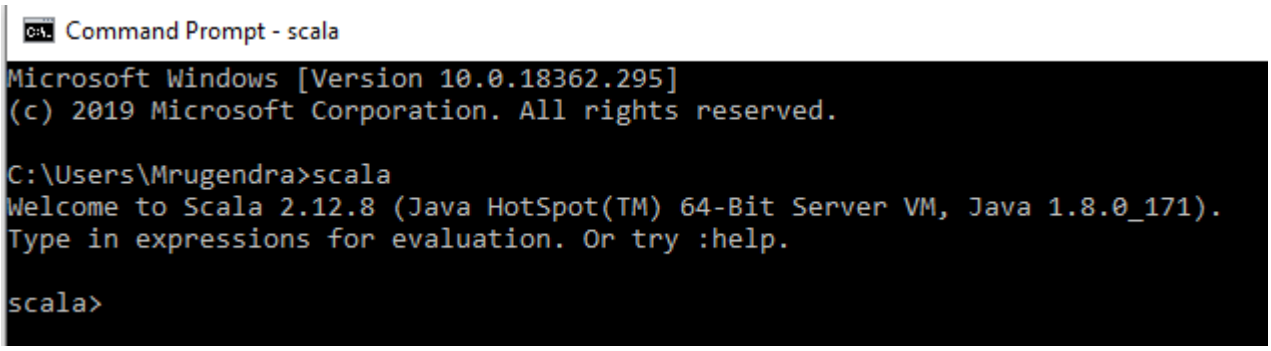
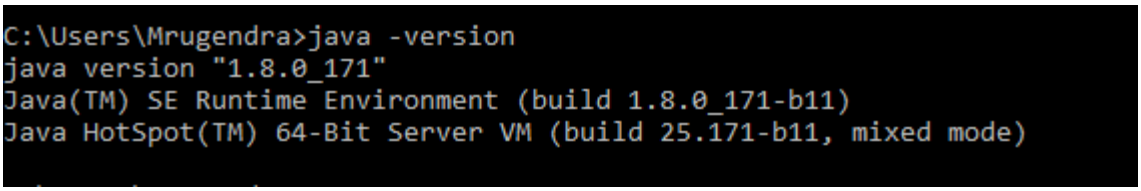
Installing Spark on Windows 10.

1. **Install Scala:**
    a. Set environmental variables:
        i. User variable:
            - Variable: SCALA_HOME;
            - Value: C:\Program Files (x86)\scala
        ii. System variable:
            - Variable: PATH
            - Value: C:\Program Files (x86)\scala\bin

