Information Retrieval

Vidya Vikas Education Society's
Vidya Vikas Education Society's

VIKAS COLLEGE OF ARTS, SCIENCE & COMMERCE

Affiliated to University of Mumbai
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This is to certify that,

____
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Student of T.Y.B.Sc. (Computer Science) (Sem-VI) with college enrolled Roll no.__________________has satisfactorily completed the practical work for the Subject Information Retrieval in the program of Computer Science from the UNIVERSITY OF MUMBAI for the academic year 2022-2023.

Guided By

____

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Head of Department

Internal Examiner

External Examiner

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Practical no 1

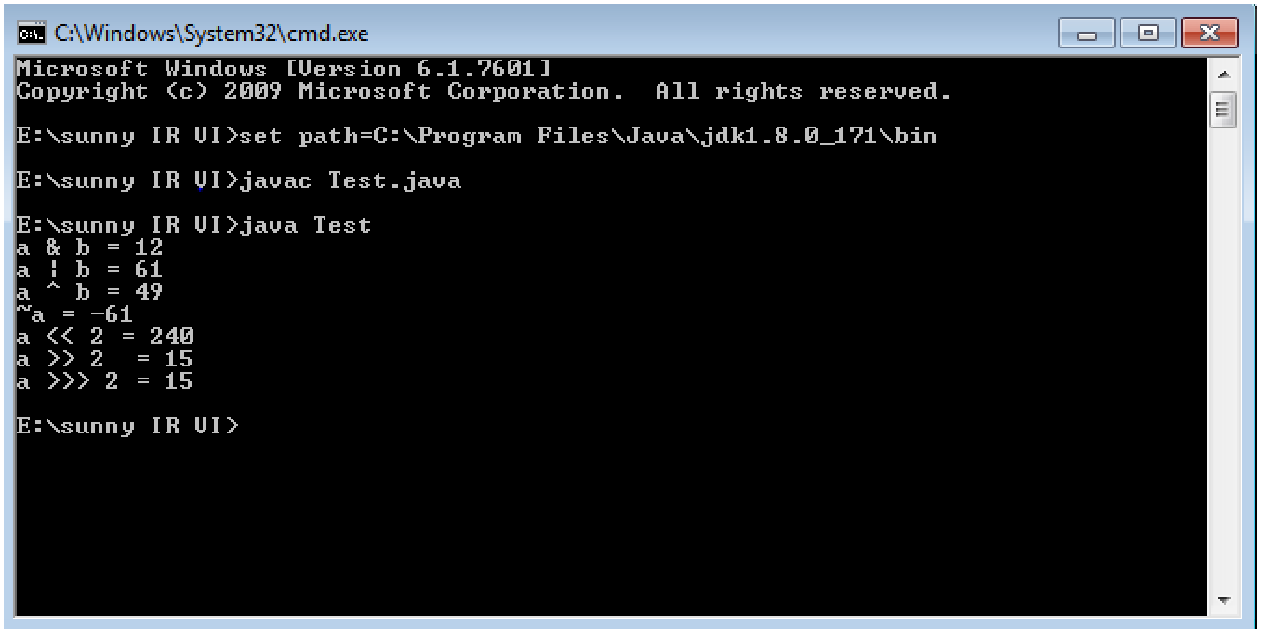
Aim: Write a program to demonstrate bitwise operation.

Code:

```
public class Test {

   public static void main(String args[]) {
      int a = 60;
      int b = 13;
      int c = 0;

      c = a & b;
      System.out.println("a & b = " + c );

      c = a | b;
      System.out.println("a | b = " + c );

      c = a ^ b;
      System.out.println("a ^ b = " + c );

      c = ~a;
      System.out.println("~a = " + c );

      c = a << 2;
      System.out.println("a << 2 = " + c );
```

```
        c = a >> 2;
        System.out.println("a >> 2  = " + c );

        c = a >>> 2;      /* 15 = 0000 1111 */
        System.out.println("a >>> 2 = " + c );
    }
}
```

Output:



```
Microsoft Windows [Version 6.1.7601]
Copyright (c) 2009 Microsoft Corporation.  All rights reserved.

E:\sunny IR VI>set path=C:\Program Files\Java\jdk1.8.0_171\bin

E:\sunny IR VI>javac Test.java

E:\sunny IR VI>java Test
a & b = 12
a | b = 61
a ^ b = 49
~a = -61
a << 2 = 240
a >> 2  = 15
a >>> 2 = 15

E:\sunny IR VI>
```

Practical No.2

Aim:- Implement Page Rank Algorithm.

Code:-

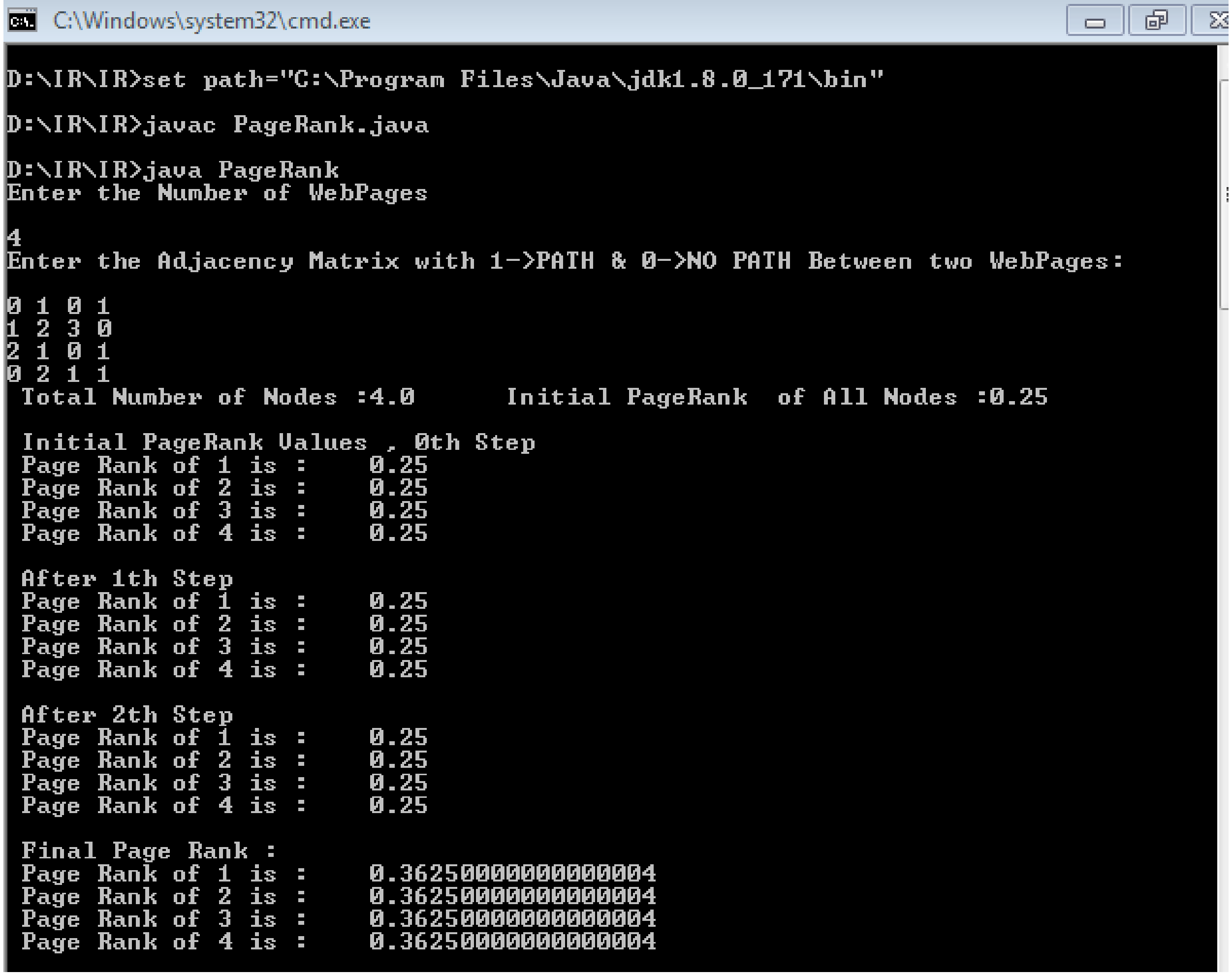
```
import java.util.*;
import java.io.*;
public class PageRank {

public int path[][] = new int[10][10];
public double pagerank[] = new double[10];

public void calc(double totalNodes){

double InitialPageRank;
double OutgoingLinks=0;
double DampingFactor = 0.85;
double TempPageRank[] = new double[10];

int ExternalNodeNumber;
int InternalNodeNumber;
int k=1; // For Traversing
int ITERATION_STEP=1;

InitialPageRank = 1/totalNodes;
System.out.printf(" Total Number of Nodes :"+totalNodes+"\t Initial PageRank of All Nodes :"+InitialPageRank+"\n");
```

```
for(k=1;k<=totalNodes;k++)
{
 this.pagerank[k]=InitialPageRank;
}
System.out.printf("\n Initial PageRank Values , 0th Step \n");
for(k=1;k<=totalNodes;k++)
{
 System.out.printf(" Page Rank of "+k+" is :\t"+this.pagerank[k]+"\n");
}
  while(ITERATION_STEP<=2) // Iterations
 {
   for(k=1;k<=totalNodes;k++)
 {
  TempPageRank[k]=this.pagerank[k];
  this.pagerank[k]=0;
 }

for(InternalNodeNumber=1;InternalNodeNumber<=totalNodes;InternalNodeNumber++)
 {
for(ExternalNodeNumber=1;ExternalNodeNumber<=totalNodes;ExternalNodeNumber++)
  {
   if(this.path[ExternalNodeNumber][InternalNodeNumber] == 1)
  {
   k=1;
   OutgoingLinks=0;  // Count the Number of Outgoing Links for each
ExternalNodeNumber
   while(k<=totalNodes)
   {
    if(this.path[ExternalNodeNumber][k] == 1 )
    {
     OutgoingLinks=OutgoingLinks+1; // Counter for Outgoing Links
    }
    k=k+1;
   }

this.pagerank[InternalNodeNumber]+=TempPageRank[ExternalNodeNumber]*(1/
OutgoingLinks);
   }
  }
 }
 System.out.printf("\n After "+ITERATION_STEP+"th Step \n");
  for(k=1;k<=totalNodes;k++)
   System.out.printf(" Page Rank of "+k+" is :\t"+this.pagerank[k]+"\n");
  ITERATION_STEP = ITERATION_STEP+1;
}
for(k=1;k<=totalNodes;k++)
{
 this.pagerank[k]=(1-DampingFactor)+     DampingFactor*this.pagerank[k];
```

```
  }
System.out.printf("\n Final Page Rank : \n");
for(k=1;k<=totalNodes;k++)
{
 System.out.printf(" Page Rank of "+k+" is :\t"+this.pagerank[k]+"\n");
  }
  }
public static void main(String args[])
    {
        int nodes,i,j,cost;
        Scanner in = new Scanner(System.in);
        System.out.println("Enter the Number of WebPages \n");
        nodes = in.nextInt();
        PageRank p = new PageRank();
        System.out.println("Enter the Adjacency Matrix with 1->PATH & 0->NO
PATH Between two WebPages: \n");
        for(i=1;i<=nodes;i++)
          for(j=1;j<=nodes;j++)
          {
            p.path[i][j]=in.nextInt();
            if(j==i)
              p.path[i][j]=0;
          }
        p.calc(nodes);
         }
```

}

Output:-



```
D:\IR\IR>set path="C:\Program Files\Java\jdk1.8.0_171\bin"

D:\IR\IR>javac PageRank.java

D:\IR\IR>java PageRank
Enter the Number of WebPages

4
Enter the Adjacency Matrix with 1->PATH & 0->NO PATH Between two WebPages:

0 1 0 1
1 2 3 0
2 1 0 1
0 2 1 1
 Total Number of Nodes :4.0      Initial PageRank  of All Nodes :0.25

 Initial PageRank Values , 0th Step
 Page Rank of 1 is :     0.25
 Page Rank of 2 is :     0.25
 Page Rank of 3 is :     0.25
 Page Rank of 4 is :     0.25

 After 1th Step
 Page Rank of 1 is :     0.25
 Page Rank of 2 is :     0.25
 Page Rank of 3 is :     0.25
 Page Rank of 4 is :     0.25

 After 2th Step
 Page Rank of 1 is :     0.25
 Page Rank of 2 is :     0.25
 Page Rank of 3 is :     0.25
 Page Rank of 4 is :     0.25

 Final Page Rank :
 Page Rank of 1 is :     0.36250000000000004
 Page Rank of 2 is :     0.36250000000000004
 Page Rank of 3 is :     0.36250000000000004
 Page Rank of 4 is :     0.36250000000000004
```

