APACHE POI QUICK GUIDE

APACHE POI OVERVIEW

Many a time, a software application is required to generate reports in Microsoft Excel file format. Sometimes, an application is even expected to receive Excel files as input data. For example, an application developed for the Finance department of a company will be required to generate all their outputs in Excel.

Any Java programmer who wants to produce MS Office files as output must use a predefined and read-only API to do so.

What is Apache POI?

Apache POI is a popular API that allows programmers to create, modify, and display MS Office files using Java programs. It is an open source library developed and distributed by Apache Software Foundation to design or modify Microsoft Office files using Java program. It contains classes and methods to decode the user input data or a file into MS Office documents.

Components of Apache POI

Apache POI contains classes and methods to work on all OLE2 Compound documents of MS Office. The list of components of this API is given below.

- **POIFS** *PoorObfuscationImplementationFileSystem* : This component is the basic factor of all other POI elements. It is used to read different files explicitly.
- **HSSF** *HorribleSpreadsheetFormat* : It is used to read and write xls format of MS-Excel files.
- **XSSF** *XMLSpreadsheetFormat* : It is used for xlsx file format of MS-Excel.
- **HPSF** *HorriblePropertySetFormat* : It is used to extract property sets of the MS-Office files.
- **HWPF** *HorribleWordProcessorFormat* : It is used to read and write doc extension files of MS-Word.
- **XWPF** *XMLWordProcessorFormat* : It is used to read and write docx extension files of MS-Word.
- **HSLF** *HorribleSlideLayoutFormat* : It is used for read, create, and edit PowerPoint presentations.
- **HDGF** *HorribleDiaGramFormat* : It contains classes and methods for MS-Visio binary files.
- **HPBF** *HorriblePuBlisherFormat* : It is used to read and write MS-Publisher files.

This tutorial guides you through the process of working on Excel files using Java. Therefore the discussion is confined to HSSF and XSSF components.

Note : Older versions of POI support binary file formats such as doc, xls, ppt, etc. Version 3.5 onwards, POI supports OOXML file formats of MS-Office such as docx, xlsx, pptx, etc.

Like Apache POI, there are other libraries provided by various vendors for Excel file generation. These include Aspose cells for Java by Aspose, JXL by Commons Libraries, and JExcel by Team Dev.

FLAVORS OF JAVA EXCEL API

This chapter takes you through some of the flavors of Java Excel API and their features. There are many vendors who provide Java Excel related APIs; some of them are considered in this chapter.

Aspose Cells for Java

Aspose Cells for Java is a purely licensed Java Excel API developed and distributed by the vendor Aspose. The latest version of this API is 8.1.2, released in July 2014. It is a rich and heavy API *combinationofplainJavaclassesandAWTclasses* for designing the Excel component that can read, write, and manipulate spreadsheets. The common uses of this API are as follows:

- Excel reporting, build dynamic Excel reports
- High-fidelity Excel rendering and printing
- Import and export data from Excel spreadsheets
- Generate, edit, and convert spreadsheets

JXL

JXL is a third-party framework designed for Selenium that supports data driven automation on web browsers $auto - updateofdataonwebbrowsers$. However it is also used as a common support library for JExcel API because it has basic features to create, read, and write spreadsheets. The basic features are as follows:

- Generate Excel files
- Import data from workbooks and spreadsheets
- Obtain the total number of rows and columns

Note : JXL supports only .xls file format and it cannot handle large data volume.

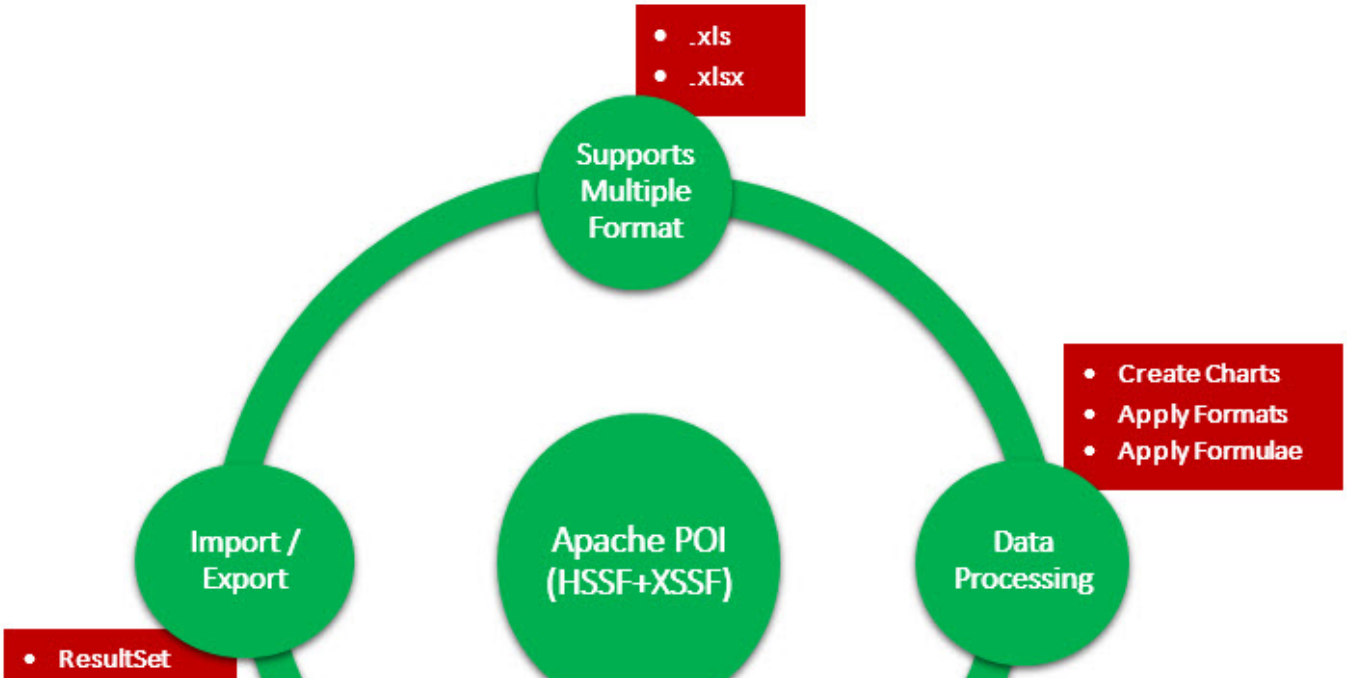
JExcel

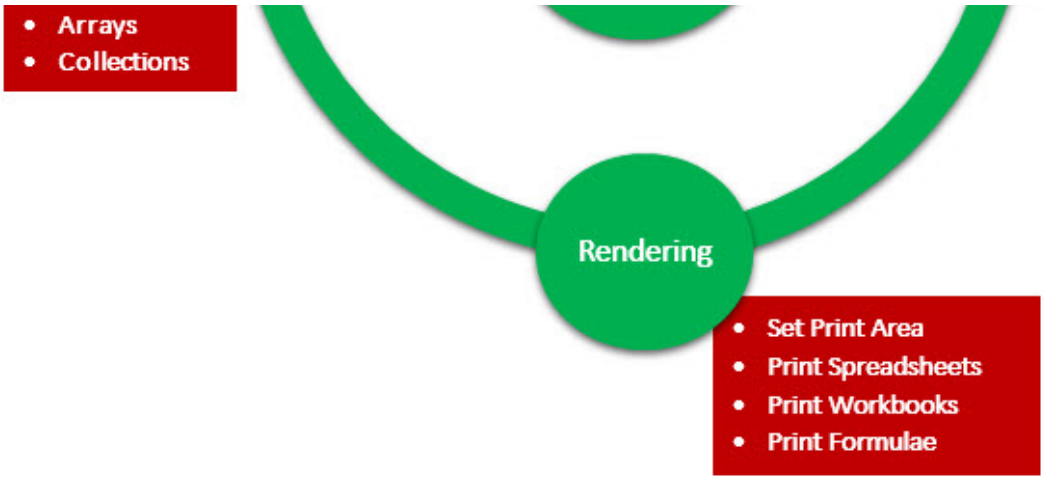
JExcel is a purely licensed API provided by Team Dev. Using this, programmers can easily read, write, display, and modify Excel workbooks in both .xls and .xlsx formats. This API can be easily embedded with Java Swing and AWT. The latest version of this API is Jexcel-2.6.12, released in 2009. The main features are as follows.

- Automate Excel application, workbooks, spreadsheets, etc.
- Embed workbooks in a Java Swing application as ordinary Swing component
- Add event listeners to workbooks and spreadsheets
- Add event handlers to handle the behavior of workbook and spreadsheet events
- Add native peers to develop custom functionality

Apache POI

Apache POI is a 100% open source library provided by Apache Software Foundation. Most of the small and medium scale application developers depend heavily on Apache POI $HSSF + XSSF$. It supports all the basic features of Excel libraries; however, rendering and text extraction are its main features.





APACHE POI INSTALLATION

This chapter takes you through the process of setting up Apache POI on Windows and Linux based systems. Apache POI can be easily installed and integrated with your current Java environment following a few simple steps without any complex setup procedures. User administration is required while installation.

System Requirements

JDK	Java SE 2 JDK 1.5 or above
Memory	1 GB RAM *recommended*
Disk Space	No minimum requirement
Operating System Version	Windows XP or above, Linux

Let us now proceed with the steps to install Apache POI.

Step 1: Verify your Java Installation

First of all, you need to have Java Software Development Kit *SDK* installed on your system. To verify this, execute any of the two commands depending on the platform you are working on.

If the Java installation has been done properly, then it will display the current version and specification of your Java installation. A sample output is given in the following table.

Platform	Command	Sample Output
Windows	Open Command Console and type: \>java –version	Java version "1.7.0_60" Java *TM* SE Run Time Environment $build 1.7.0_6 0 - b19$ Java Hotspot *TM* 64-bit Server VM $build 24.60 - b09$, *mixedmode*
Open command	java version "1.7.0_25" Open JDK Runtime	

terminal and type: $java –version	Environment $rhel - 2.3.10.4.el6_4 - x86_64$ Open JDK 64-Bit Server VM $build23.7 - b01, mixedmode$

- We assume the readers of this tutorial have Java SDK version 1.7.0_60 installed on their system.
- In case you do not have Java SDK, download its current version from http://www.oracle.com/technetwork/java/javase/downloads/index.html and have it installed.

Step 2: Set your Java Environment

Set the environment variable JAVA_HOME to point to the base directory location where Java is installed on your machine. For example,

Platform	Description
Windows	Set JAVA_HOME to C:\ProgramFiles\java\jdk1.7.0_60
Linux	Export JAVA_HOME=/usr/local/java-current

Append the full path of Java compiler location to the System Path.

