

## MANUAL FOR WEBXL – A WEBBASED SPREADSHEET APPLICATION.

This can be opened in the following link: <http://www.nirt.in/webxl>

**1.You will see the following page in your web browser.**

**2.Selecting Cells in the Spread sheet.**

**3.Entering texts and values in the cells.**

**4.Doing Calculations in spreadsheet.**

**5.Copy and Paste functions in this spreadsheet.**

**6.Saving the spread sheet.**

**7.Loading the spread sheet from saved file.**

**8.Loading in Microsoft Excel spread sheet from saved file.**

**9.OPEN SOURCE DATA:**

**10.String functions:**

**11.Format functions:**

**12. Solution of simultaneous equations in spreadsheet:**

**13. Javascript programming within spreadsheet:**

**14. Shortcut keys:**

1. You will see the following page in your web browser.

The screenshot shows a web browser window titled "WORKSHEET". Below the title bar, there are two text input boxes. The first box is empty, and the second box contains the text "go". To the right of these boxes is a toolbar with buttons for mathematical operations: "=", "?", "+", "-", "\*", and "/". Below this toolbar is another row of buttons: "pow", "sqrt", "(", ")", "Range", "Copy", "Paste", "Pasv", "Save", and "load". Below the buttons is a spreadsheet grid with 16 rows (ROW1 to ROW16) and 9 columns (COLUMN1 to COLUMN9). The top-left cell (ROW1, COLUMN1) is highlighted in yellow.

The text boxes and buttons at top with yellow background are tools for this spread sheet application. This sheet contains 100 rows and 100 columns.

The top left text box will show the location of your selected cell in spreadsheet in the format of [ row\_no,column\_no]. example [1,1] shows that you selected the cell meeting at first row and first column.[1,1][1,1] shows that you selected single cell. This will change as [1,1][10,10] when you selected range of cells between [1,1] and [10,10] and selected cells will change to yellow color.

The next text box just right of the above text box is the input box, where you can type text or formula as in other spreadsheet applications.

## 2. Selecting Cells in the Spread sheet.

In the above sheet click on the cell [1,1] and you will see the following screen.

WORKSHEET

[1,1][1,1] go = ? + - \* / sum

pow sqrt ( ) Range Copy Paste Pasv Save load

	COLUMN1	COLUMN2	COLUMN3	COLUMN4	COLUMN5	COLUMN6	COLUMN7	COLUMN8	COLUMN9
ROW1									
ROW2									
ROW3									
ROW4									
ROW5									
ROW6									
ROW7									
ROW8									
ROW9									
ROW10									
ROW11									
ROW12									
ROW13									
ROW14									
ROW15									
ROW16									

Click on [10,1] you will see the following screen.

WORKSHEET

[10.1][10.1] go = ? + - \* / sum

pow sqrt ( ) Range Copy Paste Pasv Save load

	COLUMN1	COLUMN2	COLUMN3	COLUMN4	COLUMN5	COLUMN6	COLUMN7	COLUMN8	COLUMN9
ROW1									
ROW2									
ROW3									
ROW4									
ROW5									
ROW6									
ROW7									
ROW8									
ROW9									
ROW10									
ROW11									
ROW12									
ROW13									
ROW14									
ROW15									

You will see that your selection is shown as [10,1][10,1] in location indicator text box at top left.

To select the range of Cells . Click on the Range button after selecting the first cell and then select another cell which will select all the cells within the range and all cells within the range will become yellow in color. For example in the above sheet first select [10,1] and then Range button once and then select [1,5]. You will see the range as shown below. And you will see [1,1][10,5] in location indicator.



### 3.Entering texts and values in the cells.

First select [1,1] and then type something in input box and then press enter key or go button in tools. You will see the entries in the selected cells. For example select [1,1] and then type Hello in input text box as shown below.

The screenshot shows a software interface for a worksheet. At the top, there is a title bar with a globe icon and the text 'WORKSHEET'. Below the title bar is a toolbar containing several buttons: '[1.1][1.1]', 'Hello', 'go', '=', '?', '+', '-', '\*', '/', 'sum', 'pow', 'sqrt', '(', ')', 'Range', 'Copy', 'Paste', 'Pasv', 'Save', and 'load'. The 'go' button is highlighted in yellow. Below the toolbar is a grid with 9 columns and 15 rows. The columns are labeled 'COLUMN1' through 'COLUMN9' and the rows are labeled 'ROW1' through 'ROW15'. The cell at the intersection of 'COLUMN1' and 'ROW1' is highlighted in yellow.

	COLUMN1	COLUMN2	COLUMN3	COLUMN4	COLUMN5	COLUMN6	COLUMN7	COLUMN8	COLUMN9
ROW1									
ROW2									
ROW3									
ROW4									
ROW5									
ROW6									
ROW7									
ROW8									
ROW9									
ROW10									
ROW11									
ROW12									
ROW13									
ROW14									
ROW15									

Then press Enter key or press go button in tool box. You will see the following screen as shown below.

	COLUMN1	COLUMN2	COLUMN3	COLUMN4	COLUMN5	COLUMN6	COLUMN7	COLUMN8	COLUMN9
ROW1	Hello								
ROW2									
ROW3									
ROW4									
ROW5									
ROW6									
ROW7									
ROW8									
ROW9									
ROW10									
ROW11									
ROW12									
ROW13									
ROW14									
ROW15									

The “Hello” is entered in cell[1,1] and your cell selection is changed to just below the previous cell that is [2,1][2,1] and you will see your location in the location indicator. (*Note: Enter key won't work in Firefox and you have to press go button instead.*) Now enter some value that is 10 in input box and press enter key. You will see the following screen.

	COLUMN1	COLUMN2	COLUMN3	COLUMN4	COLUMN5	COLUMN6	COLUMN7	COLUMN8	COLUMN9
ROW1	Hello								
ROW2	10								
ROW3									
ROW4									
ROW5									
ROW6									
ROW7									
ROW8									
ROW9									
ROW10									
ROW11									
ROW12									
ROW13									
ROW14									
ROW15									

You will see that the values / numbers are right justified and text is left justified.

#### 4. Doing Calculations in spreadsheet.

Now I want to add +10 to value in cell [2,1] and put the value in the current selected cell[3,1][3,1]. For that in the input box enter “=” sign by keyboard or press “=” button (just right side of the “go” button) and then select the cell[2,1] and you will see the following in input box as shown below. The contents in the input box is =[2,1].

The screenshot shows a spreadsheet application window titled "WORKSHEET". The formula bar at the top contains the text "[3,1][3,1] = [2,1]" and a "go" button. Below the formula bar is a row of mathematical operators: "=", "?", "+", "-", "\*", and "/", along with a "sum" button. A second row of buttons includes "pow", "sqrt", "(", ")", "Range", "Copy", "Paste", "Pasv", "Save", and "load". The spreadsheet grid below has 9 columns labeled COLUMN1 to COLUMN9 and 15 rows labeled ROW1 to ROW15. Cell [1,1] contains the text "Hello". Cell [2,1] contains the number "10". Cell [3,1] is highlighted in yellow.

	COLUMN1	COLUMN2	COLUMN3	COLUMN4	COLUMN5	COLUMN6	COLUMN7	COLUMN8	COLUMN9
ROW1	Hello								
ROW2	10								
ROW3									
ROW4									
ROW5									
ROW6									
ROW7									
ROW8									
ROW9									
ROW10									
ROW11									
ROW12									
ROW13									
ROW14									
ROW15									

Now type +10 in the input box after =[2,1] as =[2,1]+10 and then press enter key or ‘go’ button. You will see the following screen as below.

WORKSHEET

[3.1][3.1]    =[2.1]+10    go   =   ?   +   -   \*   /   sum

pow   sqrt   (   )   Range   Copy   Paste   Pasv   Save   load

	COLUMN1	COLUMN2	COLUMN3	COLUMN4	COLUMN5	COLUMN6	COLUMN7	COLUMN8	COLUMN9
ROW1	Hello								
ROW2	10								
ROW3									
ROW4									
ROW5									
ROW6									
ROW7									
ROW8									
ROW9									
ROW10									
ROW11									
ROW12									
ROW13									
ROW14									
ROW15									

After pressing 'go' button you will see the following screen.

WORKSHEET

[4.1][4.1] | go = ? + - \* / sum

pow sqrt ( ) Range Copy Paste Pasv Save load

	COLUMN1	COLUMN2	COLUMN3	COLUMN4	COLUMN5	COLUMN6	COLUMN7	COLUMN8	COLUMN9
ROW1	Hello								
ROW2	10								
ROW3	20								
ROW4									
ROW5									
ROW6									
ROW7									
ROW8									
ROW9									
ROW10									
ROW11									
ROW12									
ROW13									
ROW14									
ROW15									

Now you will see that the contents of [3,1]=20 . This is calculated as Value at [2,1]+10. The formula is =[2,1]+10. Similarly you can subtract 5 from the value at [3,1] by entering =[3,1]-5 and then press enter key. You need not type [3,1] in the formula. After entering '=' sign in the current cell click on cell [3,1] and then type -5 and then enter. Instead of typing '-' you can use the '-' button in tools also. You will see the formula as =[3,1]-5 and after pressing 'go' button you will see the following screen.

	COLUMN1	COLUMN2	COLUMN3	COLUMN4	COLUMN5	COLUMN6	COLUMN7	COLUMN8	COLUMN9
ROW1	Hello								
ROW2	10								
ROW3	20								
ROW4	15								
ROW5									
ROW6									
ROW7									
ROW8									
ROW9									
ROW10									
ROW11									
ROW12									
ROW13									
ROW14									
ROW15									

You can go and select the cells with values and formula to see the values or formulas present in those cells. The contents in input box will show formula or values in the selected cells. For example now select the cell [3,1] you will see the following screen with contents of input box displays the formula in that cell.

WORKSHEET

[3,1][3,1]    =[2,1]+10    go   =   ?   +   -   \*   /   sum

pow   sqrt   (   )   Range   Copy   Paste   Pasv   Save   load

	COLUMN1	COLUMN2	COLUMN3	COLUMN4	COLUMN5	COLUMN6	COLUMN7	COLUMN8	COLUMN9
ROW1	Hello								
ROW2	10								
ROW3	20								
ROW4	15								
ROW5									
ROW6									
ROW7									
ROW8									
ROW9									
ROW10									
ROW11									
ROW12									
ROW13									
ROW14									
ROW15									

Now you will see that the input box shows the formula =[2,1]+10 and now you can edit the formula in input box. For example put the cursor at + sign and retype to change it as \* and your formula will change as =[2,1]\*10 as shown below.

WORKSHEET											
[3.1][3.1]		=[2.1]*10		go	=	?	+	-	*	/	sum
pow	sqrt	(	)	Range	Copy	Paste	Pasv	Save	load		
	COLUMN1	COLUMN2	COLUMN3	COLUMN4	COLUMN5	COLUMN6	COLUMN7	COLUMN8	COLUMN9		
ROW1	Hello										
ROW2	10										
ROW3	20										
ROW4	15										
ROW5											
ROW6											
ROW7											
ROW8											
ROW9											
ROW10											
ROW11											
ROW12											
ROW13											
ROW14											
ROW15											

Now press enter key or 'go' button. You will see the sheet as below.

	COLUMN1	COLUMN2	COLUMN3	COLUMN4	COLUMN5	COLUMN6	COLUMN7	COLUMN8	COLUMN9
ROW1	Hello								
ROW2	10								
ROW3	100								
ROW4	95								
ROW5									
ROW6									
ROW7									
ROW8									
ROW9									
ROW10									
ROW11									
ROW12									
ROW13									
ROW14									
ROW15									

Now you will see the contents of [3,1] = [2,1]\*10 which is equal to (10\*10=100) and the contents in [4,1] is also changed as per formula [4,1]=[3,1]-5 which is equal to (100-5=95). Similarly you can change the formula in [4,1] as =[3,1]/2 as below.

WORKSHEET

[4.1][4.1]    =[3.1]/2    go   =   ?   +   -   \*   /   sum

pow   sqrt   (   )   Range   Copy   Paste   Pasv   Save   load

	COLUMN1	COLUMN2	COLUMN3	COLUMN4	COLUMN5	COLUMN6	COLUMN7	COLUMN8	COLUMN9
ROW1	Hello								
ROW2	10								
ROW3	100								
ROW4	95								
ROW5									
ROW6									
ROW7									
ROW8									
ROW9									
ROW10									
ROW11									
ROW12									
ROW13									
ROW14									
ROW15									

Now press 'go' button will show the following change.

	COLUMN1	COLUMN2	COLUMN3	COLUMN4	COLUMN5	COLUMN6	COLUMN7	COLUMN8	COLUMN9
ROW1	Hello								
ROW2	10								
ROW3	100								
ROW4	50								
ROW5									
ROW6									
ROW7									
ROW8									
ROW9									
ROW10									
ROW11									
ROW12									
ROW13									
ROW14									
ROW15									

Now you will see that the contents of [4,1]=[3,1]/2 which is (100/2=50). Now you understood basic calculation of +,-,\*,/. Now will see the =sum function which is used for summing up of columns or rows or range of cells. For that in the above screen select the cell [11,1] as shown below.

	COLUMN1	COLUMN2	COLUMN3	COLUMN4	COLUMN5	COLUMN6	COLUMN7	COLUMN8	COLUMN9
ROW1	Hello								
ROW2	10								
ROW3	100								
ROW4	50								
ROW5									
ROW6									
ROW7									
ROW8									
ROW9									
ROW10									
ROW11									
ROW12									
ROW13									
ROW14									
ROW15									

Now you will see the location indicator as [11,1][11,1]. In the input box enter '=' and then click 'sum' button. you will see the following screen.

	COLUMN1	COLUMN2	COLUMN3	COLUMN4	COLUMN5	COLUMN6	COLUMN7	COLUMN8	COLUMN9
ROW1	Hello								
ROW2	10								
ROW3	100								
ROW4	50								
ROW5									
ROW6									
ROW7									
ROW8									
ROW9									
ROW10									
ROW11									
ROW12									
ROW13									
ROW14									
ROW15									

Now press '(' button or type from key board and then click on [1,1] you will see the following screen.

WORKSHEET

[11,1][11,1]    =sum([1,1]    go    =    ?    +    -    \*    /    sum

pow    sqrt    (    )    Range    Copy    Paste    Pasv    Save    load

	COLUMN1	COLUMN2	COLUMN3	COLUMN4	COLUMN5	COLUMN6	COLUMN7	COLUMN8	COLUMN9
ROW1	Hello								
ROW2	10								
ROW3	100								
ROW4	50								
ROW5									
ROW6									
ROW7									
ROW8									
ROW9									
ROW10									
ROW11									
ROW12									
ROW13									
ROW14									
ROW15									

Then click on [10,1] and you will see the following in the formula box as shown below.

WORKSHEET

[11.1][11.1]    =sum([1.1][10.1]    go    =    ?    +    -    \*    /    sum

pow    sqrt    (    )    Range    Copy    Paste    Pasv    Save    load

	COLUMN1	COLUMN2	COLUMN3	COLUMN4	COLUMN5	COLUMN6	COLUMN7	COLUMN8	COLUMN9
ROW1	Hello								
ROW2	10								
ROW3	100								
ROW4	50								
ROW5									
ROW6									
ROW7									
ROW8									
ROW9									
ROW10									
ROW11									
ROW12									
ROW13									
ROW14									
ROW15									

Now press “)” button or type from keyboard and now the formula box will show as =sum([1,1][10,1]) and then press enter key or ‘go’ button. You will see the following screen.

	COLUMN1	COLUMN2	COLUMN3	COLUMN4	COLUMN5	COLUMN6	COLUMN7	COLUMN8	COLUMN9
ROW1	Hello								
ROW2	10								
ROW3	100								
ROW4	50								
ROW5									
ROW6									
ROW7									
ROW8									
ROW9									
ROW10									
ROW11	160								
ROW12									
ROW13									
ROW14									
ROW15									
ROW16									

Now go back to the cell [11,1] to see the formula =sum([1,1][10,1]) which is summation of values in Cells [1,1][2,1][3,1][4,1].. [10,1] and works out to be 160 as above. Now you go to cell [1,1] as shown below.

	COLUMN1	COLUMN2	COLUMN3	COLUMN4	COLUMN5	COLUMN6	COLUMN7	COLUMN8	COLUMN9
ROW1	Hello								
ROW2	10								
ROW3	100								
ROW4	50								
ROW5									
ROW6									
ROW7									
ROW8									
ROW9									
ROW10									
ROW11	160								
ROW12									
ROW13									
ROW14									
ROW15									
ROW16									

Now edit the contents in input box and change 'Hello' to some value 20.25 as shown below.

WORKSHEET

[1.1][1.1] 20.25 go = ? + - \* / sum

pow sqrt ( ) Range Copy Paste Pasv Save load

	COLUMN1	COLUMN2	COLUMN3	COLUMN4	COLUMN5	COLUMN6	COLUMN7	COLUMN8	COLUMN9
ROW1	Hello								
ROW2	10								
ROW3	100								
ROW4	50								
ROW5									
ROW6									
ROW7									
ROW8									
ROW9									
ROW10									
ROW11	160								
ROW12									
ROW13									
ROW14									
ROW15									

Now press 'go' button. The screen will be as shown below.

	COLUMN1	COLUMN2	COLUMN3	COLUMN4	COLUMN5	COLUMN6	COLUMN7	COLUMN8	COLUMN9
ROW1	20.25								
ROW2	10								
ROW3	100								
ROW4	50								
ROW5									
ROW6									
ROW7									
ROW8									
ROW9									
ROW10									
ROW11	180.25								
ROW12									
ROW13									
ROW14									
ROW15									

In the above screen you will see that the contents in [1,1] is changed from 'Hello' to 20.25 and the =sum[1,1][10,1] formula in [11,1] also changed the contents of [11,1] as 180.25.

**One more calculation is the power of and square root of values.**

Now select the cell [3,2] as shown below.

WORKSHEET

[3,2][3,2] go = ? + - \* / sum

pow sqrt ( ) Range Copy Paste Pasv Save load

	COLUMN1	COLUMN2	COLUMN3	COLUMN4	COLUMN5	COLUMN6	COLUMN7	COLUMN8	COLUMN9
ROW1	20.25								
ROW2	10								
ROW3	100								
ROW4	50								
ROW5									
ROW6									
ROW7									
ROW8									
ROW9									
ROW10									
ROW11	180.25								
ROW12									
ROW13									
ROW14									
ROW15									
ROW16									

You will see the location indicator as [3,2][3,2]. Now in the formula box type '=' and then press 'sqrt' button. You will see the following screen.

WORKSHEET

[3,2][3,2]    =Math.sqrt(    go   =   ?   +   -   \*   /   sum

pow   sqrt   (   )   Range   Copy   Paste   Pasv   Save   load

	COLUMN1	COLUMN2	COLUMN3	COLUMN4	COLUMN5	COLUMN6	COLUMN7	COLUMN8	COLUMN9
ROW1	20.25								
ROW2	10								
ROW3	100								
ROW4	50								
ROW5									
ROW6									
ROW7									
ROW8									
ROW9									
ROW10									
ROW11	180.25								
ROW12									
ROW13									
ROW14									
ROW15									

You will that the formula box changes to =Math.sqrt( and now you select the cell for which you want to find the squareroot value. In this case select [3,1] and then type ‘)’ and then press enter key or ‘go’ button. The screen will be as below.