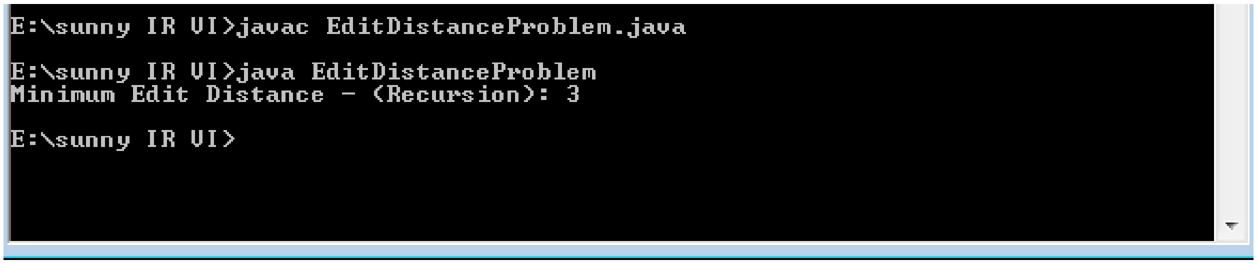
Practical No.3

Aim:- Implement Dynamic programming algorithm for computing the edit distance between

Code:

```
public class EditDistanceProblem

{

        public int editDistanceRecursion(String s1,String s2,int m,int n)

        {

                if(m==0)

                        return n;

                if(n==0)

                        return m;

                if(s1.charAt(m-1)==s2.charAt(n-1))


                        return editDistanceRecursion(s1,s2,m-1,n-1);


                return 1 + Math.min(editDistanceRecursion(s1, s2, m, n-1 ),

                        Math.min(editDistanceRecursion(s1, s2 , m-1 , n ),

                                editDistanceRecursion(s1 ,s2 , m-1 , n-1) ) );

        }



        public static void main(String[] args)

        {

                String s1 = "horizon";
        String s2 = "horizontal";
        EditDistanceProblem ed = new EditDistanceProblem();
        System.out.println("Minimum Edit Distance - (Recursion): " +
            ed.editDistanceRecursion(s1,s2,s1.length(),s2.length()   )  );
    }
}
```

Output:



```
E:\sunny IR VI>javac EditDistanceProblem.java

E:\sunny IR VI>java EditDistanceProblem
Minimum Edit Distance - (Recursion): 3

E:\sunny IR VI>
```

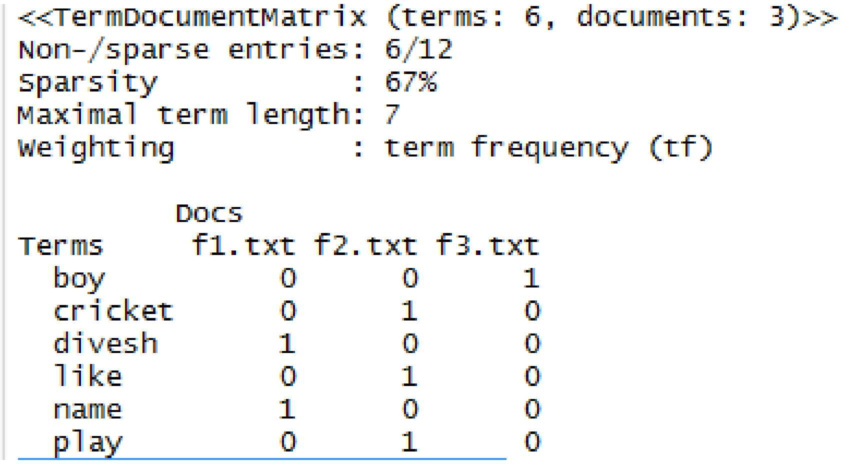
Practical No.4

Aim:- Write a program to Compute Similarity between two text documents.

Code:-

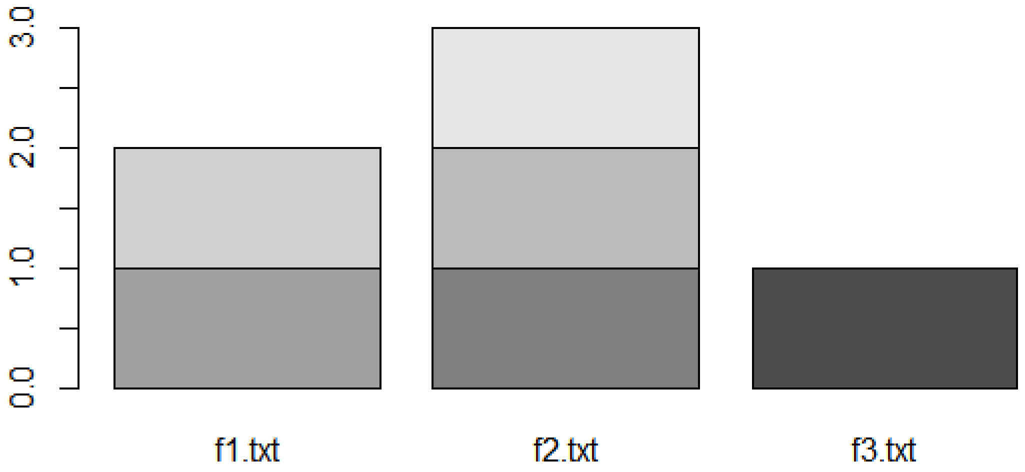
```
> install.packages('tm')
> install.packages('ggplot2')
> install.packages('textreuse')
> install.packages('devtools')
> install.packages('NLP')
> library('tm')
> require('NLP')
> library('tm')
> setwd('C:/r-corpus/')
> my.corpus<-Corpus(DirSource("C:/r-corpus"))
> my.corpus<-tm_map(my.corpus,removeWords,stopwords(kind = "english"))
> my.tdm<-TermDocumentMatrix(my.corpus)
> my.df<-as.data.frame(inspect(my.tdm))
```

Output:-



```
<<TermDocumentMatrix (terms: 6, documents: 3)>>
Non-/sparse entries: 6/12
Sparsity           : 67%
Maximal term length: 7
Weighting          : term frequency (tf)

          Docs
Terms     f1.txt f2.txt f3.txt
  boy          0      0      1
  cricket      0      1      0
  divesh       1      0      0
  like         0      1      0
  name         1      0      0
  play         0      1      0
```

```
> barplot(as.matrix(my.tdm))
```



Practical No. 5

Aim: Write a map-reduce program to count the number of occurrences of each alphabetic character in the given dataset. The count for each letter should be case-insensitive (i.e., include both upper-case and lower-case versions of the letter; Ignore non-alphabetic characters).

Steps:

1. 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:

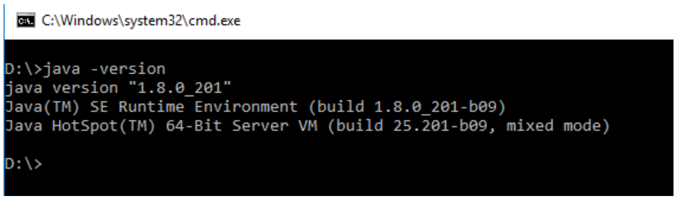
i. User variable:

- Variable: JAVA_HOME
- Value: C:\java

ii. System variable:

- Variable: PATH
- Value: C:\java\bin

b. Check on cmd, see below:



```
D:\>java -version
java version "1.8.0_201"
Java(TM) SE Runtime Environment (build 1.8.0_201-b09)
Java HotSpot(TM) 64-Bit Server VM (build 25.201-b09, mixed mode)

D:\>
```

2. 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

b. Download “hadoop2x-eclipse-plugin-master.”

You will see three Jar files on the path “hadoop2x-eclipse-plugin-master\release.”

Copy these three jar files and pate them into “C:\eclipse\dropins.”

c. Download “slf4j-1.7.21.”

Copy Jar files from this folder and paste them to “C:\eclipse\plugins”.

3. Download Hadoop-2.6.x: download Hadoop 2.6.x from the link: http://www.apache.org/dyn/closer.cgi/hadoop/common/hadoop-2.6.2/hadoop-2.6.2.tar.gz

a. Put extracted Hadoop-2.6.x files into D drive.

Note that do not put these extracted files into C drive, where you installed your Windows.

b. Download “hadoop-common-2.6.0-bin-master” from the link:

https://github.com/amihalik/hadoop-common-2.6.0-bin/tree/master/bin.

You will see 11 files there.

Paste all these files into the “bin” folder of Hadoop-2.6.x.

c. Create a “data” folder inside Hadoop-2.6.x, and

also create two more folders in the “data” folder as “data” and “name.”

d. Create a folder to store temporary data during execution of a project, such as “D:\hadoop\temp.”

e. Create a log folder, such as “D:\hadoop\userlog”

f. Go to Hadoop-2.6.x /etc / Hadoop and edit four files:

i. core-site.xml

ii. hdfs-site.xml

iii. mapred.xml

iv. yarn.xml

core-site.xml

```
<?xml version="1.0" encoding="UTF-8"?> <?xml-stylesheet type="text/xsl"
href="configuration.xsl"?> <!--   Licensed under the Apache License, Version 2.0
(the "License");   you may not use this file except in compliance with the License.
You may obtain a copy of the License at

   http://www.apache.org/licenses/LICENSE-2.0

  Unless required by applicable law or agreed to in writing, software   distributed
under the License is distributed on an "AS IS" BASIS,   WITHOUT
WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied.
See the License for the specific language governing permissions and   limitations
under the License. See accompanying LICENSE file. -->

<!-- Put site-specific property overrides in this file. -->

<configuration> <property>

 <name>hadoop.tmp.dir</name>

 <value>D:\hadoop\temp</value>

</property>

<property>

<name>fs.default.name</name>

 <value>hdfs://localhost:50071</value>

</property>

</configuration>
```

hdfs-site.xml

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

<?xml-stylesheet type="text/xsl" href="configuration.xsl"?> <!-- Licensed under
the Apache License, Version 2.0 (the "License"); you may not use this file except
in compliance with the License.  You may obtain a copy of the License at

   http://www.apache.org/licenses/LICENSE-2.0

  Unless required by applicable law or agreed to in writing, software    distributed
under the License is distributed on an "AS IS" BASIS,    WITHOUT
WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied.
See the License for the specific language governing permissions and    limitations
under the License. See accompanying LICENSE file. -->

<!-- Put site-specific property overrides in this file. -->

<configuration>
<property><name>dfs.replication</name><value>1</value></property>

<property>
<name>dfs.namenode.name.dir</name><value>/hadoop2.6.2/data/name</value><
final>true</final></property>

<property><name>dfs.datanode.data.dir</name><value>/hadoop2.6.2/data/data</
value><final>true</final> </property> </configuration>
```

mapred.xml

```
 <?xml version="1.0"?> <configuration <property>

 <name>mapreduce.framework.name</name>

 <value>yarn</value>

 </property>

<property>

 <name>mapred.job.tracker</name>

 <value>localhost:9001</value>
 </property>
<property>
<name>mapreduce.application.classpath</name>
<value>/hadoop-2.6.2/share/hadoop/mapreduce/*,
 /hadoop-2.6.2/share/hadoop/mapreduce/lib/*,
 /hadoop-2.6.2/share/hadoop/common/*,
 /hadoop-2.6.2/share/hadoop/common/lib/*,
 /hadoop-2.6.2/share/hadoop/yarn/*,
 /hadoop-2.6.2/share/hadoop/yarn/lib/*,
 /hadoop-2.6.2/share/hadoop/hdfs/*,
 /hadoop-2.6.2/share/hadoop/hdfs/lib/*,
 </value>
</property></configuration>
```

yarn-site.xml

```
<?xml version="1.0"?> <!--   Licensed under the Apache License, Version 2.0 (the
"License");   you may not use this file except in compliance with the License.
You may obtain a copy of the License at

   http://www.apache.org/licenses/LICENSE-2.0

  Unless required by applicable law or agreed to in writing, software    distributed
under the License is distributed on an "AS IS" BASIS,    WITHOUT
WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied.
See the License for the specific language governing permissions and    limitations
under the License. See accompanying LICENSE file. -->

