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Q-1: Mapper class

```
import java.io.IOException;
import
org.apache.hadoop.io.IntWritable;
import org.apache.hadoop.io.Text;
import org.apache.hadoop.mapreduce.Mapper;

public class TokenizerMapper extends Mapper<Object, Text, Text, IntWritable>{

    private final static IntWritable one = new
    IntWritable(1); private Text word = new Text();

    // The map method
    public void map(Object key, Text value, Context context) throws IOException,
    InterruptedException
    {
        // Split the line into tokens (words)
        String[] tokens = value.toString().split("\\s+");

        // Iterate through each word in the tokens
        for (String token : tokens) {
            word.set(token);
            context.write(word, one); // Emit the word as the key and 1 as the value
        }
    }
}
```

Reducer class:

```
import java.io.IOException;
import org.apache.hadoop.io.IntWritable;
```

```

import org.apache.hadoop.io.Text;
import org.apache.hadoop.mapreduce.Reducer;

public class IntSumReducer extends Reducer<Text, IntWritable, Text,
IntWritable> {

    private IntWritable result = new IntWritable();

    // The reduce method
    public void reduce(Text key, Iterable<IntWritable> values, Context
context) throws IOException, InterruptedException {
        int sum = 0;
        // Iterate over the values (which are all 1s) and sum
        them up for (IntWritable val : values) {
            sum += val.get();
        }
        result.set(sum);
        // Emit the word and its count
        context.write(key, result);
    }
}

```

Driver class:

```

import org.apache.hadoop.conf.Configura*on;
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.lib.input.FileInputFormat;

```

```

import
org.apache.hadoop.mapreduce.lib.output.FileOutputFormat;
import org.apache.hadoop.util.GenericOptionsParser;

public class WordCount {

    public static void main(String[] args) throws
        Exception { Configuration conf = new
        Configuration();
        String[] otherArgs = new GenericOptionsParser(conf, args).getRemainingArgs();

        if (otherArgs.length < 2) {
            System.err.println("Usage: wordcount <in>
            <out>"); System.exit(2);
        }

        Job job = new Job(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)
        ;

        // Set input and output paths
        FileInputFormat.addInputPath(job, new
        Path(otherArgs[0])); FileOutputFormat.setOutputPath(job,
        new Path(otherArgs[1]));

        System.exit(job.waitForCompletion(true) ? 0 : 1);
    }

```

}

Q-2: Mapper class:

```
import java.io.IOException;

import
org.apache.hadoop.io.IntWritable;
import org.apache.hadoop.io.Text;
import org.apache.hadoop.mapreduce.Mapper;

public class MinTempMapper extends Mapper<Object, Text, Text, IntWritable> {

    private Text year = new Text();
    private IntWritable temperature = new IntWritable();

    public void map(Object key, Text value, Context context) throws IOException,
    InterruptedException
    {
        // Split the line into year and temperature
        String[] fields =
        value.toString().split("\\s+");

        // Parse the year and
        temperature if (fields.length ==
        2) {
            year.set(fields[0]); // Set the year
            temperature.set(Integer.parseInt(fields[1])); // Set the temperature
            // Emit the year as the key and temperature as the value
            context.write(year, temperature);
        }
    }
}
```

Reducer class:

```
import java.io.IOException;

import
org.apache.hadoop.io.IntWritable;
```

```
import org.apache.hadoop.io.Text;  
import org.apache.hadoop.mapreduce.Reducer;
```

```

public class MinTempReducer 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 minTemp = Integer.MAX_VALUE;

        // Iterate through all temperatures and find the
        minimum for (IntWritable val : values) {

            minTemp = Math.min(minTemp, val.get());

        }

        result.set(minTemp);

        // Emit the year and the minimum temperature
        context.write(key, result);

    }
}

```

Driver class:

```

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.lib.input.FileInputFormat;
import
org.apache.hadoop.mapreduce.lib.output.FileOutputFormat;
import org.apache.hadoop.util.GenericOptionsParser;

public class MinTemp {