	COLUMN1	COLUMN2	COLUMN3	COLUMN4	COLUMN5	COLUMN6	COLUMN7	COLUMN8
ROW1	20.25							
ROW2	10							
ROW3	100	10						
ROW4	50							
ROW5								
ROW6								
ROW7								
ROW8								
ROW9								
ROW10								
ROW11	180.25							
ROW12								
ROW13								
ROW14								
ROW15								

Now square root of [3,1] is placed in [3,2], which is 10. You can click on [3,2] to see the exact syntax of formula as shown below.

WORKSHEET

[3.2][3.2]    =Math.sqrt([3,1])    go    =    ?    +    -    \*    /    sum

pow    sqrt    (    )    Range    Copy    Paste    Pasv    Save    load

	COLUMN1	COLUMN2	COLUMN3	COLUMN4	COLUMN5	COLUMN6	COLUMN7	COLUMN8	COLUMN9
ROW1	20.25								
ROW2	10								
ROW3	100	10							
ROW4	50								
ROW5									
ROW6									
ROW7									
ROW8									
ROW9									
ROW10									
ROW11	180.25								
ROW12									
ROW13									
ROW14									
ROW15									
ROW16									

You will see the formula as =Math.sqrt([3,1]) . This is Native javascript formula for finding the root value. Similarly you can do Power of or Exponent of function as follows. Now you want to find the value of [4,1] raised to the power of 3 and place it in the cell[4,2]. Now select the cell [4,2] and then click on '=' button and then on 'pow' button will show the formula box as below.

WORKSHEET

[4.2][4.2] =Math.pow( go = ? + - \* / sum

pow sqrt ( ) Range Copy Paste Pasv Save load

	COLUMN1	COLUMN2	COLUMN3	COLUMN4	COLUMN5	COLUMN6	COLUMN7	COLUMN8	COLUMN9
ROW1	20.25								
ROW2	10								
ROW3	100	10							
ROW4	50								
ROW5									
ROW6									
ROW7									
ROW8									
ROW9									
ROW10									
ROW11	180.25								
ROW12									
ROW13									
ROW14									
ROW15									

You will see the formula bar changed to =Math.pow( and now you click the cell you want to raise the power and that is [4,1] and you will see the screen as below.

WORKSHEET

[4.2][4.2]      =Math.pow([4.1]      go      =      ?      +      -      \*      /      sum

pow      sqrt      (      )      Range      Copy      Paste      Pasv      Save      load

	COLUMN1	COLUMN2	COLUMN3	COLUMN4	COLUMN5	COLUMN6	COLUMN7	COLUMN8	COLUMN9
ROW1	20.25								
ROW2	10								
ROW3	100	10							
ROW4	50								
ROW5									
ROW6									
ROW7									
ROW8									
ROW9									
ROW10									
ROW11	180.25								
ROW12									
ROW13									
ROW14									
ROW15									

Now in the formula box type ,3) and the formula bar will become =math.pow([4,1],3) and press enter or 'go' button will change the screen as below.

	COLUMN1	COLUMN2	COLUMN3	COLUMN4	COLUMN5	COLUMN6	COLUMN7	COLUMN8	COLUMN9
ROW1	20.25								
ROW2	10								
ROW3	100	10							
ROW4	50	125000							
ROW5									
ROW6									
ROW7									
ROW8									
ROW9									
ROW10									
ROW11	180.25								
ROW12									
ROW13									
ROW14									
ROW15									

Now you will see that the contents of [4,2] is value of [4,1] raised to the power of 3 which is  $(50*50*50=125000)$ . Go back to the cell [4,2] to see the syntax of the formula. You will see the screen as below.

	COLUMN1	COLUMN2	COLUMN3	COLUMN4	COLUMN5	COLUMN6	COLUMN7	COLUMN8	COLUMN9
ROW1	20.25								
ROW2	10								
ROW3	100	10							
ROW4	50	125000							
ROW5									
ROW6									
ROW7									
ROW8									
ROW9									
ROW10									
ROW11	180.25								
ROW12									
ROW13									
ROW14									
ROW15									

This formula `=Math.pow([4,1],3)` is also Native Javascript formula. Similarly any native javascript formula can be used anywhere. For example I want to find Minimum of [3,1] and [4,1] and put it in the cell [5,2]. Select the cell [5,2] and then type the formula as `=Math.min([3,1],[4,1])` and then press enter or 'go' button will give the following screen.

	COLUMN1	COLUMN2	COLUMN3	COLUMN4	COLUMN5	COLUMN6	COLUMN7	COLUMN8	COLUMN9
ROW1	20.25								
ROW2	10								
ROW3	100	10							
ROW4	50	125000							
ROW5		50							
ROW6									
ROW7									
ROW8									
ROW9									
ROW10									
ROW11	180.25								
ROW12									
ROW13									
ROW14									
ROW15									

Now go back to the cell [5,2] to see the syntax of the formula as shown below.

	COLUMN1	COLUMN2	COLUMN3	COLUMN4	COLUMN5	COLUMN6	COLUMN7	COLUMN8	COLUMN9
ROW1	20.25								
ROW2	10								
ROW3	100	10							
ROW4	50	125000							
ROW5		50							
ROW6									
ROW7									
ROW8									
ROW9									
ROW10									
ROW11	180.25								
ROW12									
ROW13									
ROW14									
ROW15									
ROW16									

You will see the formula bar as =Math.min([3,1][4,1]) which means the minimum value of [3,1] or [4,1] which is 50 in this case. Similarly any valid javascript Math formula can be used in this spread sheet.

### 5.Copy and Paste functions in this spreadsheet.

Now there is formula =sum([1,1][10,1] in cell [11,1]. To copy the formula from cell [11,1] to [11,2] do the following. First select the cell [11,1] as shown below.

The screenshot shows a spreadsheet application window titled 'WORKSHEET'. The formula bar displays the formula `=sum([1,1][10,1])`. Below the formula bar is a toolbar with buttons for 'pow', 'sqrt', '(', ')', 'Range', 'Copy', 'Paste', 'Pasv', 'Save', and 'load'. The spreadsheet grid has columns labeled COLUMN1 through COLUMN9 and rows labeled ROW1 through ROW15. The cell at the intersection of ROW11 and COLUMN1 is highlighted in yellow and contains the value 180.25. Other cells in the grid contain numerical values: ROW1, COLUMN1 (20.25); ROW2, COLUMN1 (10); ROW3, COLUMN1 (100), COLUMN2 (10); ROW4, COLUMN1 (50), COLUMN2 (125000); ROW5, COLUMN2 (50).

	COLUMN1	COLUMN2	COLUMN3	COLUMN4	COLUMN5	COLUMN6	COLUMN7	COLUMN8	COLUMN9
ROW1	20.25								
ROW2	10								
ROW3	100	10							
ROW4	50	125000							
ROW5		50							
ROW6									
ROW7									
ROW8									
ROW9									
ROW10									
ROW11	180.25								
ROW12									
ROW13									
ROW14									
ROW15									

Now press Copy button once.

	COLUMN1	COLUMN2	COLUMN3	COLUMN4	COLUMN5	COLUMN6	COLUMN7	COLUMN8
ROW1	20.25							
ROW2	10							
ROW3	100	10						
ROW4	50	125000						
ROW5		50						
ROW6								
ROW7								
ROW8								
ROW9								
ROW10								
ROW11	180.25							
ROW12								
ROW13								
ROW14								
ROW15								

Then select the cell [11,2] as shown below.

	COLUMN1	COLUMN2	COLUMN3	COLUMN4	COLUMN5	COLUMN6	COLUMN7	COLUMN8	COLUMN9
ROW1	20.25								
ROW2	10								
ROW3	100	10							
ROW4	50	125000							
ROW5		50							
ROW6									
ROW7									
ROW8									
ROW9									
ROW10									
ROW11	180.25								
ROW12									
ROW13									
ROW14									
ROW15									

Now just press Paste button once as shown below and you will see the following screen.

	COLUMN1	COLUMN2	COLUMN3	COLUMN4	COLUMN5	COLUMN6	COLUMN7	COLUMN8	COLUMN9
ROW1	20.25								
ROW2	10								
ROW3	100	10							
ROW4	50	125000							
ROW5		50							
ROW6									
ROW7									
ROW8									
ROW9									
ROW10									
ROW11	180.25	125060							
ROW12									
ROW13									
ROW14									
ROW15									

Now go back to Cell [11,2] to see the formula as below.

	COLUMN1	COLUMN2	COLUMN3	COLUMN4	COLUMN5	COLUMN6	COLUMN7	COLUMN8	COLUMN9
ROW1	20.25								
ROW2	10								
ROW3	100	10							
ROW4	50	125000							
ROW5		50							
ROW6									
ROW7									
ROW8									
ROW9									
ROW10									
ROW11	180.25	125060							
ROW12									
ROW13									
ROW14									
ROW15									

You will see the formula in cell [11,2] is =sum([1,2][10,2]) and the value in the cell [11,2] is the summation of cells [1,2][2,2][3,2] ... [10,2] which is calculated as 125060 as seen the above sheet.

If you want to paste the value of [11,2] at [12,2]. Select the cell [12,2] as below.

	COLUMN1	COLUMN2	COLUMN3	COLUMN4	COLUMN5	COLUMN6	COLUMN7	COLUMN8	COLUMN9
ROW1	20.25								
ROW2	10								
ROW3	100	10							
ROW4	50	125000							
ROW5		50							
ROW6									
ROW7									
ROW8									
ROW9									
ROW10									
ROW11	180.25	125060							
ROW12									
ROW13									
ROW14									
ROW15									

Now press Pasv button. You will the value at [11,1] is put in cell [12,2] as shown below.

WORKSHEET

[12,2][12,2] go = ? + - \* / sum

pow sqrt ( ) Range Copy Paste Pasv Save load

	COLUMN1	COLUMN2	COLUMN3	COLUMN4	COLUMN5	COLUMN6	COLUMN7	COLUMN8	COLUMN9
ROW1	20.25								
ROW2	10								
ROW3	100	10							
ROW4	50	125000							
ROW5		50							
ROW6									
ROW7									
ROW8									
ROW9									
ROW10									
ROW11	180.25	125060							
ROW12		180.25							
ROW13									
ROW14									
ROW15									

Now you will see the same 180.25 is put in the cell [12,2] also. This is similar to Paste Values in Excel spread sheet.

### Copy and paste with range.

Now select the cell [1,1] and then Range button once and then select cell [11,1] to select the range as shown below.

WORKSHEET											
[1.1][11.1]		20.25		go	=	?	+	-	*	/	sum
pow	sqrt	(	)	Range	Copy	Paste	Pasv	Save	load		
	COLUMN1	COLUMN2	COLUMN3	COLUMN4	COLUMN5	COLUMN6	COLUMN7	COLUMN8	COLUMN9		
ROW1	20.25										
ROW2	10										
ROW3	100	10									
ROW4	50	125000									
ROW5		50									
ROW6											
ROW7											
ROW8											
ROW9											
ROW10											
ROW11	180.25	125060									
ROW12		180.25									
ROW13											
ROW14											
ROW15											

Now press Copy button once.

	COLUMN1	COLUMN2	COLUMN3	COLUMN4	COLUMN5	COLUMN6	COLUMN7	COLUMN8	COLUMN9
ROW1	20.25								
ROW2	10								
ROW3	100	10							
ROW4	50	125000							
ROW5		50							
ROW6									
ROW7									
ROW8									
ROW9									
ROW10									
ROW11	180.25	125060							
ROW12		180.25							
ROW13									
ROW14									
ROW15									

Select the cell [1,3] as shown below.

	COLUMN1	COLUMN2	COLUMN3	COLUMN4	COLUMN5	COLUMN6	COLUMN7	COLUMN8	COLUMN9
ROW1	20.25								
ROW2	10								
ROW3	100	10							
ROW4	50	125000							
ROW5		50							
ROW6									
ROW7									
ROW8									
ROW9									
ROW10									
ROW11	180.25	125060							
ROW12		180.25							
ROW13									
ROW14									
ROW15									

Now press Paste button once and you will see the following screen.

	COLUMN1	COLUMN2	COLUMN3	COLUMN4	COLUMN5	COLUMN6	COLUMN7	COLUMN8	COLUMN9
ROW1	20.25		20.25						
ROW2	10		10						
ROW3	100	10	100						
ROW4	50	125000	50						
ROW5		50							
ROW6									
ROW7									
ROW8									
ROW9									
ROW10									
ROW11	180.25	125060	180.25						
ROW12		180.25							
ROW13									
ROW14									
ROW15									
ROW16									

Now go to cell [11,3] to see the contents of the cell.

WORKSHEET

[11,3][11,3] =sum([1,3][10,3]) go = ? + - \* / sum

pow sqrt ( ) Range Copy Paste Pasv Save load

	COLUMN1	COLUMN2	COLUMN3	COLUMN4	COLUMN5	COLUMN6	COLUMN7	COLUMN8	COLUMN9
ROW1	20.25		20.25						
ROW2	10		10						
ROW3	100	10	100						
ROW4	50	125000	50						
ROW5		50							
ROW6									
ROW7									
ROW8									
ROW9									
ROW10									
ROW11	180.25	125060	180.25						
ROW12		180.25							
ROW13									
ROW14									
ROW15									
ROW16									

Now you see the formula at cell [11,3] is =sum([1,3][10,3])

In this way you can copy and paste range of cells with formulae.

Now go to Cell [1,4] and then press Pasv button and you will see the following screen.

	COLUMN1	COLUMN2	COLUMN3	COLUMN4	COLUMN5	COLUMN6	COLUMN7	COLUMN8	COLUMN9
ROW1	20.25		20.25	20.25					
ROW2	10		10	10					
ROW3	100	10	100	100					
ROW4	50	125000	50	50					
ROW5		50							
ROW6									
ROW7									
ROW8									
ROW9									
ROW10									
ROW11	180.25	125060	180.25	180.25					
ROW12		180.25							
ROW13									
ROW14									
ROW15									

Now go to cell [11,4] and see the contents. You will see only the value of 180.25. Since Pasv button will paste only values from copy range.. see below.



## 6. Saving the spread sheet.

Now you want to save this spread sheet. press Save button and you will see the following screen.

The screenshot shows a spreadsheet application window titled "WORKSHEET". The interface includes a toolbar with various mathematical and editing functions. A "Save" button is highlighted, and a dialog box is open over the spreadsheet grid. The dialog box has a title bar "Copy and save in Notepad" and contains a large text area with the following mathematical formula:

$$[1,1]:20.25^{[1,3]}:20.25^{[1,4]}:20.25^{[2,1]}:10^{[2,3]}:10^{[2,4]}:10^{[3,4]}:100^{[4,4]}:50^{[11,4]}:180.25^{[12,2]}:180.25^{[3,1]}:=[2,1]*10^{[3,2]}:=\text{Math.sqrt}([3,1])^{[3,3]}:=[2,3]*10^{[4,1]}:=[3,1]/2^{[4,2]}:=\text{Math.pow}([4,1],3)^{[4,3]}:=[3,3]/2^{[5,2]}:=\text{Math.min}([3,1],[4,1])^{[11,1]}:=\text{sum}([1,1][10,1])^{[11,2]}:=\text{sum}([1,2][10,2])^{[11,3]}:=\text{sum}([1,3][10,3])^$$

Now in the above screen select all contents in the popup with heading Copy and save in Notepad as shown below.

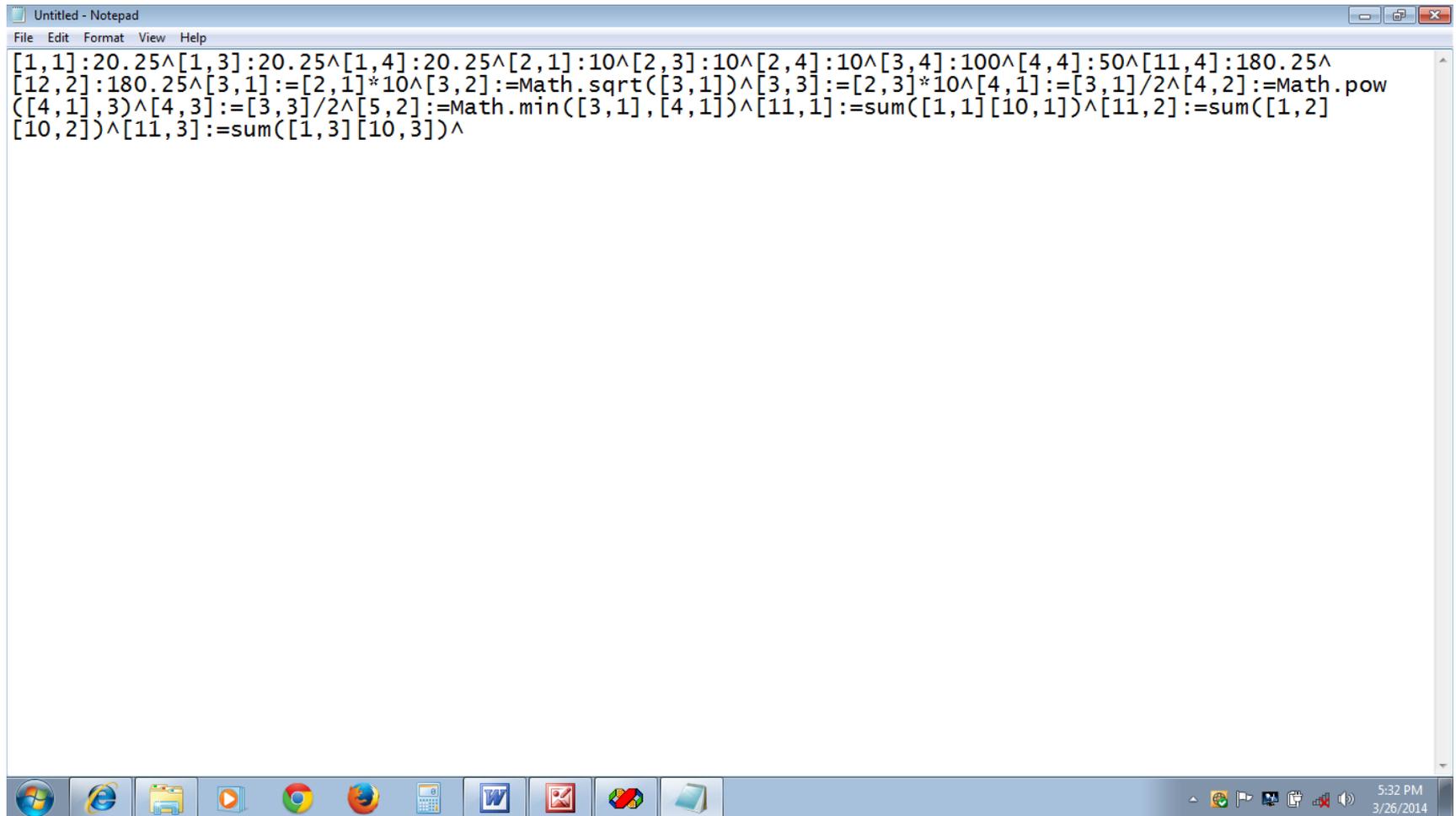
WORKSHEET

go = ? + - \* / sum

pow sqrt ( ) Range Copy Paste Pasv Save load

	COLUMN1	COLUMN2	COLUMN3	COLUMN4	COLUMN5	COLUMN6	COLUMN7	COLUMN8	COLUMN9
ROW1	20.25		20.25	20.25					
ROW2	Copy and save in Notepad								
ROW3	[1, 1]:20.25^[1, 3]:20.25^[1, 4]:20.25^[2, 1]:10^[2, 3]:10^								
ROW4	[2, 4]:10^[3, 4]:100^[4, 4]:50^[11, 4]:180.25^[12, 2]:180.25^								
ROW5	[3, 1]:=[2, 1]*10^[3, 2]:=Math.sqrt([3, 1])^[3, 3]:=[2, 3]*10^								
ROW6	[4, 1]:=[3, 1]/2^[4, 2]:=Math.pow([4, 1], 3)^[4, 3]:=[3, 3]/2^								
ROW7	[5, 2]:=Math.min([3, 1], [4, 1])^[11, 1]:=sum([1, 1][10, 1])^								
ROW8	[11, 2]:=sum([1, 2][10, 2])^[11, 3]:=sum([1, 3][10, 3])^								
ROW9									
ROW10									
ROW11									
ROW12									
ROW13									
ROW14									
ROW15									
ROW16									
ROW17									
ROW18	Copy and save in a notepad file								
ROW19									
ROW20									

Now copy the above contents using CTRL+C and then paste in a notepad as shown below.



```
[1,1]:20.25^[1,3]:20.25^[1,4]:20.25^[2,1]:10^[2,3]:10^[2,4]:10^[3,4]:100^[4,4]:50^[11,4]:180.25^[12,2]:180.25^[3,1]:=[2,1]*10^[3,2]:=Math.sqrt([3,1])^[3,3]:=[2,3]*10^[4,1]:=[3,1]/2^[4,2]:=Math.pow([4,1],3)^[4,3]:=[3,3]/2^[5,2]:=Math.min([3,1],[4,1])^[11,1]:=sum([1,1][10,1])^[11,2]:=sum([1,2][10,2])^[11,3]:=sum([1,3][10,3])^
```

Now you can save it in any file name. For example I save it as webx11.txt in my documents folder and close the notepad. You will see the same screen as below.