<configuration>    <property>
 <name>yarn.nodemanager.aux-services</name>
 <value>mapreduce_shuffle</value>
 </property>
 <property>
 <name>yarn.nodemanager.aux-services.mapreduce.shuffle.class</name>
 <value>org.apache.hadoop.mapred.ShuffleHandler</value>
 </property>
<property>
 <name>yarn.nodemanager.log-dirs</name>
 <value>D:\hadoop\userlog</value><final>true</final>
 </property>
<property><name>yarn.nodemanager.local-
dirs</name><value>D:\hadoop\temp\nm-localdir</value></property>
 <property>
 <name>yarn.nodemanager.delete.debug-delay-sec</name>
 <value>600</value></property>
<property><name>yarn.application.classpath</name>
 <value>/hadoop-2.6.2/,/hadoop-
2.6.2/share/hadoop/common/*,/hadoop2.6.2/share/hadoop/common/lib/*,/hadoop-
2.6.2/share/hadoop/hdfs/*,/hadoop2.6.2/share/hadoop/hdfs/lib/*,/hadoop-
2.6.2/share/hadoop/mapreduce/*,/hadoop2.6.2/share/hadoop/mapreduce/lib/*,/hado
op-2.6.2/share/hadoop/yarn/*,/hadoop2.6.2/share/hadoop/yarn/lib/*</value>
 </property></configuration>
```

g. Go to the location: “Hadoop-2.6.0/etc/hadoop,” and edit “hadoop-env.cmd” by writing set JAVA_HOME= C:\Progra~1\Java\jdk1.8.0_201

h. Set environmental variables:

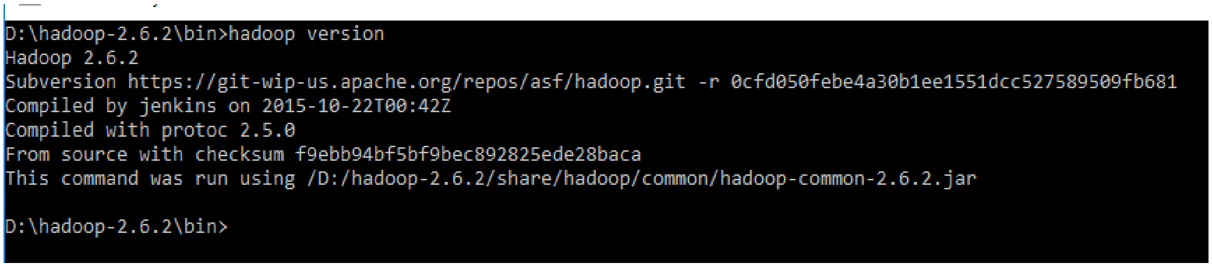
Do: My computer □ Properties □ Advance system settings □ Advanced □ Environmental variables

i. User variables:
   - Variable: HADOOP_HOME
   - Value: D:\hadoop-2.6.0

ii. System variable

- Variable: Path
- Value: D:\hadoop-2.6.2\bin D:\hadoop-2.6.2\sbin D:\hadoop-2.6.2\share\hadoop\common\* D:\hadoop-2.6.2\share\hadoop\hdfs D:\hadoop-2.6.2\share\hadoop\hdfs\lib\* D:\hadoop-2.6.2\share\hadoop\hdfs\* D:\hadoop-2.6.2\share\hadoop\yarn\lib\* D:\hadoop-2.6.2\share\hadoop\yarn\* D:\hadoop-2.6.2\share\hadoop\mapreduce\lib\* D:\hadoop-2.6.2\share\hadoop\mapreduce\* D:\hadoop-2.6.2\share\hadoop\common\lib\*

i. Check on cmd; see below



```
D:\hadoop-2.6.2\bin>hadoop version
Hadoop 2.6.2
Subversion https://git-wip-us.apache.org/repos/asf/hadoop.git -r 0cfd050febe4a30b1ee1551dcc527589509fb681
Compiled by jenkins on 2015-10-22T00:42Z
Compiled with protoc 2.5.0
From source with checksum f9ebb94bf5bf9bec892825ede28baca
This command was run using /D:/hadoop-2.6.2/share/hadoop/common/hadoop-common-2.6.2.jar

D:\hadoop-2.6.2\bin>
```

j. Format name-node:

On cmd go to the location “Hadoop-2.6.2/bin” by writing on cmd “cd hadoop-2.6.2.\bin” and then “hdfs namenode –format”

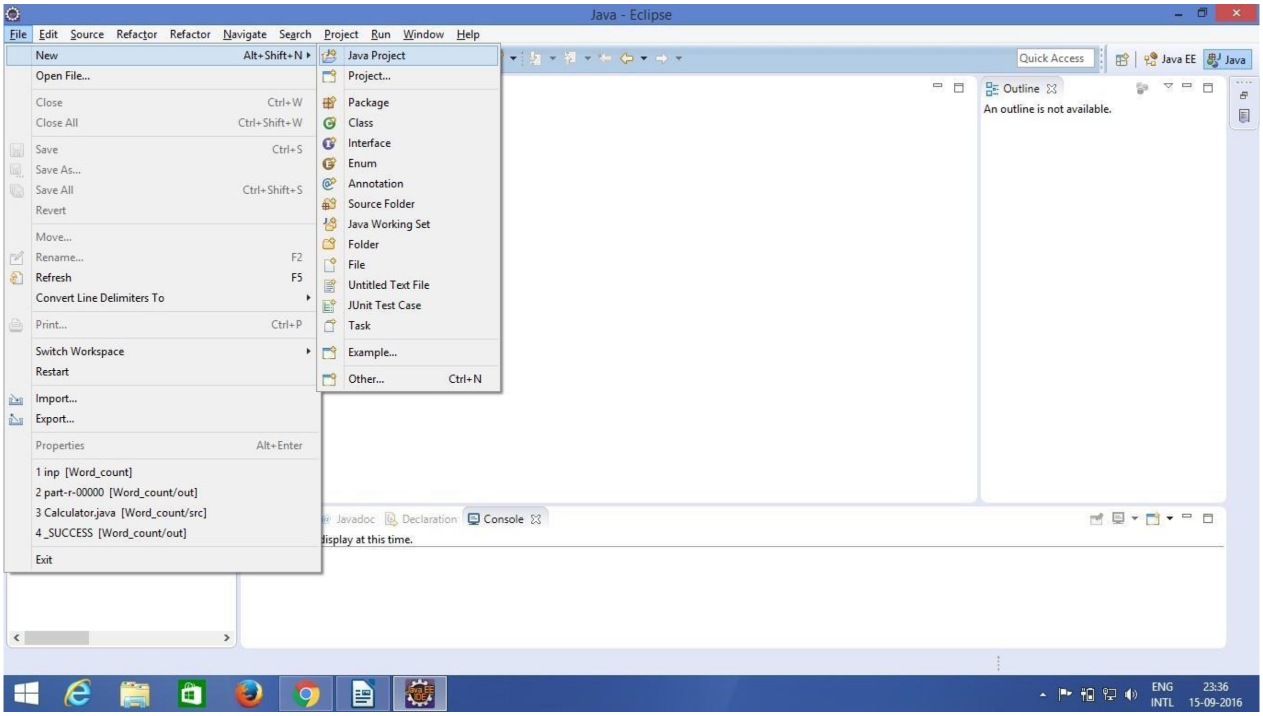
k. Start Hadoop. Go to the location: “D:\hadoop-2.6.0\sbin.”

Run the following files as administrator “start-all.cmd”

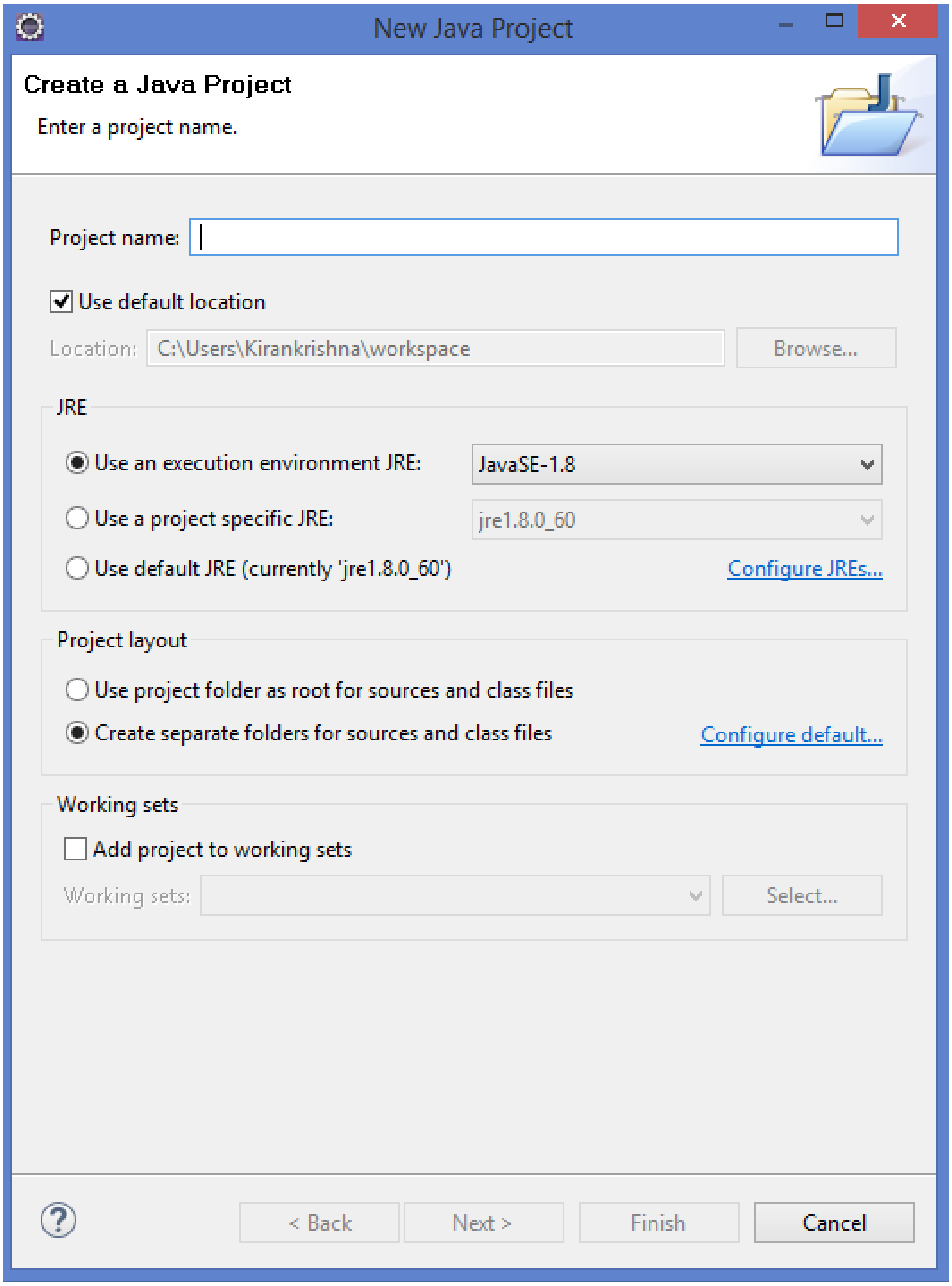
How to create a new MapReduce project in Eclipse

1. Open Ellipse

2. Click File - New Project - Java project



Hereafter clicking on the New Java project, it will ask for the project name as shown in the below screen shot. Give a project name. Here we have given the project name as W**ord_count**.



New Java Project

Create a Java Project

Enter a project name.

Project name:

☑ Use default location

Location: C:\Users\Kirankrishna\workspace

JRE

● Use an execution environment JRE: JavaSE-1.8

○ Use a project specific JRE: jre1.8.0_60

○ Use default JRE (currently 'jre1.8.0_60')

Project layout

○ Use project folder as root for sources and class files

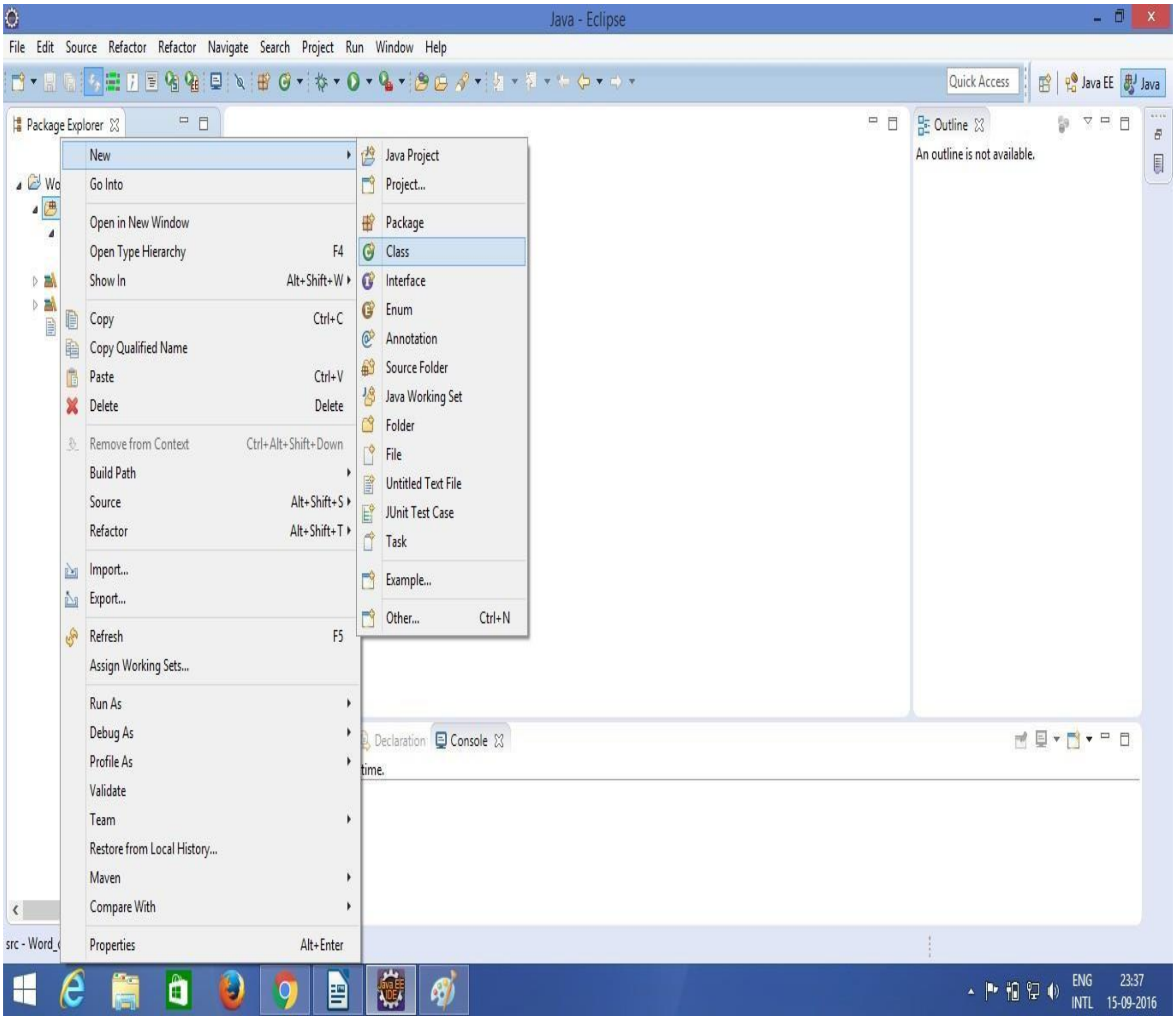
● Create separate folders for sources and class files

Working sets

□ Add project to working sets

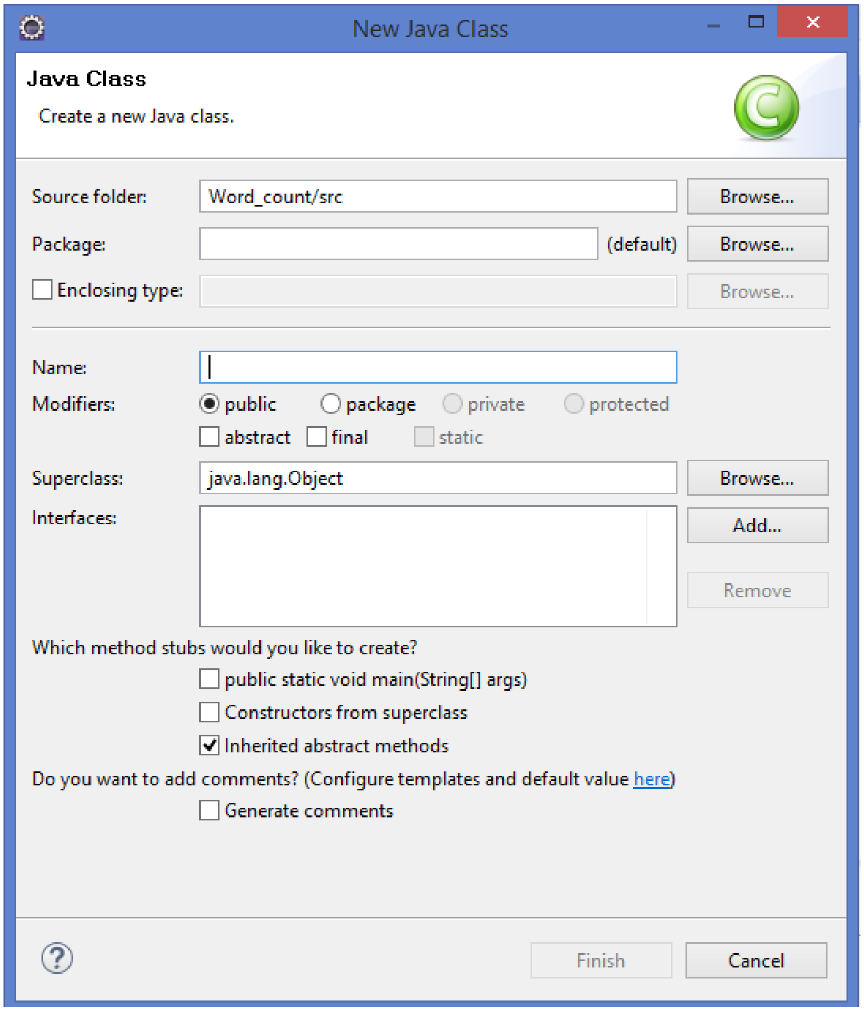
Working sets:

Now after giving the project name, a project will be created with the given name. Click on the project and inside the project, you will find a directory called **src**. Right click and create new class as shown in the below screen shot.



Now you will be prompted with another screen to provide the class name as shown in the below screen shot.

Here, give the class name of your choice. We have given the name as **WordCount**. Inside the **src,** a file with name **WordCount.java** has been created. Click on the file and write the MapReduce code for the word count program



Java Class

Create a new Java class.

Source folder: Word_count/src

Package: (default)

□ Enclosing type:

Name:

Modifiers: ● public ○ package ○ private ○ protected

□ abstract □ final □ static

Superclass: java.lang.Object

Interfaces:

Which method stubs would you like to create?

□ public static void main(String[] args)

□ Constructors from superclass

☑ Inherited abstract methods

Do you want to add comments? (Configure templates and default value here)

□ Generate comments

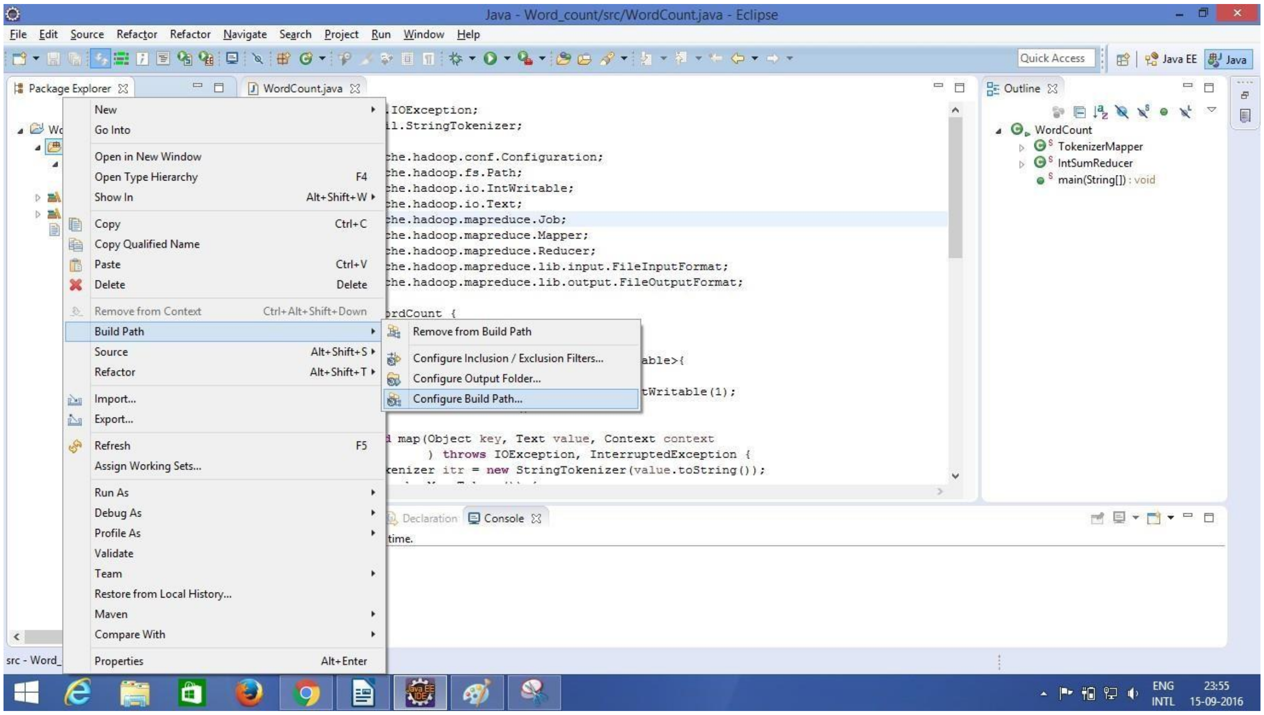
Source Code:

```
import java.io.IOException;
import java.util.StringTokenizer;
import org.apache.hadoop.conf.Configuration;
import org.apache.hadoop.fs.Path;
import org.apache.hadoop.io.IntWritable;
import org.apache.hadoop.io.Text;
import org.apache.hadoop.mapreduce.Job;
import org.apache.hadoop.mapreduce.Mapper;
import org.apache.hadoop.mapreduce.Reducer;
import org.apache.hadoop.mapreduce.lib.input.FileInputFormat;
import org.apache.hadoop.mapreduce.lib.output.FileOutputFormat;
public class WordCount {
  public static class TokenizerMapper
```

```
     extends Mapper<Object, Text, Text, IntWritable>{
  private final static IntWritable one = new IntWritable(1);
  private Text word = new Text();
  public void map(Object key, Text value, Context context
                  ) throws IOException, InterruptedException {
    StringTokenizer itr = new StringTokenizer(value.toString());
    while (itr.hasMoreTokens()) {
      word.set(itr.nextToken());
      context.write(word, one);
    }
  }
}
public static class IntSumReducer
     extends Reducer<Text,IntWritable,Text,IntWritable> {
  private IntWritable result = new IntWritable();
  public void reduce(Text key, Iterable<IntWritable> values,
                     Context context
                     ) throws IOException, InterruptedException {
    int sum = 0;
    for (IntWritable val : values) {
      sum += val.get();
    }
    result.set(sum);
    context.write(key, result);
  }
}
public static void main(String[] args) throws Exception {
  Configuration conf = new Configuration();
  Job job = Job.getInstance(conf, "word count");
  job.setJarByClass(WordCount.class);
  job.setMapperClass(TokenizerMapper.class);
  job.setCombinerClass(IntSumReducer.class);
  job.setReducerClass(IntSumReducer.class);
  job.setOutputKeyClass(Text.class);
  job.setOutputValueClass(IntWritable.class);
  FileInputFormat.addInputPath(job, new Path(args[0]));
  FileOutputFormat.setOutputPath(job, new Path(args[1]));
  System.exit(job.waitForCompletion(true) ? 0 : 1);
  }
}
```

After copying the code save the file. Now you need to add a few dependency files for running this program in Windows.

First, we need to add the jar files that are present in **hadoop-2.6.0/share/hadoop** directory. For that **Righ click on src–>Build path–>Configure build path** as shown in the below screen shot.