```

```

public static void main(String[] args) throws
    Exception { Configuration conf = new
    Configuration();
    String[] otherArgs = new GenericOptionsParser(conf, args).getRemainingArgs();

    if (otherArgs.length < 2) {
        System.err.println("Usage: mintemp <in>
        <out>"); System.exit(2);
    }

    Job job = new Job(conf, "minimum
    temperature");
    job.setJarByClass(MinTemp.class);
    job.setMapperClass(MinTempMapper.class);
    job.setReducerClass(MinTempReducer.class);
    job.setOutputKeyClass(Text.class);
    job.setOutputValueClass(IntWritable.class);

    // Set input and output paths
    FileInputFormat.addInputPath(job, new
    Path(otherArgs[0])); FileOutputFormat.setOutputPath(job,
    new Path(otherArgs[1]));

    System.exit(job.waitForCompletion(true) ? 0 : 1);
    }
}

```

Text file:

```

2014 -1
2014 5
2015 20
2015 25
2016 30

```


Q-3: Mapper class:

```
import java.io.IOException;

import
org.apache.hadoop.io.IntWritable;
import org.apache.hadoop.io.Text;
import org.apache.hadoop.mapreduce.Mapper;

public class TokenCountMapper extends Mapper<Object, Text, Text, IntWritable> {

    private final static IntWritable one = new
    IntWritable(1); private Text word = new Text();
    private Text specialKey = new Text("SpecialCount");

    public void map(Object key, Text value, Context context) throws IOException,
    InterruptedException
    {
        // Split the line into tokens (words)
        String[] tokens =
        value.toString().split("\\s+"); int
        tokenCount = tokens.length;

        // Emit each word as key with 1 as the
        value for (String token : tokens) {
            word.set(token);
            context.write(word, one);
        }

        // Emit a special key with token count for later aggregation
        context.write(specialKey, new IntWritable(tokenCount));
    }
}
```

Reducer class:

```
import java.io.IOException;
```

```

import
org.apache.hadoop.io.IntWritable;
import org.apache.hadoop.io.Text;
import org.apache.hadoop.mapreduce.Reducer;

public class TokenCountReducer extends Reducer<Text, IntWritable, Text, IntWritable> {

    private IntWritable result = new
    IntWritable(); private int totalTokens = 0;
    private int lineCount = 0;

    public void reduce(Text key, Iterable<IntWritable> values, Context context) throws
    IOException, InterruptedException {
        int sum = 0;

        // Special case: if the key is "SpecialCount", aggregate token count and line
        count if (key.toString().equals("SpecialCount")) {
            for (IntWritable val :
                values) { totalTokens +=
                val.get(); lineCount++;
            }
        } else {
            // For regular tokens, sum up the values to count occurrences of the
            token for (IntWritable val : values) {
                sum += val.get();
            }
            result.set(sum);
            context.write(key, result); // Emit the token and its count
        }
    }

    // ASer all the data is processed, emit the average token count

```

@Override

```
protected void cleanup(Context context) throws IOException,
    InterruptedException { if (lineCount > 0) {
        float average = (float) totalTokens / lineCount;
        context.write(new Text("AverageCount"), new IntWritable(Math.round(average)));
    }
}
```

Driver class:

```
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.lib.input.FileInputFormat;
import
org.apache.hadoop.mapreduce.lib.output.FileOutputFormat;
import org.apache.hadoop.util.GenericOptionsParser;

public class TokenCount {

    public static void main(String[] args) throws
        Exception { Configuration conf = new
        Configuration();
        String[] otherArgs = new GenericOptionsParser(conf, args).getRemainingArgs();

        if (otherArgs.length < 2) {
            System.err.println("Usage: tokencount <in> <out>");
            System.exit(2);
        }
    }
}
```

```
Job job = new Job(conf, "token count with average");
```

```

    job.setJarByClass(TokenCount.class);
    job.setMapperClass(TokenCountMapper.class);
    job.setReducerClass(TokenCountReducer.class);
    job.setOutputKeyClass(Text.class);
    job.setOutputValueClass(IntWritable.class);

    // Set input and output paths
    FileInputFormat.addInputPath(job, new
    Path(otherArgs[0])); FileOutputFormat.setOutputPath(job,
    new Path(otherArgs[1]));

    System.exit(job.waitForCompletion(true) ? 0 : 1);
}
}