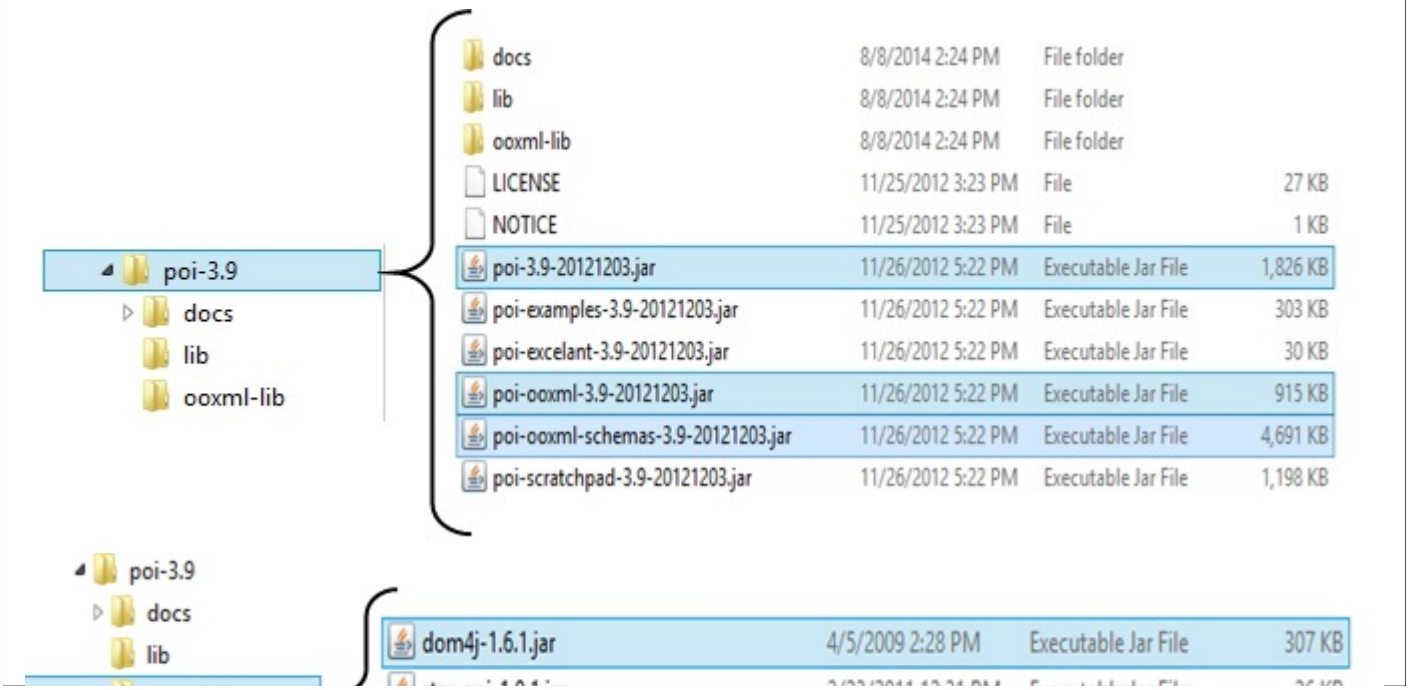
Platform	Description
Windows	Linux
Append the String "C:\Program Files\Java\jdk1.7.0_60\bin" to the end of the system variable PATH.	Export PATH=$PATH$: JAVA_HOME/bin/

Execute the command java -version from the command prompt as explained above.

Step 3: Install Apache POI Library

Download the latest version of Apache POI from http://poi.apache.org/download.html and unzip its contents to a folder from where the required libraries can be linked to your Java program. Let us assume the files are collected in a folder on C drive.

The following images show the directories and the file structure inside the downloaded folder.



Add the complete path of the five jars as highlighted in the above image to the CLASSPATH.

Platform	Description
Windows	Append the following strings to the end of the user variable CLASSPATH: “C:\poi-3.9\poi-3.9-20121203.jar;” “C:\poi-3.9\poi-ooxml-3.9-20121203.jar;” “C:\poi-3.9\poi-ooxml-schemas-3.9-20121203.jar;” “C:\poi-3.9\ooxml-lib\dom4j-1.6.1.jar;” “C:\poi-3.9\ooxml-lib\xmlbeans-2.3.0.jar;.;”
Linux	Export CLASSPATH=$CLASSPATH: /usr/share/poi-3.9/poi-3.9-20121203.tar: /usr/share/poi-3.9/poi-ooxml-schemas-3.9-20121203.tar: /usr/share/poi-3.9/poi-ooxml-3.9-20121203.tar: /usr/share/poi-3.9/ooxml-lib/dom4j-1.6.1.tar: /usr/share/poi-3.9/ooxml-lib/xmlbeans-2.3.0.tar

POI – CLASSES AND METHODS

This chapter explains a few classes and methods under the Apache POI API that are critical to work on Excel files using Java programs.

Workbook

This is the super-interface of all classes that create or maintain Excel workbooks. It belongs to the **org.apache.poi.ss.usermodel** package. The two classes that implement this interface are as follows:

- **HSSFWorkbook** : This class has methods to read and write Microsoft Excel files in .xls format. It is compatible with MS-Office versions 97–2003.
- **XSSFWorkbook** : This class has methods to read and write Microsoft Excel and OpenOffice xml files in .xls or .xlsx format. It is compatible with MS-Office versions 2007 or later.

HSSFWorkbook

It is a high-level class under the org.apache.poi.hssf.usermodel package. It implements the Workbook interface and is used for Excel files in .xls format. Listed below are some of the methods and constructors under this class.

Class Constructors

S.No.	Constructor and Description
1	HSSFWorkbook Creates a new HSSFWorkbook object from scratch.
2	HSSFWorkbook*DirectoryNodedirectory, booleanpreserveNodes* Creates a new HSSFWworkbook objectinside a specific directory.
3	HSSFWorkbook*DirectoryNodedirectory, POIFSFileSystemfs, booleanpreserveNodes* Given a POIFSFileSystem object and a specific directory within it, it creates an SSFWorkbook object to read a specified workbook.
4	HSSFWorkbook*java. io. InputStreams* Creates a new HSSFWorkbook object using an input stream.
5	HSSFWorkbook*java. io. InputStreams, booleanpreserveNodes* Constructs a POI file system around your input stream.
6	HSSFWorkbook*POIFSFileSystemfs* Constructs a new HSSFWorkbook object using a POIFSFileSystem object.
7	HSSFWorkbook*POIFSFileSystemfs, booleanpreserveNodes* Given a POIFSFileSystem object, it creates a new HSSFWorkbook object to read a specified workbook.

The frequently used parameters inside these constructors are:

- **directory** : It is the POI filesystem directory to process from.
- **fs** : It is the POI filesystem that contains the workbook stream.
- **preservenodes** : This is an optional parameter that decides whether to preserve other nodes like macros. It consumes a lot of memory as it stores all the POIFileSystem in memory *ifset*.

Note : The HSSFWorkbook class contains a number of methods; however they are compatible with xls format only. In this tutorial, the focus is on the latest version of Excel file formats. Hence, the class methods of HSSFWorkbook are not listed here. If you require these class methods, then refer POI-HSSFWorkbook class API at https://poi.apache.org/apidocs/org/apache/poi/hssf/usermodel/HSSFWorkbook.html.

XSSFWorkbook

It is a class that is used to represent both high and low level Excel file formats. It belongs to the org.apache.xssf.usemodel package and implements the Workbook interface. Listed below are the methods and constructors under this class.

Class Constructors

S.No.	Constructor and Description
1	**XSSFWorkbook** Creates a new XSSFworkbook object from scratch.
2	**XSSFWorkbook***java. io. Filefile* Constructs an XSSFWorkbook object from a given file.
3	**XSSFWorkbook***java. io. InputStreamis* Constructs an XSSFWorkbook object, by buffering the whole input stream into memory and then opening an OPCPackage object for it.
4	**XSSFWorkbook***java. lang. Stringpath* Constructs an XSSFWorkbook object given the full path of a file.

Class Methods

S.No.	Method and Description
1	**createSheet** Creates an XSSFSheet for this workbook, adds it to the sheets, and returns the high level representation.
2	**createSheet***java. lang. Stringsheetname* Creates a new sheet for this Workbook and returns the high level representation.
3	**createFont** Creates a new font and adds it to the workbook's font table.
4	**createCellStyle** Creates a new XSSFCellStyle and adds it to the workbook's style table.
5	**createFont** Creates a new font and adds it to the workbook's font table.
6	

setPrintArea*intsheetIndex, intstartColumn, intendColumn, intstartRow, intendRow*

Sets the print area of a given sheet as per the specified parameters.

For the remaining methods of this class, refer the complete API document at: http://poi.apache.org/apidocs/org/apache/poi/xssf/usermodel/XSSFWorkbook.html.for the complete list of methods.

Sheet

Sheet is an interface under the org.apache.poi.ss.usermodel package and it is a super-interface of all classes that create high or low level spreadsheets with specific names. The most common type of spreadsheet is worksheet, which is represented as a grid of cells.

HSSFSheet

This is a class under the org.apache.poi.hssf.usermodel package. It can create excel spreadsheets and it allows to format the sheet style and sheet data.

Class Constructors

S.No.	Constructor and Description
1	**HSSFSheet***HSSFWorkbookworkbook* Creates new HSSFSheet called by HSSFWorkbook to create a sheet from scratch.
2	**HSSFSheet***HSSFWorkbookworkbook, InternalSheetsheet* Creates an HSSFSheet representing the given sheet object.

XSSFSheet

This is a class which represents high level representation of excel spreadsheet. It is under org.apache.poi.hssf.usermodel package.

Class Constructors

S.No.	Constructor and Description
1	**XSSFSheet** Creates new XSSFSheet - called by XSSFWorkbook to create a sheet from scratch.
2	**XSSFSheet***PackagePartpart, PackageRelationshiprel* Creates an XSSFSheet representing the given package part and relationship.

Class Methods

S.No.	Methods and Description
1	**addMergedRegion***CellRangeAddressregion* Adds a merged region of cells *hencethosecellsformone*.
2	**autoSizeColumn***intcolumn* Adjusts the column width to fit the contents.
3	**iterator** This method is an alias for rowIterator to allow foreach loops
4	**addHyperlink***XSSFHyperlinkhyperlink* Registers a hyperlink in the collection of hyperlinks on this sheet

For the remaining methods of this class, refer the complete API at:
https://poi.apache.org/apidocs/org/apache/poi/xssf/usermodel/XSSFSheet.html.

Row

This is an interface under the org.apache.poi.ss.usermodel package. It is used for high-level representation of a row of a spreadsheet. It is a super-interface of all classes that represent rows in POI library.

XSSFRow

This is a class under the **org.apache.poi.xssf.usermodel** package. It implements the Row interface, therefore it can create rows in a spreadsheet. Listed below are the methods and constructors under this class.

Class Methods

S.No.	Description
1	**createCell***intcolumnIndex* Creates new cells within the row and returns it.
2	**setHeight***shortheight* Sets the height in short units.

For the remaining methods of this class, follow the given link
https://poi.apache.org/apidocs/org/apache/poi/xssf/usermodel/XSSFRow.html

Cell

This is an interface under the org.apache.poi.ss.usermodel package. It is a super-interface of all classes that represent cells in the rows of a spreadsheet.

Cells can take various attributes such as blank, numeric, date, error, etc. Cells should have their own numbers *0based* before being added to a row.

XSSFCell

This is a class under the org.apache.poi.xssf.usermodel package. It implements the Cell interface. It is a high-level representation of cells in the rows of a spreadsheet.

Field Summary

Listed below are some of the fields of the XSSFCell class along with their description.

Cell Type	Description
CELL_TYPE_BLANK	Represents blank cell
CELL_TYPE_BOOLEAN	Represents Boolean cell *trueorfalse*
CELL_TYPE_ERROR	Represents error value on a cell
CELL_TYPE_FORMULA	Represents formula result on a cell
CELL_TYPE_NUMERIC	Represents numeric data on a cell
CELL_TYPE_STRING	Represents string *text* on a cell

Class Methods

S.No.	Description
1	**setCellStyle***CellStylestyle* Sets the style for the cell.
2	**setCellType***intcellType* Sets the type of cells *numeric, formula, orstring*.
3	**setCellValue***booleanvalue* Sets a boolean value for the cell.
4	**setCellValue***java. util. Calendarvalue* Sets a date value for the cell.
5	**setCellValue***doublevalue* Sets a numeric value for the cell.
6	**setCellValue***java. lang. Stringstr* Sets a string value for the cell.