```
.IOException;
il.StringTokenizer;

che.hadoop.conf.Configuration;
che.hadoop.fs.Path;
che.hadoop.io.IntWritable;
che.hadoop.io.Text;
che.hadoop.mapreduce.Job;
che.hadoop.mapreduce.Mapper;
che.hadoop.mapreduce.Reducer;
che.hadoop.mapreduce.lib.input.FileInputFormat;
che.hadoop.mapreduce.lib.output.FileOutputFormat;

ordCount {

                                  able>{

                                  tWritable(1);

d map(Object key, Text value, Context context
      ) throws IOException, InterruptedException {
kenizer itr = new StringTokenizer(value.toString());
```

```
time.
```

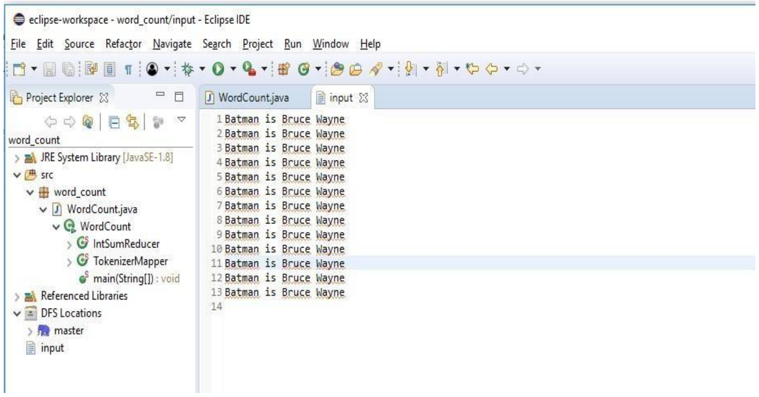
In the **Build Path** select the **Libraries** tab and click on **Add External Jars**. Now browse the path where the **Hadoop-2.6.0** extracted folder is present.

Copy all the Jar files from the locations "D:\hadoop-2.6.0\"
a. \share\hadoop\common\lib
b. \share\hadoop\mapreduce
c. \share\hadoop\mapreduce\lib

d. share\hadoop\yarn
e. \share\hadoop\yarn\lib

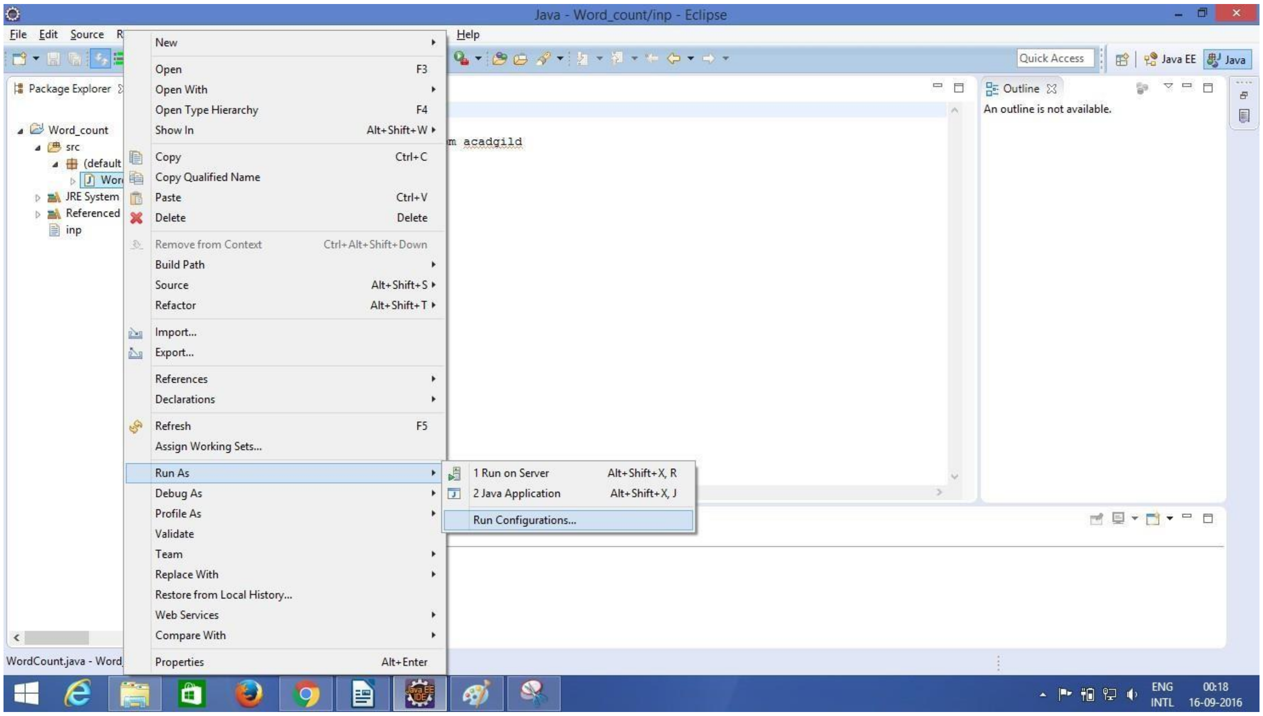
Open the **hadoop-2.6.0/share/hadoop/hdfs/lib**
folder and add the **commons-io-2.4.jar** file
Open the **hadoop-2.6.0/share/hadoop/tools/lib**
and add the **hadoop-auth-2.6.0.jar** file
Create bin folder under hadoop-2.6.2/bin
And add **winutils** files(lib and exe)
That's it all the set up required for running your Hadoop application in Windows. Make sure that your input file is ready.

Here we have created our input file in the project directory itself with the name **input** as shown in the below screen shot.

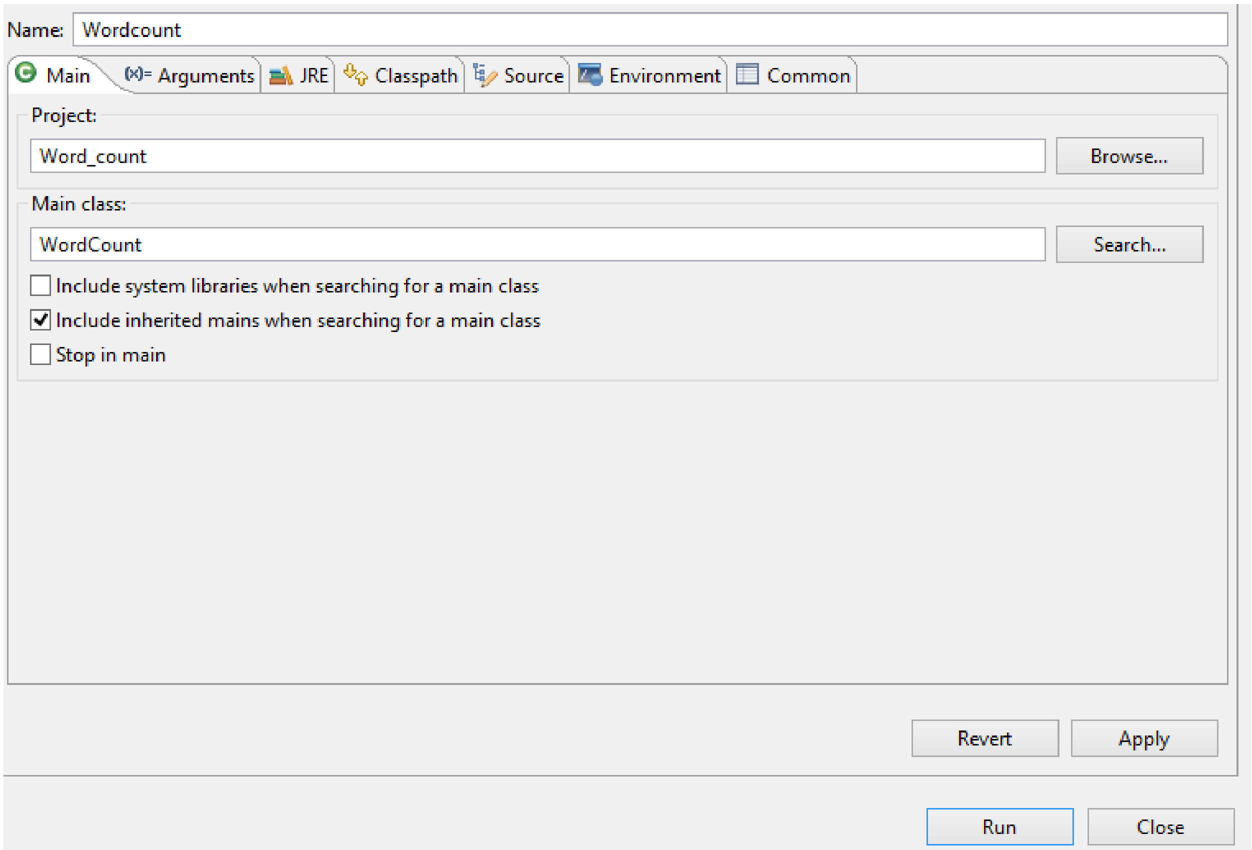


```
Batman is Bruce Wayne
Batman is Bruce Wayne
Batman is Bruce Wayne
Batman is Bruce Wayne
Batman is Bruce Wayne
Batman is Bruce Wayne
Batman is Bruce Wayne
Batman is Bruce Wayne
Batman is Bruce Wayne
Batman is Bruce Wayne
Batman is Bruce Wayne
Batman is Bruce Wayne
Batman is Bruce Wayne

```

For giving the input and output file paths, **Right click on the main class–>Run As–>Run configurations**
as shown in the below screen shot.



In the **main** select the project name and the class name of the program as shown in the below screen shot.



Name: Wordcount

Project: Word_count

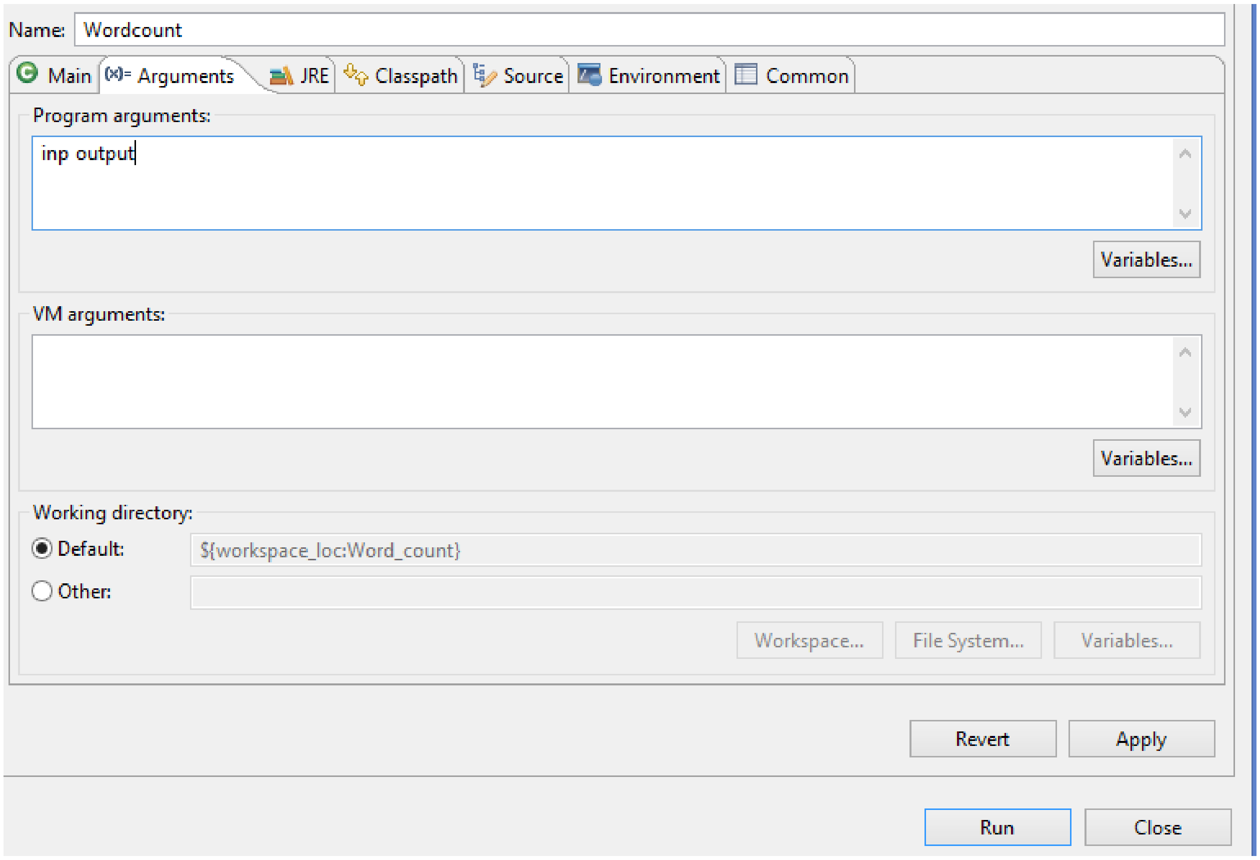
Main class: WordCount

☐ Include system libraries when searching for a main class

☑ Include inherited mains when searching for a main class

☐ Stop in main

Now move into the **Arguments** tab and provide the **input file path** and the **output file path** as shown in the below screen shot.



Name: Wordcount

Program arguments:

inp output

VM arguments:

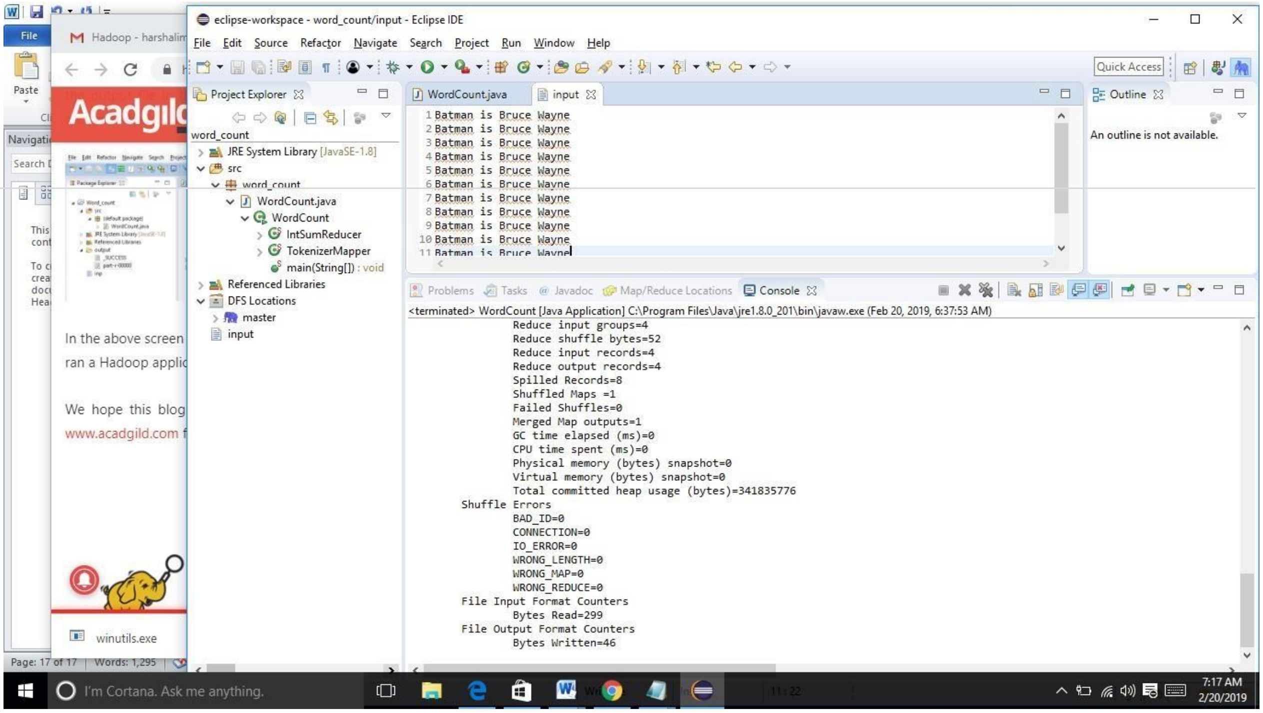
Working directory:

● Default: ${workspace_loc:Word_count}

○ Other:

Since we have our input file inside the project directory itself, we have just given **inp** as input file path and then a **tabspace.** We have given the **output file path** as just **output.** It will create the output directory inside the project directory itself.

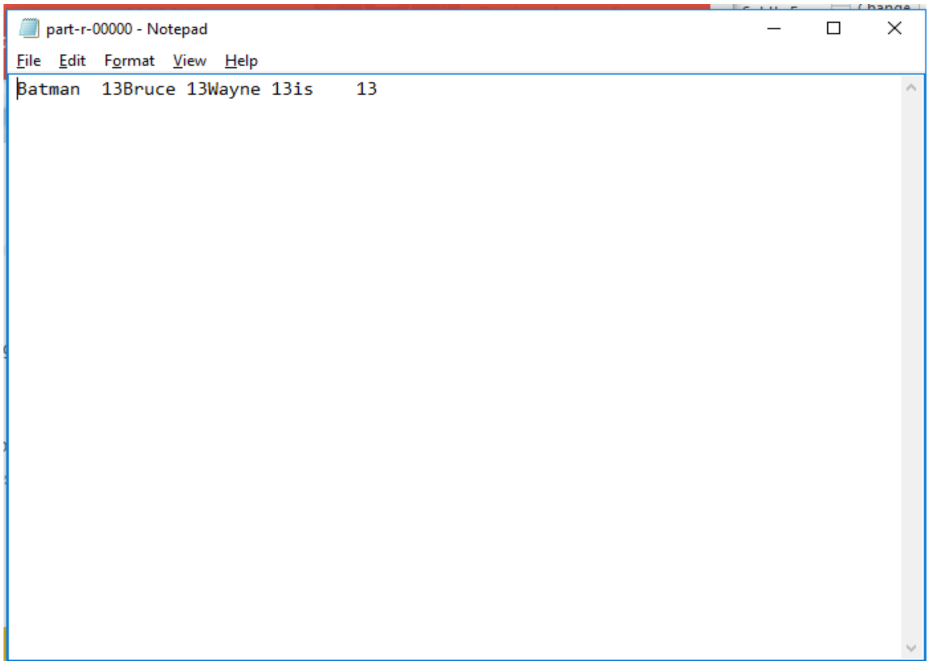
Now click on Run. You will see the Eclipse console running