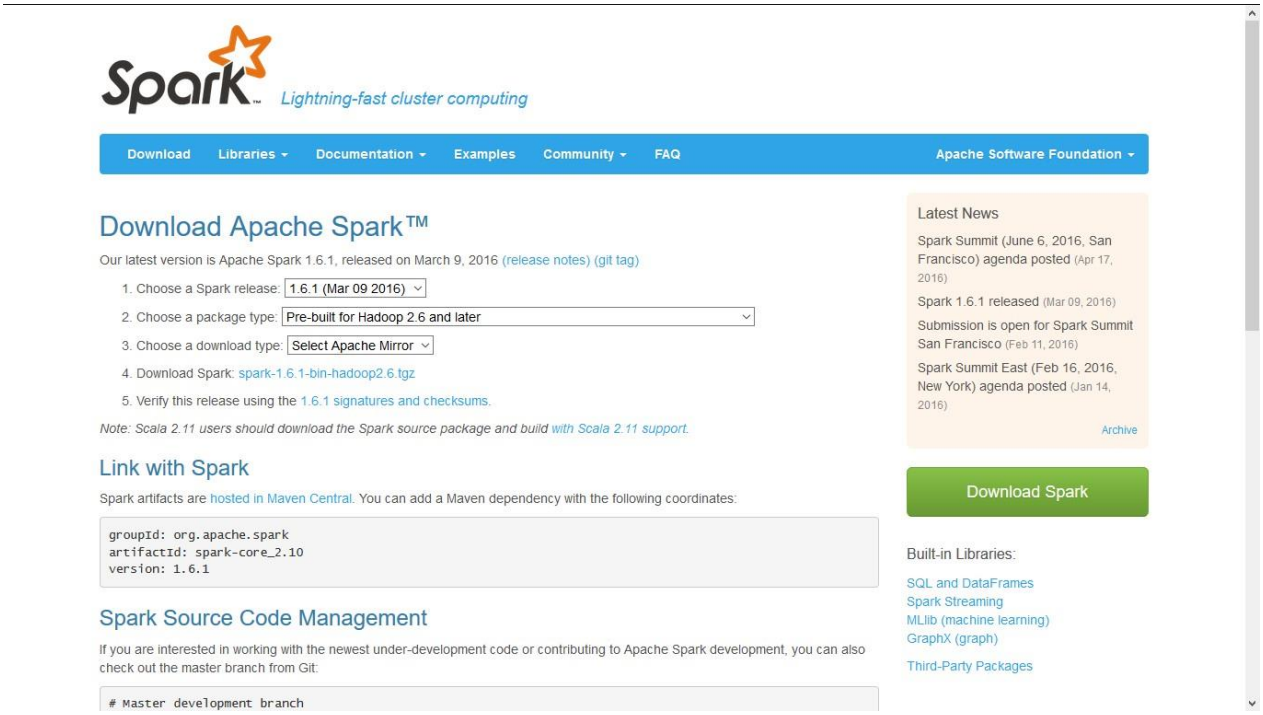


2. **Install Java 8:** Download Java 8 from the link: http://www.oracle.com/technetwork/java/javase/downloads/jdk8-downloads-2133151.html
    a. Set environmental variables:
        i. User variable:
            - Variable: JAVA_HOME
            - Value: C:\Program Files\Java\jdk1.8.0_91
        ii. System variable:
            - Variable: PATH
            - Value: C:\Program Files\Java\jdk1.8.0_91\bin



3. **Install Eclipse** Mars. Download it from the link: https://eclipse.org/downloads/ and extract it into C drive.
    a. Set environmental variables:
        i. User variable:
            - Variable: ECLIPSE_HOME
            - Value: C:\eclipse
        ii. System variable:
            - Variable: PATH
            - Value: C:\eclipse \bin

4. **Install Spark 1.6.1.** Download it from the following link: http://spark.apache.org/downloads.html and extract it into D drive, such as D:\Spark.



a. Set environmental variables:
    i. User variable:
        - Variable: SPARK_HOME
        - Value: D:\spark\spark-1.6.1-bin-hadoop2.6
    ii. System variable:
        - Variable: PATH

- Value: D:\spark\spark-1.6.1-bin-hadoop2.6\bin

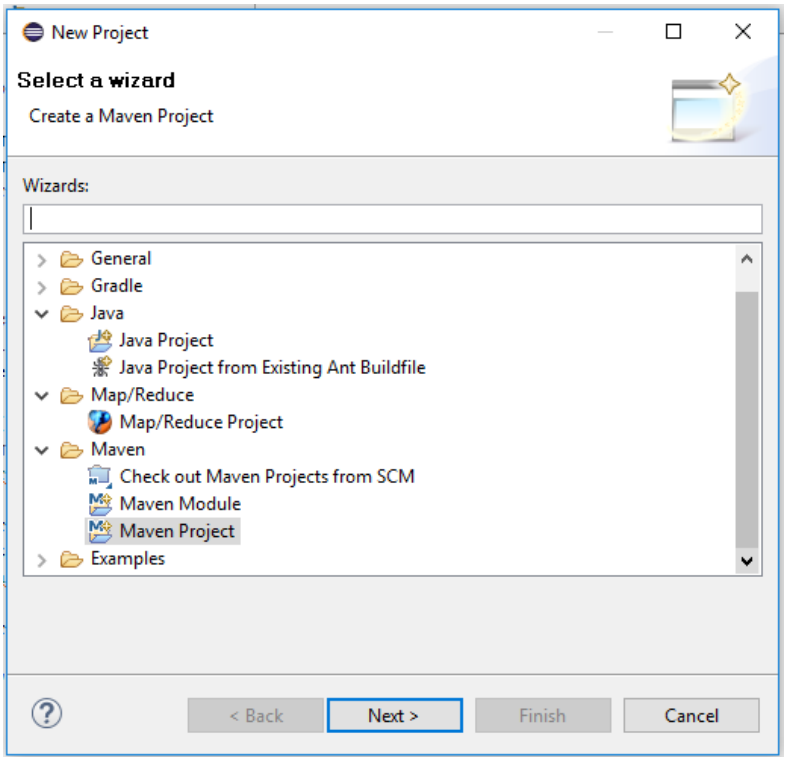
5. **Download Windows Utilities**: Download it from the link: https://github.com/steveloughran/winutils/tree/master/hadoop-2.6.0/bin
   And paste it in D:\spark\spark-1.6.1-bin-hadoop2.6\bin
6. **Execute Spark** on cmd, see below:

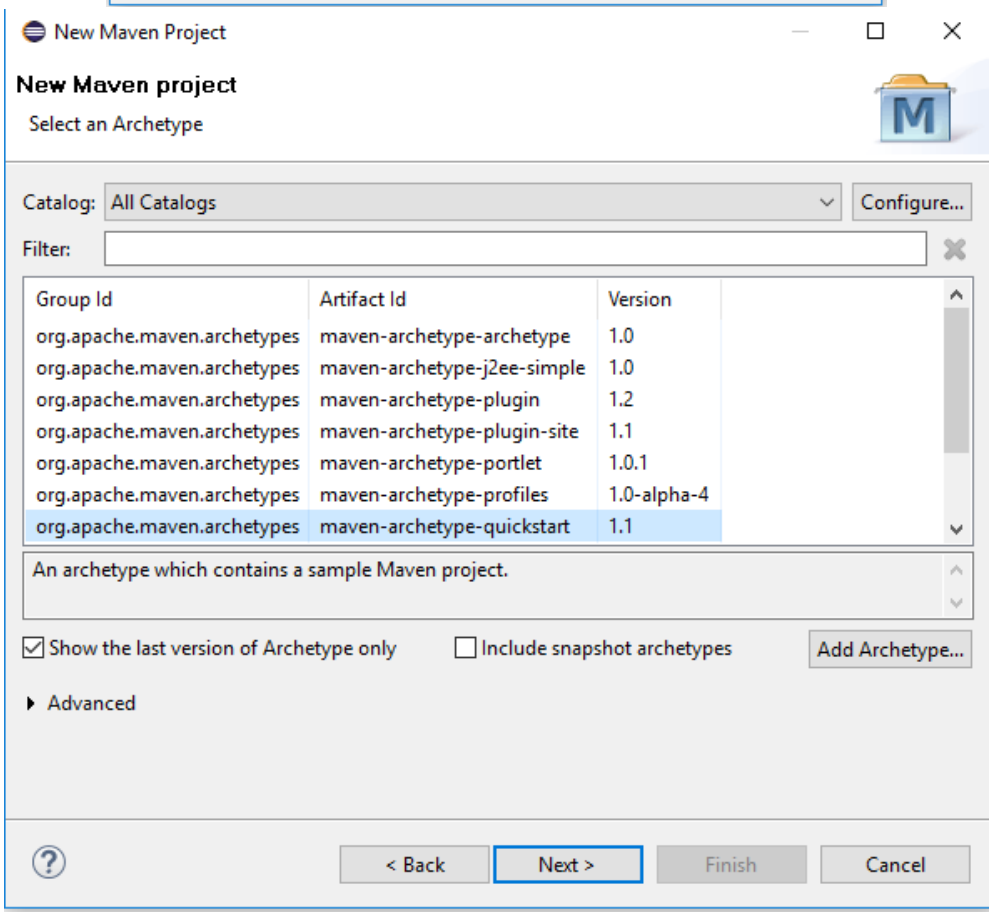
```
C:\Users\Mrugendra>spark-shell
Setting default log level to "WARN".
To adjust logging level use sc.setLogLevel(newLevel). For SparkR, use setLogLevel(newLevel).
Spark context Web UI available at http://host.docker.internal:4040
Spark context available as 'sc' (master = local[*], app id = local-1566364181408).
Spark session available as 'spark'.
Welcome to
      ____              __
     / __/__  ___ _____/ /__
    _\ \/ _ \/ _ `/ __/  '_/
   /___/ .__/\_,_/_/ /_/\_\   version 2.4.0
      /_/

Using Scala version 2.11.12 (Java HotSpot(TM) 64-Bit Server VM, Java 1.8.0_171)
Type in expressions to have them evaluated.
Type :help for more information.
```

7. **Install Maven 3.3**. Download Apache-Maven-3.3.9 from the link: http://apache.mivzakim.net/maven/maven-3/3.3.9/binaries/apache-maven-3.3.9-bin.zip
   And extract it into D drive, such as D:\apache-maven-3.3.9
   a. Set Environmental variables:
      i. User variable
         - Variable: MAVEN_HOME
         - Value: D:\apache-maven-3.3.9
      ii. System variable
         - Variable: Path
         - Value: D:\apache-maven-3.3.9\bin
   b. Check on cmd, see below