WORKSHEET

go = ? + - \* / sum

pow sqrt ( ) Range Copy Paste Pasv Save load

	COLUMN1	COLUMN2	COLUMN3	COLUMN4	COLUMN5	COLUMN6	COLUMN7	COLUMN8	COLUMN9
ROW1	20.25		20.25	20.25					
ROW2	Copy and save in Notepad								
ROW3	[1, 1]:20.25^[1, 3]:20.25^[1, 4]:20.25^[2, 1]:10^[2, 3]:10^[								
ROW4	[2, 4]:10^[3, 4]:100^[4, 4]:50^[11, 4]:180.25^[12, 2]:180.25^[								
ROW5	[3, 1]:=[2, 1]*10^[3, 2]:=Math.sqrt([3, 1])^[3, 3]:=[2, 3]*10^[								
ROW6	[4, 1]:=[3, 1]/2^[4, 2]:=Math.pow([4, 1], 3)^[4, 3]:=[3, 3]/2^[								
ROW7	[5, 2]:=Math.min([3, 1], [4, 1])^[11, 1]:=sum([1, 1][10, 1])^[								
ROW8	[11, 2]:=sum([1, 2][10, 2])^[11, 3]:=sum([1, 3][10, 3])^[								
ROW9									
ROW10									
ROW11									
ROW12									
ROW13									
ROW14									
ROW15									
ROW16									
ROW17									
ROW18	Copy and save in a notepad file								
ROW19									
ROW20									

Now press Save button once again to remove the popup from the screen.

	COLUMN1	COLUMN2	COLUMN3	COLUMN4	COLUMN5	COLUMN6	COLUMN7	COLUMN8	COLUMN9
ROW1	20.25		20.25	20.25					
ROW2	10		10	10					
ROW3	100	10	100	100					
ROW4	50	125000	50	50					
ROW5		50							
ROW6									
ROW7									
ROW8									
ROW9									
ROW10									
ROW11	180.25	125060	180.25	180.25					
ROW12		180.25							
ROW13									
ROW14									
ROW15									

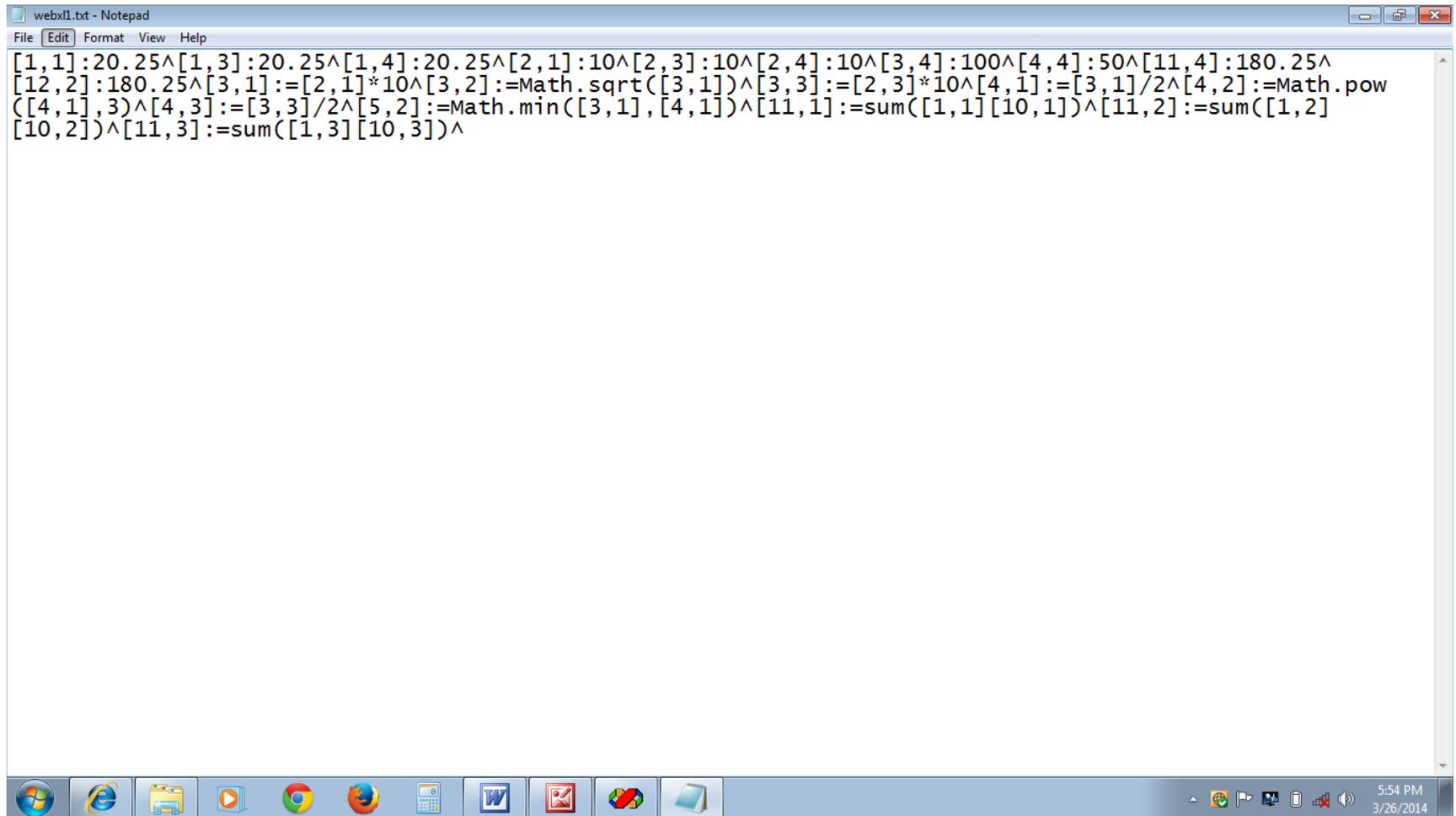
Now you will be seeing same screen without popup as above.

### 7.Loading the spread sheet from saved file.

Now the spread sheet is already saved in webx11.txt file in notepad as ordinary text file. Now you want to load the spread sheet from the saved file. Before that clear the screen. Just press Refresh or Reload button of the browser will create the empty sheet as below.

	COLUMN1	COLUMN2	COLUMN3	COLUMN4	COLUMN5	COLUMN6	COLUMN7	COLUMN8	COLUMN9
ROW1									
ROW2									
ROW3									
ROW4									
ROW5									
ROW6									
ROW7									
ROW8									
ROW9									
ROW10									
ROW11									
ROW12									
ROW13									
ROW14									
ROW15									

Now open the webx11.txt in notepad as below.

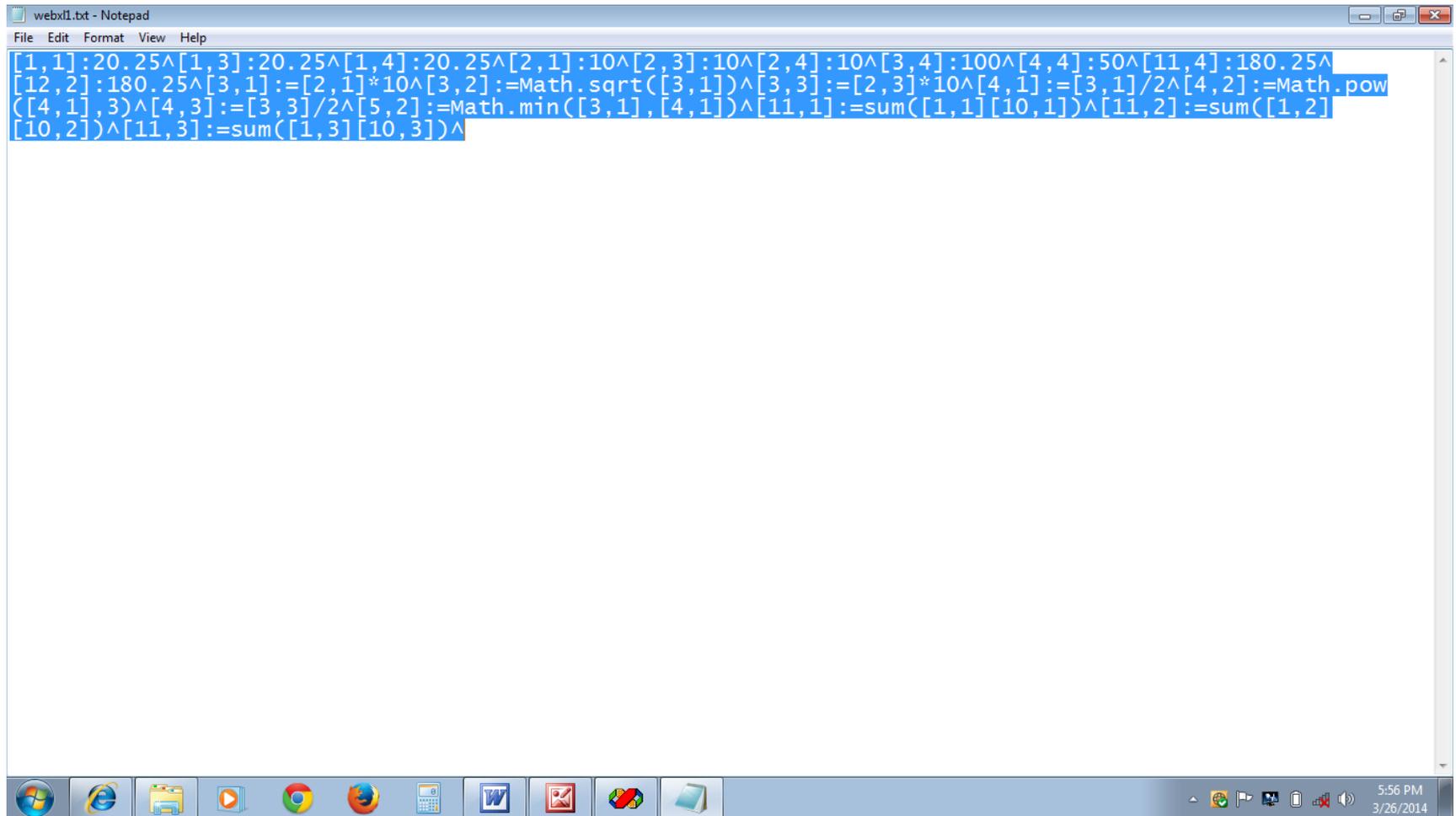


The image shows a Notepad window titled "webx1.txt - Notepad". The text inside the window consists of several mathematical expressions and assignments, some using array notation and mathematical functions like sqrt, min, and sum. The expressions are:

```
[1,1]:20.25^[1,3]:20.25^[1,4]:20.25^[2,1]:10^[2,3]:10^[2,4]:10^[3,4]:100^[4,4]:50^[11,4]:180.25^  
[12,2]:180.25^[3,1]:=[2,1]*10^[3,2]:=Math.sqrt([3,1])^[3,3]:=[2,3]*10^[4,1]:=[3,1]/2^[4,2]:=Math.pow  
([4,1],3)^[4,3]:=[3,3]/2^[5,2]:=Math.min([3,1],[4,1])^[11,1]:=sum([1,1][10,1])^[11,2]:=sum([1,2]  
[10,2])^[11,3]:=sum([1,3][10,3])^
```

The window's taskbar at the bottom shows various application icons and the system tray with the date and time: 5:54 PM, 3/26/2014.

Now use the Select all CTRL+A and then CTRL+C to copy to clip board.



Minimise the notepad window and you will see blank worksheet screen.  
Now press Load button will show the following screen.

The image shows a window titled "WORKSHEET" with a toolbar containing buttons for "go", "=", "?", "+", "-", "\*", "/", "sum", "pow", "sqrt", "(", ")", "Range", "Copy", "Paste", "Pasv", "Save", and "load". Below the toolbar is a grid with columns labeled COLUMN1 through COLUMN9 and rows labeled ROW1 through ROW20. A yellow popup window is open over the grid, containing the text "Copy and save in Notepad" and an "ok" button.

Now the Paste the Clip Board contents in the text area of the above popup window as below.

WORKSHEET

go = ? + - \* / sum

pow sqrt ( ) Range Copy Paste Pasv Save load

	COLUMN1	COLUMN2	COLUMN3	COLUMN4	COLUMN5	COLUMN6	COLUMN7	COLUMN8	COLUMN9
ROW1									
ROW2									
ROW3									
ROW4									
ROW5									
ROW6									
ROW7									
ROW8									
ROW9									
ROW10									
ROW11									
ROW12									
ROW13									
ROW14									
ROW15									
ROW16									
ROW17									
ROW18									
ROW19									
ROW20									

**Copy and save in Notepad**

```
[1,1]:20.25^[1,3]:20.25^[1,4]:20.25^[2,1]:10^[2,3]:10^[2,4]:10^[3,4]:100^[4,4]:50^[11,4]:180.25^
```

```
[12,2]:180.25^[3,1]:=[2,1]*10^[3,2]:=Math.sqrt([3,1])^[3,3]:=[2,3]*10^[4,1]:=[3,1]/2^[4,2]:=Math.pow
```

```
([4,1],3)^[4,3]:=[3,3]/2^[5,2]:=Math.min([3,1],[4,1])^[11,1]:=sum([1,1][10,1])^[11,2]:=sum([1,2]
```

```
[10,2])^[11,3]:=sum([1,3][10,3])^
```

ok

Now press OK button in the popup window and you will see that your file is loaded in the worksheet as below.

	COLUMN1	COLUMN2	COLUMN3	COLUMN4	COLUMN5	COLUMN6	COLUMN7	COLUMN8	COLUMN9	COLUMN10
ROW1	20.25		20.25	20.25						
ROW2	10		10	10						
ROW3	100	10	100	100						
ROW4	50	125000	50	50						
ROW5		50								
ROW6										
ROW7										
ROW8										
ROW9										
ROW10										
ROW11	180.25	125060	180.25	180.25						
ROW12		180.25								
ROW13										
ROW14										
ROW15										

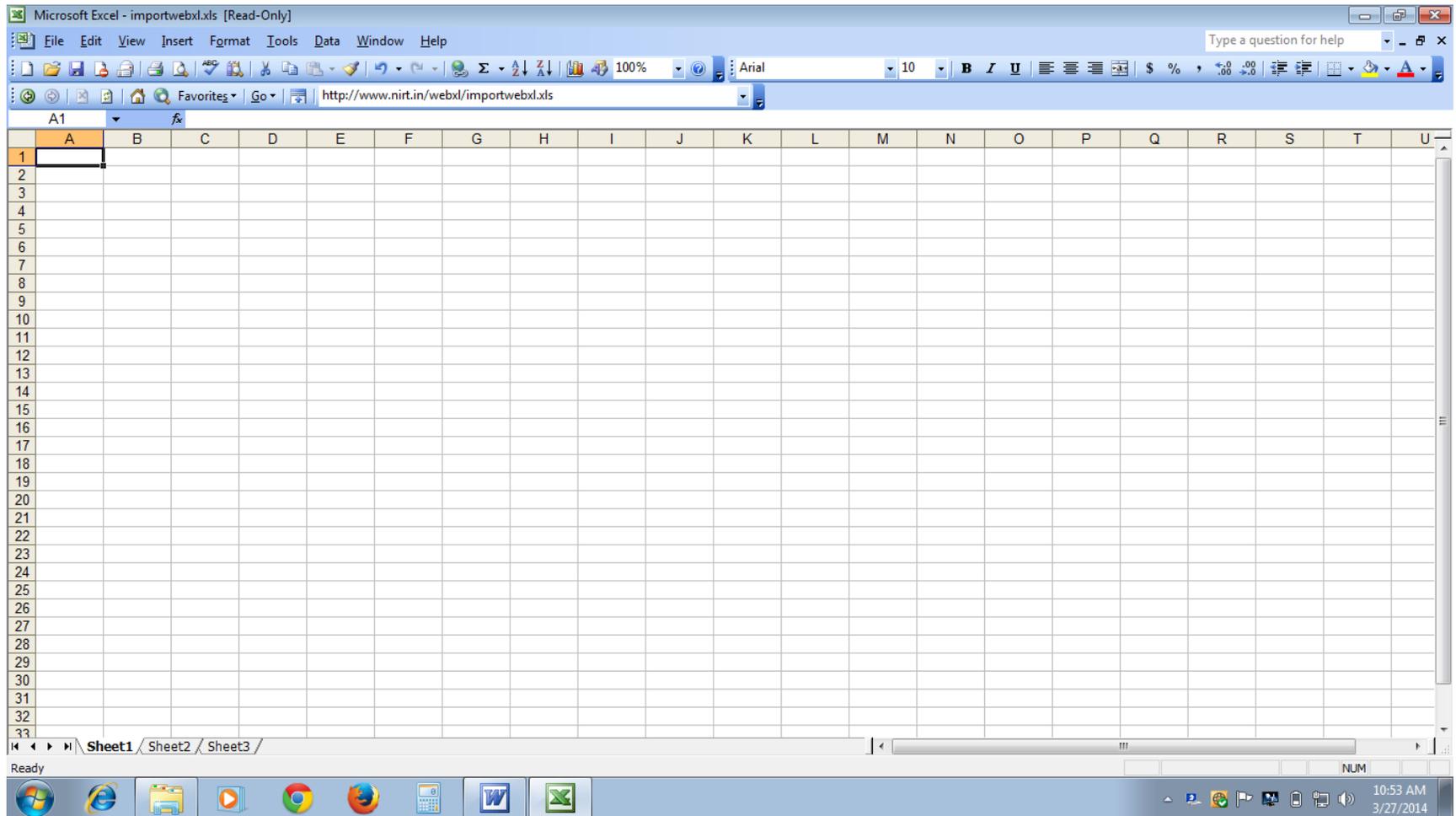
Now you will see that the file saved in notepad is loaded in the spread sheet with same vaues and formulae.

