

SCIENTIFIC CALCULATOR

FINAL REPORT

Degree Of

Bachelor's Of Technology In

Computer Science And Engineering

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We would like to Thank Ms. Navpreet Rupal for assigning us with this project . Through this project we all were able to learn more about technical knowledge and have a hands-on practical experience with

python projects . Because of this project we all were able to learn more about Tkinter which is a library of Python written in Java . Through it we were able to learn how a basic app is created and how necessary and crucial technical knowledge is . We are really grateful to the faculty that has provided us with the necessary guidelines .

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INTRODUCTION

1.1 Introduction

This project is a scientific calculator which is used by mathematicians as well as students to perform difficult calculations . This calculator will help them to solve difficult questions using this calculator . The Calculator will help them to save their time by performing difficult questions quickly . This project is made in **Python (Tkinter)** which is used to make graphic user interface . Two major libraries are used such as Tkinter , Math and along with that PIL module which is used to print images on the GUI window.

1.2 Uses

By developing this Calculator , anyone can solve difficult trigonometric as well as basic mathematic problems . As the interface of the project is very simple and easy to use therefor can easily access the use of the project.

METHODOLOGY

2.1 Requirements

First step is gathering our requirements for this project . The functions and the modules are necessary for the development of this project.

In this step we will discuss the different functions used in the program and how they are working together to create such a user friendly interface .

The different types of functions used are :-

-
-

2.2 Functionality

Exit()

Click()

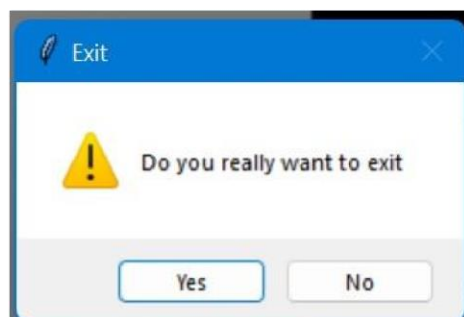
Exit Button is there in the calculator which is used to exit the applications. The exit button contains a command Exit() in which tkinter.messagebox.askquestion is used . In this command user will be asked if he/she really want to exit the app . If yes, then the

root.destroy function is called otherwise the user returns to the GUI window .

2.3 The following code is used to make the exit button :-

```
def exit():  
    x = tkinter.messagebox.askquestion("Exit","Do you really want to  
exit",icon="warning")  
    if x == "yes":  
        root.destroy()  
  
Button(root,text="Exit",fg="Green",bg="skyblue",command=exit).grid()
```

This kind of warning message will appear if the uses clicks on the exit button :



The Procedural programming is done in which different iterative statements are made like **nested ifelse** to use the **Math module** .

2.4 Code :

```
if value == 'C':  
    ex = ex[0:len(ex) - 1]  
print("hello")  
entryField.delete(0, END)  
entryField.insert(0, ex)  
return elif value == "CE":  
entryField.delete(0, "end") elif  
value ==  
'√':  
  
answer =  
math.sqrt(eval(ex))
```



```
elif value == 'π':  
    answer = math.pi  
  
elif value == 'Cosθ':  
    answer = math.cos(math.radians(eval(ex)))  
  
elif value == 'tanθ':  
    answer = math.tan(math.radians(eval(ex)))  
  
elif value == 'Sinθ':  
    answer = math.sin(math.radians(eval(ex)))  
  
elif value == '2π':  
    answer = 2 * math.pi  
  
elif value == 'Cosh':  
    answer = math.cosh(eval(ex))  
  
elif value == 'tanh':  
    answer = math.tanh(eval(ex))  
  
    answer = math.sinh(eval(ex))  
  
elif value == chr(8731):  
    answer = eval(ex) ** (1 / 3)  
  
elif value == 'x\u02b8': # 7**5  
    entryField.insert(END, '**')  
    return  
  
elif value == 'x\u00B3':  
    answer = eval(ex) ** 3
```

```
elif value == 'x\u00B2':  
    answer = eval(ex) ** 2  
  
elif value == 'ln':  
    answer = math.log2(eval(ex))  
  
elif value == 'deg':  
    answer = math.degrees(eval(ex))  
  
elif value == 'rad':  
    answer = math.radians(eval(ex))  
  
elif value == 'e':  
    answer = math.e  
  
elif value == 'log10':  
    answer = math.log10(eval(ex))  
  
elif value == 'X!':  
    answer = math.factorial(ex)  
  
elif value == chr(247):  
    entryField.insert(END, "/")  
    return  
  
elif value == '=':  
    answer = eval(ex)
```