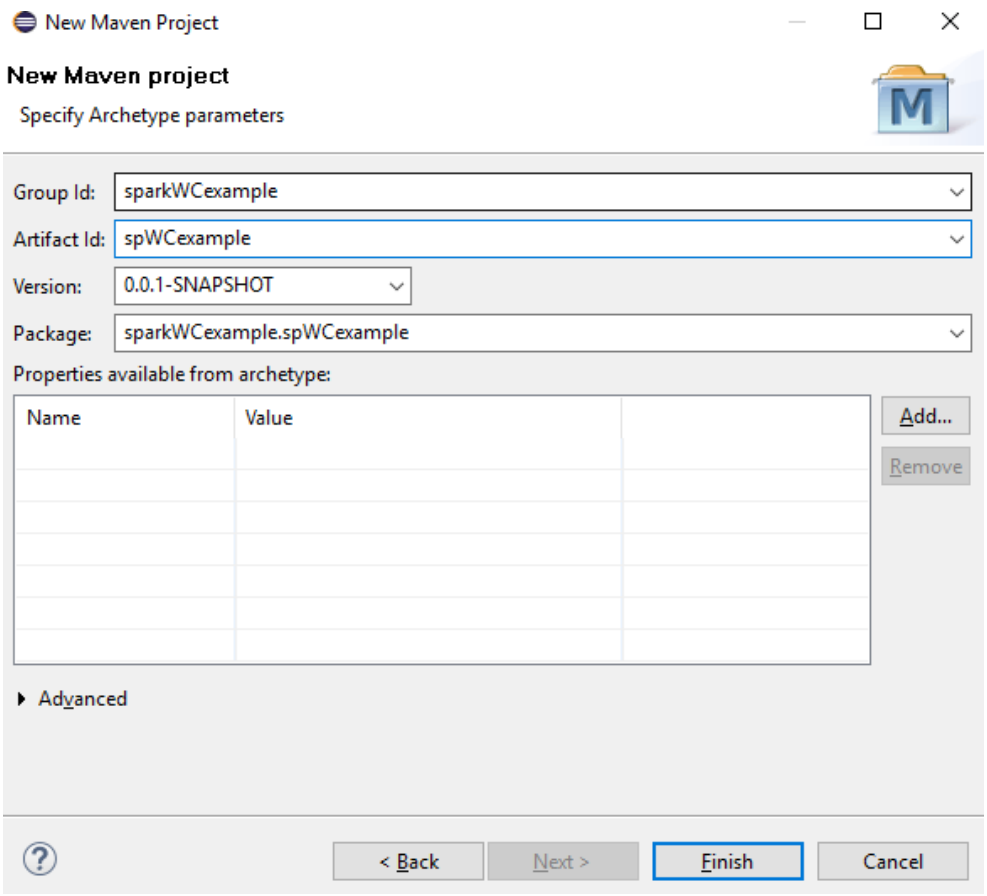
```
Administrator: Command Prompt

D:\>mvn
D:\
[INFO] Scanning for projects...
[INFO] ------------------------------------------------------------------------
[INFO] BUILD FAILURE
[INFO] ------------------------------------------------------------------------
[INFO] Total time: 0.196 s
[INFO] Finished at: 2016-05-20T23:28:50+03:00
[INFO] Final Memory: 6M/61M
[INFO] ------------------------------------------------------------------------
[ERROR] No goals have been specified for this build. You must specify a valid lifecycle phase or a goal in the format <plugin-prefix>:<goal> or <plugin-group-id>:<plugi
n-artifact-id>[:<plugin-version>]:<goal>. Available lifecycle phases are: validate, initialize, generate-sources, process-sources, generate-resources, process-resources
, compile, process-classes, generate-test-sources, process-test-sources, generate-test-resources, process-test-resources, test-compile, process-test-classes, test, prep
are-package, package, pre-integration-test, integration-test, post-integration-test, verify, install, deploy, pre-clean, clean, post-clean, pre-site, site, post-site, s
ite-deploy. -> [Help 1]
[ERROR]
[ERROR] To see the full stack trace of the errors, re-run Maven with the -e switch.
[ERROR] Re-run Maven using the -X switch to enable full debug logging.
[ERROR]
[ERROR] For more information about the errors and possible solutions, please read the following articles:
[ERROR] [Help 1] http://cwiki.apache.org/confluence/display/MAVEN/NoGoalSpecifiedException

D:\>
```

8. **Create first WordCount project.**
   a. Open Eclipse and do File→ New → project → Select Maven Project; see below.





b. Enter Group id, Artifact id, and click finish.