7	**setHyperlink***Hyperlinkhyperlink* Assigns a hyperlink to this cell.

For the remaining methods and fields of this class, visit the following link:
https://poi.apache.org/apidocs/org/apache/poi/xssf/usermodel/XSSFCell.html

XSSFCellStyle

This is a class under the org.apache.poi.xssf.usermodel package. It will provide possible information regarding the format of the content in a cell of a spreadsheet. It also provides options for modifying that format. It implements the CellStyle interface.

Field Summary

The following table lists a few fields that are inherited from the CellStyle interface.

Field Name	Field Description
ALIGN_CENTER	Center align the cell contents
ALIGN_CENTER_SELECTION	Center-selection horizontal alignment
ALIGN_FILL	Cell fit to the content size
ALIGN_JUSTIFY	Fit cell contents to its width
ALIGN_LEFT	Left align the cell contents
ALIGN_RIGHT	Right align the cell contents
BORDER_DASH_DOT	Cell style with dash and dot
BORDER_DOTTED	Cell style with dotted border
BORDER_DASHED	Cell style with dashed border
BORDER_THICK	Cell style with thick border
BORDER_THIN	Cell style with thin border
VERTICAL_BOTTOM	Align the cell contents vertical bottom
VERTICAL_CENTER	Align the cell contents vertical center
VERTICAL_JUSTIFY	Align and justify the cell contents vertically
VERTICAL_TOP	Top aligned vertical alignment

Class Constructors

S.No.	Constructor and Description
1	**XSSFCellStyle***intcellXfId, intcellStyleXfId, StylesTablestylesSource, ThemesTabletheme* Creates a cell style from the supplied parts
2	

XSSFCellStyle*StylesTablestylesSource*

Creates an empty cell Style

Class Methods

Sets the type of border for the bottom border of the cell

S.No	Method and Description
1	**setAlignment***shortalign* Sets the type of horizontal alignment for the cell
2	**setBorderBottom***shortborder*
3	**setBorderColor***XSSFCellBorder. BorderSideside, XSSFColorcolor* Sets the color for the selected border
4	**setBorderLeft***Shortborder* Sets the type of border for the left border of the cell
5	**setBorderRight***shortborder* Sets the type of border for the right border of the cell
6	**setBorderTop***shortborder* Sets the type of border for the top border of the cell
7	**setFillBackgroundColor***XSSFColorcolor* Sets the background fill color represented as an XSSFColor value.
8	**setFillForegroundColor***XSSFColorcolor* Sets the foreground fill color represented as an XSSFColor value.
9	**setFillPattern***shortfp* Specifies the cell fill information for pattern and solid color cell fills.
10	**setFont***Fontfont* Sets the font for this style.

11	**setRotation***shortrotation* Sets the degree of rotation for the text in the cell.
12	**setVerticalAlignment***shortalign* Sets the type of vertical alignment for the cell.

For the remaining methods and fields in this class, go through the following link: https://poi.apache.org/apidocs/org/apache/poi/xssf/usermodel/XSSFCellStyle.html

HSSFColor

This is a class under the org.apache.poi.hssf.util package. It provides different colors as nested classes. Usually these nested classes are represented by using their own indexes. It implements the Color interface.

Nested classes

All nested classes of this class are static and each class has its index. These nested color classes are used for cell formatting such as cell content, border, foreground, and background. Listed below are some of the nested classes.

S.No.	Class names *colors*
1	HSSFColor.AQUA
2	HSSFColor.AUTOMATIC
3	HSSFColor.BLACK
4	HSSFColor.BLUE
5	HSSFColor.BRIGHT_GREEN
6	HSSFColor.BRIGHT_GRAY
7	HSSFColor.CORAL
8	HSSFColor.DARK_BLUE
9	HSSFColor.DARK_GREEN
10	HSSFColor.SKY_BLUE
11	HSSFColor.WHITE
12	HSSFColor.YELLOW

Class Methods

Only one method of this class is important and that is used to get the index value.

S.No.	Method and Description
1	**getIndex**

This method is used to get the index value of a nested class

For the remaining methods and nested classes, refer the following link:
https://poi.apache.org/apidocs/org/apache/poi/hssf/util/HSSFColor.html.

XSSFColor

This is a class under the org.apache.poi.xssf.usermodel package. It is used to represent color in a spreadsheet. It implements the Color interface. Listed below are some of its methods and constructors.

Class Constructors

S.No.	Constructor and Description
1	**XSSFColor** Creates a new instance of XSSFColor.
2	**XSSFColor*byte[]rgb*** Creates a new instance of XSSFColor using RGB.
3	**XSSFColor*java. awt. Colorclr*** Creates a new instance of XSSFColor using the Color class from the awt package.

Class Methods

S.No.	Method and Description
1	**setAuto*booleanauto*** Sets a boolean value to indicate that the ctColor is automatic and the system ctColor is dependent.
2	**setIndexed*intindexed*** Sets indexed ctColor value as system ctColor.

For the remaining methods, visit the following link:
https://poi.apache.org/apidocs/org/apache/poi/xssf/usermodel/XSSFColor.html.

XSSFFont

This is a class under the org.apache.poi.xssf.usermodel package. It implements the Font interface and therefore it can handle different fonts in a workbook.

Class Constructor

S.No.	Constructor and Description
1	**XSSFFont** Creates a new XSSFont instance.

Class Methods

S.No.	Method and Description
1	**setBold***booleanbold* Sets a Boolean value for the 'bold' attribute.
2	**setColor***shortcolor* Sets the indexed color for the font.
3	**setColor***XSSFColorcolor* Sets the color for the font in Standard Alpha RGB color value.
4	**setFontHeight***shortheight* Sets the font height in points.
5	**setFontName***java. lang. Stringname* Sets the name for the font.
6	**setItalic***booleanitalic* Sets a Boolean value for the 'italic' property.

For the remaining methods, go through the following link:
https://poi.apache.org/apidocs/org/apache/poi/xssf/usermodel/XSSFFont.html.

XSSFHyperlink

This is a class under the **org.apache.poi.xssf.usermodel** package. It implements the Hyperlink interface. It is used to set a hyperlink to the cell contents of a spreadsheet.

Fields

The fields of this class are as follows. Here, fields mean the types of hyperlinks used.

Field	Description
LINK_DOCUMENT	Used to link any other document

LINK_EMAIL	Used to link email
LINK_FILE	Used to link any other file in any format
LINK_URL	Used to link a web URL

Class Methods

S.No.	Method and Description
1	**setAddress***java. lang. Stringaddress* Hyperlink address.

For the remaining methods, visit the following link:
https://poi.apache.org/apidocs/org/apache/poi/xssf/usermodel/XSSFHyperlink.html

XSSFCreationHelper

This is a class under the **org.apache.poi.xssf.usermodel** package. It implements the CreationHelper interface. It is used as a support class for formula evaluation and setting up hyperlinks.

Class methods

S.No.	Method and Description
1	**createFormulaEvaluator** Creates an XSSFFormulaEvaluator instance, the object that evaluates formula cells.
2	**createHyperlink***inttype* Creates a new XSSFHyperlink.

For the remaining methods, refer the following link:
https://poi.apache.org/apidocs/org/apache/poi/xssf/usermodel/XSSFCreationHelper.html.

XSSFPrintSetup

This is a class under the **org.apache.poi.xsssf.usermodel** package. It implements the PrintSetup interface. It is used to set print page size, area, options, and settings.

Class Methods

S.No.	Method and Description
1	**setLandscape***booleanls* Sets a boolean value to allow or block landscape printing.

2

setLeftToRight*booleanItor*

Sets whether to go left to right or top down in ordering while printing.

3

setPaperSize*shortsize*

Sets the paper size.

For the remaining methods, visit the following link:
https://poi.apache.org/apidocs/org/apache/poi/hssf/usermodel/HSSFPrintSetup.html

POI – WORKBOOKS

Here the term 'Workbook' means Microsoft Excel file. After completion of this chapter, you will be able to create new Workbooks and open existing Workbooks with your Java program.

Create Blank Workbook

The following simple program is used to create a blank Microsoft Excel Workbook.

```
import java.io.*;
import org.apache.poi.xssf.usermodel.*;
public class CreateWorkBook
{
   public static void main(String[] args)throws Exception
   {
      //Create Blank workbook
      XSSFWorkbook workbook = new XSSFWorkbook();
      //Create file system using specific name
      FileOutputStream out = new FileOutputStream(
      new File("createworkbook.xlsx"));
      //write operation workbook using file out object
      workbook.write(out);
      out.close();
      System.out.println("
      createworkbook.xlsx written successfully");
   }
}
```

Let us save the above Java code as CreateWorkBook.java, and then compile and execute it from the command prompt as follows:

```
$javac CreateWorkBook.java
$java CreateWorkBook
```

If your system environment is configured with the POI library, it will compile and execute to generate the blank Excel file named **createworkbook.xlsx** in your current directory and display the following output in the command prompt.

```
createworkbook.xlsx written successfully
```

Open Existing Workbook

Use the following code to open an existing workbook.

```
import java.io.*;
import org.apache.poi.xssf.usermodel.*;
public class OpenWorkBook
{
   public static void main(String args[])throws Exception
```

```
   {
      File file = new File("openworkbook.xlsx");
      FileInputStream fIP = new FileInputStream(file);
      //Get the workbook instance for XLSX file
      XSSFWorkbook workbook = new XSSFWorkbook(fIP);
      if(file.isFile() && file.exists())
      {
         System.out.println(
         "openworkbook.xlsx file open successfully.");
      }
      else
      {
         System.out.println(
         "Error to open openworkbook.xlsx file.");
      }
   }
}
```

Save the above Java code as OpenWorkBook.java, and then compile and execute it from the command prompt as follows:

```
$javac OpenWorkBook.java
$java OpenWorkBook
```

It will compile and execute to generate the following output.

```
openworkbook.xlsx file open successfully.
```

After opening a workbook, you can perform read and write operations on it.

POI – SPREADSHEETS

This chapter explains how to create a spreadsheet and manipulate it using Java. Spreadsheet is a page in an Excel file; it contains rows and columns with specific names.

After completing this chapter, you will be able to create a spreadsheet and perform read operations on it.

Create a Spreadsheet

First of all, let us create a spreadsheet using the referenced classes discussed in the earlier chapters. By following the previous chapter, create a workbook first and then we can go on and create a sheet.

The following code snippet is used to create a spreadsheet.

```
//Create Blank workbook
XSSFWorkbook workbook = new XSSFWorkbook();
//Create a blank spreadsheet
XSSFSheet spreadsheet = workbook.createSheet("Sheet Name");
```

Rows on Spreadsheet

Spreadsheets have a grid layout. The rows and columns are identified with specific names. The columns are identified with alphabets and rows with numbers.

The following code snippet is used to create a row.

```
XSSFRow row = spreadsheet.createRow((short)1);
```

Write into a Spreadsheet

Let us consider an example of employee data. Here the employee data is given in a tabular form.

