

Extensions for Open Office Calc

Extensions for Newton Raphson Solver Function and Resistor Color Code Calculator Function

J.P.S Bashani

Department of Computer Science & Engineering, University of Moratuwa,

samiththa.10@cse.mrt.ac.lk

Abstract- Nowadays most use OpenOffice as it is the leading international office suite which is runs on many platforms and provides number of functionalities. OpenOfficeCalc is used for organizations for the analysis of data in tabular form. Though it supports a large number of functions certain functionalities which are required quiet frequently are not available. In this project two functions which not available in the OpenOfficeCalc are implemented as an extension for the OpenOffice Calc. The first one is Newton Raphson function. It is a function which implement Newton Raphson method which gives approximate roots of a real valued function. The other one is Resistor color code calculator. It is a function which calculates resistance value of a resistor according to its color code.

I. INTRODUCTION

Nowadays most use OpenOfficeCalc for organization and analysis of data in tabular form. Even though it facilitates a large number of functions users have to face number of difficulties when using Calc as it does not facilitate certain functions that are required quite frequently. Therefore in this project I have considered on two such functions that are not available in AOOO(Apache OpenOfficeCalc).The first function is newtonraphson function that solves quadratic equations. The other function calculates the resistance value (in ohms) of a resistor according to the colour code of the particular resistor. The extensions provide the two functions to the Calc users so that the roots of quadratic equations can be calculated easily and the resistance value of a resistor can be found efficiently.

Newton Raphson solver function

This function provides the facility to apply Newton Raphson method for calculations.

$$\text{Eg- newraph} \left(x, f(x), \frac{df(x)}{dx}, \text{eps} \right) = x - \frac{f(x)}{\frac{df(x)}{dx}}$$

eps=convergence criteria

Resistor color code calculator

This function provides the resistance value (ohm) of the resistor according to its colour code.

rescol(brown,red,orange)=12000 (ohm)

II. RELATED WORK

Apache OpenOffice is the leading open-source office software suite for word processing, spreadsheets, presentations, graphics, databases and etc. It is available in many languages and compatible with any computer. It stores all your data in an international open standard format it can also read and write files from other common office software packages. Due to these reasons apache open office applications are widely used at the present.

Apache OpenOfficeCalc which is part of Open Office suite is used for organization for analysis of data in tabular format.

Though it supports large number of functions there are some functions which are not available but required frequently. Newton Raphson function and resistor color code calculator functions are two such functions.

Newton Raphson function is a method for finding successively better approximations for the roots (or zeroes) of a real-valued function.

The Newton-Raphson method uses an iterative process to approach one root of the function. The specific root that the process locates depends on the initial, arbitrarily chosen x-value.

$$x_{n+1} = x_n - \frac{f(x_n)}{f'(x_n)}$$

Since this method is useful in mathematical calculations I selected this as one of the two functions for my project to implement extension. In the extension the function is worked as follows.

$$\text{newraph} \left(x, f(x), \frac{df(x)}{dx}, \text{eps} \right) = x - \frac{f(x)}{\frac{df(x)}{dx}}$$

eps=convergence criteria

$x_0, f(x), \text{eps}$ are input for the function.

Eg-: function: $2x^3 - 2.5x - 5 = 0$,

Approximate value= 2

eps= 0.03

newraph(2,(2:3);(-2.5:1);(-5:0),0.03) = 1.39195

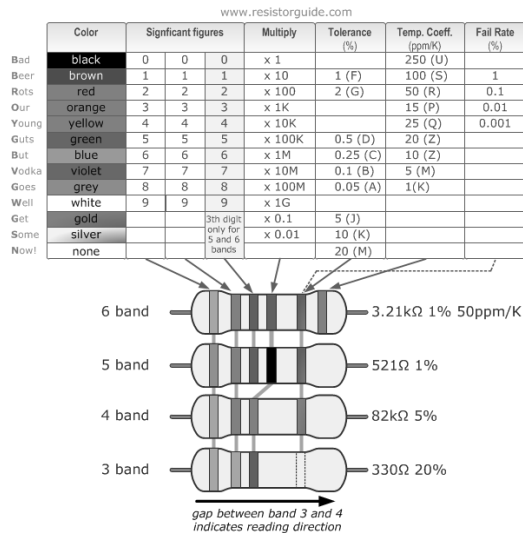


Figure 1: Color Code Values

The second function is resistor color code calculator function. It calculates resistance of a given resistor using its colour code is required to know the resistance value when using resistors. For that we have to refer data sheets^[5] and calculate them accordingly but that is very inefficient. Hence it is useful if we have an application that calculates the resistance value from its color code. Though there are some online applications that provide this function there is no offline application to fulfill this purpose yet. Therefore it is extremely beneficial if we could add this functionality to OpenOfficeCalc. So I selected this function as my second function of the extension.

The extension gives the resistance value in ohms. The function works as follows.

- For 4 band resistors
rescol(brown,red,orange)=12000 (ohm)
- For 5 band or 6 band resistors
rescol(brown,red,orange,blue)= 123000000 (ohm)

Though there are many types of resistors in this project I implemented only for the above two resistor types. For further extensive purposes, we can implement this for other types of resistors as well.