```
Batman is Bruce Wayne
Batman is Bruce Wayne
Batman is Bruce Wayne
Batman is Bruce Wayne
Batman is Bruce Wayne
Batman is Bruce Wayne
Batman is Bruce Wayne
Batman is Bruce Wayne
Batman is Bruce Wayne
Batman is Bruce Wayne
Batman is Bruce Wayne
```

```
<terminated> WordCount [Java Application] C:\Program Files\Java\jre1.8.0_201\bin\javaw.exe (Feb 20, 2019, 6:37:53 AM)
                Reduce input groups=4
                Reduce shuffle bytes=52
                Reduce input records=4
                Reduce output records=4
                Spilled Records=8
                Shuffled Maps =1
                Failed Shuffles=0
                Merged Map outputs=1
                GC time elapsed (ms)=0
                CPU time spent (ms)=0
                Physical memory (bytes) snapshot=0
                Virtual memory (bytes) snapshot=0
                Total committed heap usage (bytes)=341835776
        Shuffle Errors
                BAD_ID=0
                CONNECTION=0
                IO_ERROR=0
                WRONG_LENGTH=0
                WRONG_MAP=0
                WRONG_REDUCE=0
        File Input Format Counters
                Bytes Read=299
        File Output Format Counters
                Bytes Written=46
```

eclipse-workspace - word_count/input - Eclipse IDE
File Edit Source Refactor Navigate Search Project Run Window Help
Quick Access
Project Explorer
word_count
JRE System Library [JavaSE-1.8]
src
word_count
WordCount.java
WordCount
IntSumReducer
TokenizerMapper
main(String[]) : void
Referenced Libraries
DFS Locations
master
input
WordCount.java
input
Outline
An outline is not available.
Problems Tasks Javadoc Map/Reduce Locations Console
I'm Cortana. Ask me anything.
7:17 AM
2/20/2019



```
Batman  13Bruce 13Wayne 13is    13
```

part-r-00000 - Notepad
File Edit Format View Help

Practical No.6

Aim:- Implement a basic IR system using Lucene

Code:-

LuceneConstants.java

```
package com.tutorialspoint.lucene;

public class LuceneConstants {
   public static final String CONTENTS = "contents";
   public static final String FILE_NAME = "filename";
   public static final String FILE_PATH = "filepath";
   public static final int MAX_SEARCH = 10;
}
```

TextFileFilter.java:-

```
package com.tutorialspoint.lucene;

import java.io.File;

import java.io.FileFilter;

public class TextFileFilter implements FileFilter {

   @Override

   public boolean accept(File pathname) {

      return    pathname.getName().toLowerCase().endsWith(".txt");

   }
}
```

Indexer.java:-

```
package com.tutorialspoint.lucene;

import java.io.File;

import java.io.FileFilter;

import java.io.FileReader;

import java.io.IOException;

import org.apache.lucene.analysis.standard.StandardAnalyzer;

import org.apache.lucene.document.Document;

import org.apache.lucene.document.Field;

import org.apache.lucene.index.CorruptIndexException;

import org.apache.lucene.index.IndexWriter;

import org.apache.lucene.store.Directory;

import org.apache.lucene.store.FSDirectory;

import org.apache.lucene.util.Version;

public class Indexer {

   private IndexWriter writer;

   public Indexer(String indexDirectoryPath) throws IOException {

      Directory indexDirectory =

         FSDirectory.open(new File(indexDirectoryPath));
```

```
    writer = new IndexWriter(indexDirectory,
      new StandardAnalyzer(Version.LUCENE_36),true,
      IndexWriter.MaxFieldLength.UNLIMITED);
  }
  public void close() throws CorruptIndexException, IOException {
    writer.close();
  }
  private Document getDocument(File file) throws IOException {
    Document document = new Document();
    Field contentField = new Field(LuceneConstants.CONTENTS, new
FileReader(file));
    Field fileNameField = new Field(LuceneConstants.FILE_NAME,
      file.getName(),Field.Store.YES,Field.Index.NOT_ANALYZED);
    Field filePathField = new Field(LuceneConstants.FILE_PATH,
      file.getCanonicalPath(),Field.Store.YES,Field.Index.NOT_ANALYZED);
    document.add(contentField);
    document.add(fileNameField);
    document.add(filePathField);
    return document;
```

```
}


private void indexFile(File file) throws IOException {
  System.out.println("Indexing "+file.getCanonicalPath());
  Document document = getDocument(file);
  writer.addDocument(document);
}


public int createIndex(String dataDirPath, FileFilter filter)
  throws IOException {
  File[] files = new File(dataDirPath).listFiles();
  for (File file : files) {
    if(!file.isDirectory()
      && !file.isHidden()
      &&  file.exists()
      && file.canRead()
      && filter.accept(file)
    ){
      indexFile(file);
    }
```

```
      }

      return writer.numDocs();

   }

}
```

Searcher.java:-

```
package com.tutorialspoint.lucene;

import java.io.File;
import java.io.IOException;

import    org.apache.lucene.analysis.standard.StandardAnalyzer;
import   org.apache.lucene.document.Document;
import org.apache.lucene.index.CorruptIndexException;
import org.apache.lucene.queryParser.ParseException;
import org.apache.lucene.queryParser.QueryParser;
import org.apache.lucene.search.IndexSearcher;
import org.apache.lucene.search.Query;
import org.apache.lucene.search.ScoreDoc;
import org.apache.lucene.search.TopDocs;
import org.apache.lucene.store.Directory;
import org.apache.lucene.store.FSDirectory;
import org.apache.lucene.util.Version;

public class Searcher {

   IndexSearcher indexSearcher;
   QueryParser queryParser;
   Query query;

   public Searcher(String indexDirectoryPath)
      throws IOException {
      Directory indexDirectory =
         FSDirectory.open(new File(indexDirectoryPath));
      indexSearcher = new ~~IndexSearcher~~(indexDirectory);
      queryParser = new QueryParser(Version.LUCENE_36,
         LuceneConstants.CONTENTS,
         new StandardAnalyzer(Version.LUCENE_36));
   }

   public TopDocs search( String searchQuery)
      throws IOException, ParseException {
      query = queryParser.parse(searchQuery);
      return indexSearcher.search(query, LuceneConstants.MAX_SEARCH);
   }

   public Document getDocument(ScoreDoc scoreDoc)
      throws CorruptIndexException, IOException {
      return indexSearcher.doc(scoreDoc.doc);
   }

   public void close() throws IOException {
      indexSearcher.close();
   }
}
```

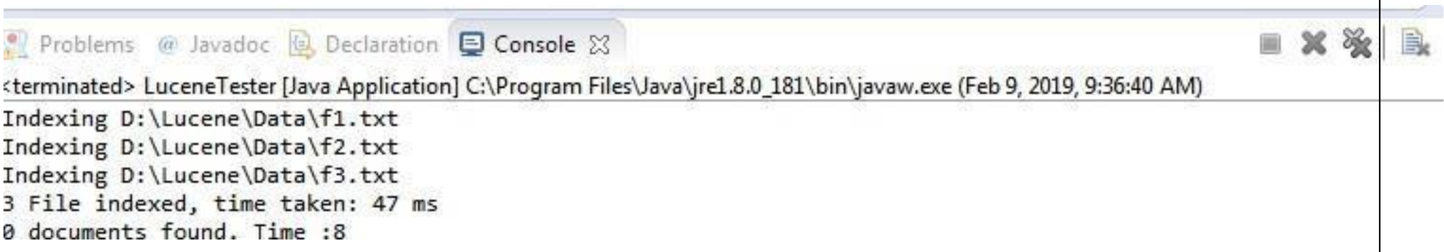
LuceneTester.java:-

```
package com.tutorialspoint.lucene;

import java.io.IOException;

import org.apache.lucene.document.Document;
import org.apache.lucene.queryParser.ParseException;
import org.apache.lucene.search.ScoreDoc;
import   org.apache.lucene.search.TopDocs;

public class LuceneTester {

   String indexDir = "D:\\Lucene\\Index";
   String dataDir = "D:\\Lucene\\Data";
   Indexer indexer;
   Searcher searcher;
```

