Python- GUI Programming

(Tkinter)

Sub-code:-INT213

SUBMISSION REPORT ON PYTHON PROJECT

PROJECT TITLE

Develop a GUI interface to convert number from one number system (binary, octal, decimal, and hexadecimal) to other number system (binary, octal, decimal and hexadecimal) with explanation using Python.

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OBJECTIVE

The primary objective of this project is to implement what we've learnt in Python throughout the semester. Implementing the root window and main loop with various tkinter widgets to build the program.

Through what we have learnt in GUI we have implement it to make a number base calculator which will perform the number base conversion operation. It has included 4 number bases: binary (base 2), octal (base 8), decimal (base 10), hexadecimal (base 16) to calculate.

The second objective is to make this calculator more convenient to the user. So, we have added the backspace, reset function. We have added a normal calculator too to perform all basic mathematical operations. We have added log function which stores the previous calculation data performed by the user. We have also done some beautification in the calculator by adding colours to the buttons. We have also make the triggered like function to state error done by the user while putting the input.

INTRODUCTION:

NUMBER SYSTEM

The number system or the numeral system is the system of naming or representing numbers. We know that a number is a mathematical value that helps to count or measure objects and it helps in performing various mathematical calculations. There are different types of number systems in Maths like decimal number system, binary number system, octal number system, and hexadecimal number system.

Types of Number Systems

There are various types of number systems in mathematics. The four most common number system types are:

1. Decimal number system (Base- 10)
2. Binary number system (Base- 2)
3. Octal number system (Base-8)
4. Hexadecimal number system (Base- 16)

Decimal Number System (Base 10 Number System)

The decimal number system has a base of 10 because it uses ten digits from 0 to 9. In the decimal number system, the positions successive to the left of the decimal point represent units, tens, hundreds, thousands and so on. This system is expressed in decimal numbers. Every position shows a particular power of the base (10).

Binary Number System (Base 2 Number System)

The base 2 number system is also known as the Binary number system wherein, only two binary digits exist, i.e., 0 and 1. Specifically, the usual base-2 is a radix of 2. The figures described under this system are known as binary numbers which are the combination of 0 and 1. For example, 110101 is a binary number.

Octal Number System (Base 8 Number System)

In the octal number system, the base is 8 and it uses numbers from 0 to 7 to represent numbers. Octal numbers are commonly used in computer applications. Converting an octal number to decimal is the same as decimal conversion and is explained below using an example.

Hexadecimal Number System (Base 16 Number System)

In the hexadecimal system, numbers are written or represented with base 16. In the hexadecimal system, the numbers are first represented just like in the decimal system, i.e. from 0 to 9. Then, the numbers are represented using the alphabet from A to F. The below-given table shows the representation of numbers in the hexadecimal number system.

Hexadecimal	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
Decimal	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15

About Tkinter

Tkinter is the standard GUI library for Python. Python when combined with Tkinter provides a fast and easy way to create GUI applications. Tkinter provides a powerful object-oriented interface to the Tk GUI toolkit.

It's built in library so no need to install. just need to import.

TKINTER WIDGETS

Tkinter provides various controls, such as buttons, labels and text boxes used in a GUI application. These controls are commonly called widgets.

There are currently 15 types of widgets in Tkinter

1	**Button:** The Button widget is used to display buttons in your application.
2	**Canvas:** The Canvas widget is used to draw shapes, such as lines, ovals, polygons and rectangles, in your application.
3	**Check-button:** **Check-button:**

	The Check-button widget is used to display a number of options as checkboxes. The user can select multiple options at a time.
4	**Entry:** The Entry widget is used to display a single-line text field for accepting values from a user.
5	**Frame:** The Frame widget is used as a container widget to organize other widgets.
6	**Label**: The Label widget is used to provide a single-line caption for other widgets. It can also contain images
7	**List-box:** The List-box widget is used to provide a list of options to a user.
8	**Menu-button:** The Menu-button widget is used to display menus in your application.
9	**Menu:** The Menu widget is used to provide various commands to a user. These commands are contained inside Menu-button.
10	**Message:** The Message widget is used to display multiline text fields for accepting values from a user.