### 8.Loading in Microsoft Excel spread sheet from saved file.

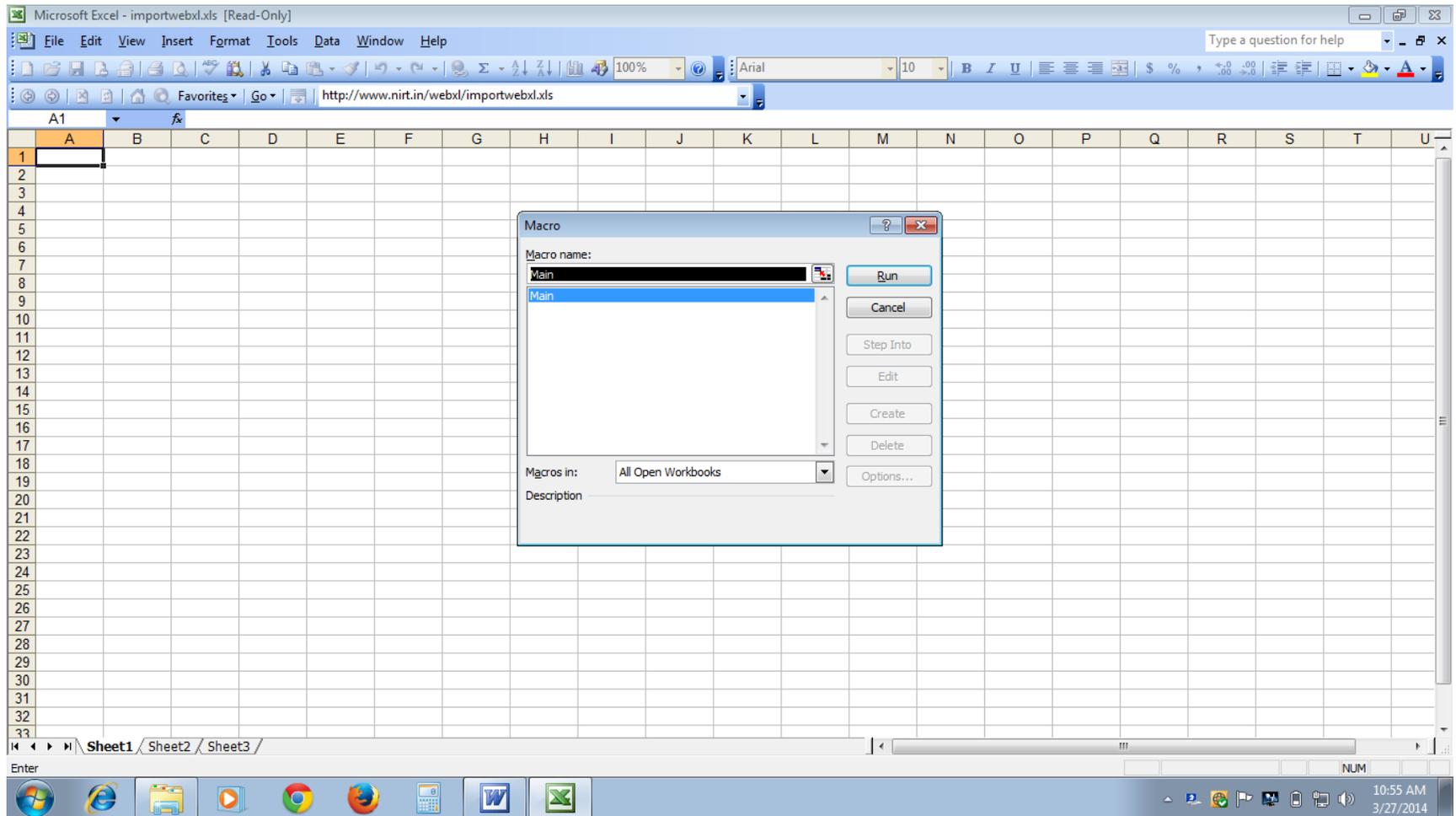
To load the saved webxl1.txt file in Microsoft Excel Spread sheet one Excel macro to import the contents of webxl1.txt is developed. You can download that Excel sheet from the following link.

<http://www.nirt.in/webxl/importwebxl.xls>

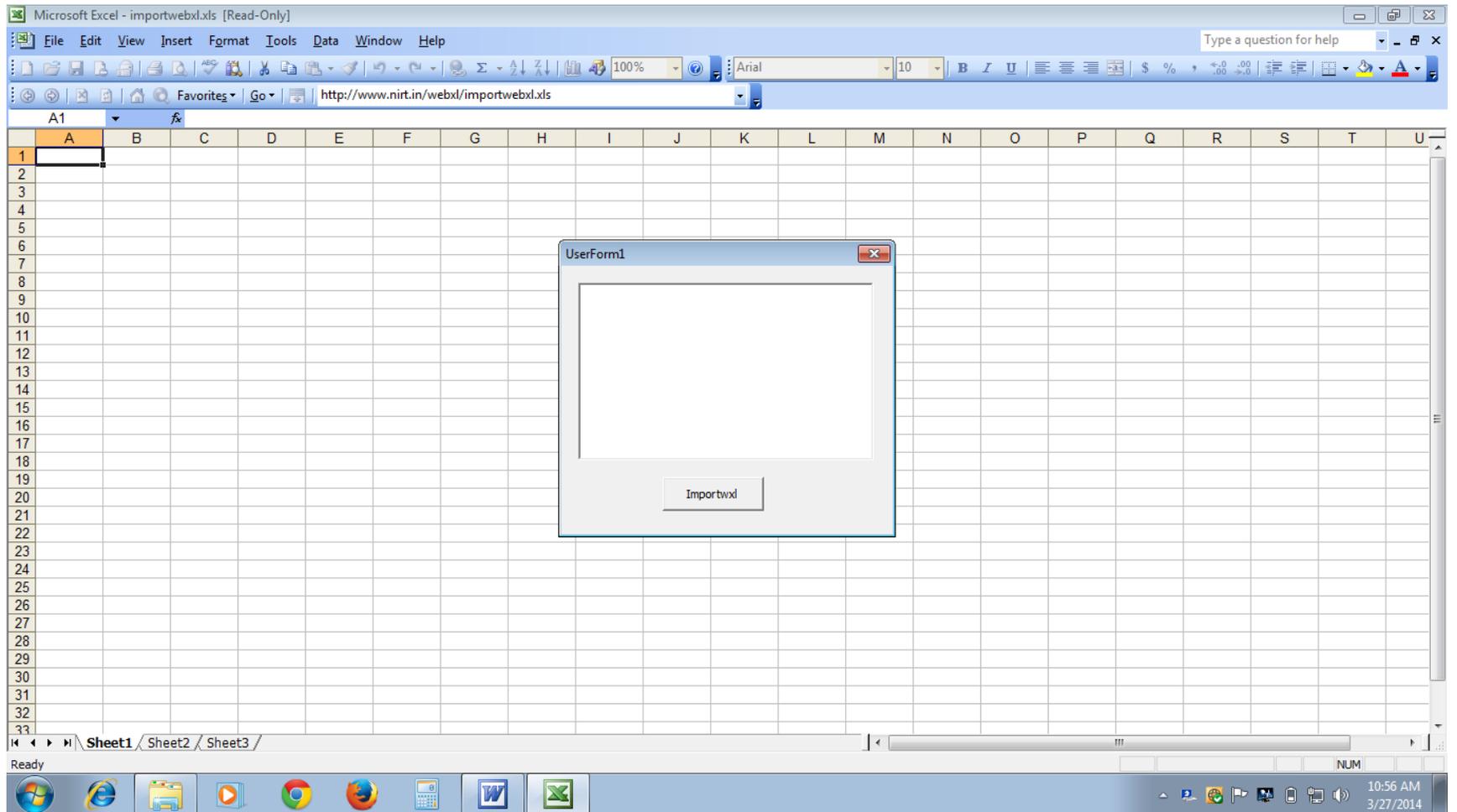
Then open the Excel sheet as below.



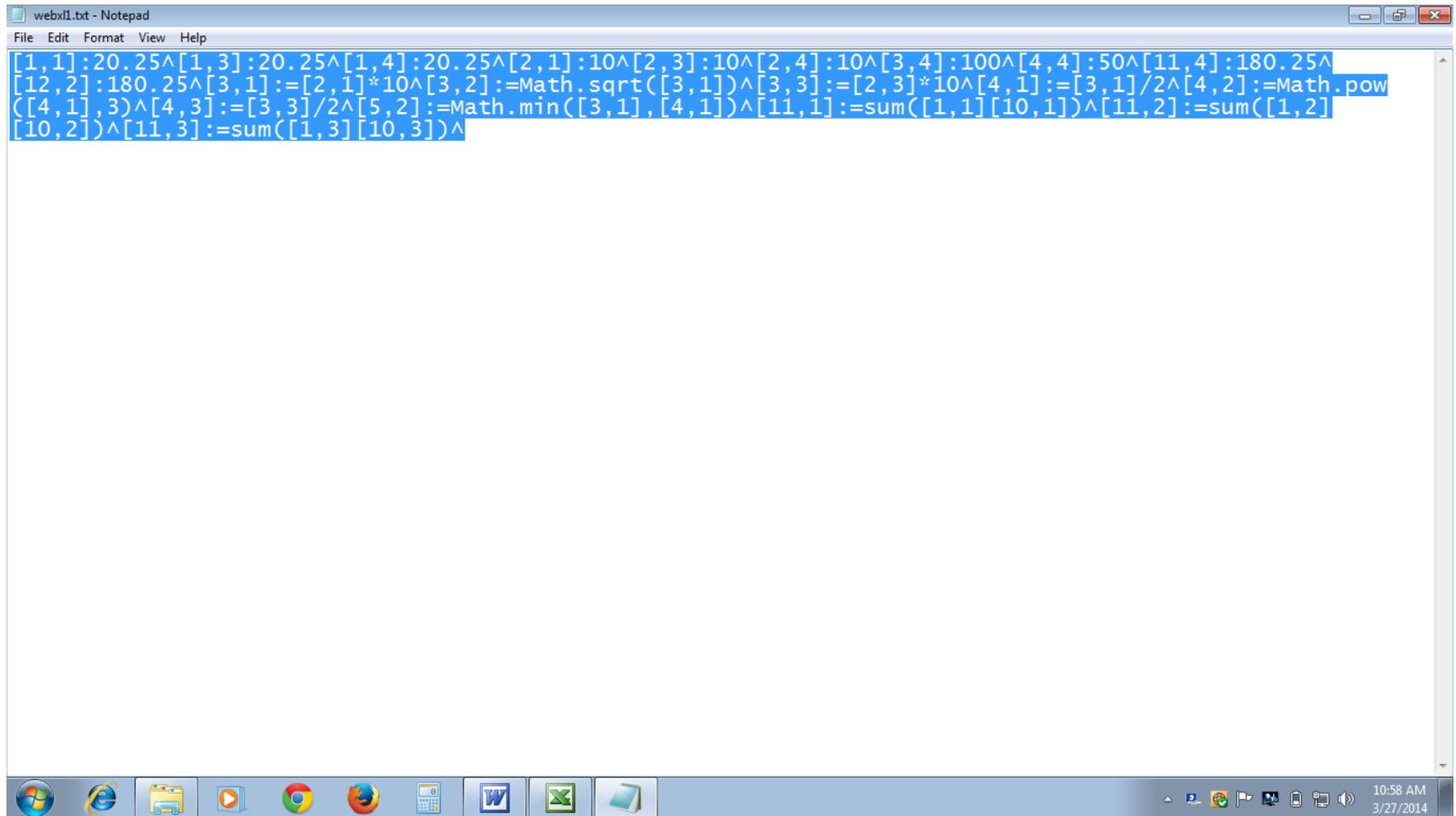
When opening the above worksheet enable the macros in the worksheet. Then go to Tools menu and open Macros you will see the following.



Now run the Macro main in the above sheet by click on the run button. The screen will show as follows.



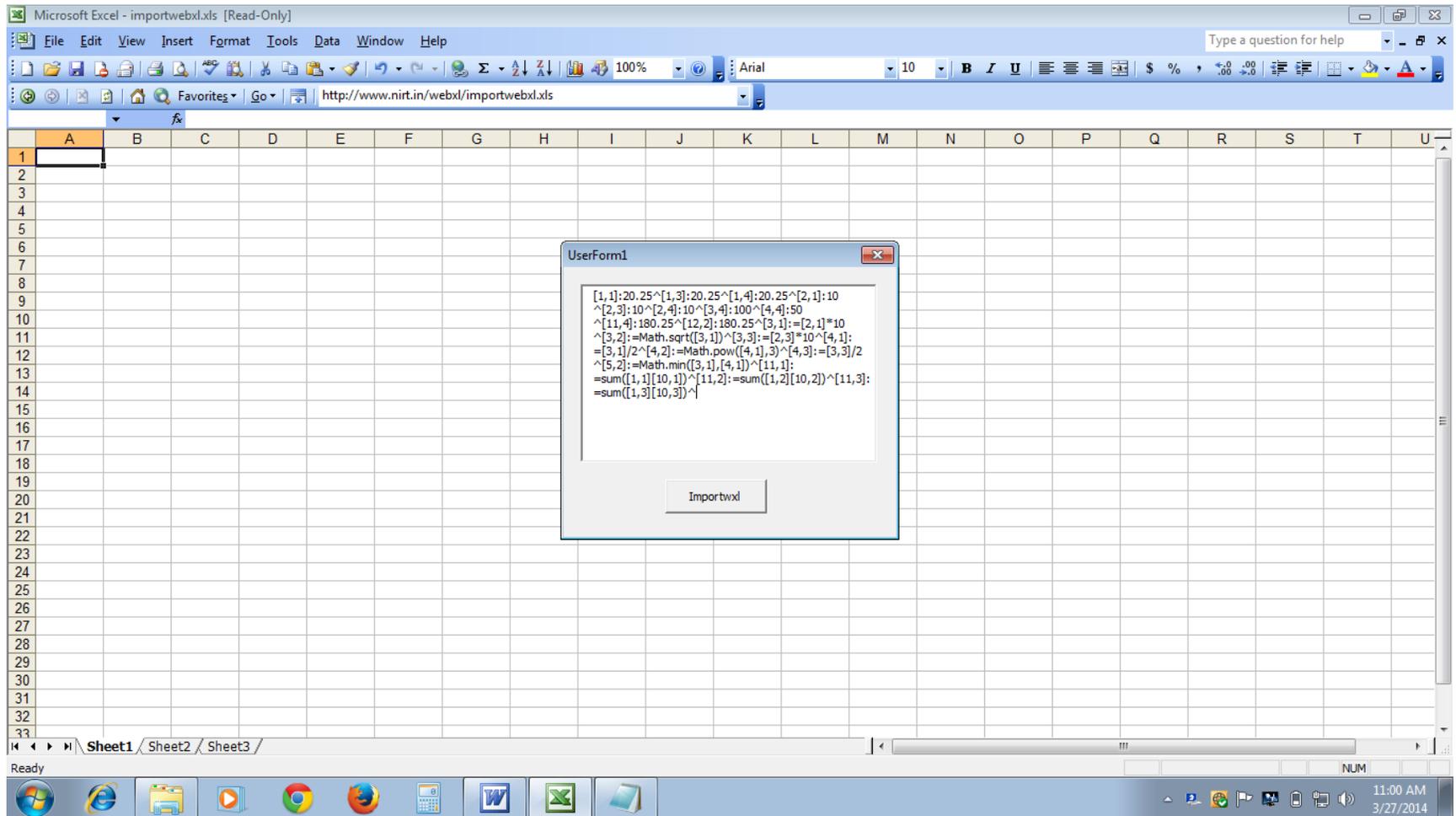
In the above form paste the contents of webxl1.txt already stored in notepad file as shown below.



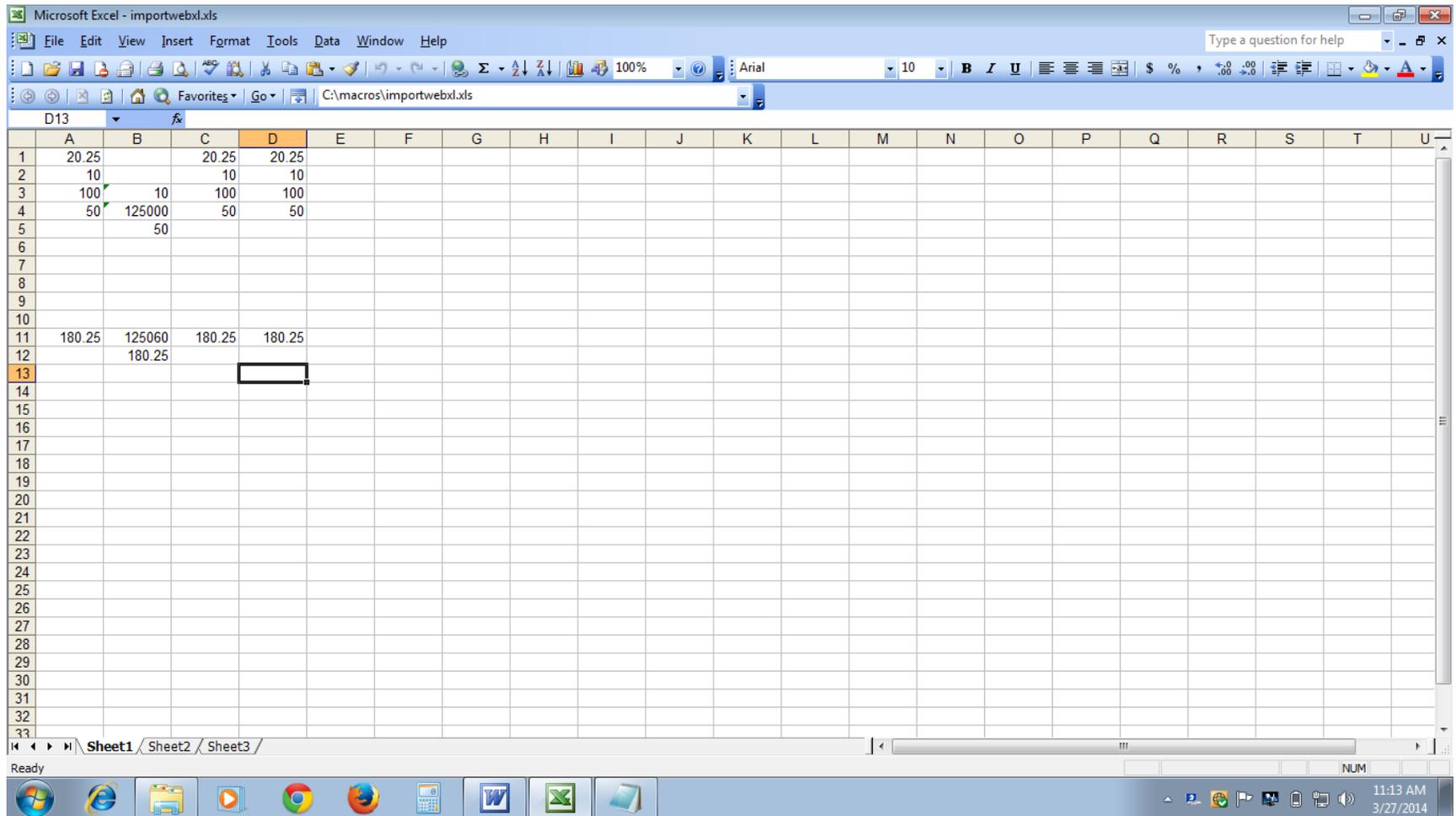
The screenshot shows a Notepad window titled "webx11.txt - Notepad". The text inside the window is a long, single-line string of mathematical expressions and functions, including powers, square roots, min, sum, and Math.pow. The text is highlighted in blue. The window has a standard menu bar with "File", "Edit", "Format", "View", and "Help". The taskbar at the bottom shows various application icons and the system clock indicating 10:58 AM on 3/27/2014.

```
[1,1]:20.25^[1,3]:20.25^[1,4]:20.25^[2,1]:10^[2,3]:10^[2,4]:10^[3,4]:100^[4,4]:50^[11,4]:180.25^[12,2]:180.25^[3,1]:=[2,1]*10^[3,2]:=Math.sqrt([3,1])^[3,3]:=[2,3]*10^[4,1]:=[3,1]/2^[4,2]:=Math.pow([4,1],3)^[4,3]:=[3,3]/2^[5,2]:=Math.min([3,1],[4,1])^[11,1]:=sum([1,1][10,1])^[11,2]:=sum([1,2][10,2])^[11,3]:=sum([1,3][10,3])^
```

Then paste the above contents in the Excel text area as shown below.