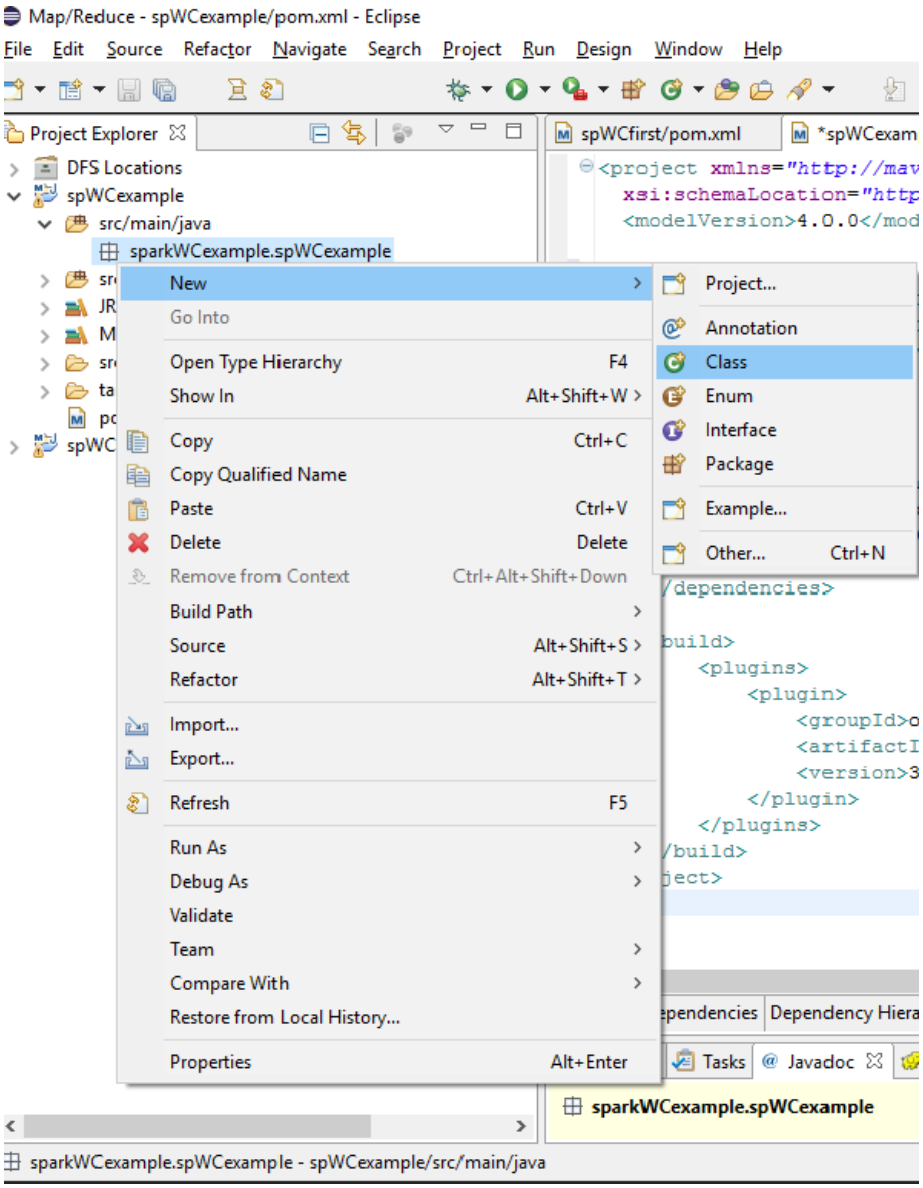


c. **Edit pom.xml.** Paste the following code.

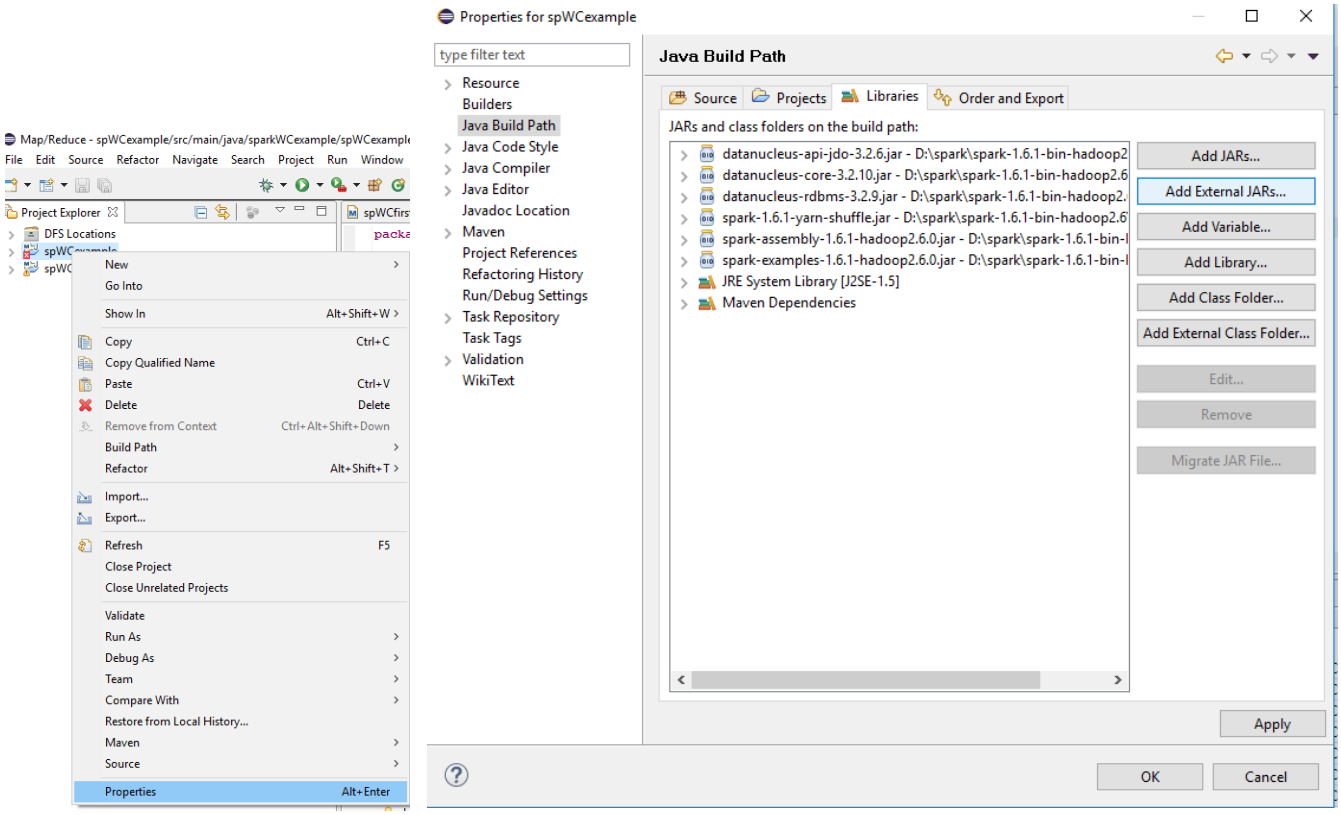
```
<project xmlns="http://maven.apache.org/POM/4.0.0" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://maven.apache.org/POM/4.0.0 http://maven.apache.org/xsd/maven-4.0.0.xsd">
  <modelVersion>4.0.0</modelVersion>

  <groupId>sparkWCexample</groupId>
  <artifactId>spWCexample</artifactId>
  <version>1.0-SNAPSHOT</version>

 <dependencies>
     <dependency>
       <groupId>org.apache.spark</groupId>
       <artifactId>spark-core_2.10</artifactId>
       <version>1.2.0</version>
     </dependency>
  </dependencies>

  <build>
     <plugins>
       <plugin>
         <groupId>org.apache.maven.plugins</groupId>
         <artifactId>maven-compiler-plugin</artifactId>
         <version>3.3</version>
       </plugin>
     </plugins>
  </build>
```