11	**Radio-button:** The Radio-button widget is used to display a number of options as radio buttons. The user can select only one option at a time.
12	**Scale:**

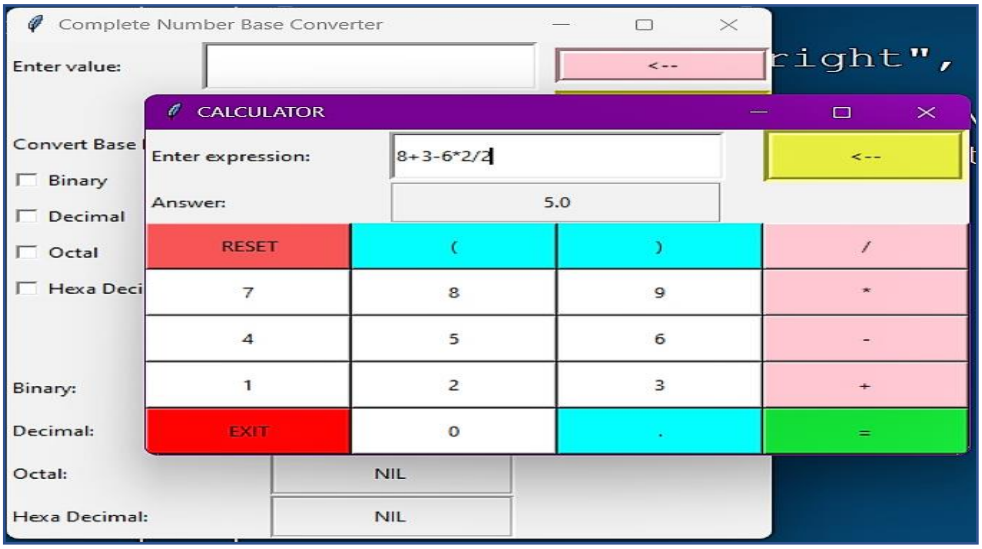
	The Scale widget is used to provide a slider widget.
13	**Scrollbar:** The Scrollbar widget is used to add scrolling capability to various widgets, such as list boxes.
14	**Text:** The Text widget is used to display text in multiple lines.
15	**Top-level:** The Top-level widget is used to provide a separate window container.
16	**Spin-box:** The Spin-box widget is a variant of the standard Tkinter Entry widget, which can be used to select from a fixed number of values.
17	**Paned-Window:** A Paned-Window is a container widget that may contain any number of panes, arranged horizontally or vertically.

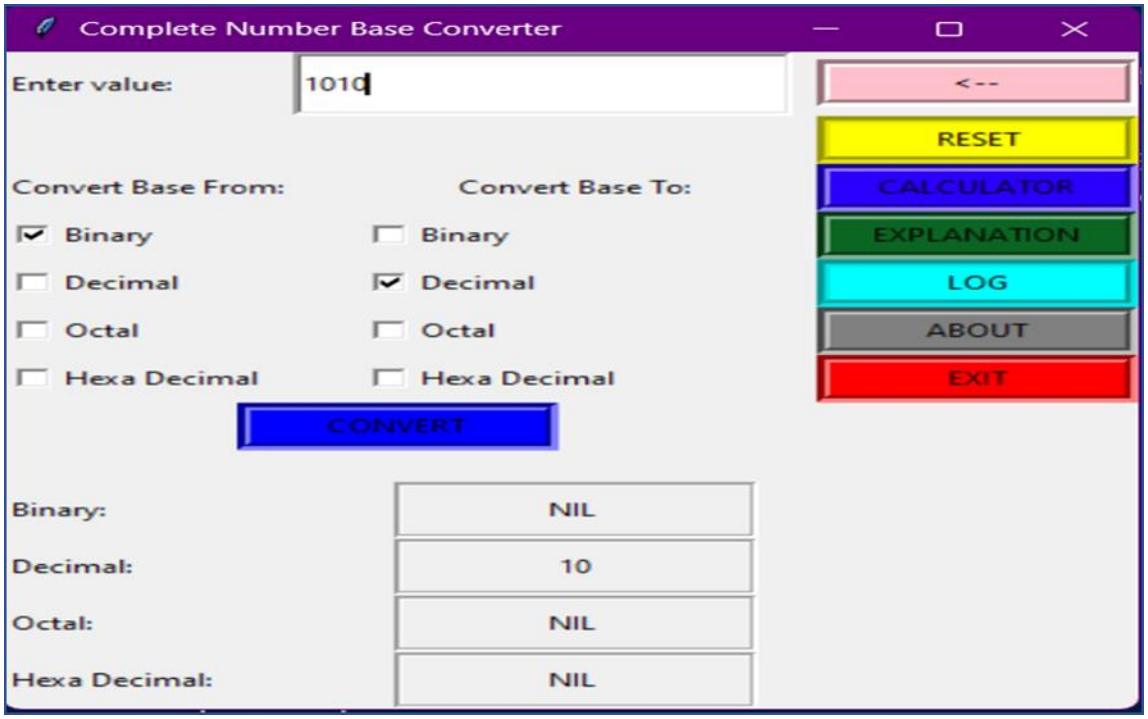
18	**Label-Frame**: A label-frame is a simple container widget. Its primary purpose is to act as a spacer or container for complex window layouts.
19	**Tk-Message-Box:** This module is used to display message boxes in your applications.