OBJECTIVES

Most of us carry around a basic calculator with us at all times; otherwise known as our smartphone. But what if you are taking advanced math and science classes? Or if you work in an industry that

regularly uses complicated calculations to design or develop advanced concepts like engineering, surveying, medicine, or chemistry?

Scientific calculators perform the same functions as their standard electronic calculator counterparts, but they also have myriad other features available. There are three main categories of calculators on the market today: business, basic, and scientific. It's likely that you have already used a basic calculator in your high school math classes, and you may have even used a business or graphing calculator in an economics or business statistics course. The scientific calculator, however, is the only one that can handle certain functions in fields such as trigonometry, physics, chemistry, and engineering. A scientific calculator has additional features that allow you to work with exponents and logs, which require more memory in order to perform functions for the best results.

3.1 Basic functions: Calculate basic functions such as addition, subtraction, multiplication, and division. You should keep in mind that the subtraction sign (-) is different from a separate negative function. This can end up causing some confusion concerning negative and positive numbers when you start using your calculator at first because the signs look similar.

3.2 Trigonometric functions: Tangents are another concept you will have to learn in a trigonometry class, and this too involves finding unknown quantities. In geometry, you'll most likely encounter tangents when calculating perpendicular lines.

3.2 Sine functions: A sine function is used to find the measurement of a certain angle, especially when other sides or angles are unknown. You may also encounter the inverse sine, which is often used to find the hypotenuse of a triangle.

For those taking a trigonometry or calculus course, sine functions are a given. They also often pop up if your career path involves any sort of engineering or architectural field.

Similarly cosine, cot and cosecant have their own functions and meaning.

3.4 Scientific notation : A scientific calculator isn't just used for more complicated math problems. In fact, one of its best uses may be that it can calculate scientific notation. For numbers that can't be written in decimal point form because they are too large, a normal calculator won't be able to cover it.

You'll most likely use scientific notation if you plan to work in a field related to science, engineering, and mathematics, and you will definitely need a more complex calculator to handle your homework.

DESIGN

4.1 MODULES AND TOOLS

To design the scientific calculator our team is going to use various libraries of python . The libraries we are going the below mentioned libraries but the addition of more libraries can be there .

- Tkinter
- Math
- Web browser
- Message box

4.2 PYTHON 3.10

Python is a high level, general purpose language. Python is dynamically typed and garbage-collected. It supports multiple programming paradigms, including structured (particularly procedural), object- oriented and functional programming. Python is so versatile language as you can make web frameworks , GUI (graphic user interface) , games and also you can use it write backend and manage database with it .

4.3 Tkinter

Tkinter is the standard GUI library for Python. Python when combined with Tkinter provides a fast and easy way to create GUI