```

Text file:

Hadoop is a
framework Hotspot
JVM for Java Hadoop
is great

Q-4: Mapper class:

```

import java.io.IOException;
import
org.apache.hadoop.io.IntWritable;
import org.apache.hadoop.io.Text;
import org.apache.hadoop.mapreduce.Mapper;

public class TokenLengthMapper extends Mapper<Object, Text, Text, IntWritable> {

    private final static IntWritable one = new
    IntWritable(1); private Text specialKey = new
    Text("TokenCount");

```

```

public void map(Object key, Text value, Context context) throws IOException,
InterruptedException
{
    // Split the line into tokens (words)
    String[] tokens = value.toString().split("\\s+");

    // Iterate over the tokens
    for (String token :
tokens) {
        if (token.length() >= 4) {
            // Emit "TokenCount" as key and 1 as the value for tokens with length >= 4
            context.write(specialKey, one);
        }
    }
}
}

```

Reducer class:

```

import java.io.IOException;
import
org.apache.hadoop.io.IntWritable;
import org.apache.hadoop.io.Text;
import org.apache.hadoop.mapreduce.Reducer;

public class TokenLengthReducer 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;

        // Sum up all the values (counts) for tokens with length
        >= 4 for (IntWritable val : values) {

```

```

        sum += val.get();
    }

    result.set(sum);
    // Emit the special key and the total count of tokens with length >= 4
    context.write(key, result);
}
}

```

Driver class:

```

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.lib.input.FileInputFormat;
import
org.apache.hadoop.mapreduce.lib.output.FileOutputFormat;
import org.apache.hadoop.util.GenericOptionsParser;

public class TokenLength {

    public static void main(String[] args) throws
        Exception { Configuration conf = new
        Configuration();
        String[] otherArgs = new GenericOptionsParser(conf, args).getRemainingArgs();

        if (otherArgs.length < 2) {
            System.err.println("Usage: tokenlength <in> <out>");
            System.exit(2);
        }
    }
}

```



```
Job job = new Job(conf, "token length count");
```

```

        job.setJarByClass(TokenLength.class);
        job.setMapperClass(TokenLengthMapper.class);
        job.setReducerClass(TokenLengthReducer.class);
        job.setOutputKeyClass(Text.class);
        job.setOutputValueClass(IntWritable.class);

        // Set input and output paths
        FileInputFormat.addInputPath(job, new
        Path(otherArgs[0])); FileOutputFormat.setOutputPath(job,
        new Path(otherArgs[1]));

        System.exit(job.waitForCompletion(true) ? 0 : 1);
    }
}

```

Text file:

Hadoop is a powerful framework
 MapReduce is a processing
 model Distributed computing is
 great

Q-5: Mapper class:

```

import java.io.IOException;
import
org.apache.hadoop.io.IntWritable;
import org.apache.hadoop.io.Text;
import org.apache.hadoop.mapreduce.Mapper;

public class FemaleVoterMapper extends Mapper<Object, Text, Text, IntWritable> {

    private final static IntWritable one = new
    IntWritable(1); private Text femaleKey = new
    Text("FemaleVoterCount");

```

```
public void map(Object key, Text value, Context context) throws IOException,  
    InterruptedException  
{
```

```

// Skip the header if it's the first
line String line = value.toString();
if (line.startsWith("ID,NAME,GENDER,AGE"))
    { return;
    }

// Split the line by commas to extract
fields String[] fields = line.split(",");
if (fields.length == 4) {
    String gender = fields[2].trim(); // Get the gender field

    // Check if gender is female (F)
    if (gender.equalsIgnoreCase("F")) {
        // Emit the special key for female voters with a value of 1
        context.write(femaleKey, one);
    }
}
}
}