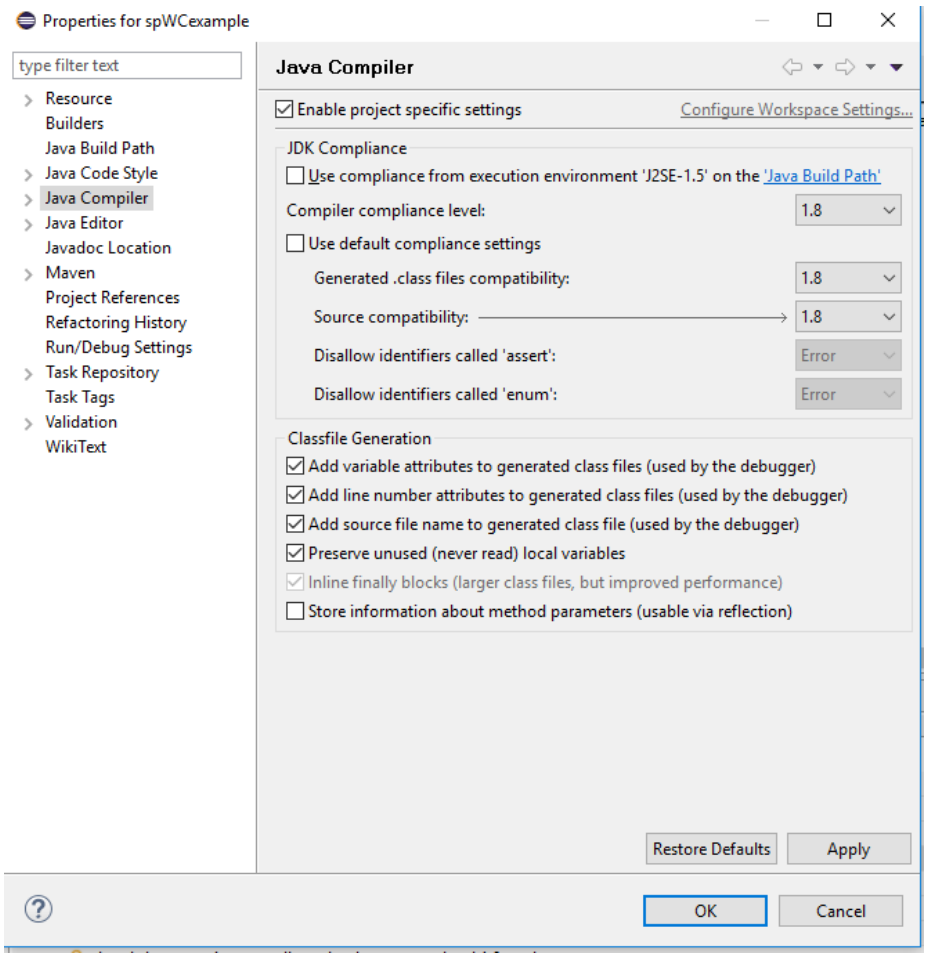
</project>

d. Write your code or just copy given WordCount code from D:\spark\spark-1.6.1-bin-hadoop2.6\examples\src\main\java\org\apache\spark\examples