III. DESIGN AND IMPLEMENTATION

For the development I have used rational unified process. Firstly designing was done for the project. In order to understand the functional requirements of the system use case diagrams were drawn.

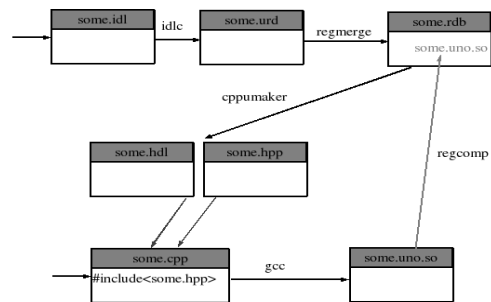


Figure 2: Project implementation

The Application consists of three layers. User interface layer, logical layer and the data access layer.

User Interface: Since this application is an extension for the OpenOfficeCalc after deploy extension in open office the user interface for the implemented functions also the User interface of the Open Office Calc.

Logical Layer: The calculations according to the given functions belong to the logical layer.

Data Access Layer: In data access layer, the Input given by users are saved and the results that are calculated by logical layer is also saved.

The project implementation is shown in figure 2.^[6]

The extension was implemented using c++ and unoidllangauages. Basically to implement interface between OpenOffice application and extension unoidl language was used. Testing and the implementation of the project were done simultaneously. The testing was done in two phases.

- 1) Unit testing for the functionalities severalty.
- 2) Integrating testing after deploy the extension in open office environment.

In addition to the testing in open office calc environment the two functions were tested using my macros and dialogs window. Further it can be checked whether these functions give an accurate answers or not.

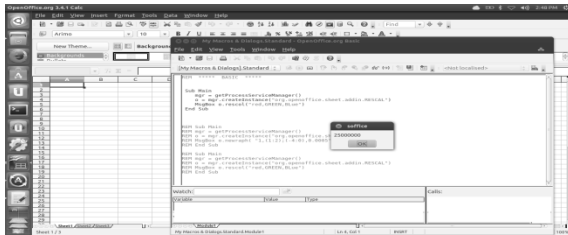


Figure 2: Testing Newton Raphson method in mymacros and dialog window

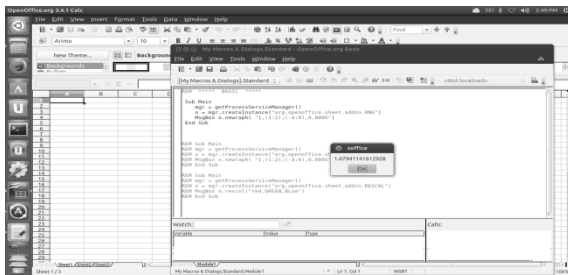


Figure 3: Testing resistor color code calculator method in mymacros and dialog window

IV. RESULTS

The extension for the OpenOffice Calc which provides the functionalities; Newton-Raphson method and resistor color code calculator which calculates the resistance value of a resistor according to its color code was successfully completed.

Both these functions are displayed in the open office calc function list a same as the other functions which are already normally available in OpenOffice Calc and the answer of these two functions are accurate.

V. CONCLUSION

This extension provides two highly useful functions that are not currently available in the OpenOffice Calc. Nevertheless, in using these functions the user has to face some difficulties when entering inputs. For instance in Newton Raphson method the user should know the input format as it is of a specific format. Furthermore it is convenient if the user get suggestions of the colors while entering colors for the color code calculator function. Also in this extension color code calculator was implemented only for resistors of two types. This can be further improved for all kinds of resistors. In addition the tolerance value of the resistor according to the color codes can be displayed. Likewise it is possible to improve these extensions to give the tolerance value together with the resistance of the resistor as it helps the user to get the correct value of the resistance value. It is useful to find functions which are not available in

the OpenOffice Calc and implement them accordingly.

ACKNOWLEDGEMENT

This work was guided and supported by academic staff, department of Computer Science & Engineering, University of Moratuwa.

REFERENCES

- [1] Apache OpenOffice Community Forum, Apache OpenOffice Community Forum, <http://forum.openoffice.org/en/forum/> (Accessed: 20 August 2014).
- [2] Spreadsheet Project, Apache OpenOffice, <http://www.openoffice.org/sc/> (Accessed: 20 August 2014).
- [3] Apache OpenOffice Support, Apache OpenOffice, <http://www.openoffice.org/support/> (Accessed: 20 August 2014).
- [4] The Apache OpenOffice Wiki, Apache OpenOffice Wiki, https://wiki.openoffice.org/wiki/Main_Page (Accessed: 20 August 2014).
- [5] Four, Five or Six Band Resistor Color Code Calculator, <http://www.1728.org/resisclr.htm> (Accessed: 20 August 2014).
- [6] Calc/Add-In/Simple Calc Add-In, https://wiki.openoffice.org/wiki/Calc/Add-In/Simple_Calc_Add-In (Accessed: 20 August 2014).