Emp Id	Emp Name	Designation
Tp01	Gopal	Technical Manager
TP02	Manisha	Proof Reader
Tp03	Masthan	Technical Writer
Tp04	Satish	Technical Writer
Tp05	Krishna	Technical Writer

The following code is used to write the above data into a spreadsheet.

```
import java.io.File;
import java.io.FileOutputStream;
import java.util.Map;
import java.util.Set;
import java.util.TreeMap;
import org.apache.poi.ss.usermodel.Cell;
import org.apache.poi.xssf.usermodel.XSSFRow;
import org.apache.poi.xssf.usermodel.XSSFSheet;
import org.apache.poi.xssf.usermodel.XSSFWorkbook;
public class Writesheet
{
   public static void main(String[] args) throws Exception
   {
      //Create blank workbook
      XSSFWorkbook workbook = new XSSFWorkbook();
      //Create a blank sheet
      XSSFSheet spreadsheet = workbook.createSheet(
      " Employee Info ");
      //Create row object
      XSSFRow row;
      //This data needs to be written (Object[])
      Map < String, Object[] > empinfo =
      new TreeMap < String, Object[] >();
      empinfo.put( "1", new Object[] {
      "EMP ID", "EMP NAME", "DESIGNATION" });
      empinfo.put( "2", new Object[] {
      "tp01", "Gopal", "Technical Manager" });
      empinfo.put( "3", new Object[] {
      "tp02", "Manisha", "Proof Reader" });
      empinfo.put( "4", new Object[] {
      "tp03", "Masthan", "Technical Writer" });
      empinfo.put( "5", new Object[] {
      "tp04", "Satish", "Technical Writer" });
      empinfo.put( "6", new Object[] {
      "tp05", "Krishna", "Technical Writer" });
      //Iterate over data and write to sheet
      Set < String > keyid = empinfo.keySet();
      int rowid = 0;
      for (String key : keyid)
      {
         row = spreadsheet.createRow(rowid++);
         Object [] objectArr = empinfo.get(key);
         int cellid = 0;
         for (Object obj : objectArr)
         {
            Cell cell = row.createCell(cellid++);
            cell.setCellValue((String)obj);
         }
      }
      //Write the workbook in file system
      FileOutputStream out = new FileOutputStream(
      new File("Writesheet.xlsx"));
      workbook.write(out);
```

```
      out.close();
      System.out.println(
      "Writesheet.xlsx written successfully" );
   }
}
```

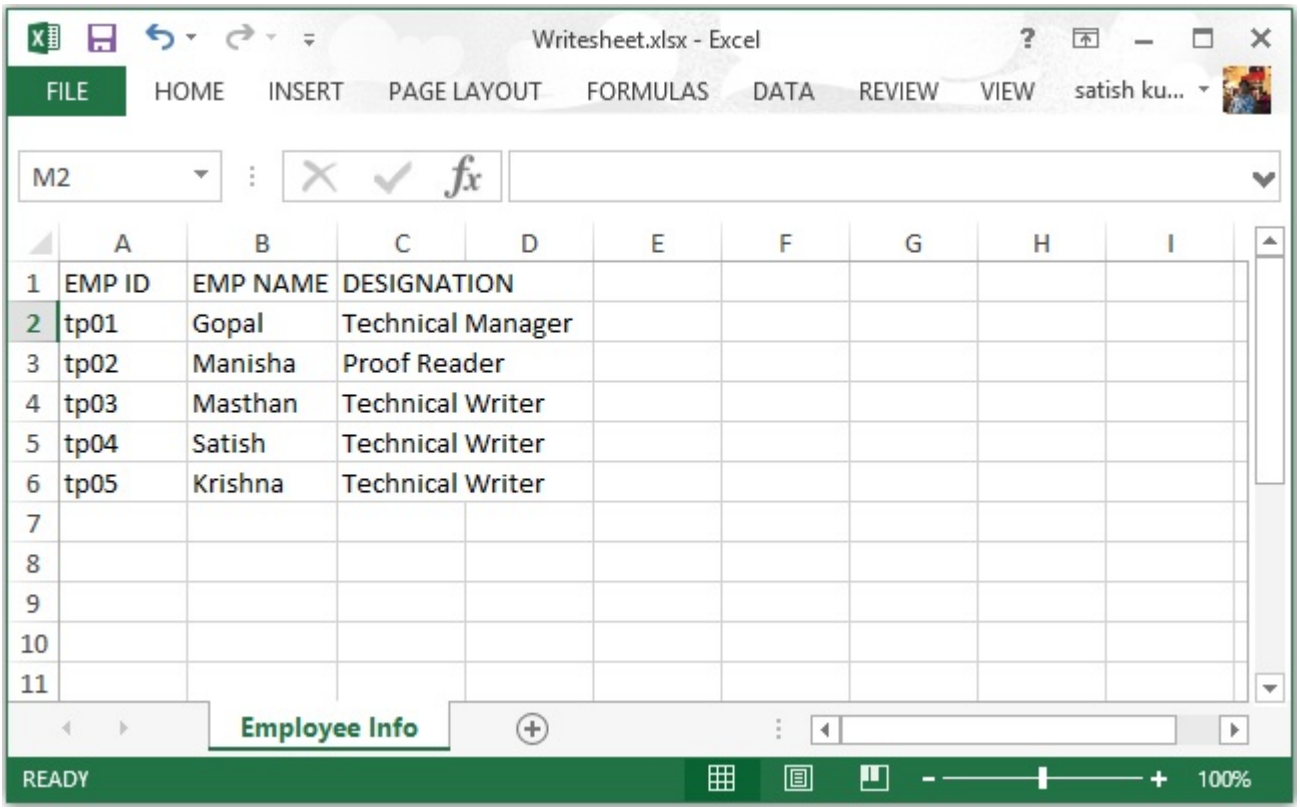
Save the above Java code as **Writesheet.java**, and then compile and run it from the command prompt as follows:

```
$javac Writesheet.java
$java Writesheet
```

It will compile and execute to generate an Excel file named **Writesheet.xlsx** in your current directory and you will get the following output in the command prompt.

```
Writesheet.xlsx written successfully
```

The Writesheet.xlsx file looks as follows.



Read from a Spreadsheet

Let us consider the above excel file named **Writesheet.xslx** as input. Observe the following code; it is used for reading the data from a spreadsheet.

```
import java.io.File;
import java.io.FileInputStream;
import java.util.Iterator;
import org.apache.poi.ss.usermodel.Cell;
import org.apache.poi.ss.usermodel.Row;
import org.apache.poi.xssf.usermodel.XSSFRow;
import org.apache.poi.xssf.usermodel.XSSFSheet;
import org.apache.poi.xssf.usermodel.XSSFWorkbook;
public class Readsheet
{
   static XSSFRow row;
   public static void main(String[] args) throws Exception
   {
      FileInputStream fis = new FileInputStream(
      new File("WriteSheet.xlsx"));
```

```
      XSSFWorkbook workbook = new XSSFWorkbook(fis);
      XSSFSheet spreadsheet = workbook.getSheetAt(0);
      Iterator < Row > rowIterator = spreadsheet.iterator();
      while (rowIterator.hasNext())
      {
         row = (XSSFRow) rowIterator.next();
         Iterator < Cell > cellIterator = row.cellIterator();
         while ( cellIterator.hasNext())
         {
            Cell cell = cellIterator.next();
            switch (cell.getCellType())
            {
               case Cell.CELL_TYPE_NUMERIC:
               System.out.print(
               cell.getNumericCellValue() + " \t\t " );
               break;
               case Cell.CELL_TYPE_STRING:
               System.out.print(
               cell.getStringCellValue() + " \t\t " );
               break;
            }
         }
         System.out.println();
      }
      fis.close();
   }
}
```

Let us keep the above code in **Readsheet.java** file, and then compile and run it from the command prompt as follows:

```
$javac Readsheet.java
$java Readsheet
```

If your system environment is configured with the POI library, it will compile and execute to generate the following output in the command prompt.

```
EMP ID EMP NAME DESIGNATION
 tp01   Gopal    Technical Manager
 tp02   Manisha  Proof Reader
 tp03   Masthan  Technical Writer
 tp04   Satish   Technical Writer
 tp05   Krishna  Technical Writer
```

POI – CELLS

Any data that you enter into a spreadsheet is always stored in a cell. We use the labels of rows and columns to identify a cell. This chapter describes how to manipulate data in cells in a spreadsheet using Java programming.

Create a Cell

You need to create a row before creating a cell. A row is nothing but a collection of cells.

The following code snippet is used for creating a cell.

```
//create new workbook
XSSFWorkbook workbook = new XSSFWorkbook();
//create spreadsheet with a name
XSSFSheet spreadsheet = workbook.createSheet("new sheet");
//create first row on a created spreadsheet
XSSFRow row = spreadsheet.createRow(0);
//create first cell on created row
XSSFCell cell = row.createCell(0);
```

Types of Cells

The cell type specifies whether a cell can contain strings, numeric value, or formulas. A string cell cannot hold numeric values and a numeric cell cannot hold strings. Given below are the types of cells, their values, and type syntax.

Type of cell value	Type Syntax
Blank cell value	XSSFCell.CELL_TYPE_BLANK
Boolean cell value	XSSFCell.CELL.TYPE_BOOLEAN
Error cell value	XSSFCell.CELL_TYPE_ERROR
Numeric cell value	XSSFCell.CELL_TYPE_NUMERIC
String cell value	XSSFCell.CELL_TYPE_STRING

The following code is used to create different types of cells in a spreadsheet.

```
import java.io.File;
import java.io.FileOutputStream;
import java.util.Date;
import org.apache.poi.xssf.usermodel.XSSFCell;
import org.apache.poi.xssf.usermodel.XSSFRow;
import org.apache.poi.xssf.usermodel.XSSFSheet;
import org.apache.poi.xssf.usermodel.XSSFWorkbook;
public class TypesofCells
{
   public static void main(String[] args)throws Exception
   {
       XSSFWorkbook workbook = new XSSFWorkbook();
       XSSFSheet spreadsheet = workbook.createSheet("cell types");
       XSSFRow row = spreadsheet.createRow((short) 2);
       row.createCell(0).setCellValue("Type of Cell");
       row.createCell(1).setCellValue("cell value");
       row = spreadsheet.createRow((short) 3);
       row.createCell(0).setCellValue("set cell type BLANK");
       row.createCell(1);
       row = spreadsheet.createRow((short) 4);
       row.createCell(0).setCellValue("set cell type BOOLEAN");
       row.createCell(1).setCellValue(true);
       row = spreadsheet.createRow((short) 5);
       row.createCell(0).setCellValue("set cell type ERROR");
       row.createCell(1).setCellValue(XSSFCell.CELL_TYPE_ERROR );
       row = spreadsheet.createRow((short) 6);
       row.createCell(0).setCellValue("set cell type date");
       row.createCell(1).setCellValue(new Date());
       row = spreadsheet.createRow((short) 7);
       row.createCell(0).setCellValue("set cell type numeric" );
       row.createCell(1).setCellValue(20 );
       row = spreadsheet.createRow((short) 8);
       row.createCell(0).setCellValue("set cell type string");
       row.createCell(1).setCellValue("A String");
       FileOutputStream out = new FileOutputStream(
       new File("typesofcells.xlsx"));
       workbook.write(out);
       out.close();
       System.out.println(
       "typesofcells.xlsx written successfully");
   }
}
```