```

Reducer class:

```

import java.io.IOException;
import
org.apache.hadoop.io.IntWritable;
import org.apache.hadoop.io.Text;
import org.apache.hadoop.mapreduce.Reducer;

public class FemaleVoterReducer 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;

    // Sum all the values to get the total number of female
    voters for (IntWritable val : values) {
        sum += val.get();
    }

    result.set(sum);
    // Emit the final count of female voters
    context.write(new Text("No. of female voters are: "), result);
}
}

```

Driver class:

```

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.lib.input.FileInputFormat;
import
org.apache.hadoop.mapreduce.lib.output.FileOutputFormat;
import org.apache.hadoop.util.GenericOptionsParser;

public class FemaleVoterCount {

    public static void main(String[] args) throws
        Exception { Configuration conf = new
        Configuration();
        String[] otherArgs = new GenericOptionsParser(conf, args).getRemainingArgs();

```

```

    if (otherArgs.length < 2) {
        System.err.println("Usage: femalevotercount <in>
        <out>"); System.exit(2);
    }

    Job job = new Job(conf, "female voter count");
    job.setJarByClass(FemaleVoterCount.class);
    job.setMapperClass(FemaleVoterMapper.class);
    job.setReducerClass(FemaleVoterReducer.class);
    job.setOutputKeyClass(Text.class);
    job.setOutputValueClass(IntWritable.class);

    // Set input and output paths
    FileInputFormat.addInputPath(job, new
    Path(otherArgs[0])); FileOutputFormat.setOutputPath(job,
    new Path(otherArgs[1]));

    System.exit(job.waitForCompletion(true) ? 0 : 1);
}
}

```

Q-6: Mapper class:

```

import java.io.IOException;
import
org.apache.hadoop.io.IntWritable;
import org.apache.hadoop.io.Text;
import org.apache.hadoop.mapreduce.Mapper;

public class ReviewCountMapper extends Mapper<Object, Text, Text, IntWritable> {

    private final static IntWritable one = new
    IntWritable(1); private Text userId = new Text();

```

```

public void map(Object key, Text value, Context context) throws IOException,
InterruptedException
{
    // Split the input line by commas to extract fields
    String[] fields = value.toString().split(",");

    // Ensure the line has enough
    fields if (fields.length > 0) {
        String reviewerID = fields[0].trim(); // Extract the reviewerID (UserID)

        // Emit the UserID with a count
        of 1 userId.set(reviewerID);
        context.write(userId, one);
    }
}
}

```

Reducer class:

```

} import java.io.IOException;
import
org.apache.hadoop.io.IntWritable;
import org.apache.hadoop.io.Text;
import org.apache.hadoop.mapreduce.Reducer;

public class ReviewCountReducer 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;

        // Sum the number of reviews for each user

```

```

    for (IntWritable val :
        values) { sum +=
            val.get();
        }

    result.set(sum);
    // Emit the UserID and the total number of reviews
    context.write(key, result);
}

```

Driver class:

```

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.lib.input.FileInputFormat;
import
    org.apache.hadoop.mapreduce.lib.output.FileOutputFormat;
import org.apache.hadoop.util.GenericOptionsParser;

public class ReviewCount {

    public static void main(String[] args) throws
        Exception { Configuration conf = new
            Configuration();
            String[] otherArgs = new GenericOptionsParser(conf, args).getRemainingArgs();

            if (otherArgs.length < 2) {
                System.err.println("Usage: reviewcount <in> <out>");
                System.exit(2);
            }
}

```



```
Job job = new Job(conf, "review count");
```

```

    job.setJarByClass(ReviewCount.class);
    job.setMapperClass(ReviewCountMapper.class);
    job.setReducerClass(ReviewCountReducer.class);
    job.setOutputKeyClass(Text.class);
    job.setOutputValueClass(IntWritable.class);

    // Set input and output paths
    FileInputFormat.addInputPath(job, new
    Path(otherArgs[0])); FileOutputFormat.setOutputPath(job,
    new Path(otherArgs[1]));

    System.exit(job.waitForCompletion(true) ? 0 : 1);
}
}