Now click on the Importwxd button at the bottom of the popup useform1 you will see the following.



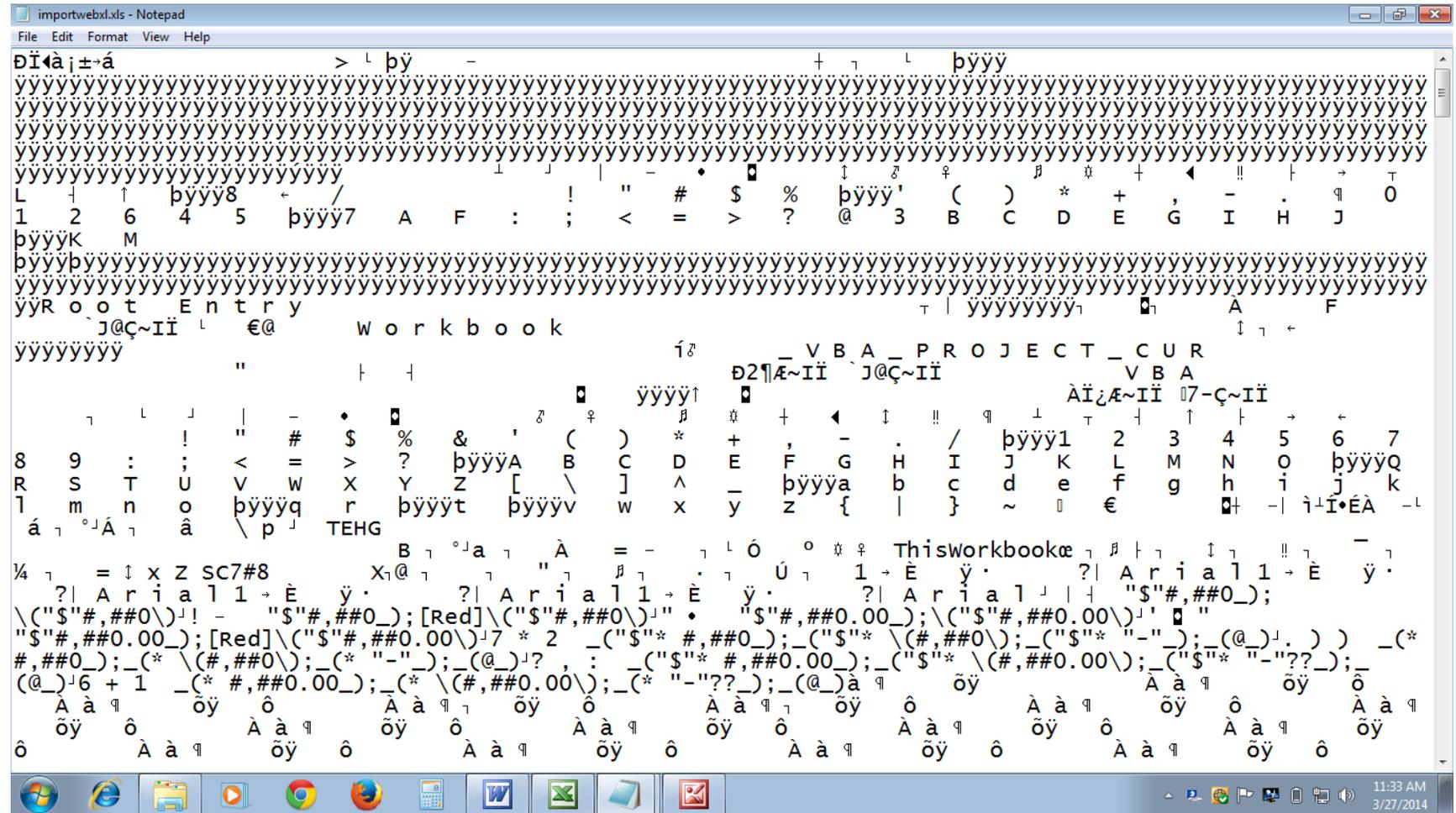
You can go to some of the cells in the above Excel sheet to see whether the formulae are imported correctly. Go to Cell A11 in the above sheet and you will see the following.

	A	B	C	D	E	F	G	H	I	J
1	20.25		20.25	20.25						
2	10		10	10						
3	100	10	100	100						
4	50	125000	50	50						
5		50								
6										
7										
8										
9										
10										
11	180.25	125060	180.25	180.25						
12		180.25								
13										
14										
15										

You will see that the formula in A11 is =SUM(A1:A10) which is similar to webxl spread sheet. This way you can import the webXL javascript spreadsheet contents into Microsoft Excel sheet also.

## 9.OPEN SOURCE DATA:

This software with source code in javascript is developed for the purpose of understanding the process of happenings within the spread sheet operations. If above excel sheet is saved and opened in notepad you will see the contents as follows.



The above contents goes about 10 pages. But the real content with connected calculations are not found in the above file. But you can see the contents of webxl1.txt as below.

[1,1]:20.25^[1,3]:20.25^[1,4]:20.25^[2,1]:10^[2,3]:10^[2,4]:10^[3,4]:100^[4,4]:50^[11,4]:180.25^[12,2]:180.25^[3,1]:=[2,1]\*10^[3,2]:=Math.sqrt([3,1])^[3,3]:=[2,3]\*10^[4,1]:=[3,1]/2^[4,2]:=Math.pow([4,1],3)^[4,3]:=[3,3]/2^[5,2]:=Math.min([3,1],[4,1])^[11,1]:=sum([1,1][10,1])^[11,2]:=sum([1,2][10,2])^[11,3]:=sum([1,3][10,3])^

The 3 lines without spaces are the real contents involved in calculation. In the above cell references are shown simply as [R,C] that is [1,1] means first row and first column. The cell references before “:” indicates the cell reference where the contents to be placed. The values after “:” indicates the contents to be placed in the reference cell. Each Cell reference and its contents are separated by “^” symbol. In the above [1,1]:20.25^ indicates that the contents in Cell [1,1] is 20.25. The next refence after “^” indicated as [1,3]:20.25 indicates that the contents in Cell [1,3] is 20.25. The formulae are indicated as [3,1]:=[2,1]\*10 shows that contents to be placed in [3,1] is the value of [2,1] multiplied by 10. Even the contents in the above can also be edited and saved and loaded with revised values. For example edit the contents above as follows

[1,1]:120.25^[1,3]:20.25^[1,4]:20.25^[2,1]:10^[2,3]:10^[2,4]:10^[3,4]:100^[4,4]:50^[11,4]:180.25^[12,2]:180.25^[3,1]:=[2,1]\*10  
 ^[3,2]:=Math.sqrt([3,1])^[3,3]:=[2,3]\*10^[4,1]:=[3,1]/2^[4,2]:=Math.pow([4,1],3)^[4,3]:=[3,3]/2^[5,2]:=Math.min([3,1],  
 [4,1])^[11,1]:=sum([1,1][10,1])^[11,2]:=sum([1,2][10,2])^[11,3]:=sum([1,3][10,3])^

I just corrected 20.25 into 120.25 and saved in the same file. And I will show importing it in the worksheet as follows.

WORKSHEET

go = ? + - \* / sum

pow sqrt ( ) Range Copy Paste Pasv Save load

	COLUMN1	COLUMN2	COLUMN3	COLUMN4	COLUMN5	COLUMN6	COLUMN7	COLUMN8	COLUMN9
ROW1									
ROW2									
ROW3									
ROW4									
ROW5									
ROW6									
ROW7									
ROW8									
ROW9									
ROW10									
ROW11									
ROW12									
ROW13									
ROW14									
ROW15									
ROW16									
ROW17									
ROW18									
ROW19									
ROW20									
ROW21									

**Copy and save in Notepad**

```
[1,1]:120.25^[1,3]:20.25^[1,4]:20.25^[2,1]:10^[2,3]:10^[2,4]:10^[3,4]:100^[4,4]:50^[11,4]:180.25^
[12,2]:180.25^[3,1]:=[2,1]*10^[3,2]:=Math.sqrt([3,1])^
[3,3]:=[2,3]*10^[4,1]:=[3,1]/2^[4,2]:=Math.pow
([4,1],3)^[4,3]:=[3,3]/2^[5,2]:=Math.min([3,1],[4,1])^
[11,1]:=sum([1,1][10,1])^[11,2]:=sum([1,2]
[10,2])^[11,3]:=sum([1,3][10,3])^
```

ok

In the above screen it is seen that [1,1]:120.25^ in the first reference. Now click OK will show the sheet as below.

WORKSHEET

go = ? + - \* / sum

pow sqrt ( ) Range Copy Paste Pasv Save load

	COLUMN1	COLUMN2	COLUMN3	COLUMN4	COLUMN5	COLUMN6	COLUMN7	COLUMN8	COLUMN9
ROW1	120.25		20.25	20.25					
ROW2	10		10	10					
ROW3	100	10	100	100					
ROW4	50	125000	50	50					
ROW5		50							
ROW6									
ROW7									
ROW8									
ROW9									
ROW10									
ROW11	280.25	125060	180.25	180.25					
ROW12		180.25							
ROW13									
ROW14									
ROW15									
ROW16									
ROW17									
ROW18									
ROW19									
ROW20									
ROW21									

So the contents changed in the above sheet [1,1] as 120.25 and the formula using this value also changed. So the contents of Excel can be edited in a notepad file also.

This is just for understanding the methodology working within the spread sheet programs. Many facilities like insert rows, columns, formatting, sorting, filtering can also be done by adding some functions in source code. I will try to add them in future.

### 10.String functions:

In this webxl program you can do string concatenation, substring functions also. I just changed the tools portion so that more space is provided for input text box so that long formula / texts can be seen easily. Also I included Fmt and NFmt buttons for Format and NoFormat operations.

Let us see the new screen as follows.

	COLUMN1	COLUMN2	COLUMN3	COLUMN4	COLUMN5	COLUMN6	COLUMN7	COLUMN8	COLUMN9	COLUMN10
ROW1										
ROW2										
ROW3										
ROW4										
ROW5										
ROW6										
ROW7										
ROW8										
ROW9										
ROW10										
ROW11										
ROW12										
ROW13										
ROW14										
ROW15										

In the selected cell [1,1] type some text India . The screen will be shown as follows.

	COLUMN1	COLUMN2	COLUMN3	COLUMN4	COLUMN5	COLUMN6	COLUMN7	COLUMN8	COLUMN9	COLUMN10
ROW1	India									
ROW2										
ROW3										
ROW4										
ROW5										
ROW6										
ROW7										
ROW8										
ROW9										
ROW10										
ROW11										
ROW12										
ROW13										
ROW14										
ROW15										

Now India is entered in Cell [1,1] and I entered Tamilnadu in the cell[2,1] as shown below.

	COLUMN1	COLUMN2	COLUMN3	COLUMN4	COLUMN5	COLUMN6	COLUMN7	COLUMN8	COLUMN9	COLUMN10
ROW1	India									
ROW2	Tamilnadu									
ROW3										
ROW4										
ROW5										
ROW6										
ROW7										
ROW8										
ROW9										
ROW10										
ROW11										
ROW12										
ROW13										
ROW14										
ROW15										

To concatenate the above 2 strings and place the concatenated string in [3,1] as below.

WORKSHEET

[3,1][3,1]      ="[1,1]"+"[2,1]"      go

= + - \* / sum pow sqrt ( ) Range Fmt NFmt Copy Paste Pasv Save load

	COLUMN1	COLUMN2	COLUMN3	COLUMN4	COLUMN5	COLUMN6	COLUMN7	COLUMN8	COLUMN9	COLUMN10
ROW1	India									
ROW2	Tamilnadu									
ROW3										
ROW4										
ROW5										
ROW6										
ROW7										
ROW8										
ROW9										
ROW10										
ROW11										
ROW12										
ROW13										
ROW14										
ROW15										

In the input box enter “=” and then type “ as prefix and then select the cell [1,1] and then type “ and then “+” and then type “ and then select [2,1] and then “ as bove.(ie =”[1,1]”+”[2,1]”) and then press enter or ‘go’ button.

The screen will be as shown below.

WORKSHEET

[4,1][4,1] go

= + - \* / sum pow sqrt ( ) Range Fmt NFmt Copy Paste Pasv Save load

	COLUMN1	COLUMN2	COLUMN3	COLUMN4	COLUMN5	COLUMN6	COLUMN7	COLUMN8	COLUMN9	COLUMN10
ROW1	India									
ROW2	Tamilnadu									
ROW3	IndiaTamilnadu									
ROW4										
ROW5										
ROW6										
ROW7										
ROW8										
ROW9										
ROW10										
ROW11										
ROW12										
ROW13										
ROW14										
ROW15										

Now go back to the Cell [3,1] to see the syntax of the formula.

WORKSHEET

[3,1][3,1]      ="[1,1]"+"[2,1]"      go

= + - \* / sum pow sqrt ( ) Range Fmt NFmt Copy Paste Pasv Save load

	COLUMN1	COLUMN2	COLUMN3	COLUMN4	COLUMN5	COLUMN6	COLUMN7	COLUMN8	COLUMN9	COLUMN10
ROW1	India									
ROW2	Tamilnadu									
ROW3	IndiaTamilnadu									
ROW4										
ROW5										
ROW6										
ROW7										
ROW8										
ROW9										
ROW10										
ROW11										
ROW12										
ROW13										
ROW14										
ROW15										
ROW16										

Just “ (double quote) as prefix and suffix to the cell references and ‘+’ between them concatenate the two strings and put them in Cell [3,1] as above. A space between above two strings can be done by modifying the formula as below.

WORKSHEET

[3,1][3,1]    ="[1,1]"+" "+"[2,1]"    go

= + - \* / sum pow sqrt ( ) Range Fmt NFmt Copy Paste Pasv Save load

	COLUMN1	COLUMN2	COLUMN3	COLUMN4	COLUMN5	COLUMN6	COLUMN7	COLUMN8	COLUMN9	COLUMN10
ROW1	India									
ROW2	Tamilnadu									
ROW3	India Tamilnadu									
ROW4										
ROW5										
ROW6										
ROW7										
ROW8										
ROW9										
ROW10										
ROW11										
ROW12										
ROW13										
ROW14										
ROW15										

That is ="[1,1]"+" "+"[2,1]" will add a space between two strings as shown above.

Now go to cell [3,2] and put the first 5 characters of string in Cell [3,1]. For that use native javascript substr method as follows.

WORKSHEET

[3.2][3.2]    ="[3,1]".substr(0,5)    go

= + - \* / sum pow sqrt ( ) Range Fmt NFmt Copy Paste Pasv Save load

	COLUMN1	COLUMN2	COLUMN3	COLUMN4	COLUMN5	COLUMN6	COLUMN7	COLUMN8	COLUMN9	COLUMN10
ROW1	India									
ROW2	Tamilnadu									
ROW3	India Tamilnadu									
ROW4										
ROW5										
ROW6										
ROW7										
ROW8										
ROW9										
ROW10										
ROW11										
ROW12										
ROW13										
ROW14										
ROW15										

"[3,1]".substr(0,5) is given in input box and pressing 'go' button will show the following screen as below.

	COLUMN1	COLUMN2	COLUMN3	COLUMN4	COLUMN5	COLUMN6	COLUMN7	COLUMN8	COLUMN9	COLUMN10
ROW1	India									
ROW2	Tamilnadu									
ROW3	India Tamilnadu	India								
ROW4										
ROW5										
ROW6										
ROW7										
ROW8										
ROW9										
ROW10										
ROW11										
ROW12										
ROW13										
ROW14										
ROW15										

Now the string containing the first 5 characters of string in cell [3,1] is put in Cell [3,2].

Similarly the string starting from 7<sup>th</sup> character to a length of 5 characters is put in cell [3,3] as follows.

	COLUMN1	COLUMN2	COLUMN3	COLUMN4	COLUMN5	COLUMN6	COLUMN7	COLUMN8	COLUMN9	COLUMN10
ROW1	India									
ROW2	Tamilnadu									
ROW3	India Tamilnadu	India	Tamil							
ROW4										
ROW5										
ROW6										
ROW7										
ROW8										
ROW9										
ROW10										
ROW11										
ROW12										
ROW13										
ROW14										
ROW15										

="[3,1]".substr(6,5) separates the string starting from 7<sup>th</sup> character to a length of 5 characters is put in cell[3,3] as above.

You can also mix numerical formula with text also as below.

I just entered the formula ="total="+sum([1,1][10,1]) in cell [11,1] and the screen will be as shown below.