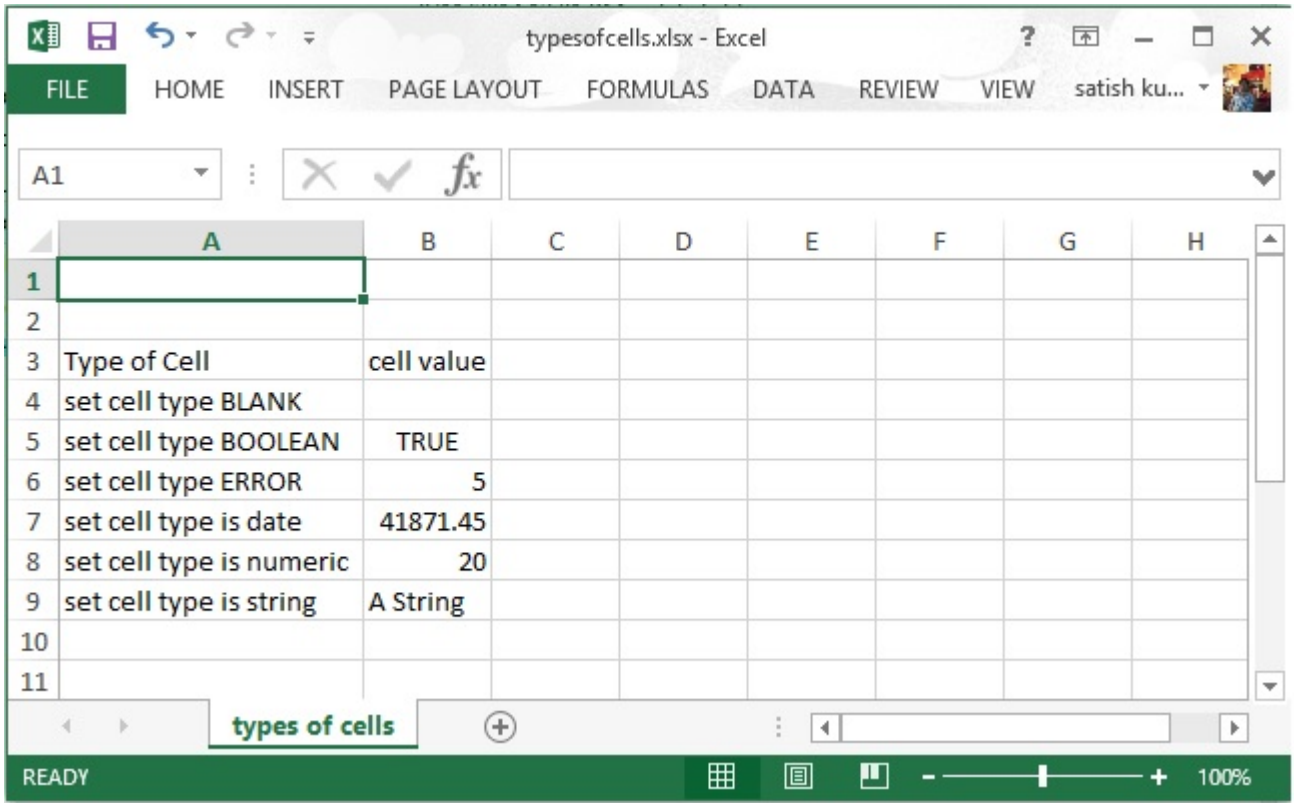
Save the above code in a file named **TypesofCells.java**, compile and execute it from the command prompt as follows.

```
$javac TypesofCells.java
$java TypesofCells
```

pIf your system is configured with the POI library, then it will compile and execute to generate an Excel file named **typesofcells.xlsx** in your current directory and display the following output.

```
typesofcells.xlsx written successfully
```

The **typesofcells.xlsx** file looks as follows.



Cell Styles

Here you can learn how to do cell formatting and apply different styles such as merging adjacent cells, adding borders, setting cell alignment and filling with colors.

The following code is used to apply different styles to cells using Java programming.

```
import java.io.File;
import java.io.FileOutputStream;
import org.apache.poi.hssf.util.HSSFColor;
import org.apache.poi.ss.usermodel.IndexedColors;
import org.apache.poi.ss.util.CellRangeAddress;
import org.apache.poi.xssf.usermodel.XSSFCell;
import org.apache.poi.xssf.usermodel.XSSFCellStyle;
import org.apache.poi.xssf.usermodel.XSSFRow;
import org.apache.poi.xssf.usermodel.XSSFSheet;
import org.apache.poi.xssf.usermodel.XSSFWorkbook;
public class CellStyle
{
   public static void main(String[] args)throws Exception
   {
      XSSFWorkbook workbook = new XSSFWorkbook();
      XSSFSheet spreadsheet = workbook.createSheet("cellstyle");
      XSSFRow row = spreadsheet.createRow((short) 1);
      row.setHeight((short) 800);
      XSSFCell cell = (XSSFCell) row.createCell((short) 1);
      cell.setCellValue("test of merging");
      //MEARGING CELLS
      //this statement for merging cells
```

```
        spreadsheet.addMergedRegion(new CellRangeAddress(
        1, //first row (0-based)
        1, //last row (0-based)
        1, //first column (0-based)
        4 //last column (0-based)
        ));
        //CELL Alignment
        row = spreadsheet.createRow(5);
        cell = (XSSFCell) row.createCell(0);
        row.setHeight((short) 800);
        // Top Left alignment
        XSSFCellStyle style1 = workbook.createCellStyle();
        spreadsheet.setColumnWidth(0, 8000);
        style1.setAlignment(XSSFCellStyle.ALIGN_LEFT);
        style1.setVerticalAlignment(XSSFCellStyle.VERTICAL_TOP);
        cell.setCellValue("Top Left");
        cell.setCellStyle(style1);
        row = spreadsheet.createRow(6);
        cell = (XSSFCell) row.createCell(1);
        row.setHeight((short) 800);
        // Center Align Cell Contents
        XSSFCellStyle style2 = workbook.createCellStyle();
        style2.setAlignment(XSSFCellStyle.ALIGN_CENTER);
        style2.setVerticalAlignment(
        XSSFCellStyle.VERTICAL_CENTER);
        cell.setCellValue("Center Aligned");
        cell.setCellStyle(style2);
        row = spreadsheet.createRow(7);
        cell = (XSSFCell) row.createCell(2);
        row.setHeight((short) 800);
        // Bottom Right alignment
        XSSFCellStyle style3 = workbook.createCellStyle();
        style3.setAlignment(XSSFCellStyle.ALIGN_RIGHT);
        style3.setVerticalAlignment(
        XSSFCellStyle.VERTICAL_BOTTOM);
        cell.setCellValue("Bottom Right");
        cell.setCellStyle(style3);
        row = spreadsheet.createRow(8);
        cell = (XSSFCell) row.createCell(3);
        // Justified Alignment
        XSSFCellStyle style4 = workbook.createCellStyle();
        style4.setAlignment(XSSFCellStyle.ALIGN_JUSTIFY);
        style4.setVerticalAlignment(
        XSSFCellStyle.VERTICAL_JUSTIFY);
        cell.setCellValue("Contents are Justified in Alignment");
        cell.setCellStyle(style4);
        //CELL BORDER
        row = spreadsheet.createRow((short) 10);
        row.setHeight((short) 800);
        cell = (XSSFCell) row.createCell((short) 1);
        cell.setCellValue("BORDER");
        XSSFCellStyle style5 = workbook.createCellStyle();
        style5.setBorderBottom(XSSFCellStyle.BORDER_THICK);
        style5.setBottomBorderColor(
        IndexedColors.BLUE.getIndex());
        style5.setBorderLeft(XSSFCellStyle.BORDER_DOUBLE);
        style5.setLeftBorderColor(
        IndexedColors.GREEN.getIndex());
        style5.setBorderRight(XSSFCellStyle.BORDER_HAIR);
        style5.setRightBorderColor(
        IndexedColors.RED.getIndex());
        style5.setBorderTop(XSSFCellStyle.BIG_SPOTS);
        style5.setTopBorderColor(
        IndexedColors.CORAL.getIndex());
        cell.setCellStyle(style5);
        //Fill Colors
        //background color
        row = spreadsheet.createRow((short) 10 );
        cell = (XSSFCell) row.createCell((short) 1);
```

```
        XSSFCellStyle style6 = workbook.createCellStyle();
        style6.setFillBackgroundColor(
        HSSFColor.LEMON_CHIFFON.index );
        style6.setFillPattern(XSSFCellStyle.LESS_DOTS);
        style6.setAlignment(XSSFCellStyle.ALIGN_FILL);
        spreadsheet.setColumnWidth(1,8000);
        cell.setCellValue("FILL BACKGROUNG/FILL PATTERN");
        cell.setCellStyle(style6);
        //Foreground color
        row = spreadsheet.createRow((short) 12);
        cell = (XSSFCell) row.createCell((short) 1);
        XSSFCellStyle style7=workbook.createCellStyle();
        style7.setFillForegroundColor(HSSFColor.BLUE.index);
        style7.setFillPattern( XSSFCellStyle.LESS_DOTS);
        style7.setAlignment(XSSFCellStyle.ALIGN_FILL);
        cell.setCellValue("FILL FOREGROUND/FILL PATTERN");
        cell.setCellStyle(style7);
        FileOutputStream out = new FileOutputStream(
        new File("cellstyle.xlsx"));
        workbook.write(out);
        out.close();
        System.out.println("cellstyle.xlsx written successfully");
    }
}
```

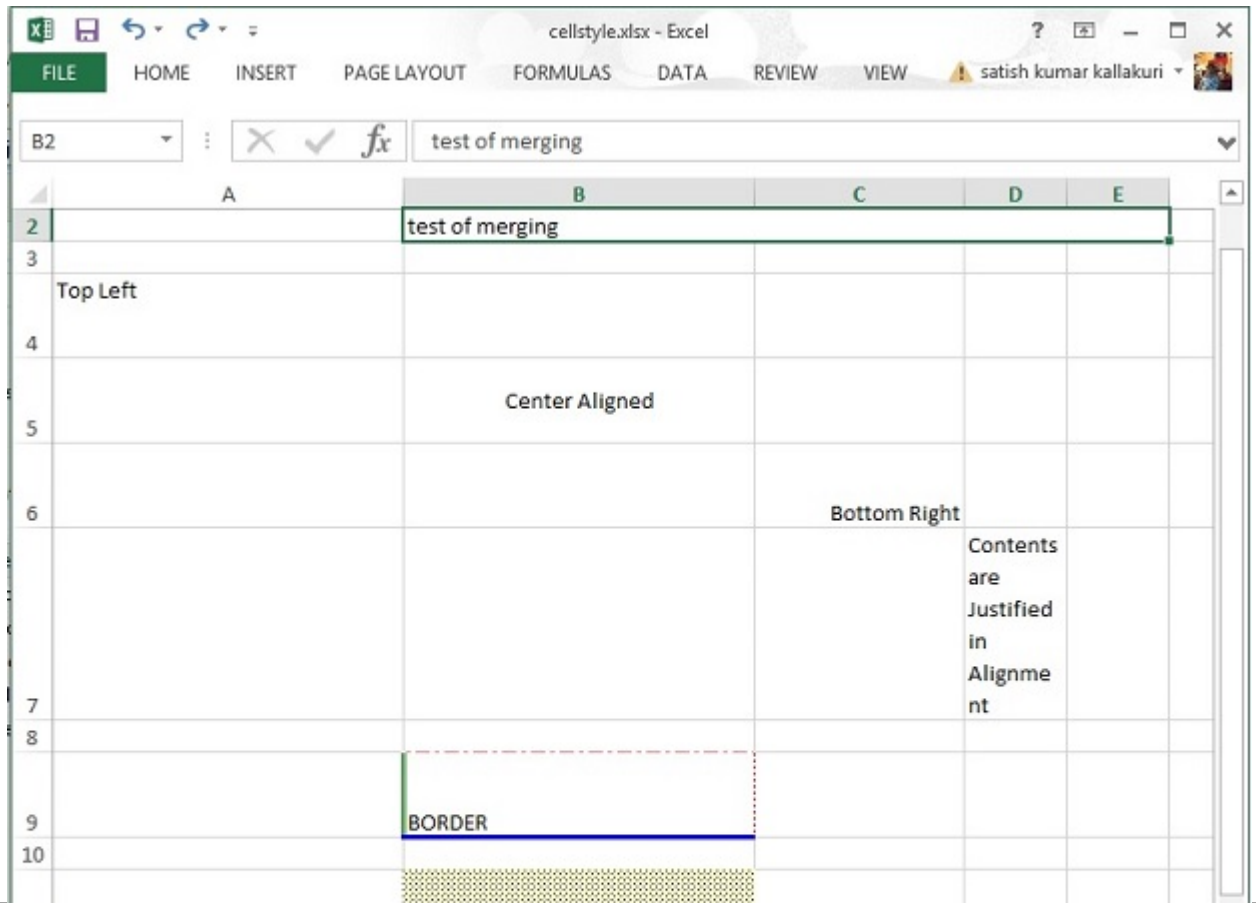
Save the above code in a file named **CellStyle.java**, compile and execute it from the command prompt as follows.