```

Q-7: Mapper class:

7.1 Write a MapReduce job to display all the details of the comedy

movies. import java.io.IOException;

import org.apache.hadoop.io.Text;

import org.apache.hadoop.mapreduce.Mapper;

```

public class ComedyMoviesMapper extends Mapper<Object, Text, Text, Text> {

```

```

    public void map(Object key, Text value, Context context) throws IOException,
    InterruptedException
    {

```

```

        // Skip the header line

```

```

        String line = value.toString();

```

```

        if (line.startsWith("movieId")) return;

```

```

        // Split the line into fields

```

```

        String[] fields =

```

```

        line.split(",");

```

```

if (fields.length == 3) {
    String genres = fields[2].trim();

    // Check if genres contain
    "Comedy" if
    (genres.contains("Comedy")) {
        context.write(new Text(fields[0]), new Text(line)); // movieId as key, full record as value
    }
}
}
}

```

Reducer class:

```

import java.io.IOException;
import org.apache.hadoop.io.Text;
import org.apache.hadoop.mapreduce.Reducer;

public class ComedyMoviesReducer extends Reducer<Text, Text, Text, Text> {

    public void reduce(Text key, Iterable<Text> values, Context context) throws IOException,
    InterruptedException {
        for (Text value : values) {
            context.write(key, value); // Emit the movie details
        }
    }
}

```

7.2 Write a MapReduce job to find the count of the Documentary movies released in the year 1995. Mapper Class:

```

import java.io.IOException;

import
org.apache.hadoop.io.IntWritable;
import org.apache.hadoop.io.Text;

```

```
import org.apache.hadoop.mapreduce.Mapper;
```

```
public class Documentary1995Mapper extends Mapper<Object, Text, Text, IntWritable> {
```

```
    private final static IntWritable one = new IntWritable(1);
```

```
    private Text documentaryKey = new Text("Documentary_1995");
```

```
    public void map(Object key, Text value, Context context) throws IOException,
        InterruptedException
    {
```

```
        // Skip the header line
```

```
        String line = value.toString();
```

```
        if (line.startsWith("movieId")) return;
```

```
        // Split the line into fields
```

```
        String[] fields =
```

```
        line.split(",");
```

```
        if (fields.length == 3) {
```

```
            String *tle = fields[1].trim();
```

```
            String genres =
```

```
            fields[2].trim();
```

```
            // Check if the genre is Documentary and year is 1995
```

```
            if (genres.contains("Documentary") && *tle.contains("(1995)")) {
```

```
                context.write(documentaryKey, one);
```

```
            }
```

```
        }
```

```
    }
```

```
}
```

```
Reducer class:
```

```
import java.io.IOException;
```

```
import
```

```
org.apache.hadoop.io.IntWritable;
```

```
import org.apache.hadoop.io.Text;
```

```

import org.apache.hadoop.mapreduce.Reducer;

public class Documentary1995Reducer extends Reducer<Text, IntWritable, Text, IntWritable> {

    public void reduce(Text key, Iterable<IntWritable> values, Context context) throws
    IOException, InterruptedException {
        int sum = 0;

        for (IntWritable val :
            values) { sum +=
                val.get();
            }

        // Emit the total count of documentary movies in 1995
        context.write(key, new IntWritable(sum));
    }
}

```

7.3 Write a MapReduce job that will count the total number of missing records where 'genres' are missing.

Mapper class:

```

import java.io.IOException;

import
    org.apache.hadoop.io.IntWritable;
    import org.apache.hadoop.io.Text;
    import org.apache.hadoop.mapreduce.Mapper;

public class MissingGenresMapper extends Mapper<Object, Text, Text, IntWritable> {

    private final static IntWritable one = new IntWritable(1);
    private Text missingGenreKey = new Text("MissingGenresCount");

    public void map(Object key, Text value, Context context) throws IOException,
    InterruptedException
    {