WORKSHEET

[11.1][11.1]    =total="+sum([1.1][10.1])    go

= + - \* / sum pow sqrt ( ) Range Fmt NFmt Copy Paste Pasv Save load

	COLUMN1	COLUMN2	COLUMN3	COLUMN4	COLUMN5	COLUMN6	COLUMN7	COLUMN8	COLUMN9	COLUMN10
ROW1	India									
ROW2	Tamilnadu									
ROW3	India Tamilnadu	India	Tamil							
ROW4										
ROW5										
ROW6										
ROW7										
ROW8										
ROW9										
ROW10										
ROW11	total=0									
ROW12										
ROW13										
ROW14										
ROW15										

Now you see total=0 in cell[11,1]. Some value can be entered in cell [4,1] as 10.45 and screen will be as follows

	COLUMN1	COLUMN2	COLUMN3	COLUMN4	COLUMN5	COLUMN6	COLUMN7	COLUMN8	COLUMN9	COLUMN10
ROW1	India									
ROW2	Tamilnadu									
ROW3	India Tamilnadu	India	Tamil							
ROW4	10.45									
ROW5										
ROW6										
ROW7										
ROW8										
ROW9										
ROW10										
ROW11	total=10.45									
ROW12										
ROW13										
ROW14										
ROW15										

Now you see the value of 10.45 entered in cell [4,1] will also change the contents of cell[11,1] as “total=10.45”. In this way you can use both string and numerical formula mixed.

In the above screen change the value of Cell[1,1] as 10 you will see the following screen.

	COLUMN1	COLUMN2	COLUMN3	COLUMN4	COLUMN5	COLUMN6	COLUMN7	COLUMN8	COLUMN9	COLUMN10
ROW1	10									
ROW2	Tamilnadu									
ROW3	10 Tamilnadu	10 Ta	ilnad							
ROW4	10.45									
ROW5										
ROW6										
ROW7										
ROW8										
ROW9										
ROW10										
ROW11	total=20.45									
ROW12										
ROW13										
ROW14										
ROW15										

You see the Cell [3,1] is changed as “10 Tamilnadu” , and Cell [3,2] changed as “10 Ta” and cell [3,3] changed as “ilnad” according to the formula in the corresponding cells. The cell value in [11,1] is also changed as “total=20.45” as it is the sum of values in [1,1] to [10,1]. Now I change the value of [2,1] as =[1,1]/2 you will see the following screen.

WORKSHEET

[2,1][2,1]      =-[1,1]/2      go

= + - \* / sum pow sqrt ( ) Range Del fMt Nfmt Copy Paste Pasv Save load

	COLUMN1	COLUMN2	COLUMN3	COLUMN4	COLUMN5	COLUMN6	COLUMN7	COLUMN8	COLUMN9	COLUMN10
ROW1	10									
ROW2	5									
ROW3	10 5	10 5								
ROW4	10.45									
ROW5										
ROW6										
ROW7										
ROW8										
ROW9										
ROW10										
ROW11	total=25.45									
ROW12										
ROW13										
ROW14										
ROW15										

Now select Copy button to copy the formula in cell [2,1] you will see the copy button click as below.

[2.1][2.1]      =[1.1]/2      go

= + - \* / sum pow sqrt ( ) Range Del fMt Nfmt Copy Paste Pasv Save load

	COLUMN1	COLUMN2	COLUMN3	COLUMN4	COLUMN5	COLUMN6	COLUMN7	COLUMN8	COLUMN9	COLUMN10
ROW1	10									
ROW2	5									
ROW3	10 5	10 5								
ROW4	10.45									
ROW5										
ROW6										
ROW7										
ROW8										
ROW9										
ROW10										
ROW11	total=25.45									
ROW12										
ROW13										
ROW14										
ROW15										

Now select cell [3,1] and then Range button and then select cell [10,1] , you will see the following screen.

WORKSHEET

[3.1][10.1]    ="[1.1]"+" "+"[2.1]"    go

= + - \* / sum pow sqrt ( ) Range Del fMt Nfmt Copy Paste Pasv Save load

	COLUMN1	COLUMN2	COLUMN3	COLUMN4	COLUMN5	COLUMN6	COLUMN7	COLUMN8	COLUMN9	COLUMN10
ROW1	10									
ROW2	5									
ROW3	10 5	10 5								
ROW4	10.45									
ROW5										
ROW6										
ROW7										
ROW8										
ROW9										
ROW10										
ROW11	total=25.45									
ROW12										
ROW13										
ROW14										
ROW15										

Now press Paste button and you will see the following screen.

WORKSHEET

[3,1][10,1]      ="[1,1]"+" "+"[2,1]"      go

= + - \* / sum pow sqrt ( ) Range Del fMt Nfmt Copy Paste Pasv Save load

	COLUMN1	COLUMN2	COLUMN3	COLUMN4	COLUMN5	COLUMN6	COLUMN7	COLUMN8	COLUMN9	COLUMN10
ROW1	10									
ROW2	5									
ROW3	2.5	2.5								
ROW4	1.25									
ROW5	0.625									
ROW6	0.3125									
ROW7	0.15625									
ROW8	0.078125									
ROW9	0.0390625									
ROW10	0.01953125									
ROW11	total=19.98046875									
ROW12										
ROW13										
ROW14										
ROW15										

Now you see the each cell value from [3,1] to [10,1] is changed as its corresponding top row value divided by 2 as per formula. And the value in Cell [11,1] is also changed as “total=19.98046875” (total=sum of all values from [1,1] to [10,1]).

### 11.Format and Delete functions:

Format function is used for displaying no of decimal places of values.

In the above sheet select the Range of cells [1,1] to [11,1] by first select [1,1] then Range button once and then select [11,1] and the screen will be as follows.

The screenshot shows a spreadsheet application window titled "WORKSHEET". The interface includes a formula bar with the range "[1,1][11,1]" and the value "10", and a "go" button. Below the formula bar is a toolbar with buttons for mathematical operations (=, +, -, \*, /), sum, pow, sqrt, parentheses, Range, Del, fMt, Nfmt, Copy, Paste, Pasv, Save, and load. The spreadsheet grid has 11 columns (COLUMN1 to COLUMN10) and 15 rows (ROW1 to ROW15). The cells in the first column (COLUMN1) from ROW1 to ROW11 are highlighted in yellow and contain the values 10, 5, 2.5, 1.25, 0.625, 0.3125, 0.15625, 0.078125, 0.0390625, 0.01953125, and total=19.98046875 respectively. The cell in ROW11, COLUMN2 contains the value 2.5. All other cells are empty.

	COLUMN1	COLUMN2	COLUMN3	COLUMN4	COLUMN5	COLUMN6	COLUMN7	COLUMN8	COLUMN9	COLUMN10
ROW1	10									
ROW2	5									
ROW3	2.5	2.5								
ROW4	1.25									
ROW5	0.625									
ROW6	0.3125									
ROW7	0.15625									
ROW8	0.078125									
ROW9	0.0390625									
ROW10	0.01953125									
ROW11	total=19.98046875									
ROW12										
ROW13										
ROW14										
ROW15										

Now Click on the “fMt” button you will see the following screen.

WORKSHEET

[1.1][11.1] 10 go

= + - \* / sum pow sqrt ( ) Range Del fMt Nfmt Copy Paste Pasv Save load

	COLUMN1	COLUMN2	COLUMN3	COLUMN4	COLUMN5	COLUMN6	COLUMN7	COLUMN8	COLUMN9	COLUMN10
ROW1	10									
ROW2	Type no of decimal places									
ROW3										
ROW4	ok									
ROW5	0.625									
ROW6	0.3125									
ROW7	0.15625									
ROW8	0.078125									
ROW9	0.0390625									
ROW10	0.01953125									
ROW11	total=19.98046875									
ROW12										
ROW13										
ROW14										
ROW15										

In the above popup you are asked to fill in the no of decimal places . type 2 in the text box in popup window and then press OK button you will see the following.

WORKSHEET

[1,1][11,1] 10 go

= + - \* / sum pow sqrt ( ) Range Del fMt Nfmt Copy Paste Pasv Save load

	COLUMN1	COLUMN2	COLUMN3	COLUMN4	COLUMN5	COLUMN6	COLUMN7	COLUMN8	COLUMN9	COLUMN10
ROW1	10.00									
ROW2	5.00									
ROW3	2.50	2.5								
ROW4	1.25									
ROW5	0.63									
ROW6	0.31									
ROW7	0.16									
ROW8	0.08									
ROW9	0.04									
ROW10	0.02									
ROW11	total=19.98046875									
ROW12										
ROW13										
ROW14										
ROW15										

You see all the values selected in the range are formatted with 2 decimal places. But the cell [11,1] is not formatted since it contains both string and values mixed. To format that value you can use the following method. Select the cell [11,1] and you will see the formula as =”total=”+sum([1,1][10,1]) as follows.

WORKSHEET

[11.1][11.1]    ="total="+sum([1.1][10.1])    go

= + - \* / sum pow sqrt ( ) Range Del fMt Nfmt Copy Paste Pasv Save load

	COLUMN1	COLUMN2	COLUMN3	COLUMN4	COLUMN5	COLUMN6	COLUMN7	COLUMN8	COLUMN9	COLUMN10
ROW1	10.00									
ROW2	5.00									
ROW3	2.50	2.5								
ROW4	1.25									
ROW5	0.63									
ROW6	0.31									
ROW7	0.16									
ROW8	0.08									
ROW9	0.04									
ROW10	0.02									
ROW11	total=19.98046875									
ROW12										
ROW13										
ROW14										
ROW15										

Now change the formula as ="total="+Math.round(sum([1,1][10,1])\*100)/100  
 And then click 'go' button will give the following screen.

WORKSHEET

[11,1][11,1]    ="total="+Math.round(sum([1,1][10,1])\*100)/100[11,1]    go

= + - \* / sum pow sqrt ( ) Range Del fMt Nfmt Copy Paste Pasv Save load

	COLUMN1	COLUMN2	COLUMN3	COLUMN4	COLUMN5	COLUMN6	COLUMN7	COLUMN8	COLUMN9	COLUMN10
ROW1	10.00									
ROW2	5.00									
ROW3	2.50	2.5								
ROW4	1.25									
ROW5	0.63									
ROW6	0.31									
ROW7	0.16									
ROW8	0.08									
ROW9	0.04									
ROW10	0.02									
ROW11	total=19.98									
ROW12										
ROW13										
ROW14										
ROW15										

Now you will see that the value in [11,1] is changed as “total=19.98” and formatted with 2 decimal places. If you want to format with 4 decimal places in the formula use 10000 instead of 100 as follows.

WORKSHEET

[11.1][11.1]    =total="(Math.round(sum([1.1][10.1])\*10000))/10000    go

= + - \* / sum pow sqrt ( ) Range Del fMt Nfmt Copy Paste Pasv Save load

	COLUMN1	COLUMN2	COLUMN3	COLUMN4	COLUMN5	COLUMN6	COLUMN7	COLUMN8	COLUMN9	COLUMN10
ROW1	10.00									
ROW2	5.00									
ROW3	2.50	2.5								
ROW4	1.25									
ROW5	0.63									
ROW6	0.31									
ROW7	0.16									
ROW8	0.08									
ROW9	0.04									
ROW10	0.02									
ROW11	total=19.9805									
ROW12										
ROW13										
ROW14										
ROW15										

=total="(Math.round(sum([1,1][10,1])\*10000))/10000 is native javascript method for formatting. You can use this for formatting any cell values also.

The formatted values are not correct values and they are rounded of to number of decimal places as per format. To see the full values without truncation any time you cam press 'Nfmt' button and you will see the following screen.

WORKSHEET

[11.1][11.1]    =total="(Math.round(sum([1.1][10.1])\*10000))/10000    go

= + - \* / sum pow sqrt ( ) Range Del fMt Nfmt Copy Paste Pasv Save load

	COLUMN1	COLUMN2	COLUMN3	COLUMN4	COLUMN5	COLUMN6	COLUMN7	COLUMN8	COLUMN9	COLUMN10
ROW1	10									
ROW2	5									
ROW3	2.5	2.5								
ROW4	1.25									
ROW5	0.625									
ROW6	0.3125									
ROW7	0.15625									
ROW8	0.078125									
ROW9	0.0390625									
ROW10	0.01953125									
ROW11	total=19.9805									
ROW12										
ROW13										
ROW14										
ROW15										

But the value in Cell [11,1] is not yet removed from format. For that you have to change the formula in the cell as follows.

WORKSHEET

[11.1][11.1]    ="total="+sum([1.1][10.1])    go

= + - \* / sum pow sqrt ( ) Range Del fMt Nfmt Copy Paste Pasv Save load

	COLUMN1	COLUMN2	COLUMN3	COLUMN4	COLUMN5	COLUMN6	COLUMN7	COLUMN8	COLUMN9	COLUMN10
ROW1	10									
ROW2	5									
ROW3	2.5	2.5								
ROW4	1.25									
ROW5	0.625									
ROW6	0.3125									
ROW7	0.15625									
ROW8	0.078125									
ROW9	0.0390625									
ROW10	0.01953125									
ROW11	total=19.98046875									
ROW12										
ROW13										
ROW14										
ROW15										

Once the formula is corrected as ="total="+sum([1,1][10,1]) the value without format is displayed.

### Deleting Cells:

Select the cell [3,2] as follows.

WORKSHEET

[3.2][3.2]    ="[3.1]".substr(0,5)    go

= + - \* / sum pow sqrt ( ) Range Del fMt Nfmt Copy Paste Pasv Save load

	COLUMN1	COLUMN2	COLUMN3	COLUMN4	COLUMN5	COLUMN6	COLUMN7	COLUMN8	COLUMN9	COLUMN10
ROW1	10									
ROW2	5									
ROW3	2.5	2.5								
ROW4	1.25									
ROW5	0.625									
ROW6	0.3125									
ROW7	0.15625									
ROW8	0.078125									
ROW9	0.0390625									
ROW10	0.01953125									
ROW11	total=19.98046875									
ROW12										
ROW13										
ROW14										
ROW15										

Now press 'Del' button in the above screen next to Range button will delete the value in the selected cell and the screen will be as follows.

WORKSHEET

[3,2][3,2] go

= + - \* / sum pow sqrt ( ) Range Del fMt Nfmt Copy Paste Pasv Save load

	COLUMN1	COLUMN2	COLUMN3	COLUMN4	COLUMN5	COLUMN6	COLUMN7	COLUMN8	COLUMN9	COLUMN10
ROW1	10									
ROW2	5									
ROW3	2.5									
ROW4	1.25									
ROW5	0.625									
ROW6	0.3125									
ROW7	0.15625									
ROW8	0.078125									
ROW9	0.0390625									
ROW10	0.01953125									
ROW11	total=19.98046875									
ROW12										
ROW13										
ROW14										
ROW15										

Now you will see the contents in cell [3,2] is deleted.  
 You can select range as follows.

WORKSHEET

[4.1][9.1]      =[3.1]/2      go

= + - \* / sum pow sqrt ( ) Range Del fMt Nfmt Copy Paste Pasv Save load

	COLUMN1	COLUMN2	COLUMN3	COLUMN4	COLUMN5	COLUMN6	COLUMN7	COLUMN8	COLUMN9	COLUMN10
ROW1	10									
ROW2	5									
ROW3	2.5									
ROW4	1.25									
ROW5	0.625									
ROW6	0.3125									
ROW7	0.15625									
ROW8	0.078125									
ROW9	0.0390625									
ROW10	0.01953125									
ROW11	total=19.98046875									
ROW12										
ROW13										
ROW14										
ROW15										

Now press 'Del' button in the screen and you will see the following screen.

WORKSHEET

[4,1][9,1] go

= + - \* / sum pow sqrt ( ) Range Del fMt Nfmt Copy Paste Pasv Save load

	COLUMN1	COLUMN2	COLUMN3	COLUMN4	COLUMN5	COLUMN6	COLUMN7	COLUMN8	COLUMN9	COLUMN10
ROW1	10									
ROW2	5									
ROW3	2.5									
ROW4										
ROW5										
ROW6										
ROW7										
ROW8										
ROW9										
ROW10	0									
ROW11	total=17.5									
ROW12										
ROW13										
ROW14										
ROW15										

Now all the contents in range [4,1]to [9,1] are deleted. The contents in Cell [10,1] is 0 as per formula and the contents in [11,1] is also changed as per formula.

Now help manual also brought to first page as shown below.

	COLUMN1	COLUMN2	COLUMN3	COLUMN4	COLUMN5	COLUMN6	COLUMN7	COLUMN8	COLUMN9	COLUMN10
ROW1										
ROW2										
ROW3										
ROW4										
ROW5										
ROW6										
ROW7										
ROW8										
ROW9										
ROW10										
ROW11										
ROW12										
ROW13										
ROW14										
ROW15										

The link help just right side of the 'go' button is provided and if clicked this manual will be opened in separate window in PDF format.

## 12. Solution of simultaneous equations in spreadsheet:

	COLUMN1	COLUMN2	COLUMN3	COLUMN4	COLUMN5	COLUMN6	COLUMN7	COLUMN8	COLUMN9	COLUMN10
ROW1	8	3	2	1	20	$8x+3y+2z=20$				
ROW2	3	5	5	2		$3x+5y+5z=28$				
ROW3	2	4	7	3		$2x+4y+7z=31$				
ROW4										
ROW5										
ROW6										
ROW7										
ROW8										
ROW9										
ROW10										
ROW11										
ROW12										
ROW13										
ROW14										
ROW15										

In the above sheet I typed some 3 simultaneous equations in COLUMN6 as x,y,z as variables.

In COLUMN1 entered the values of coefficients of x

In COLUMN2 entered the values of coefficients of y

In COLUMN3 entered the values of coefficients of z

In COLUMN4 entered the sample values of  $x=1; y=2; z=3$  as 1,2,3 as values.

Now in COLUMN5 each row of 3 values are multiplied by 3 values in COLUMN4 as Matrix multiplication.

For that the formula in in Cell [1,5] is  $= [1,1]*[1,4]+[1,2]*[2,4]+[1,3]*[3,4]$  which is from the above values is  $= 8*1+3*2+2*3=20$  ; So the value of 20 is shown in Cell [5,1] and the formula given is shown in Input box above.

If the above formula is copied to the next Cell [6, 1] we need to multiply the second row of 3 values with same 3 values in COLUMN4.

For that do some modification in the above formula as in other spreadsheet to put \$ symbol before *row no* and *column no* as given below..Cell [1,5] is  $=[1,1]*[1,\$4]+[1,2]*[2,\$4]+[1,3]*[3,\$4]$

That is I am making cell references of COLUMN4 as fixed which will not change when copying the formula to other places. If row no has prefix of \$ symbol then that row no will not change when copying to other places. If column no has prefix of \$ symbol then that column no will not change when copying to other places. In this case both row no and column no are entered with prefix of \$ symbol and the same is shown below.

The screenshot shows a spreadsheet interface with a formula bar and a grid. The formula bar contains the formula  $= [1.1]*[\$1,\$4]+[1.2]*[\$2,\$4]+[1.3]*[\$3,\$4]$ . The grid has 10 columns (COLUMN1 to COLUMN10) and 15 rows (ROW1 to ROW15). The data in the grid is as follows:

	COLUMN1	COLUMN2	COLUMN3	COLUMN4	COLUMN5	COLUMN6	COLUMN7	COLUMN8	COLUMN9	COLUMN10
ROW1	8	3	2	1	20	$8x+3y+2z=20$				
ROW2	3	5	5	2		$3x+5y+5z=28$				
ROW3	2	4	7	3		$2x+4y+7z=31$				
ROW4										
ROW5										
ROW6										
ROW7										
ROW8										
ROW9										
ROW10										
ROW11										
ROW12										
ROW13										
ROW14										
ROW15										

Now I am copying the formula in Cell [1,5] to the Range of Cells [2,5][3,5] . Now Select the Cell [2,5] and see the screen as below.