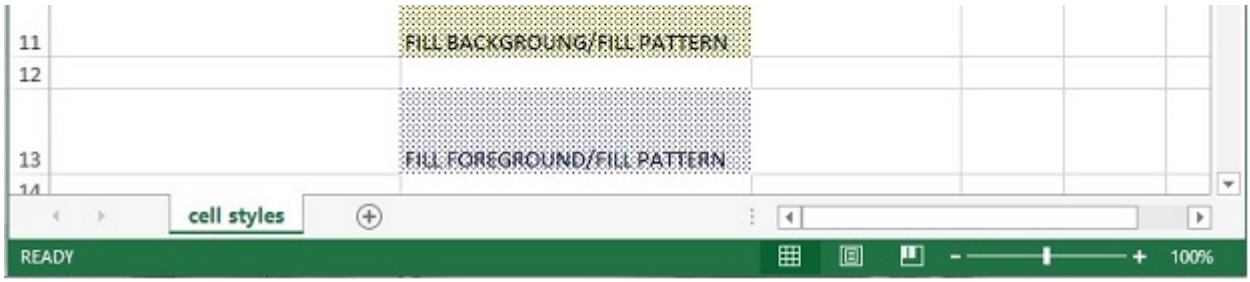
```
$javac CellStyle.java
$java CellStyle
```

It will generate an Excel file named **cellstyle.xlsx** in your current directory and display the following output.

```
cellstyle.xlsx written successfully
```

The cellstyle.xlsx file looks as follows.





POI – FONTS AND TEXT DIRECTION

This chapter explains how to set different fonts, apply styles, and display text in different angles of direction in an Excel spreadsheet.

Every system comes bundled with a huge collection of fonts such as Arial, Impact, Times New Roman, etc. The collection can also be updated with new fonts, if required. Similarly there are various styles in which a font can be displayed, for example, bold, italic, underline, strike through, etc.

Fonts and Font Styles

The following code is used to apply a particular font and style to the contents of a cell.

```
import java.io.File;
import java.io.FileOutputStream;
import org.apache.poi.hssf.util.HSSFColor;
import org.apache.poi.xssf.usermodel.XSSFCell;
import org.apache.poi.xssf.usermodel.XSSFCellStyle;
import org.apache.poi.xssf.usermodel.XSSFFont;
import org.apache.poi.xssf.usermodel.XSSFRow;
import org.apache.poi.xssf.usermodel.XSSFSheet;
import org.apache.poi.xssf.usermodel.XSSFWorkbook;
public class FontStyle
{
   public static void main(String[] args)throws Exception
   {
      XSSFWorkbook workbook = new XSSFWorkbook();
      XSSFSheet spreadsheet = workbook.createSheet("Fontstyle");
      XSSFRow row = spreadsheet.createRow(2);
      //Create a new font and alter it.
      XSSFFont font = workbook.createFont();
      font.setFontHeightInPoints((short) 30);
      font.setFontName("IMPACT");
      font.setItalic(true);
      font.setColor(HSSFColor.BRIGHT_GREEN.index);
      //Set font into style
      XSSFCellStyle style = workbook.createCellStyle();
      style.setFont(font);
      // Create a cell with a value and set style to it.
      XSSFCell cell = row.createCell(1);
      cell.setCellValue("Font Style");
      cell.setCellStyle(style);
      FileOutputStream out = new FileOutputStream(
      new File("fontstyle.xlsx"));
      workbook.write(out);
      out.close();
      System.out.println(
      "fontstyle.xlsx written successfully");
   }
}
```

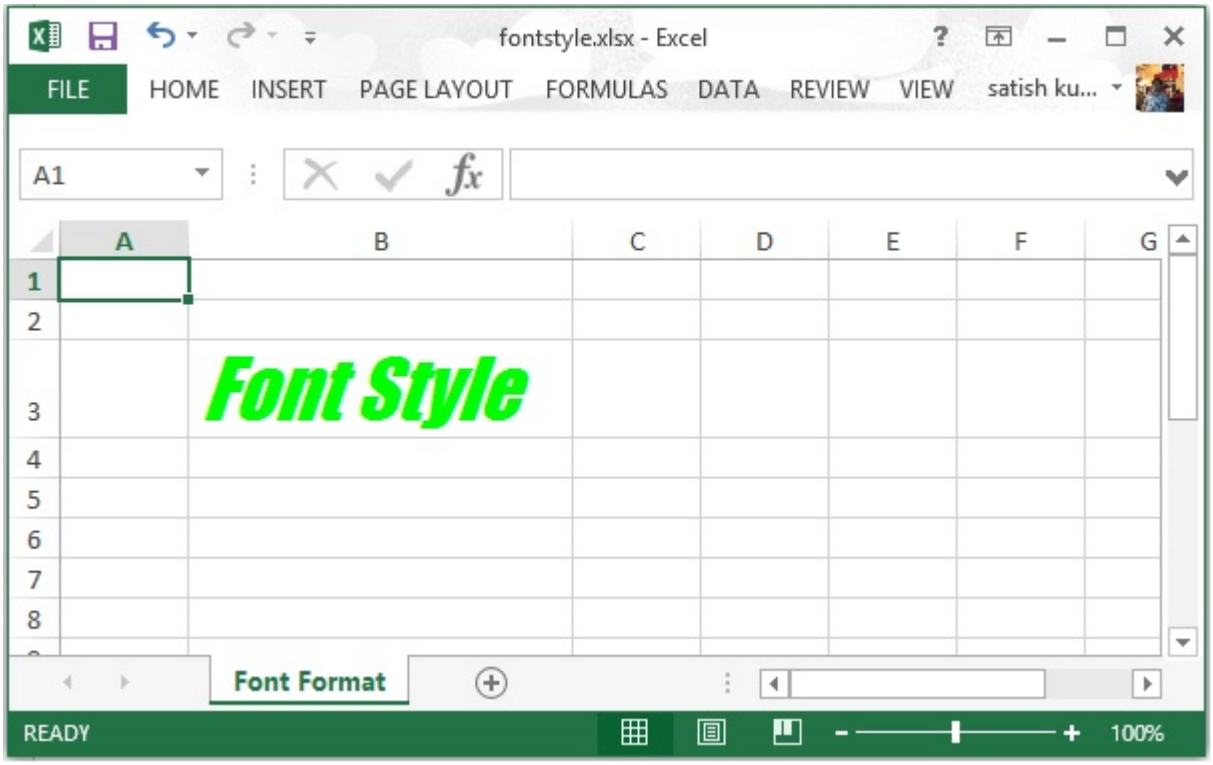
Let us save the above code in a file named **FontStyle.java**. Compile and execute it from the command prompt as follows.

```
$javac FontStyle.java
$java FontStyle
```

It generates an Excel file named **fontstyle.xlsx** in your current directory and display the following output on the command prompt.

```
fontstyle.xlsx written successfully
```

The **fontstyle.xlsx** file looks as follows.



Text Direction

Here you can learn how to set the text direction in different angles. Usually cell contents are displayed horizontally, from left to right, and at 00 angle; however you can use the following code to rotate the text direction, if required.

```
import java.io.File;
import java.io.FileOutputStream;
import org.apache.poi.xssf.usermodel.XSSFCell;
import org.apache.poi.xssf.usermodel.XSSFCellStyle;
import org.apache.poi.xssf.usermodel.XSSFRow;
import org.apache.poi.xssf.usermodel.XSSFSheet;
import org.apache.poi.xssf.usermodel.XSSFWorkbook;
public class TextDirection
{
   public static void main(String[] args)throws Exception
   {
      XSSFWorkbook workbook = new XSSFWorkbook();
      XSSFSheet spreadsheet = workbook.createSheet(
      "Text direction");
      XSSFRow row = spreadsheet.createRow(2);
      XSSFCellStyle myStyle = workbook.createCellStyle();
      myStyle.setRotation((short) 0);
      XSSFCell cell = row.createCell(1);
      cell.setCellValue("0D angle");
      cell.setCellStyle(myStyle);
      //30 degrees
      myStyle=workbook.createCellStyle();
      myStyle.setRotation((short) 30);
      cell = row.createCell(3);
      cell.setCellValue("30D angle");
      cell.setCellStyle(myStyle);
      //90 degrees
      myStyle=workbook.createCellStyle();
```

```
      myStyle.setRotation((short) 90);
      cell = row.createCell(5);
      cell.setCellValue("90D angle");
      cell.setCellStyle(myStyle);
      //120 degrees
      myStyle=workbook.createCellStyle();
      myStyle.setRotation((short) 120);
      cell = row.createCell(7);
      cell.setCellValue("120D angle");
      cell.setCellStyle(myStyle);
      //270 degrees
      myStyle = workbook.createCellStyle();
      myStyle.setRotation((short) 270);
      cell = row.createCell(9);
      cell.setCellValue("270D angle");
      cell.setCellStyle(myStyle);
      //360 degrees
      myStyle=workbook.createCellStyle();
      myStyle.setRotation((short) 360);
      cell = row.createCell(12);
      cell.setCellValue("360D angle");
      cell.setCellStyle(myStyle);
      FileOutputStream out = new FileOutputStream(
      new File("textdirection.xlsx"));
      workbook.write(out);
      out.close();
      System.out.println(
      "textdirection.xlsx written successfully");
   }
}
```

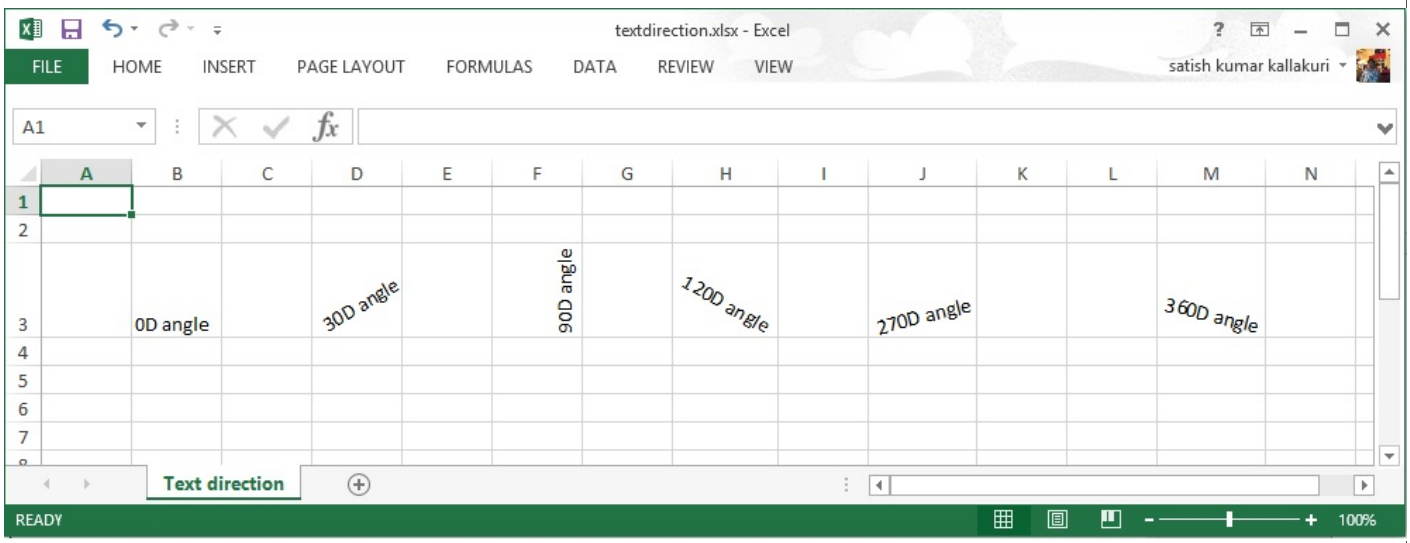
Keep the above code in **TextDirectin.java** file, then compile and execute it from the command prompt as follows.

```
$javac TextDirection.java
$java TextDirection
```

It will compile and execute to generate an Excel file named **textdirection.xlsx** in your current directory and display the following output on the command prompt.

```
textdirection.xlsx written successfully
```

The **textdirection.xlsx** file looks as follows.



