.3</version>
    <scope>test</scope>
  </dependency>

  <dependency>
    <groupId>io.cucumber</groupId>
    <artifactId>cucumber-testng</artifactId>
    <version>${cucumber.version}</version>
    <scope>test</scope>
  </dependency>

  <!-- https://mvnrepository.com/artifact/org.apache.poi/poi --
>
  <dependency>
    <groupId>org.apache.poi</groupId>
    <artifactId>poi</artifactId>
    <version>4.1.2</version>
  </dependency>

```



```

<!-- https://mvnrepository.com/artifact/org.apache.poi/poi-
ooxml -->
<dependency>
  <groupId>org.apache.poi</groupId>
  <artifactId>poi-ooxml</artifactId>
  <version>4.1.2</version>
</dependency>

</dependencies>

<build>
  <plugins>

    <plugin>
      <groupId>org.apache.maven.plugins</groupId>
      <artifactId>maven-compiler-plugin</artifactId>
      <version>${maven.compiler.version}</version>
      <configuration>
        <encoding>UTF-8</encoding>
        <source>${java.version}</source>
        <target>${java.version}</target>
      </configuration>
    </plugin>
    <plugin>
      <groupId>org.apache.maven.plugins</groupId>
      <artifactId>maven-surefire-plugin</artifactId>
      <version>${maven.surefire.version}</version>
      <configuration>
        <!-- to run with jenkins and to run using
maven use the below includes -->
        <includes>

          <include>**/ParallelRunner.java</include>
          </includes>
          <parallel>methods</parallel>
          <!--<threadCount>4</threadCount>-->

          <useUnlimitedThreads>true</useUnlimitedThreads>
          </configuration>
        </plugin>

        <!-- <plugin>
          <groupId>org.apache.maven.plugins</groupId>
          <artifactId>maven-failsafe-plugin</artifactId>
          <version>3.1.2</version>
          <executions>
            <execution>
              <goals>
                <goal>integration-test</goal>
              </goals>
              <configuration> -->
                <!-- UNCOMMENT - To add any
exclusions if required -->
                <!-- <excludes>

                <exclude>**/*IT*.java</exclude>

                </excludes> -->
                <!-- <includes> -->
                <!--UNCOMMENT BELOW LINE
- To execute feature files with a single runner -->

```

```

in the below step -->                                <!--give path of runner
                                                         <!--
    <include>**/MyTestRunner.java</include> -->
                                                         <!-- UNCOMMENT BELOW
LINE - To execute feature
runners -->                                           files with multiple
                                                         <!--
<include>**/*Runner.java</include> -->
                                                         <!--</includes> -->
                                                         <!-- UNCOMMENT BELOW 3 LINES -
To execute using
                                                         parallel or combination
    option -->
                                                         <!-- we can write parallel with
classes also.-->
                                                         <!-- <parallel>methods</parallel>
                                                         <threadCount>10</threadCount>
    <perCoreThreadCount>true</perCoreThreadCount> -->
                                                         <!-- UNCOMMENT BELOW 3 LINES -
To execute using
                                                         forking or combination option -
->
                                                         <!-- <forkCount>2</forkCount>
                                                         <reuseForks>true</reuseForks>
    <reportsDirectory>${project.build.directory}/failsafe-
reports_${surefire.forkNumber}</reportsDirectory>-->
                                                         <!--</configuration>
                                                         </execution>
                                                         </executions>
    </plugin>-->

    </plugins>
  </build>
</project>

```