	COLUMN1	COLUMN2	COLUMN3	COLUMN4	COLUMN5	COLUMN6	COLUMN7	COLUMN8	COLUMN9	COLUMN10
ROW1	8	3	2	1	20	$8x+3y+2z=20$				
ROW2	3	5	5	2	28	$3x+5y+5z=28$				
ROW3	2	4	7	3	31	$2x+4y+7z=31$				
ROW4										
ROW5										
ROW6										
ROW7										
ROW8										
ROW9										
ROW10										
ROW11										
ROW12										
ROW13										
ROW14										
ROW15										

Now you will see the formula in Cell [2,5] is  $= [2,1]*[1,4] + [2,2]*[2,4] + [2,3]*[3,4]$  and the corresponding value is 28. Now select the Cell [3,5] and see the formula.

	COLUMN1	COLUMN2	COLUMN3	COLUMN4	COLUMN5	COLUMN6	COLUMN7	COLUMN8	COLUMN9	COLUMN10
ROW1	8	3	2	1	20	$8x+3y+2z=20$				
ROW2	3	5	5	2	28	$3x+5y+5z=28$				
ROW3	2	4	7	3	31	$2x+4y+7z=31$				
ROW4										
ROW5										
ROW6										
ROW7										
ROW8										
ROW9										
ROW10										
ROW11										
ROW12										
ROW13										
ROW14										
ROW15										

Now you will see the formula in [3,5] is  $=[3,1]*[\$1,\$4]+[3,2]*[\$2,\$4]+[3,3]*[\$3,\$4]$  and the corresponding value is 31.

The same Matrix multiplication is represented as 3 simultaneous equations in COLUMN6 as

$$8x+3y+2z=20$$

$$3x+5y+5z=28$$

$$2x+4y+7z=31$$

We know the answers also for the above equation that is  $x=1;y=2;z=3$ ;

How to solve the above equation or similar equations in this spread sheet is the problem. I use Gauss Elimination method as follows.

Copy the Range of Cells [1,1][3,3] to Cell [5,1] as follows.

WORKSHEET

[1.1][3.3] 8 go [Help](#)

= + - \* / sum pow sqrt ( ) Range Del Fmt NFmt Copy Paste Pasv Save load

	COLUMN1	COLUMN2	COLUMN3	COLUMN4	COLUMN5	COLUMN6	COLUMN7	COLUMN8	COLUMN9	COLUMN10
ROW1	8	3	2	1	20	$8x+3y+2z=20$				
ROW2	3	5	5	2	28	$3x+5y+5z=28$				
ROW3	2	4	7	3	31	$2x+4y+7z=31$				
ROW4										
ROW5										
ROW6										
ROW7										
ROW8										
ROW9										
ROW10										
ROW11										
ROW12										
ROW13										
ROW14										

Then Select [5,1] and Paste.

WORKSHEET

[5,1][5,1] go [Help](#)

= + - \* / sum pow sqrt ( ) Range Del Fmt NFmt Copy Paste Pasv Save load

	COLUMN1	COLUMN2	COLUMN3	COLUMN4	COLUMN5	COLUMN6	COLUMN7	COLUMN8	COLUMN9	COLUMN10
ROW1	8	3	2	1	20	$8x+3y+2z=20$				
ROW2	3	5	5	2	28	$3x+5y+5z=28$				
ROW3	2	4	7	3	31	$2x+4y+7z=31$				
ROW4										
ROW5										
ROW6										
ROW7										
ROW8										
ROW9										
ROW10										
ROW11										
ROW12										
ROW13										
ROW14										
ROW15										

After clicking Paste button you will see the following screen.

[5.1][5.1] go [Help](#)

= + - \* / sum pow sqrt ( ) Range Del Fmt NFmt Copy Paste Pasv Save load

	COLUMN1	COLUMN2	COLUMN3	COLUMN4	COLUMN5	COLUMN6	COLUMN7	COLUMN8	COLUMN9	COLUMN10
ROW1	8	3	2	1	20	$8x+3y+2z=20$				
ROW2	3	5	5	2	28	$3x+5y+5z=28$				
ROW3	2	4	7	3	31	$2x+4y+7z=31$				
ROW4										
ROW5	8	3	2							
ROW6	3	5	5							
ROW7	2	4	7							
ROW8										
ROW9										
ROW10										
ROW11										
ROW12										
ROW13										
ROW14										
ROW15										

Then copy the 3 values in COLUMN5 to COLUMN4 as below.

WORKSHEET

[5.4][5.4] go Help

= + - \* / sum pow sqrt ( ) Range Del Fmt NFmt Copy Paste Pasv Save load

	COLUMN1	COLUMN2	COLUMN3	COLUMN4	COLUMN5	COLUMN6	COLUMN7	COLUMN8	COLUMN9	COLUMN10
ROW1	8	3	2	1	20	$8x+3y+2z=20$				
ROW2	3	5	5	2	28	$3x+5y+5z=28$				
ROW3	2	4	7	3	31	$2x+4y+7z=31$				
ROW4										
ROW5	8	3	2	20						
ROW6	3	5	5	28						
ROW7	2	4	7	31						
ROW8										
ROW9										
ROW10										
ROW11										
ROW12										
ROW13										
ROW14										
ROW15										

When pasting use Pasv button to paste only the values and not formula as above.

Now the simultaneous equation is entered in the spread sheet in the range [5,1][7,4] and this is the Matrix or Spreadsheet form of simultaneous equation.

Now in the Cell [5,5] enter the following formula as given below.

WORKSHEET

[5.5][5.5]      =([5.4]-([5.2]\*[6.5])-([5.3]\*[7.5]))/[5.1]      go [Help](#)

= + - \* / sum pow sqrt ( ) Range Del Fmt NFmt Copy Paste Pasv Save load

	COLUMN1	COLUMN2	COLUMN3	COLUMN4	COLUMN5	COLUMN6	COLUMN7	COLUMN8	COLUMN9	COLUMN10
ROW1	8	3	2	1	20	8x+3y+2z=20				
ROW2	3	5	5	2	28	3x+5y+5z=28				
ROW3	2	4	7	3	31	2x+4y+7z=31				
ROW4										
ROW5	8	3	2	20						
ROW6	3	5	5	28						
ROW7	2	4	7	31						
ROW8										
ROW9										
ROW10										
ROW11										
ROW12										
ROW13										
ROW14										
ROW15										

Now press 'go' button to execute the formula. You will see the following screen.

WORKSHEET

[6,5][6,5]  [Help](#)

	COLUMN1	COLUMN2	COLUMN3	COLUMN4	COLUMN5	COLUMN6	COLUMN7	COLUMN8	COLUMN9	COLUMN10
ROW1	8	3	2	1	20	8x+3y+2z=20				
ROW2	3	5	5	2	28	3x+5y+5z=28				
ROW3	2	4	7	3	31	2x+4y+7z=31				
ROW4										
ROW5	8	3	2	20	2.5					
ROW6	3	5	5	28						
ROW7	2	4	7	31						
ROW8										
ROW9										
ROW10										
ROW11										
ROW12										
ROW13										
ROW14										
ROW15										

Now the formula in the Cell [5,5] is  $=(\text{[5,4]} - (\text{[5,2]} * \text{[6,5]}) - (\text{[5,3]} * \text{[7,5]})) / \text{[5,1]}$  is executed. and the value is 2.5. In this the values in [6,5] and [7,5] are blank and it is treated as 0 and the result is just  $\text{[5,4]} / \text{[5,1]}$  which is equal to 2.5. Now in the Cell [6,5] enter the following formula and press 'go' button and you will see the screen as below.

	COLUMN1	COLUMN2	COLUMN3	COLUMN4	COLUMN5	COLUMN6	COLUMN7	COLUMN8	COLUMN9	COLUMN10
ROW1	8	3	2	1	20	$8x+3y+2z=20$				
ROW2	3	5	5	2	28	$3x+5y+5z=28$				
ROW3	2	4	7	3	31	$2x+4y+7z=31$				
ROW4										
ROW5	8	3	2	20	0.9625000000000001					
ROW6	3	5	5	28	5.0225					
ROW7	2	4	7	31						
ROW8										
ROW9										
ROW10										
ROW11										
ROW12										
ROW13										
ROW14										
ROW15										

Now the formula in [6,5] is  $=([6,4]-([6,1]*[5,5])-([6,3]*[7,5]))/[6,2]$  and in that the previous value of 2.5 in Cell [5,5] is used and the value of [7,5] which is blank is treated as 0. Now the value in [6,5] is changed to  $=(28-(3*2.5)-(5*0))/5$  which is equal to 4.3. Since the value in [6,5] is changed the formula in [5,5] is using the value at [6,5] and this will change to  $=(20-(3*4.3)-(2*0))/8$  which is equal to 0.9625000000000001 and using above value of [5,5] the value at [6,5] also changes to 5.0225 from 4.3. Now go to Cell [7,5] and enter the following formula as below.

WORKSHEET

[7.5][7.5]      =([7.4]-([7.1]\*[5.5])-([7.2]\*[6.5]))/[7.3]      go [Help](#)

= + - \* / sum pow sqrt ( ) Range Del Fmt NFmt Copy Paste Pasv Save load

	COLUMN1	COLUMN2	COLUMN3	COLUMN4	COLUMN5	COLUMN6	COLUMN7	COLUMN8	COLUMN9	CO
ROW1	8	3	2	1	20	8x+3y+2z=20				
ROW2	3	5	5	2	28	3x+5y+5z=28				
ROW3	2	4	7	3	31	2x+4y+7z=31				
ROW4										
ROW5	8	3	2	20	0.295669642857143					
ROW6	3	5	5	28	4.139026785714286					
ROW7	2	4	7	31	1.9789362244897954					
ROW8										
ROW9										
ROW10										
ROW11										
ROW12										
ROW13										
ROW14										
ROW15										

In formula  $=([7.4]-([7.1]*[5.5])-([7.2]*[6.5]))/[7.3]$  all values at [5,5] and [6,5] available in previous screen are used and the value is  $(31-(2*0.9625)-(4*5.0225))/7 = 1.2835714285714286$  and this value is used in formula in Cell [5,5] and Cell [6,5] and changed the values accordingly and revised values are again used in formula at [7,5] and changed as above. Now the Value at [5,5] is x, [6,5] is y, [7,5] is z. But the values are not correct. The values are to be iterated are cycled many more times to arrive at nearest or exact solution. For doing iteration you select any Cell and press 'go' button repeatedly. Now select [1,1] will show the screen as below.

WORKSHEET

[1.1][1.1] 8 go Help

= + - \* / sum pow sqrt ( ) Range Del Fmt NFmt Copy Paste Pasv Save load

	COLUMN1	COLUMN2	COLUMN3	COLUMN4	COLUMN5	COLUMN6	COLUMN7	COLUMN8	COLUMN9	COLUMN10
ROW1	8	3	2	1	20	$8x+3y+2z=20$				
ROW2	3	5	5	2	28	$3x+5y+5z=28$				
ROW3	2	4	7	3	31	$2x+4y+7z=31$				
ROW4										
ROW5	8	3	2	20	0.295669642857143					
ROW6	3	5	5	28	4.139026785714286					
ROW7	2	4	7	31	1.9789362244897954					
ROW8										
ROW9										
ROW10										
ROW11										
ROW12										
ROW13										
ROW14										
ROW15										

Now press 'go' button repeatedly and till it reaches [10,1] and screen will be as below.

WORKSHEET

[10.1][10.1]  [Help](#)

	COLUMN1	COLUMN2	COLUMN3	COLUMN4	COLUMN5	COLUMN6	COLUMN7	COLUMN8	COLUMN9	COLUMN10
ROW1	8	3	2	1	20	$8x+3y+2z=20$				
ROW2	3	5	5	2	28	$3x+5y+5z=28$				
ROW3	2	4	7	3	31	$2x+4y+7z=31$				
ROW4										
ROW5	8	3	2	20	0.9892784088757663					
ROW6	3	5	5	28	2.024646337512143					
ROW7	2	4	7	31	2.9889796903142707					
ROW8										
ROW9										
ROW10										
ROW11										
ROW12										
ROW13										
ROW14										
ROW15										

Now the value in [5,5] is nearer to 1 and value in [6,5] is nearer to 2 and value in [7,5] is nearer to 3. Now go on pressing 'go' button till the values reaches exact values of 1,2,3. You will see the screen as follows.

WORKSHEET

[74,1][74,1]  [Help](#)

	COLUMN1	COLUMN2	COLUMN3	COLUMN4	COLUMN5	COLUMN6	COLUMN7	COLUMN8	COLUMN9	COLUMN10
ROW1	8	3	2	1	20	$8x+3y+2z=20$				
ROW2	3	5	5	2	28	$3x+5y+5z=28$				
ROW3	2	4	7	3	31	$2x+4y+7z=31$				
ROW4										
ROW5	8	3	2	20	1					
ROW6	3	5	5	28	2					
ROW7	2	4	7	31	3					
ROW8										
ROW9										
ROW10										
ROW11										
ROW12										
ROW13										
ROW14										
ROW15										

Now when the Cell location reaches [74,1] the exact values of  $x=1; y=2; z=3$  are reached.

You can save this as a text file using Save button. The screen is as below.

WORKSHEET

[74,1][74,1] go Help

= + - \* / sum pow sqrt ( ) Range Del Fmt NFmt Copy Paste Pasv Save load

	COLUMN1	COLUMN2	COLUMN3	COLUMN4	COLUMN5	COLUMN6	COLUMN7	COLUMN8	COLUMN9	COLUMN10	CC
ROW1	8	3	2	1	20	$8x+3y+2z=20$					
ROW2	Copy and save in Notepad										
ROW3	[1,1]: $8^{[1,2]}$ : $3^{[1,3]}$ : $2^{[1,4]}$ : $1^{[1,6]}$ : $8x+3y+2z=20^{[2,1]}$ : $3^{[2,1]}$										
ROW4	[2,2]: $5^{[2,3]}$ : $5^{[2,4]}$ : $2^{[2,6]}$ : $3x+5y+5z=28^{[3,1]}$ : $2^{[3,2]}$ : $4^{[3,3]}$										
ROW5	[3,3]: $7^{[3,4]}$ : $3^{[3,6]}$ : $2x+4y+7z=31^{[5,1]}$ : $8^{[5,2]}$ : $3^{[5,3]}$ : $2^{[5,4]}$										
ROW6	[5,4]: $20^{[6,1]}$ : $3^{[6,2]}$ : $5^{[6,3]}$ : $5^{[6,4]}$ : $28^{[7,1]}$ : $2^{[7,2]}$ : $4^{[7,3]}$										
ROW7	[7,3]: $7^{[7,4]}$ : $31^{[1,5]}$ : $=[1,1]*[1,4]+[1,2]*[2,4]+[1,3]*[3,4]$										
ROW8	[2,5]: $=[2,1]*[1,4]+[2,2]*[2,4]+[2,3]*[3,4]$										
ROW9	[3,5]: $=[3,1]*[1,4]+[3,2]*[2,4]+[3,3]*[3,4]$										
ROW10	[5,5]: $=[5,4]-([5,2]*[6,5])-(5,3)*[7,5])/[5,1]^{[6,5]}$										
ROW11	[6,5]: $=[6,4]-([6,1]*[5,5])-(6,3)*[7,5])/[6,2]^{[7,5]}$										
ROW12	[7,5]: $=[7,4]-([7,1]*[5,5])-(7,2)*[6,5])/[7,3]^{[5,5]}$										
ROW13											
ROW14											
ROW15											
ROW16											
ROW17											
ROW18	Copy and save in a notepad file										
ROW19											
ROW20											
ROW21											

Done

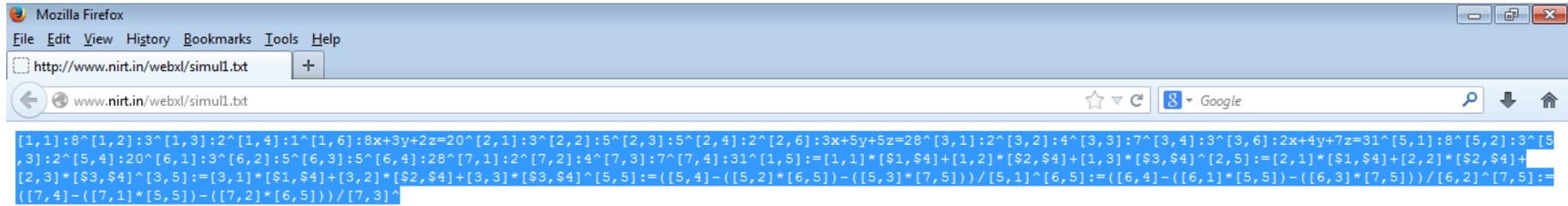
The above popup contents can be copied and saved in notepad file as below.

```

Untitled - Notepad
File Edit Format View Help
[1,1]:8^[1,2]:3^[1,3]:2^[1,4]:1^[1,6]:8x+3y+2z=20^[2,1]:3^[2,2]:5^
[2,3]:5^[2,4]:2^[2,6]:3x+5y+5z=28^[3,1]:2^[3,2]:4^[3,3]:7^[3,4]:3^
[3,6]:2x+4y+7z=31^[5,1]:8^[5,2]:3^[5,3]:2^[5,4]:20^[6,1]:3^[6,2]:5^
[6,3]:5^[6,4]:28^[7,1]:2^[7,2]:4^[7,3]:7^[7,4]:31^[1,5]:=[1,1]*[1,
$4]+[1,2]*[2,$4]+[1,3]*[$3,$4]^2,5]:=[2,1]*[$1,$4]+[2,2]*[$2,$4]+[2,3]*
[$3,$4]^3,5]:=[3,1]*[$1,$4]+[3,2]*[$2,$4]+[3,3]*[$3,$4]^5,5]:=( [5,4] -
([5,2]*[6,5])-( [5,3]*[7,5]))/[5,1]^6,5]:=( [6,4] -([6,1]*[5,5])-( [6,3]*
[7,5]))/[6,2]^7,5]:=( [7,4] -([7,1]*[5,5])-( [7,2]*[6,5]))/[7,3]^

```

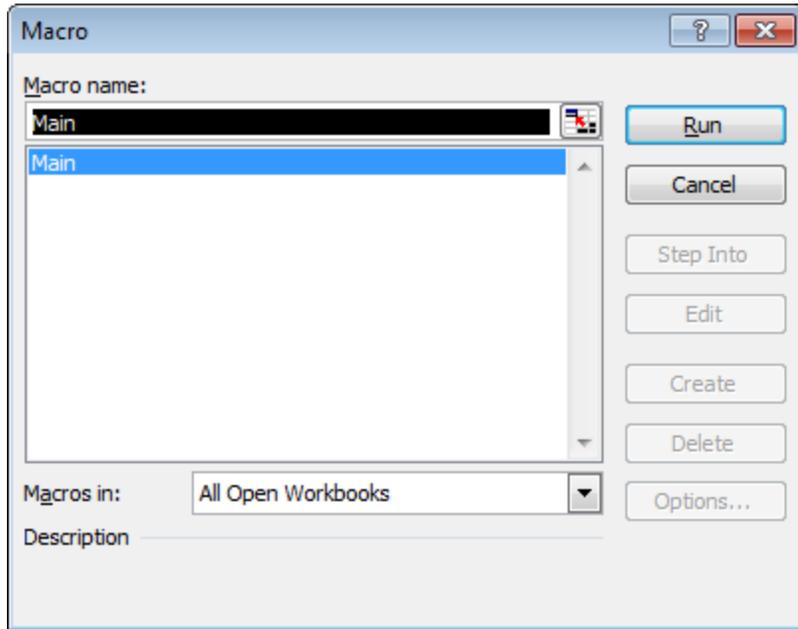
Save this as simul1.txt. and this is available in <http://www.nirt.in/webx/simul1.txt> also.



