Lab 4

**Spreadsheet**

**Introduction**

Spreadsheet is an application program that has a table of values arranged in rows and columns. In a spreadsheet application, each value sits in a cell (intersection or a row and a column). Each cell contains either alphanumeric text or numeric values. A spreadsheet cell may alternatively contain a formula (equation that performs calculations on values on your worksheet) that defines how the content of that cell is to be calculated from the contents of any other cell (or combination of cells) each time any cell is updated. Spreadsheets are frequently used for financial information because of their ability to re-calculate the entire sheet automatically after a change to a single cell is made. **Microsoft Office Excel** is a full-featured spreadsheet program that is used by millions of people around the world.

**Worksheet and Workbook**

Worksheet is the primary document that we use in Excel to store and work with data. It is also called a spreadsheet. A worksheet consists of cells that are organized into rows and columns. A worksheet is always stored in a workbook.

A workbook is made up of several worksheets, like pages in a notebook. A workbook is a collection of worksheets. By default, each workbook in Excel contains three pages or worksheets.

**Rows, Columns, and Cells**

Rows are numbered from top to the bottom along the left edge of the worksheet. The first row is numbered 1, the second 2, and so on. The columns are labeled from left to right with letters. The first column is A, the second B, and so on. A cell is the interaction of a row and a column. For example, the uppermost cell is A1 (column A, row 1). Cell E6 is the interaction of column E and row 6. Two or more adjacent cells are referred to as a range of cells. Ranges specify the first and last cell in a row, column, or rectangular area. For example,

 **E3:E12** refers all cells in column E from row 3 to row 12.

 **A3:F3** refers all cells in row 3 from column A to column F.

 **C3:G20** refers all cells in the rectangular area bounded by C3 at the upper left and G20 at the lower right.

**Formula and Function**

Formulas are equations that perform calculations on values in your worksheet. A formula starts with an equal sign (=). We can use mathematical operator like +, -, \*, /, =, >, >=, <, <= etc. in formulas. For example, the formula (=5+2\*3) multiplies 2 by 3 and then adds 5 to the result. Another example is, =SUM(A1:A15).

Functions are the mathematical expressions already available in excel to automatically calculate results from data in your worksheet. For example, SUM() is a function that is used to calculate sum of values in the given range. Other functions are: AVERAGE(), PRODUCT(), MIN(), MAX() etc. Some most commonly used functions are given below:

 **SUM():** Totals the data in the range of cells. For example, SUM(C1:C15).

 **AVERAGE():** Produces the average of the data in a range of cells. For example, AVERAGE(C1:C12).

 **PRODUCT():** Produces the product of the data in the range of cells. For example, PRODUCT(C1:C10).

 **MIN():** Gives the smallest value in a range of cells. For example, MIN(C1:C12).

 **MAX():** Produces the greatest value in a range of cells. For example, MAX(C1:C12).

 **RAND():** Generates a random number between 0 and 1. For example, RAND() \* 3 generates a random number between 0 and 3.

 **PI():** Generates the value of Pi to 14 decimal places. For example, PI().

 **SQRT():** Produces the square toot of its argument. For example, SQRT(9).

 COUNT():

 **IF():** Provides the basis for a decision; if condition is met, first answer is returned; if condition is not met, second answer is returned. For example, IF(A1>0,“yes”, “no”) returns the answer “yes” if the value of A1 is positive and “no” otherwise.

 **AND():** Returns a logical TRUE response if all of its arguments are true; otherwise returns false. For example, AND(A1>0, A2>1, A3>3) returns TRUE if all the conditions inside AND() are true.

 **OR():** Returns a logical TRUE response if at least one of its argument is true; otherwise returns false. For example, OR(A1>0, A2>1, A3>3) returns TRUE if at least one condition inside OR() is true.

**Cell Referencing or Cell Addressing**

There are three types of cell references: **relative reference**, **absolute reference**, and **mixed reference**.

 A relative cell reference in a formula, such as A1, is based on the relative position of the cell that contains the formula and the cell the reference refers to. If the position of the cell that contains the formula changes, the reference is changed. If you copy the formula across rows or down columns, the reference automatically adjusts. By default, new formulas use relative references. For example, if you copy a relative reference in cell B2 to cell B3, it automatically adjusts from =A1 to =A2.