```

```

// Skip the header line
String line = value.toString();
if (line.startsWith("movieId")) return;

// Split the line into fields
String[] fields =
line.split(",");

if (fields.length == 3) {
    String genres = fields[2].trim();

    // Check if genres are
    missing if
    (genres.isEmpty()) {
        context.write(missingGenreKey, one);
    }
}

}

}

Reducer class:
import java.io.IOException;
import
org.apache.hadoop.io.IntWritable;
import org.apache.hadoop.io.Text;
import org.apache.hadoop.mapreduce.Reducer;

public class MissingGenresReducer extends Reducer<Text, IntWritable, Text, IntWritable> {

    public void reduce(Text key, Iterable<IntWritable> values, Context context) throws
IOException, InterruptedException {

        int sum = 0;

        for (IntWritable val :
            values) { sum +=

```

```
val.get();
```



```

    }

    // Emit the total count of records with missing
    genres context.write(key, new IntWritable(sum));
}
}

```

7.4 Write a MapReduce job to display only titles of the movie having "Gold" anywhere in the title. Mapper class:

```

import java.io.IOException;
import org.apache.hadoop.io.Text;
import org.apache.hadoop.mapreduce.Mapper;

public class GoldTitleMapper extends Mapper<Object, Text, Text, Text> {

    public void map(Object key, Text value, Context context) throws IOException,
        InterruptedException
    {
        // Skip the header line
        String line = value.toString();
        if (line.startsWith("movieId")) return;

        // Split the line into fields
        String[] fields =
            line.split(",");

        if (fields.length == 3) {
            String title = fields[1].trim();

            // Check if title contains
            "Gold" if
            (title.contains("Gold")) {
                context.write(new Text("GoldMovies"), new Text(title));
            }
        }
    }
}

```

```

    }
}
}

```

Reducer class:

```

import java.io.IOException;
import org.apache.hadoop.io.Text;
import org.apache.hadoop.mapreduce.Reducer;

public class GoldTitleReducer extends Reducer<Text, Text, Text, Text> {

    public void reduce(Text key, Iterable<Text> values, Context context) throws IOException,
    InterruptedException {
        for (Text value : values) {
            context.write(new Text("MovieTitle"), value); // Emit the movie title
        }
    }
}

```

7.5 Write a MapReduce job that will display the count of the movies which belong to both Drama and Roman*c genre.

Mapper class:

```

import java.io.IOException;
import
org.apache.hadoop.io.IntWritable;
import org.apache.hadoop.io.Text;
import org.apache.hadoop.mapreduce.Mapper;

public class DramaRoman*cMapper extends Mapper<Object, Text, Text, IntWritable> {

    private final static IntWritable one = new IntWritable(1);
    private Text dramaRoman*cKey = new Text("Drama_Roman*c");

```

```

public void map(Object key, Text value, Context context) throws IOException,
InterruptedException {
    // Skip the header line
    String line = value.toString();
    if (line.startsWith("movieId")) return;

    // Split the line into fields
    String[] fields =
        line.split(",");

    if (fields.length == 3) {
        String genres = fields[2].trim();

        // Check if genres contain both "Drama" and "Roman*c"
        if (genres.contains("Drama") && genres.contains("Romance")) {
            context.write(dramaRoman*cKey, one);
        }
    }
}

```

Reducer class:

```

import java.io.IOException;
import
org.apache.hadoop.io.IntWritable;
import org.apache.hadoop.io.Text;
import org.apache.hadoop.mapreduce.Reducer;

public class DramaRoman*cReducer extends Reducer<Text, IntWritable, Text, IntWritable> {

    public void reduce(Text key, Iterable<IntWritable> values, Context context) throws
IOException, InterruptedException {
        int sum = 0;

        for (IntWritable val : values) {

```

```
        sum += val.get();
    }

    // Emit the total count of drama and roman*c
    movies context.write(key, new
    IntWritable(sum));
}
}
```