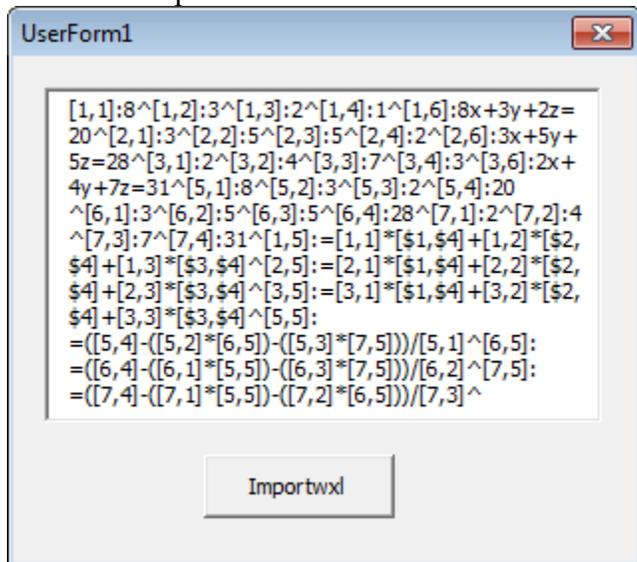
You can copy the contents and Paste in Macro in MicrosoftExcel Sheet in the following link.

<http://www.nirt.in/webxl/importwebxl.xls>

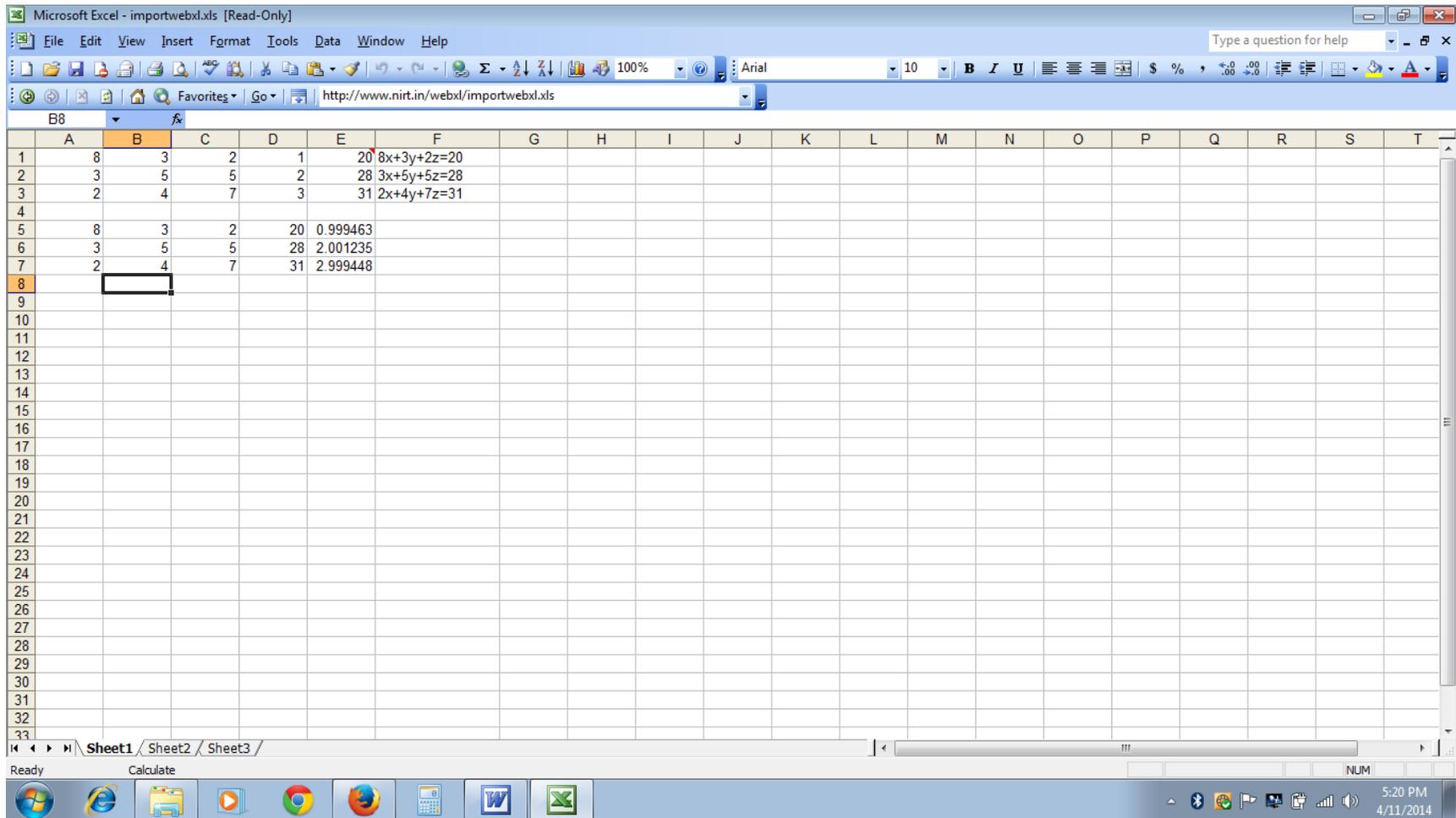
Enable the macros and run the macro .You will see the following screen.



After pressing run button you will get a text box to paste the contents as below and paste the contents in that text box as below. And then click Importwxl button.



You will get the following screen in Microsoft Excel.



You see the values of x,y,z in Excel sheet also nearing to exact values. Usually this wont import in Microsoft Excel since the formula used contains Circular reference. Circular reference means the formula ion one cell uses the output of formula in other cell. But if the iteration in Tools>options>Calculation section set as below.

The screenshot shows a Microsoft Excel spreadsheet with the following data:

	A	B	C	D	E	F
1	8	3	2	1	20	$8x+3y+2z=20$
2	3	5	5	2	28	$3x+5y+5z=28$
3	2	4	7	3	31	$2x+4y+7z=31$
4						
5	8	3	2	20	0.999463	
6	3	5	5	28	2.001235	
7	2	4	7	31	2.999448	
8						

The 'Options' dialog box is open, showing the 'Calculation' tab. The 'Iteration' checkbox is checked, and the 'Maximum iterations' is set to 300. The 'Maximum change' is set to 0.001. Other options include 'Update remote references', 'Save external link values', 'Precision as displayed', and '1904 date system'.

The Maximum iterations is set to 300. If the iteration section is not set on and the maximum iteration set to some no greater than 0 the above importwxi will give error while importing.

You can change the values of xyz as some ther values in the above work sheet and check whether the above solution works out also.

Now I change the values of  $x= 1.5;y= -2.5;z= 4.5$ ; as below.

WORKSHEET

[5,4][5,4] 20 go Help

= + - \* / sum pow sqrt ( ) Range Del Fmt NFmt Copy Paste Pasv Save load

	COLUMN1	COLUMN2	COLUMN3	COLUMN4	COLUMN5	COLUMN6	COLUMN7	COLUMN8	COLUMN9	COLUMN10
ROW1	8	3	2	1.5	13.5	$8x+3y+2z=20$				
ROW2	3	5	5	-2.5	14.5	$3x+5y+5z=28$				
ROW3	2	4	7	4.5	24.5	$2x+4y+7z=31$				
ROW4										
ROW5	8	3	2	13.5	0.06561998117268619					
ROW6	3	5	5	14.5	0.0686375202017178					
ROW7	2	4	7	24.5	3.4420299938353937					
ROW8										
ROW9										
ROW10										
ROW11										
ROW12										
ROW13										
ROW14										
ROW15										

To get exact results select cell [1,1] or some other cell go on press 'go' button till exact values are reached.

	COLUMN1	COLUMN2	COLUMN3	COLUMN4	COLUMN5	COLUMN6	COLUMN7	COLUMN8	COLUMN9	C
ROW1	8	3	2	1.5	13.5	$8x+3y+2z=13.5$				
ROW2	3	5	5	-2.5	14.5	$3x+5y+5z=14.5$				
ROW3	2	4	7	4.5	24.5	$2x+4y+7z=24.5$				
ROW4										
ROW5	8	3	2	13.5	1.4999999999999997					
ROW6	3	5	5	14.5	-2.4999999999999999					
ROW7	2	4	7	24.5	4.4999999999999999					
ROW8										
ROW9										
ROW10										
ROW11										
ROW12										
ROW13										
ROW14										
ROW15										

After [73,1] cycles the nearest value is reached and no further change is seen. Then this is the solution to a nearest accuracy.

You can solve any simultaneous equation with more values also. The basis of using the above formula is to be understood correctly.

### 13. Javascript programming within spreadsheet:

You can use javascript directly as formula in the spreadsheet.

Open the blank spread sheet and in Cell [1,1] enter value 10 as below.

	COLUMN1	COLUMN2	COLUMN3	COLUMN4	COLUMN5	COLUMN6	COLUMN7	COLUMN8	COLUMN9	COLUMN10	COLUMN11
ROW1	10										
ROW2											
ROW3											
ROW4											
ROW5											
ROW6											
ROW7											
ROW8											
ROW9											
ROW10											
ROW11											
ROW12											
ROW13											
ROW14											
ROW15											

In the Selected Cell[2,1] type ="Sum of values from 1 to " + [1,1] and press 'go' button and you will see the worksheet as below.

WORKSHEET

[2,1][2,1]    ="Sum of values from 1 to " + [1,1]    go    [Help](#)

=   +   -   \*   /   sum   pow   sqrt   (   )   Range   Del   Fmt   NFmt   Copy   Paste   Pasv   Save   load

	COLUMN1	COLUMN2	COLUMN3	COLUMN4	COLUMN5	COLUMN6	COLUMN7	COLUMN8	COLUMN9	COLUMN10
ROW1	10									
ROW2	Sum of values from 1 to 10									
ROW3										
ROW4										
ROW5										
ROW6										
ROW7										
ROW8										
ROW9										
ROW10										
ROW11										
ROW12										
ROW13										
ROW14										
ROW15										

Now Select Cell [2,2] and type the following: `=na=0;for(ai=1;ai<=[1,1];ai++){na=na+ai;}}` and press 'go' button. And you will see the following changes as below.

	COLUMN1	COLUMN2	COLUMN3	COLUMN4	COLUMN5	COLUMN6	COLUMN7	COLUMN8	COLUMN9	COLUMN10
ROW1	10									
ROW2	Sum of values from 1 to 10	55								
ROW3										
ROW4										
ROW5										
ROW6										
ROW7										
ROW8										
ROW9										
ROW10										
ROW11										
ROW12										
ROW13										
ROW14										
ROW15										

The formula used in the above cell is `={na=0;for(ai=1;ai<=[1,1];ai++){na=na+ai;}}` which is similar to javascript using for loop. In the formula I used variable 'ai' instead of variable 'i'. Since I already used 'i,j,k,l,i1,j1,k1,l1,i2,j2' etc as variables in main source code. Otherwise this may lead to some errors. Similarly in the next row I will provide some of squares as below.

WORKSHEET

[3,2][3,2]    `={na=0;for(ai=1;ai<=[1,1];ai++){na=na+ai*ai;}}`    go [Help](#)

= + - \* / sum pow sqrt ( ) Range Del Fmt NFmt Copy Paste Pasv Save load

	COLUMN1	COLUMN2	COLUMN3	COLUMN4	COLUMN5	COLUMN6	COLUMN7	COLUMN8	COLUMN9
ROW1	10								
ROW2	Sum of values from 1 to 10	55							
ROW3	Sum of squares from 1 to 10	385							
ROW4									
ROW5									
ROW6									
ROW7									
ROW8									
ROW9									
ROW10									
ROW11									
ROW12									
ROW13									
ROW14									
ROW15									

In the above I used the formula `={na=0;for(ai=1;ai<=[1,1];ai++){na=na+ai*ai;}}` to find some of squares.

Now got to Cell [1,1] and change the value as 5 and you will see the following changes in the spread sheet.

WORKSHEET

[2.1][2.1]      ="Sum of values from 1 to " + [1.1]      [go](#) [Help](#)

= + - \* / sum pow sqrt ( ) Range Del Fmt NFmt Copy Paste Pasv Save load

	COLUMN1	COLUMN2	COLUMN3	COLUMN4	COLUMN5	COLUMN6	COLUMN7	COLUMN8	COLUMN9	CO
ROW1	5									
ROW2	Sum of values from 1 to 5	15								
ROW3	Sum of squares from 1 to 5	55								
ROW4										
ROW5										
ROW6										
ROW7										
ROW8										
ROW9										
ROW10										
ROW11										
ROW12										
ROW13										
ROW14										
ROW15										

Now you will see the corresponding changes in all the formulas and the sum of values from 1 to 5 and sum of squares from 1 to 5 and corresponding change of values in the spread sheet.

Like that you can find Factorial of value using formula `= {na=1;for(ai=1;ai<=[1,1];ai++){na=na*ai;}}`

Select cell [4,1] and enter "Factorial of" + [1,1] and then Go to Cell [4,2] and enter the formula as above you will see following worksheet as below:

	COLUMN1	COLUMN2	COLUMN3	COLUMN4	COLUMN5	COLUMN6	COLUMN7	COLUMN8	COLUMN9	COLUMN10
ROW1		5								
ROW2	Sum of values from 1 to 5	15								
ROW3	Sum of squares from 1 to 5	55								
ROW4	Factorial of 5	120								
ROW5										
ROW6										
ROW7										
ROW8										
ROW9										
ROW10										
ROW11										
ROW12										
ROW13										
ROW14										
ROW15										

You can also find sum of  $1/x$  values for  $x$  from 1 to 5 as below.

WORKSHEET

[5.2][5.2]    `={na=0;for(ai=1;ai<=[1.1];ai++){na=na+1/ai}}`    go [Help](#)

	COLUMN1	COLUMN2	COLUMN3	COLUMN4	COLUMN5	COLUMN6	COLUMN7	COLUMN8	COLUMN9
ROW1		5							
ROW2	Sum of values from 1 to 5	15							
ROW3	Sum of squares from 1 to 5	55							
ROW4	Factorial of 5	120							
ROW5	Sum of 1/x from x=1 to 5	2.28333333333333							
ROW6									
ROW7									
ROW8									
ROW9									
ROW10									
ROW11									
ROW12									
ROW13									
ROW14									
ROW15									

You can use such type of javascript or c program basis in formula for programming capabilities in the worksheet.

#### 14. Shortcut keys:

The source code for shortcut facilities are copied and given below.

```
file:///C:/nproject.co.in/webxl/default.htm - Original Source
File Edit Format
641 if(tbl2.style.zindex==5)
642 {
643   tbl1.innerHTML=""
644   tbl2.style.zIndex=1;
645 }
646 else
647 {
648   tbl2.style.zIndex=5
649   tbl1.innerHTML="<input type=button value='ok' onclick='load2();'>";
650 }
651 }
652 </SCRIPT>
653
654 </head>
655
656 <BODY>
657 <table id=txt1 style=position:fixed;top:0;left:0;z-index:3; bgcolor=yellow><tr><td>
658 <input name=label1 id=label1 onfocus="ng=0;" bgcolor=yellow type=text></td><td>
659 <input type=text id=tx1 name=tx1 onfocus="ng=1;" onkeypress=displayresult(); style=width:500px;height:15px; accesskey=i></td><td>
660 <input type=button id=go value='go' onclick='rndnum1();'></td><td>
661 <a href='./webxl/manualforwebxl.pdf' target=_blank>Help</a></td></tr></table><table style=position:fixed;top:25px;left:0px;z-index:3; bgcolor=yellow><tr><td>
662 <input type=button value='=' onclick="tx1.value=tx1.value+'=';tx1.focus();" accesskey==></td><td>
663 <input type=button value='+' onclick="tx1.value=tx1.value+'+';tx1.focus();" accesskey=t></td><td>
664 <input type=button value='- ' onclick="tx1.value=tx1.value+'-';tx1.focus();" accesskey=-></td><td>
665 <input type=button value='*' onclick="tx1.value=tx1.value+'*';tx1.focus();" accesskey=*></td><td>
666 <input type=button value='/' onclick="tx1.value=tx1.value+'/';tx1.focus();" accesskey=/></td><td>
667 <input type=button value='sum' onclick="tx1.value=tx1.value+'sum';tx1.focus();" accesskey=2></td><td>
668 <input type=button value='pow' onclick="tx1.value=tx1.value+'Math.pow(';tx1.focus();" accesskey=6></td><td>
669 <input type=button value='sqrt' onclick="tx1.value=tx1.value+'Math.sqrt(';tx1.focus();" accesskey=q></td><td>
670 <input type=button value='(' onclick="tx1.value=tx1.value+'(';tx1.focus();" accesskey=9></td><td>
671 <input type=button value=')' onclick="tx1.value=tx1.value+')';tx1.focus();" accesskey=0></td><td>
672 <input type=button id=sft value='Range' onclick='nshft=1;' accesskey=r></td><td>
673 <input type=button id=del1 value='Del' onclick='dele1();' accesskey=x></td><td>
674 <input type=button id=fmt value='Fmt' onclick='format1();' accesskey=f></td><td>
675 <input type=button id=nfmt value='NFmt' onclick='nformat();' accesskey=n></td><td>
676 <input type=button value='Copy' onclick='copy1(i1,j1,i2,j2);' accesskey=c></td><td>
677 <input type=button value='Paste' onclick='paste1(i1,j1,i2,j2);' accesskey=v></td><td>
678 <input type=button value='Pasv' onclick='pastev(i1,j1,i2,j2);' accesskey=p></td><td>
679 <input type=button value='Save' onclick='save();' accesskey=s></td><td>
680 <input type=button value='load' onclick='load1();' accesskey=l></td>
681 </tr></table>
682 </BODY>
683 </HTML>
```

Instead of click on the button you can use shortcut key or accesskey indicated in the above source code. i.e,

Instead of using Range button click you can use Alt + r as shortcut.

Instead of using Del button click you can use Alt + x as shortcut.

Instead of using Fmt button click you can use Alt + f as shortcut. But this won't work in Chrome.

Instead of using Nfmt button click you can use Alt + n as shortcut.

Instead of using Copy button click you can use Alt + c as shortcut.

Instead of using Paste button click you can use Alt + v as shortcut.

Instead of using Pasv button click you can use Alt + p as shortcut.

Instead of using Save button click you can use Alt + s as shortcut.

Instead of using Load button click you can use Alt + l as shortcut.

The above shortcut keys works fine in IE,Chrome but not in Firefox.

You can edit the source code as per your requirement by copying and saving in your computer as per your requirement.