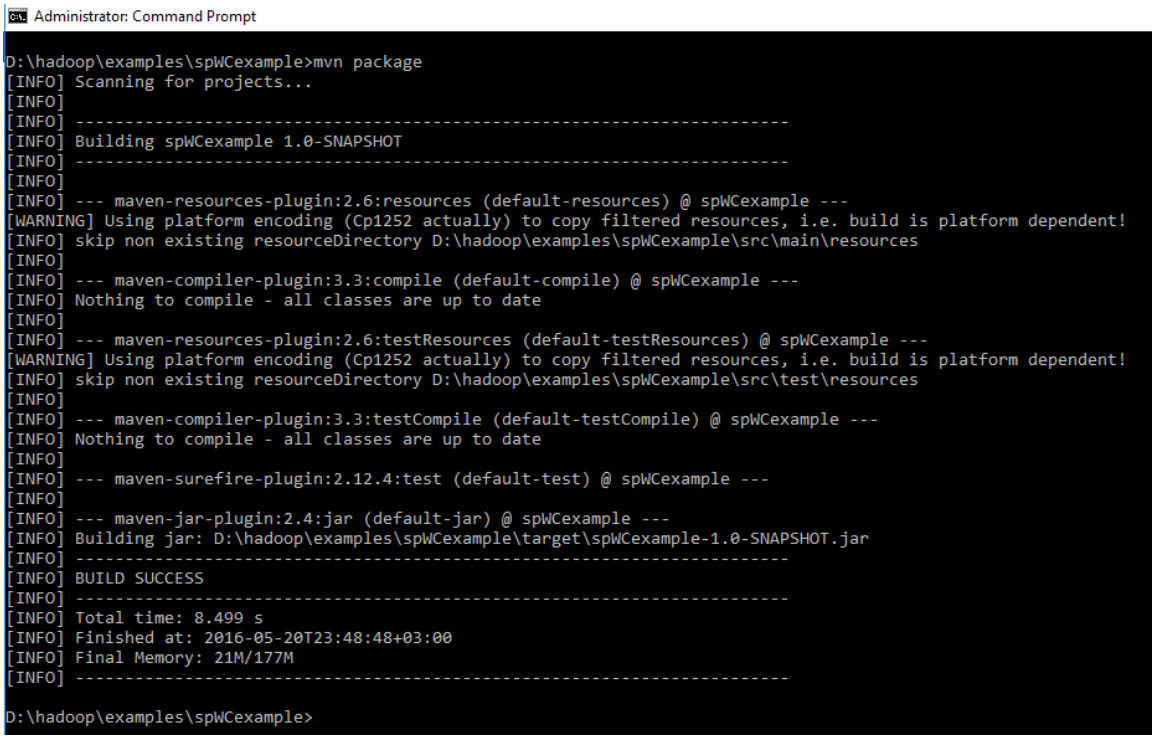


e. Now, add external jar from the location D:\spark\spark-1.6.1-bin-hadoop2.6\lib and set Java 8 for compilation; see below.





f. Build the project: Go to the following location (where we stored the project) on cmd:
D:\hadoop\examples\spWCexample
Write **mvn package** on cmd



g. Execute the project: Go to the following location on cmd: D:\spark\spark-1.6.1-bin-hadoop2.6\bin
Write the following command

spark-submit --class groupid.artifactid.classname --master local[2] /path to the jar file created using maven /path to a demo test file /path to output directory