 An absolute cell reference in a formula, such as $A$1, always refer to a cell in a specific location. If the position of the cell that contains the formula changes, the absolute reference remains the same. If you copy the formula across rows or down columns, the absolute reference does not adjust. By default, new formulas use relative references, and you need to switch them to absolute references. For example, if you copy an absolute reference in cell B2 to cell B3, it stays the same in both cells =$A$1.  A mixed reference has either an absolute column and relative row, or absolute row and relative column. An absolute column reference takes the form $A1, $B1, and so on. An absolute row reference takes the form A$1, B$1, and so on. If the position of the cell that contains the formula changes, the relative reference is changed, and the absolute reference does not change. If you copy the formula across rows or down columns, the relative reference automatically adjusts, and the absolute reference does not adjust.

**Working with Charts** With a spreadsheet program, you can create charts, which are also called graphs. Charts show data in ways that are visually more interesting than tables. We **can use different types of charts like pie,bar, column etc in excel.**

**Working with pictures**

Like in Microsoft Office Word, click on Insert, click on Picture and then select appropriate option. You can insert pictures from clip art, from file, from scanner or camera, autoshapes, wordart, and organization chart.

**Conditional Formatting**

Conditional formatting is a format, such as cell shading or font color that Excel automatically applies to cells if a specified condition is true. To add, change, or remove conditional formatting, follow the following steps:

1. On the Format menu, click Conditional Formatting.

2. Select different parameters for condition 1 (you can format the cell using different font properties, borders, shading and patterns). You can also add and delete other conditions.

3. Click on OK.

**Data Validation**

Data validation is a tool that helps you to control the kind of information that is entered in your worksheet. With data validation, you can provide users with a list of choices, restrict entries to a specific type or size, and create custom settings. To validate data, follow the following steps:

1. Click on Data.

2. Click on Validation. A Data Validation dialog box appears.

3. Choose Validation Criteria under Settings tab.

4. Enter title and input message under Input Message tab.

5. Select Style; enter Title and Error Message under Error Alert tab.

6. Click on OK.

**Pivot Table**

A pivot table is a great reporting tool that sorts and sums the original data layout in the spreadsheet. A PivotTable report is a way to extract data from a long list of information, and present it in a readable form so that it will be easy to read and analyze. It is an interactive table that quickly combines and compares large amounts of data. You can rotate its rows and columns to see different summaries of the source data, and you can display the details for areas of interest.

Use a PivotTable report when you want to analyze **related totals**, especially when you have a long list of figures to sum and you want to compare several facts about each figure.

In a PivotTable report, each column or field in your source data becomes a PivotTable field that summarizes multiple rows of information. A data field, such as Sum of Sales, provides the values to be summarized.

To create a PivotTable report, you run the PivotTable and PivotChart Wizard. To run this wizard, on the **Data** menu, click **PivotTable and PivotChart Report**. In the wizard, you select the source data you want from your worksheet list or external database. The wizard then provides you with a worksheet area for the report and a list of the available fields. As you drag the fields from the list window to the outlined areas, Microsoft Excel summarizes and calculates the report for you automatically.

**Solutions**

**2005 spring (question no 5 a)**

(i) H2=IF(AND(C2>=45,D2>=45,E2>=45,F2>=45,G2>=45), “Pass”, “Fail”)

(ii) I2=SUM(C2:G2) / 5

(iii)J2=IF(H2=“Pass”, IF(I2>=80,“Excellent”, IF(I2>=60, “First”, “Second”)), “ ”)

**2007 fall (question no 4 c)**

(i) D6=IF(C6>=15000,C6\*15%,IF(C6>=10000,C6\*10%,0))

(ii) E6=C6-D6

**2008 fall (question no 4 a)**

(i) 4B=IF(3B<=5000,3B\*20%,IF(3B<=10000, 3B\*15%,5000))

(ii) 5B=IF(3B<=5000,3B\*10%,IF(3B<=10000, 3B\*8%,3B\*6.5%))

(iii)=MAX(3B:3D), =AVERAGE(3B:3D)

**2008 spring (question no 4 b)**

D2=IF(C2<15000,C2\*15%,C2\*20%)

E2=IF(C2<15000,C2\*10%,C2\*15%)

F2=SUM(C2:E2)

**2009 fall (question no 4 b)**

(i) C2=B2\*12

(ii) D2=IF((C2-140000)>0,C2-140000,0)

(iii)E2=IF(D2>85000,D2\*25%,D2\*15%)

(iv) F2=(C2-E2)/12