POI – FORMULA

This chapter takes you through the process of applying different formulas on cells using Java programming. The basic purpose of Excel application is to maintain numerical data by applying

formulas on it.

In a formula, we pass dynamic values or locations of the values in the Excel sheet. On executing this formula, you get the desired result. The following table lists a few basic formulas that are frequently used in Excel.

Operation	Syntax
Adding multiple numbers	=SUM*Loc1:Locn* or =SUM*n1, n2,*
Count	=COUNT*Loc1:Locn* or =COUNT*n1, n2,*
Power of two numbers	=POWER*Loc1, Loc2* or =POWER*number, power*
Max of multiple numbers	=MAX*Loc1:Locn* or =MAX*n1, n2,*
Product	=PRODUCT*Loc1:Locn* or =PRODUCT*n1, n2,*
Factorial	=FACT*Locn* or =FACT*number*
Absolute number	=ABS*Locn* or =ABS*number*
Today date	=TODAY
Converts lowercase	=LOWER*Locn* or =LOWER*text*
Square root	=SQRT*locn* or =SQRT*number*

The following code is used to add formulas to a cell and execute it.

```
import java.io.File;
import java.io.FileOutputStream;
import org.apache.poi.xssf.usermodel.XSSFCell;
import org.apache.poi.xssf.usermodel.XSSFRow;
import org.apache.poi.xssf.usermodel.XSSFSheet;
import org.apache.poi.xssf.usermodel.XSSFWorkbook;
public class Formula
{
   public static void main(String[] args)throws Exception
   {
      XSSFWorkbook workbook = new XSSFWorkbook();
      XSSFSheet spreadsheet = workbook.createSheet("formula");
      XSSFRow row = spreadsheet.createRow(1);
      XSSFCell cell = row.createCell(1);
      cell.setCellValue("A =" );
      cell = row.createCell(2);
      cell.setCellValue(2);
      row = spreadsheet.createRow(2);
      cell = row.createCell(1);
      cell.setCellValue("B =");
      cell = row.createCell(2);
      cell.setCellValue(4);
      row = spreadsheet.createRow(3);
      cell = row.createCell(1);
      cell.setCellValue("Total =");
      cell = row.createCell(2);
      // Create SUM formula
      cell.setCellType(XSSFCell.CELL_TYPE_FORMULA);
      cell.setCellFormula("SUM(C2:C3)" );
      cell = row.createCell(3);
      cell.setCellValue("SUM(C2:C3)");
      row = spreadsheet.createRow(4);
      cell = row.createCell(1);
      cell.setCellValue("POWER =");
      cell=row.createCell(2);
      // Create POWER formula
```

```
        cell.setCellType(XSSFCell.CELL_TYPE_FORMULA);
        cell.setCellFormula("POWER(C2,C3)");
        cell = row.createCell(3);
        cell.setCellValue("POWER(C2,C3)");
        row = spreadsheet.createRow(5);
        cell = row.createCell(1);
        cell.setCellValue("MAX =");
        cell = row.createCell(2);
        // Create MAX formula
        cell.setCellType(XSSFCell.CELL_TYPE_FORMULA);
        cell.setCellFormula("MAX(C2,C3)");
        cell = row.createCell(3);
        cell.setCellValue("MAX(C2,C3)");
        row = spreadsheet.createRow(6);
        cell = row.createCell(1);
        cell.setCellValue("FACT =");
        cell = row.createCell(2);
        // Create FACT formula
        cell.setCellType(XSSFCell.CELL_TYPE_FORMULA);
        cell.setCellFormula("FACT(C3)");
        cell = row.createCell(3);
        cell.setCellValue("FACT(C3)");
        row = spreadsheet.createRow(7);
        cell = row.createCell(1);
        cell.setCellValue("SQRT =");
        cell = row.createCell(2);
        // Create SQRT formula
        cell.setCellType(XSSFCell.CELL_TYPE_FORMULA);
        cell.setCellFormula("SQRT(C5)");
        cell = row.createCell(3);
        cell.setCellValue("SQRT(C5)");
        workbook.getCreationHelper()
        .createFormulaEvaluator()
        .evaluateAll();
        FileOutputStream out = new FileOutputStream(
        new File("formula.xlsx"));
        workbook.write(out);
        out.close();
        System.out.println("fromula.xlsx written successfully");
    }
}
```

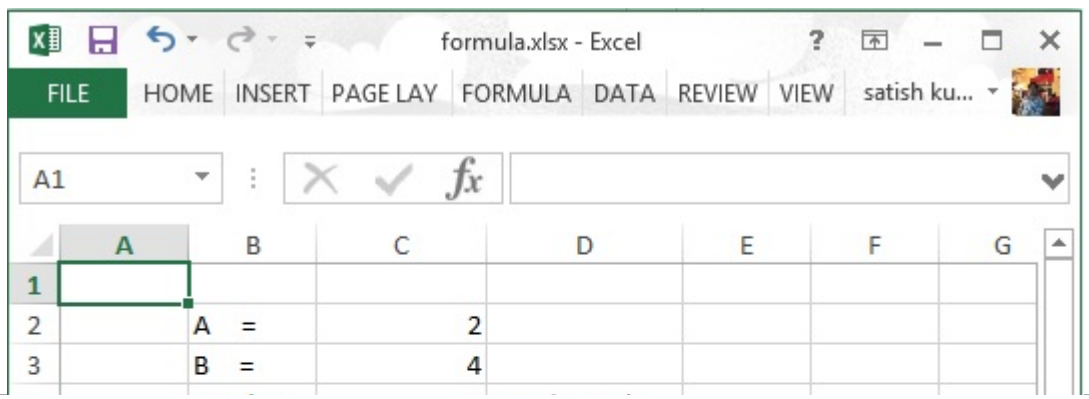
Save the above code as **Formula.java** and then compile and execute it from the command prompt as follows.

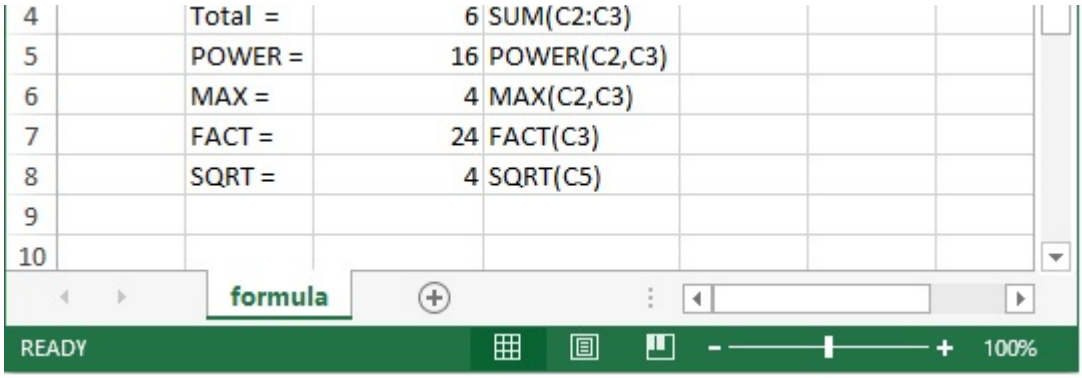
```
$javac Formula.java
$java Formula
```

It will generate an Excel file named **formula.xlsx** in your current directory and display the following output on the command prompt.

```
fromula.xlsx written successfully
```

The **formula.xlsx** file looks as follows.





POI – HYPERLINK

This chapter explains how to add hyperlinks to the contents in a cell. Usually hyperlinks are used to access any web URL, email, or an external file.

The following code shows how to create hyperlinks on cells.

```
import java.io.File;
import java.io.FileOutputStream;
import org.apache.poi.common.usermodel.Hyperlink;
import org.apache.poi.hssf.util.HSSFColor;
import org.apache.poi.ss.usermodel.CreationHelper;
import org.apache.poi.xssf.usermodel.XSSFCell;
import org.apache.poi.xssf.usermodel.XSSFCellStyle;
import org.apache.poi.xssf.usermodel.XSSFFont;
import org.apache.poi.xssf.usermodel.XSSFHyperlink;
import org.apache.poi.xssf.usermodel.XSSFSheet;
import org.apache.poi.xssf.usermodel.XSSFWorkbook;
public class HyperlinkEX
{
   public static void main(String[] args) throws Exception
   {
       XSSFWorkbook workbook = new XSSFWorkbook();
       XSSFSheet spreadsheet = workbook
       .createSheet("Hyperlinks");
       XSSFCell cell;
       CreationHelper createHelper = workbook
       .getCreationHelper();
       XSSFCellStyle hlinkstyle = workbook.createCellStyle();
       XSSFFont hlinkfont = workbook.createFont();
       hlinkfont.setUnderline(XSSFFont.U_SINGLE);
       hlinkfont.setColor(HSSFColor.BLUE.index);
       hlinkstyle.setFont(hlinkfont);
       //URL Link
       cell = spreadsheet.createRow(1)
       .createCell((short) 1);
       cell.setCellValue("URL Link");
       XSSFHyperlink link = (XSSFHyperlink)createHelper
       .createHyperlink(Hyperlink.LINK_URL);
       link.setAddress("http://www.tutorialspoint.com/" );
       cell.setHyperlink((XSSFHyperlink) link);
       cell.setCellStyle(hlinkstyle);
       //Hyperlink to a file in the current directory
       cell = spreadsheet.createRow(2)
       .createCell((short) 1);
       cell.setCellValue("File Link");
       link = (XSSFHyperlink)createHelper
       .createHyperlink(Hyperlink.LINK_FILE);
       link.setAddress("cellstyle.xlsx");
       cell.setHyperlink(link);
       cell.setCellStyle(hlinkstyle);
       //e-mail link
       cell = spreadsheet.createRow(3)
       .createCell((short) 1);
       cell.setCellValue("Email Link");
```

```
        link = (XSSFHyperlink)createHelper
        .createHyperlink(Hyperlink.LINK_EMAIL);
        link.setAddress(
        "mailto:contact@tutorialspoint.com?"
       +"subject=Hyperlink");
       cell.setHyperlink(link);
       cell.setCellStyle(hlinkstyle);
       FileOutputStream out = new FileOutputStream(
       new File("hyperlink.xlsx"));
       workbook.write(out);
       out.close();
       System.out.println("hyperlink.xlsx written successfully");
    }
}
```