spark-submit --class sparkWCexample.spWCexample.WC --master local[2] /hadoop/examples/spWCexample/target/spWCexample-1.0-SNAPSHOT.jar /hadoop/examples/spWCexample/how.txt /hadoop/examples/spWCexample/anwer.txt

```
Administrator: Command Prompt

D:\spark\spark-1.6.1-bin-hadoop2.6\bin>spark-submit --class sparkWCexample.spWCexample.WC --master local[2]  /hadoop/examples/spWCexample/target/spWCexample-1.0-SNAPSHO
T.jar /hadoop/examples/spWCexample/how.txt /hadoop/examples/spWCexample/anwer.txt
Using Spark's default log4j profile: org/apache/spark/log4j-defaults.properties
16/05/21 00:01:47 INFO SparkContext: Running Spark version 1.6.1
16/05/21 00:01:48 INFO SecurityManager: Changing view acls to: shantanu
16/05/21 00:01:48 INFO SecurityManager: Changing modify acls to: shantanu
16/05/21 00:01:48 INFO SecurityManager: SecurityManager: authentication disabled; ui acls disabled; users with view permissions: Set(shantanu); users with modify permis
sions: Set(shantanu)
16/05/21 00:01:49 INFO Utils: Successfully started service 'sparkDriver' on port 58374.
16/05/21 00:01:50 INFO Slf4jLogger: Slf4jLogger started
16/05/21 00:01:50 INFO Remoting: Starting remoting
16/05/21 00:01:51 INFO Remoting: Remoting started; listening on addresses :[akka.tcp://sparkDriverActorSystem@132.72.225.79:58387]
16/05/21 00:01:51 INFO Utils: Successfully started service 'sparkDriverActorSystem' on port 58387.
16/05/21 00:01:51 INFO SparkEnv: Registering MapOutputTracker
16/05/21 00:01:51 INFO SparkEnv: Registering BlockManagerMaster
16/05/21 00:01:51 INFO DiskBlockManager: Created local directory at C:\Users\shantanu\AppData\Local\Temp\blockmgr-f08ed6e7-b8e6-4e81-b5be-72674397e4ba
16/05/21 00:01:51 INFO MemoryStore: MemoryStore started with capacity 511.1 MB
16/05/21 00:01:51 INFO SparkEnv: Registering OutputCommitCoordinator
16/05/21 00:01:52 WARN Utils: Service 'SparkUI' could not bind on port 4040. Attempting port 4041.
16/05/21 00:01:52 INFO Utils: Successfully started service 'SparkUI' on port 4041.
16/05/21 00:01:52 INFO SparkUI: Started SparkUI at http://132.72.225.79:4041
16/05/21 00:01:52 INFO HttpFileServer: HTTP File server directory is C:\Users\shantanu\AppData\Local\Temp\spark-d4f81ffc-b218-4bce-b3d9-877a4f81e1dc\httpd-673c260c-3ee6
-4dbe-9627-ecd77a983c7e
16/05/21 00:01:52 INFO HttpServer: Starting HTTP Server
16/05/21 00:01:52 INFO Utils: Successfully started service 'HTTP file server' on port 58390.
16/05/21 00:01:52 INFO SparkContext: Added JAR file:/D:/hadoop/examples/spWCexample/target/spWCexample-1.0-SNAPSHOT.jar at http://132.72.225.79:58390/jars/spWCexample-1
.0-SNAPSHOT.jar with timestamp 1463778112284
16/05/21 00:01:52 INFO Executor: Starting executor ID driver on host localhost
16/05/21 00:01:52 INFO Utils: Successfully started service 'org.apache.spark.network.netty.NettyBlockTransferService' on port 58395.
16/05/21 00:01:52 INFO NettyBlockTransferService: Server created on 58395
16/05/21 00:01:52 INFO BlockManagerMaster: Trying to register BlockManager
16/05/21 00:01:52 INFO BlockManagerMasterEndpoint: Registering block manager localhost:58395 with 511.1 MB RAM, BlockManagerId(driver, localhost, 58395)
16/05/21 00:01:52 INFO BlockManagerMaster: Registered BlockManager
16/05/21 00:01:53 INFO MemoryStore: Block broadcast_0 stored as values in memory (estimated size 127.4 KB, free 127.4 KB)
16/05/21 00:01:53 INFO MemoryStore: Block broadcast_0_piece0 stored as bytes in memory (estimated size 13.9 KB, free 141.3 KB)
16/05/21 00:01:53 INFO BlockManagerInfo: Added broadcast_0_piece0 in memory on localhost:58395 (size: 13.9 KB, free: 511.1 MB)
16/05/21 00:01:53 INFO SparkContext: Created broadcast 0 from textFile at WC.java:66
16/05/21 00:01:54 INFO MemoryStore: Block broadcast_1 stored as values in memory (estimated size 127.4 KB, free 268.8 KB)
16/05/21 00:01:54 INFO MemoryStore: Block broadcast_1_piece0 stored as bytes in memory (estimated size 13.9 KB, free 282.7 KB)
16/05/21 00:01:54 INFO BlockManagerInfo: Added broadcast_1_piece0 in memory on localhost:58395 (size: 13.9 KB, free: 511.1 MB)
16/05/21 00:01:54 INFO SparkContext: Created broadcast 1 from textFile at WC.java:68
16/05/21 00:01:54 INFO FileInputFormat: Total input paths to process : 1
Exception in thread "main" org.apache.hadoop.mapred.FileAlreadyExistsException: Output directory file:/hadoop/examples/spWCexample/anwer.txt already exists
        at org.apache.hadoop.mapred.FileOutputFormat.checkOutputSpecs(FileOutputFormat.java:132)
        at org.apache.spark.rdd.PairRDDFunctions$$anonfun$saveAsHadoopDataset$1.apply$mcV$sp(PairRDDFunctions.scala:1179)
```

h. You can also check the progress of the project at: http://localhost:4040/jobs/

i. Finally get the answers; see below.