Standard attributes

Let us take a look at how some of their common attributes. such as sizes, colours and fonts are specified.

- **Dimensions**
- **Colours**
- **Fonts**
- **Anchors**
- **Relief styles**
- **Bitmaps**
- **Cursors**



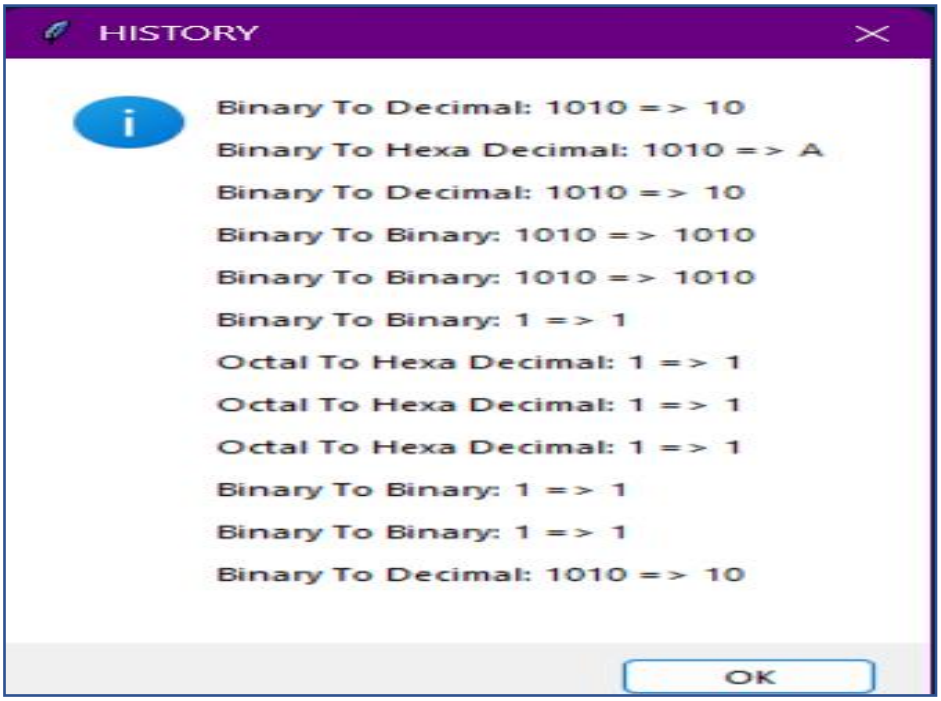


RESULT

We finally got the end product as a ‘Number Base Calculator’ that includes all the mentioned modules. We learnt how to make a GUI using Tkinter in Python and also to use various types of Tkinter widgets.

- The user will put the input and choose the number base system from which the user wants to change into which number system.
- The calculator then performs the operation and the user then can see the result.
- The backspace and reset button can be used by user for convenience.

- The normal calculator is also there to perform all the basic mathematical operations.
- The user can see some previously done calculation which is stored and can be seen by clicking on the ‘log’ button.



CONCLUSION

In this Python project, we have our main goal to developed a Number Base Calculator using Tkinter and various widgets of Tkinter. We have made this calculator with being able to do all number base calculation including binary, octal, decimal, hexadecimal. It basically covers up all the aspects of number base calculator.

We have made it pretty convenience for the user. We have also added the normal calculator in it for users to do all basic calculation. We have provided the backspace and reset function in it. We have added log function which is beneficial one as it saves the previous calculation records the user has done. We have made explanation function which explains how the calculation is done. An exit button function is also added to exit the calculator.

During the making of this Python project, we have learned about many new things. This project proves very beneficial to our increase in our knowledge and interest in python which will also provide benefit to our career. It also increases our creative way of things and was of great benefits to us.

This project has led us through the various phases of project development process and gave us real insight about python. The joy and work involved while making this project gave us the great real work benefits and experience. We finally are very thankful to lovely professional university to give us the golden opportunity to work on this project.