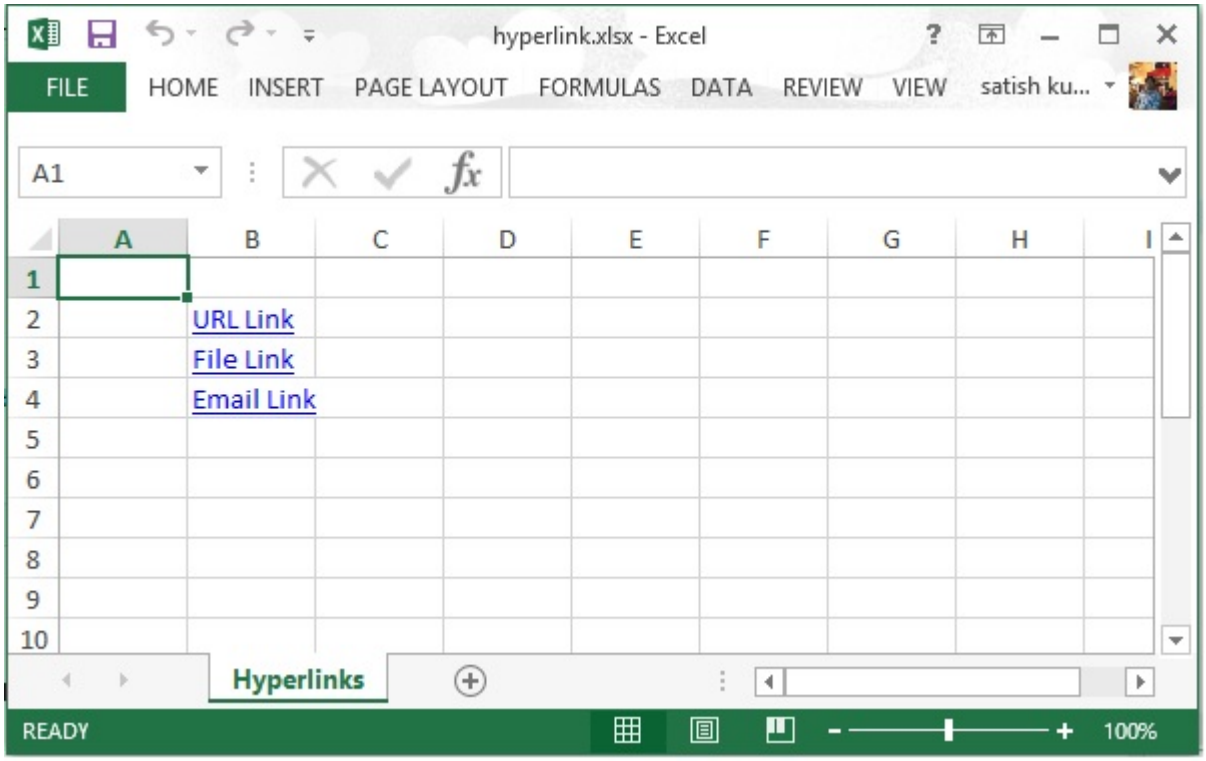
Save the above code as **HyperlinkEX.java**. Compile and execute it from the command prompt as follows.

```
$javac HyperlinkEX.java
$java HyperlinkEX
```

It will generate an Excel file named **hyperlink.xlsx** in your current directory and display the following output on the command prompt.

```
hyperlink.xlsx written successfully
```

The **hyperlink.xlsx** file looks as follows.



POI – PRINT AREA

This chapter explains how to set the print area on a spreadsheet. The usual print area is from left top to right bottom on Excel spreadsheets. Print area can be customized according to your requirement. It means you can print a particular range of cells from the whole spreadsheet, customize the paper size, print the contents with the grid lines turned on, etc.

The following code is used to set up the print area on a spreadsheet.

```
import java.io.File;
import java.io.FileOutputStream;
import org.apache.poi.xssf.usermodel.XSSFPrintSetup;
import org.apache.poi.xssf.usermodel.XSSFSheet;
```

```
import org.apache.poi.xssf.usermodel.XSSFWorkbook;
public class PrintArea
{
   public static void main(String[] args)throws Exception
   {
      XSSFWorkbook workbook = new XSSFWorkbook();
      XSSFSheet spreadsheet = workbook
      .createSheet("Print Area");
      //set print area with indexes
      workbook.setPrintArea(
      0, //sheet index
      0, //start column
      5, //end column
      0, //start row
      5 //end row
      );
      //set paper size
      spreadsheet.getPrintSetup().setPaperSize(
      XSSFPrintSetup.A4_PAPERSIZE);
      //set display grid lines or not
      spreadsheet.setDisplayGridlines(true);
      //set print grid lines or not
      spreadsheet.setPrintGridlines(true);
      FileOutputStream out = new FileOutputStream(
      new File("printarea.xlsx"));
      workbook.write(out);
      out.close();
      System.out.println("printarea.xlsx written successfully");
   }
}
```

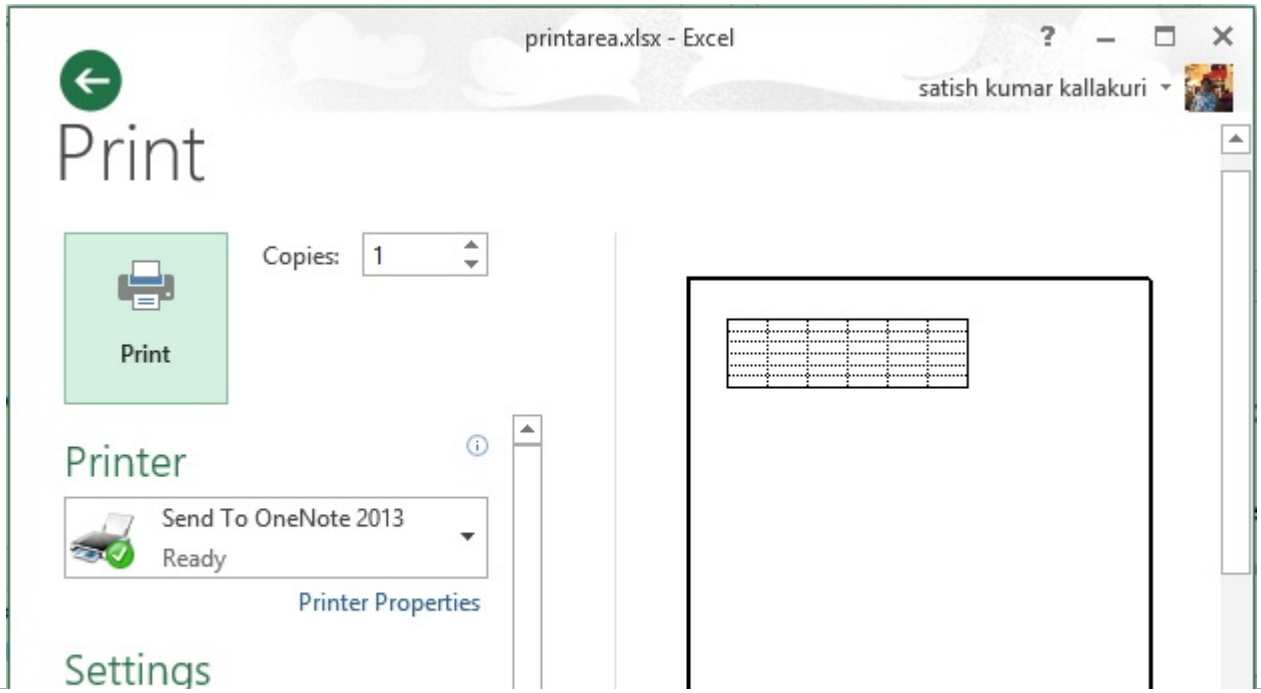
Let us save the above code as **PrintArea.java**. Compile and execute it from the command prompt as follows.

```
$javac PrintArea.java
$java PrintArea
```

It will generate a file named **printarea.xlsx** in your current directory and display the following output on the command prompt.

```
printarea.xlsx written successfully
```

In the above code, we have not added any cell values. Hence **printarea.xlsx** is a blank file. But you can observe in the following figure that the print preview shows the print area with grid lines.



POI INTERACTION WITH DATABASE

This chapter explains how the POI library interacts with a database. With the help of JDBC, you can retrieve data from a database and insert that data into a spreadsheet using the POI library. Let us consider MySQL database for SQL operations.

Write into Database

Let us assume the following employee data table called **emp_tbl** is to be retrieved from the MySQL database **test**.

EMP ID	EMP NAME	DEG	SALARY	DEPT
1201	Gopal	Technical Manager	45000	IT
1202	Manisha	Proof reader	45000	Testing
1203	Masthanvali	Technical Writer	45000	IT
1204	Kiran	Hr Admin	40000	HR
1205	Kranthi	Op Admin	30000	

Use the following code to retrieve data from a database and insert the same into a spreadsheet.

```
import java.io.File;
import java.io.FileOutputStream;
import java.sql.Connection;
import java.sql.DriverManager;
import java.sql.ResultSet;
import java.sql.Statement;
import org.apache.poi.xssf.usermodel.XSSFCell;
import org.apache.poi.xssf.usermodel.XSSFRow;
import org.apache.poi.xssf.usermodel.XSSFSheet;
import org.apache.poi.xssf.usermodel.XSSFWorkbook;
public class ExcelDatabase
{
   public static void main(String[] args) throws Exception
   {
      Class.forName("com.mysql.jdbc.Driver");
      Connection connect = DriverManager.getConnection(
      "jdbc:mysql://localhost:3306/test" ,
      "root" ,
      "root"
      );
      Statement statement = connect.createStatement();
      ResultSet resultSet = statement
      .executeQuery("select * from emp_tbl");
      XSSFWorkbook workbook = new XSSFWorkbook();
      XSSFSheet spreadsheet = workbook
      .createSheet("employe db");
      XSSFRow row=spreadsheet.createRow(1);
      XSSFCell cell;
      cell=row.createCell(1);
      cell.setCellValue("EMP ID");
      cell=row.createCell(2);
      cell.setCellValue("EMP NAME");
      cell=row.createCell(3);
      cell.setCellValue("DEG");
      cell=row.createCell(4);
      cell.setCellValue("SALARY");
```

```
      cell=row.createCell(5);
      cell.setCellValue("DEPT");
      int i=2;
      while(resultSet.next())
      {
         row=spreadsheet.createRow(i);
         cell=row.createCell(1);
         cell.setCellValue(resultSet.getInt("eid"));
         cell=row.createCell(2);
         cell.setCellValue(resultSet.getString("ename"));
         cell=row.createCell(3);
         cell.setCellValue(resultSet.getString("deg"));
         cell=row.createCell(4);
         cell.setCellValue(resultSet.getString("salary"));
         cell=row.createCell(5);
         cell.setCellValue(resultSet.getString("dept"));
         i++;
      }
      FileOutputStream out = new FileOutputStream(
      new File("exceldatabase.xlsx"));
      workbook.write(out);
      out.close();
      System.out.println(
      "exceldatabase.xlsx written successfully");
   }
}
```

Let us save the above code as **ExcelDatabase.java**. Compile and execute it from the command prompt as follows.

```
$javac ExcelDatabase.java
$java ExcelDatabase
```

It will generate an Excel file named **exceldatabase.xlsx** in your current directory and display the following output on the command prompt.

```
exceldatabase.xlsx written successfully
```

The **exceldatabase.xlsx** file looks as follows.