```
public static void main(String[] args) {
   LuceneTester tester;
   try {
      tester = new LuceneTester();
      tester.createIndex();
      tester.search("Mohan");
   } catch (IOException e) {
      e.printStackTrace();
   } catch (ParseException e) {
      e.printStackTrace();
   }
}

private void createIndex() throws IOException {
   indexer = new Indexer(indexDir);
   int numIndexed;
   long startTime = System.currentTimeMillis();
   numIndexed = indexer.createIndex(dataDir, new TextFileFilter());
   long endTime = System.currentTimeMillis();
   indexer.close();
   System.out.println(numIndexed+" File indexed, time taken: "
      +(endTime-startTime)+" ms");
}

private void search(String searchQuery) throws IOException, ParseException {
   searcher = new Searcher(indexDir);
   long startTime = System.currentTimeMillis();
   TopDocs hits = searcher.search(searchQuery);
   long endTime = System.currentTimeMillis();

   System.out.println(hits.totalHits +
      " documents found. Time :" + (endTime - startTime));
   for(ScoreDoc scoreDoc : hits.scoreDocs) {
      Document doc = searcher.getDocument(scoreDoc);
         System.out.println("File: "
         + doc.get(LuceneConstants.FILE_PATH));
   }
   searcher.close();
}
```

```
}
```

Output:-



```
<terminated> LuceneTester [Java Application] C:\Program Files\Java\jre1.8.0_181\bin\javaw.exe (Feb 9, 2019, 9:36:40 AM)
Indexing D:\Lucene\Data\f1.txt
Indexing D:\Lucene\Data\f2.txt
Indexing D:\Lucene\Data\f3.txt
3 File indexed, time taken: 47 ms
0 documents found. Time :8
```

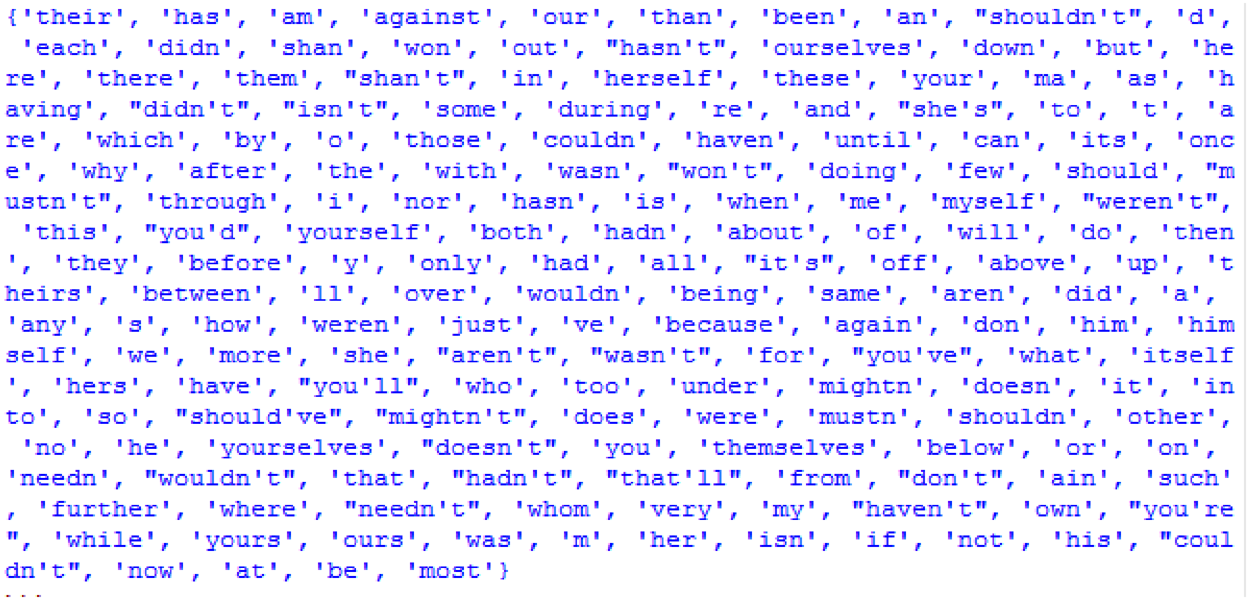
Practical No.7

Aim:- Write a program for Pre-processing of a Text Document: stop word removal.

Stopwords1.py:-

```
>>> import nltk
>>> from nltk.corpus import stopwords
>>> set(stopwords.words('english'))
```

Output:-



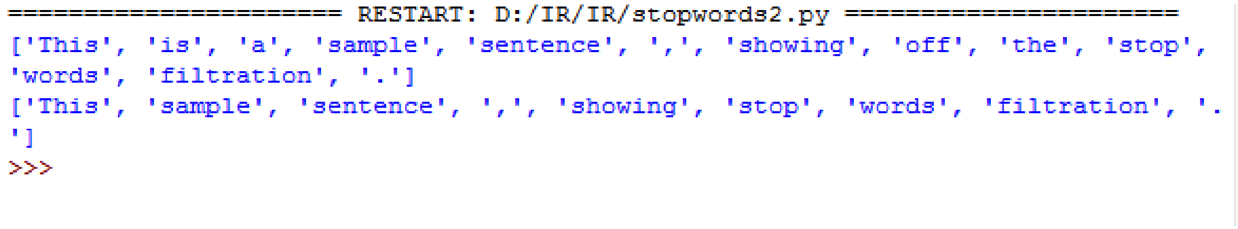
```
{'their', 'has', 'am', 'against', 'our', 'than', 'been', 'an', "shouldn't", 'd',
 'each', 'didn', 'shan', 'won', 'out', "hasn't", 'ourselves', 'down', 'but', 'he
re', 'there', 'them', "shan't", 'in', 'herself', 'these', 'your', 'ma', 'as', 'h
aving', "didn't", "isn't", 'some', 'during', 're', 'and', "she's", 'to', 't', 'a
re', 'which', 'by', 'o', 'those', 'couldn', 'haven', 'until', 'can', 'its', 'onc
e', 'why', 'after', 'the', 'with', 'wasn', "won't", 'doing', 'few', 'should', "m
ustn't", 'through', 'i', 'nor', 'hasn', 'is', 'when', 'me', 'myself', "weren't",
 'this', "you'd", 'yourself', 'both', 'hadn', 'about', 'of', 'will', 'do', 'then
', 'they', 'before', 'y', 'only', 'had', 'all', "it's", 'off', 'above', 'up', 't
heirs', 'between', 'll', 'over', 'wouldn', 'being', 'same', 'aren', 'did', 'a',
'any', 's', 'how', 'weren', 'just', 've', 'because', 'again', 'don', 'him', 'him
self', 'we', 'more', 'she', "aren't", "wasn't", 'for', "you've", 'what', 'itself
', 'hers', 'have', "you'll", 'who', 'too', 'under', 'mightn', 'doesn', 'it', 'in
to', 'so', "should've", "mightn't", 'does', 'were', 'mustn', 'shouldn', 'other',
 'no', 'he', 'yourselves', "doesn't", 'you', 'themselves', 'below', 'or', 'on',
'needn', "wouldn't", 'that', "hadn't", "that'll", 'from', "don't", 'ain', 'such'
, 'further', 'where', "needn't", 'whom', 'very', 'my', "haven't", 'own', "you're
", 'while', 'yours', 'ours', 'was', 'm', 'her', 'isn', 'if', 'not', 'his', "coul
dn't", 'now', 'at', 'be', 'most'}
```

Stopwords1.py:-

```
from nltk.corpus import stopwords
from nltk.tokenize import word_tokenize
```

```
example_sent = "This is a sample sentence, showing off the stop words filtration."

stop_words = set(stopwords.words('english'))

word_tokens = word_tokenize(example_sent)

filtered_sentence = [w for w in word_tokens if not w in stop_words]

filtered_sentence = []

for w in word_tokens:
    if w not in stop_words:
        filtered_sentence.append(w)

print(word_tokens)
print(filtered_sentence)
```

Output:-



```
====================== RESTART: D:/IR/IR/stopwords2.py ======================
['This', 'is', 'a', 'sample', 'sentence', ',', 'showing', 'off', 'the', 'stop',
'words', 'filtration', '.']
['This', 'sample', 'sentence', ',', 'showing', 'stop', 'words', 'filtration', '.
']
>>>
```

Practical No.8

Aim:- Write a program for mining twitter to identify tweets for a specific period and identify trends and named entities

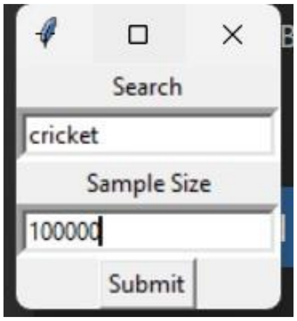
Code:

```
import tweepy
from tkinter import *
from datetime import datetime
from textblob import TextBlob
import matplotlib.pyplot as plt

consumer_key = ‘consumer_key'
consumer_secret ='consumer_secret'
access_token = acess_token'
access_token_secret = access_token_secret'

auth = tweepy.OAuthHandler(consumer_key, consumer_secret)
auth.set_access_token(access_token, access_token_secret)
api = tweepy.API(auth)
#user = api.me()
#print (user.name)
#GUI
root = Tk()

label1 = Label(root, text="Search")
E1 = Entry(root, bd =5)

label2 = Label(root, text="Sample Size")
E2 = Entry(root, bd =5)

def getE1():
return E1.get()

def getE2():
return E2.get()

def getData():
getE1()
keyword = getE1()
```

```
        getE2()
        numberOfTweets = getE2()
        numberOfTweets = int(numberOfTweets)

    #Where the tweets are stored to be plotted
    polarity_list = []
    numbers_list = []
    number = 1
    resultsn= api.search_tweets(keyword ,lang="en")
    for tweet in resultsn:
        try:
            analysis = TextBlob(tweet.text)
            analysis = analysis.sentiment
            polarity = analysis.polarity
            polarity_list.append(polarity)
            numbers_list.append(number)
            number = number + 1

        except tweepy.TweepError as e:
            print(e.reason)

        except StopIteration:
            break

    #Plotting
    axes = plt.gca()
    axes.set_ylim([-1, 2])

    plt.scatter(numbers_list, polarity_list)

    averagePolarity = (sum(polarity_list))/(len(polarity_list))
    averagePolarity = "{0:.0f}%".format(averagePolarity * 100)
    time  = datetime.now().strftime("At: %H:%M\nOn: %m-%d-%y")

    plt.text(0, 1.25, "Average Sentiment:  " + str(averagePolarity) + "\n" + time, fontsize=12, bbox =
dict(facecolor='none', edgecolor='black', boxstyle='square, pad = 1'))

    plt.title("Sentiment of " + keyword + " on Twitter")
    plt.xlabel("Number of Tweets")
    plt.ylabel("Sentiment")
    plt.show()

submit = Button(root, text ="Submit", command = getData)
```

```
label1.pack()
E1.pack()
label2.pack()
E2.pack()
submit.pack(side =BOTTOM)

root.mainloop()
```

OUTPUT :

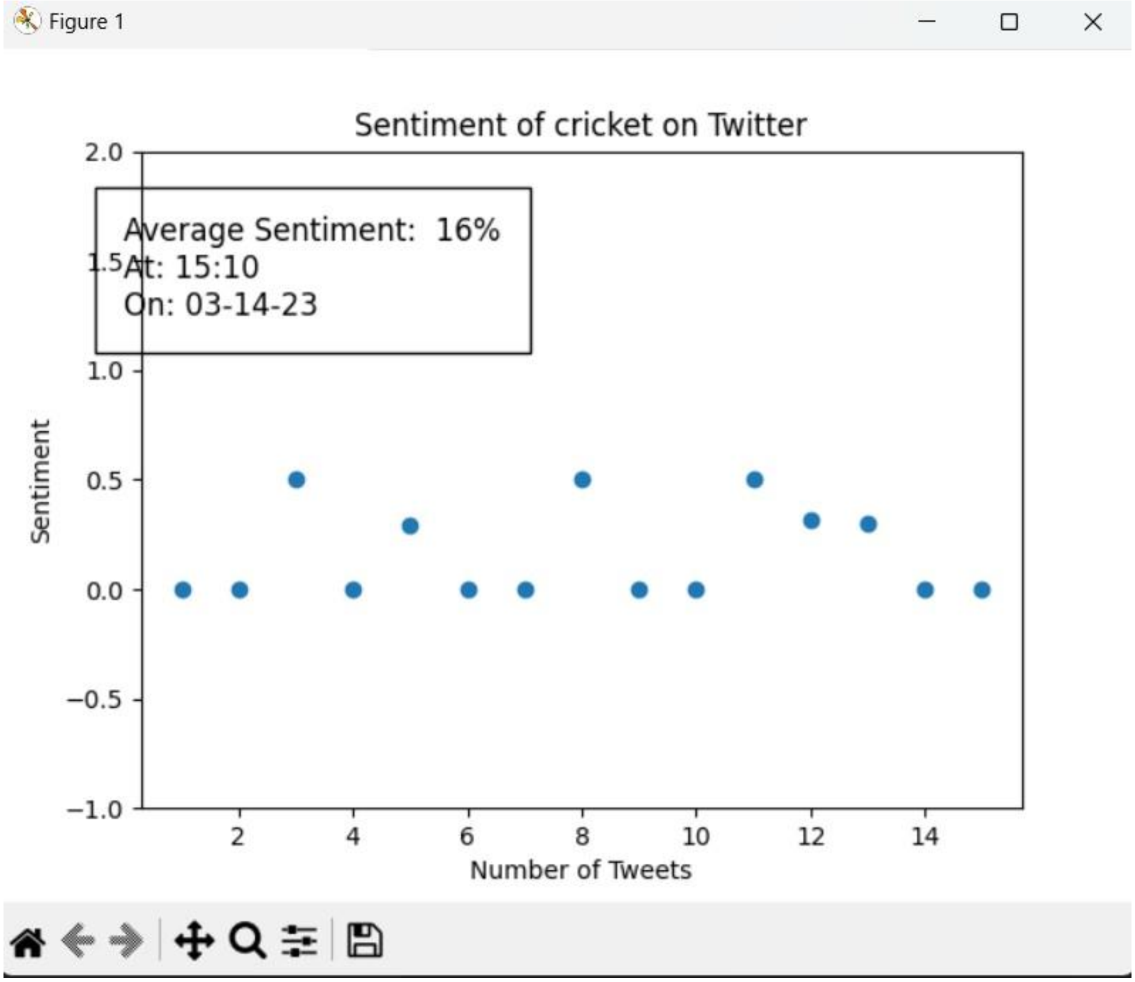


Search

cricket

Sample Size

100000



Practical No.9

Aim: Write a program to implement simple web crawler.

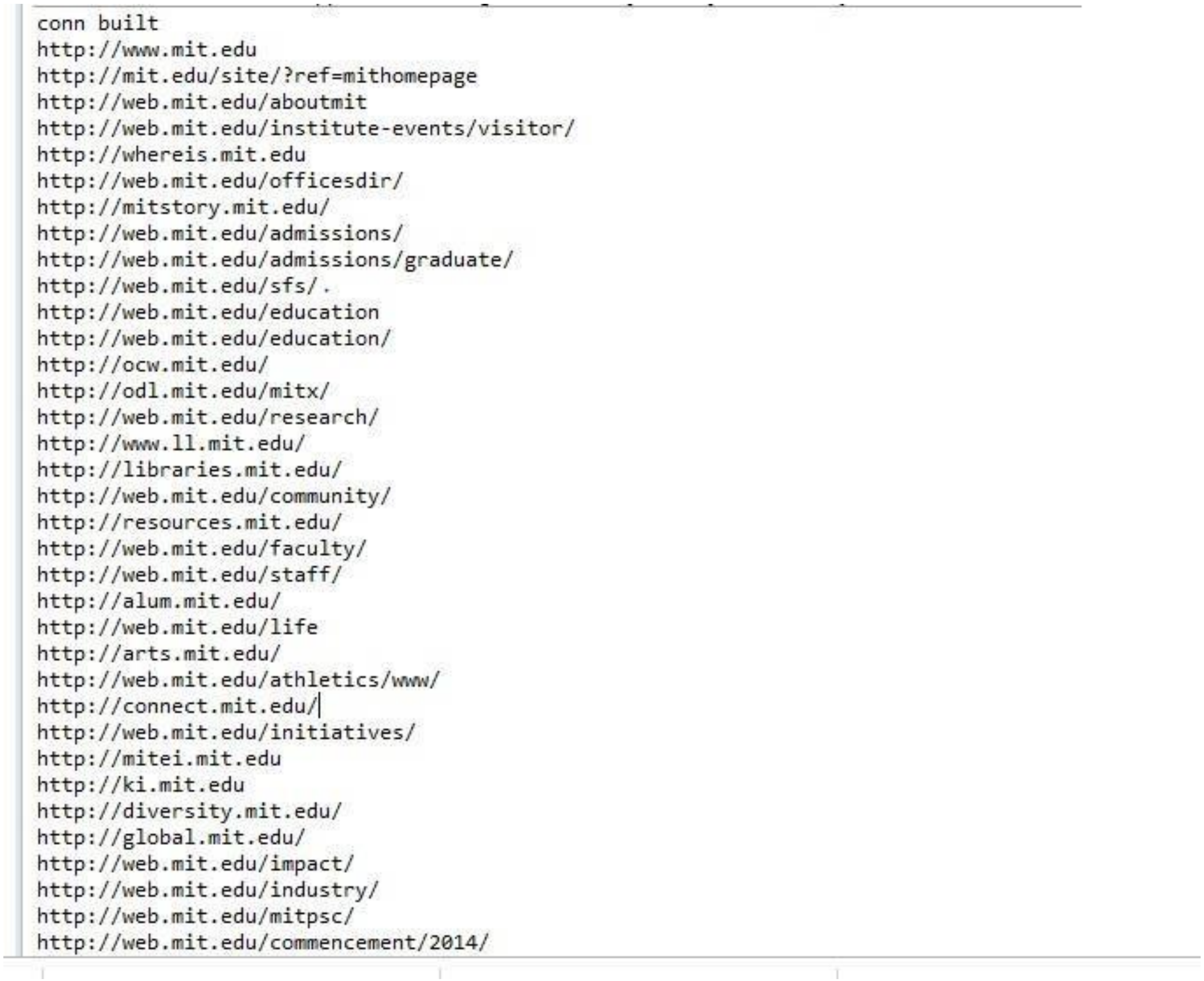
Code:

```
import java.net.*;

import java.io.*;


public class Crawler{

   public static void main(String[] args) throws Exception{

   String urls[] = new String[1000];

   String url = "https://www.cricbuzz.com/live-cricket-scores/20307/aus-vs-ind-3rd-odi-india-tour-of-australia-2018-19";

   int i=0,j=0,tmp=0,total=0, MAX = 1000;

   int start=0, end=0;

   String webpage = Web.getWeb(url);

   end = webpage.indexOf("<body");

   for(i=total;i<MAX; i++, total++){

      start = webpage.indexOf("http://", end);

      if(start == -1){

         start = 0;

         end = 0;

         try{

            webpage = Web.getWeb(urls[j++]);

         }catch(Exception e){

            System.out.println("******************");

            System.out.println(urls[j-1]);
```

```
                System.out.println("Exception caught \n"+e);
            }

            /*logic to fetch urls out of body of webpage only */
            end = webpage.indexOf("<body");
            if(end == -1){
                end = start = 0;
                continue;
            }
        }
        end = webpage.indexOf("\"", start);
        tmp = webpage.indexOf("'", start);
        if(tmp < end && tmp != -1){
            end = tmp;
        }
        url = webpage.substring(start, end);
        urls[i] = url;
        System.out.println(urls[i]);
    }
    System.out.println("Total URLS Fetched are " + total);
    }
}
```

```
/*This class contains a static function which will fetch the webpage
  of the given url and return as a string */
class Web{
    public static String getWeb(String address)throws Exception{
    String webpage = "";
        String inputLine = "";
        URL url = new URL(address);
        BufferedReader in = new BufferedReader(
        new InputStreamReader(url.openStream()));
        while ((inputLine = in.readLine()) != null)
        webpage += inputLine;
        in.close();
    return  webpage;
    }
}
```

Output:



```
conn built
http://www.mit.edu
http://mit.edu/site/?ref=mithomepage
http://web.mit.edu/aboutmit
http://web.mit.edu/institute-events/visitor/
http://whereis.mit.edu
http://web.mit.edu/officesdir/
http://mitstory.mit.edu/
http://web.mit.edu/admissions/
http://web.mit.edu/admissions/graduate/
http://web.mit.edu/sfs/ .
http://web.mit.edu/education
http://web.mit.edu/education/
http://ocw.mit.edu/
http://odl.mit.edu/mitx/
http://web.mit.edu/research/
http://www.ll.mit.edu/
http://libraries.mit.edu/
http://web.mit.edu/community/
http://resources.mit.edu/
http://web.mit.edu/faculty/
http://web.mit.edu/staff/
http://alum.mit.edu/
http://web.mit.edu/life
http://arts.mit.edu/
http://web.mit.edu/athletics/www/
http://connect.mit.edu/
http://web.mit.edu/initiatives/
http://mitei.mit.edu
http://ki.mit.edu
http://diversity.mit.edu/
http://global.mit.edu/
http://web.mit.edu/impact/
http://web.mit.edu/industry/
http://web.mit.edu/mitpsc/
http://web.mit.edu/commencement/2014/
```

Practical No.10

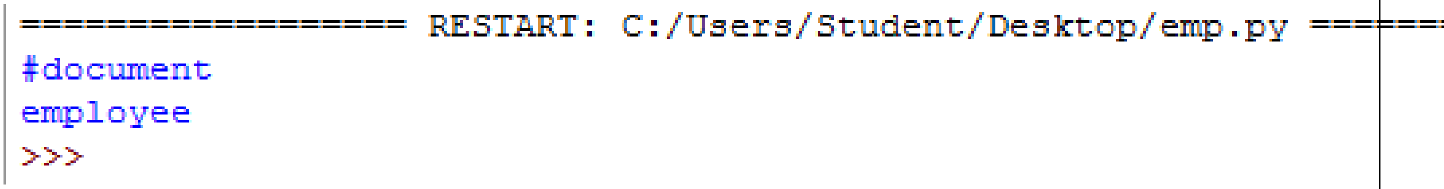
Aim:- Write a program to parse XML text, generate Web graph and compute topic specific page rank.

emp.xml:-

```
<?xml version="1.0" encoding="UTF-8"?>
<employee>
<fname>Divesh</fname>
<lname>Saurabh</lname>
<home>Thane</home>
<expertise name="SQl"/>
<expertise name="Python"/>
<expertise name="Testing"/>
<expertise name="Business"/>
</employee>
```

emp.py:-

```
import xml.dom.minidom
def main():
    doc=xml.dom.minidom.parse("emp.xml");
    print(doc.nodeName)
    print(doc.firstChild.tagName)
if__name__=="__main__":
    main()
```

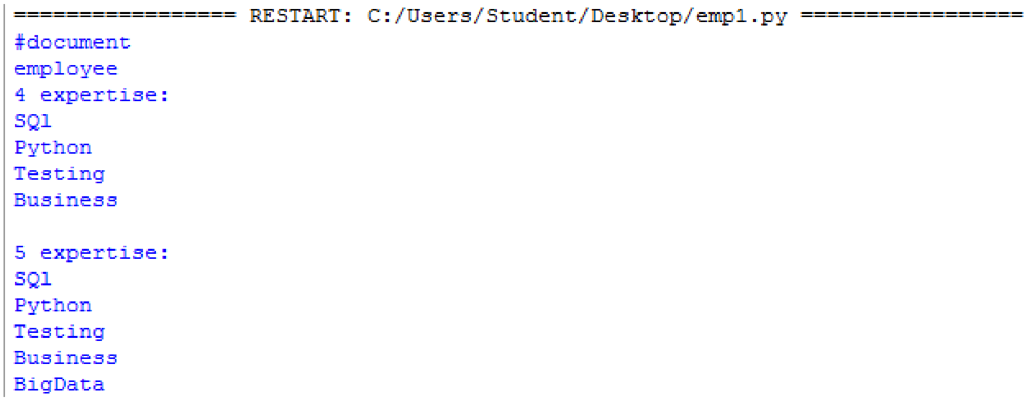


```
================== RESTART: C:/Users/Student/Desktop/emp.py ======
#document
employee
>>>
```

emp1.py:-

```
import xml.dom.minidom
def main():
   doc = xml.dom.minidom.parse("emp.xml");
   print (doc.nodeName)
   print (doc.firstChild.tagName)
   expertise = doc.getElementsByTagName("expertise")
   print ("%d expertise:" % expertise.length)
   for skill in expertise:
     print (skill.getAttribute("name"))
  newexpertise = doc.createElement("expertise")
  newexpertise.setAttribute("name", "BigData")
  doc.firstChild.appendChild(newexpertise)
  print (" ")
   expertise = doc.getElementsByTagName("expertise")
   print ("%d expertise:" % expertise.length)
   for skill in expertise:
     print (skill.getAttribute("name"))
if___name___== "__main__":
main();
```

Output:



```
================= RESTART: C:/Users/Student/Desktop/emp1.py =================
#document
employee
4 expertise:
SQl
Python
Testing
Business

5 expertise:
SQl
Python
Testing
Business
BigData
```