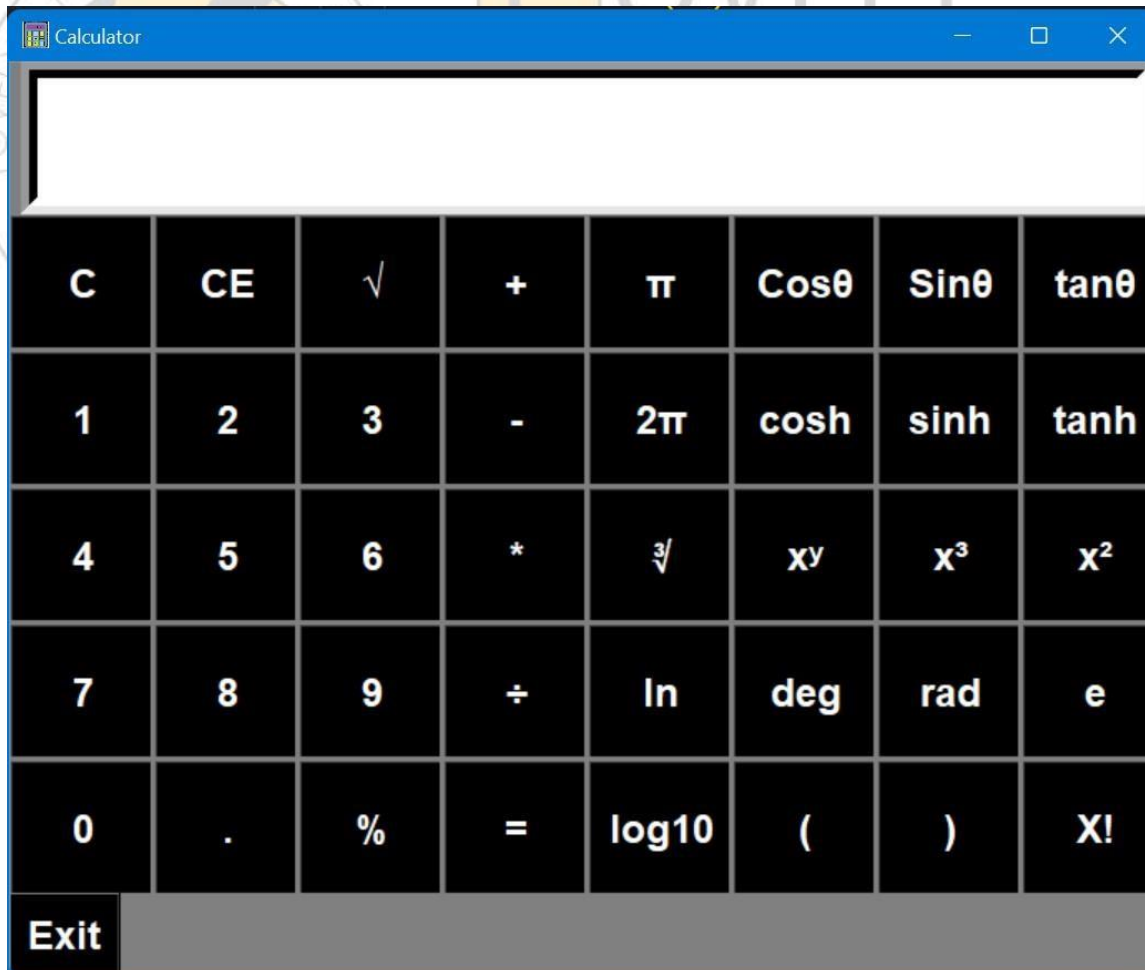
applications. Tkinter is easy to use . It has various widgets such as entry, frame, button etc. Following steps should be taken to use Tkinter .

✚ Import Tkinter

✚ Create GUI main window

✚ End the main window ✚ Write logics in the window

4.4 Interface



Various kinds of methods are used within this project . As it is clearly visible that the window has an icon along with the title . The icon is made in the paint and **wm_icon.bitmap** is used to put the icon . The icon should be in the **ICO** format to avoid error . Also there are a lot of symbols which a keyboard do not have such as cube root , square root etc. for that **Unicode** is used

There are a lot of button which has different functions such as **C** button which is used to del a character and **CE** button is used to clear

4.5 Methods

Used:

--	--

Entry widget is used here which takes the input from the button given by the user and then with the help of math module the calculations are made . Also user can perform calculations which include trigonometric functions .

Buttons are created using for loop and each button has same background color and font which is done by using following attributes.

4.6 Common attributes used:

Fg is a common attribute to color the text as in the project the foreground of the text is white.

Bg is a common attribute called as background , already clear from the name it is used for giving color to the background of the text . In the project the bg or background of the text in button is black . and the color of the window is grey.

Command is used various times . It is used in the buttons . The functions are called using this command attribute .

Font it is used to beautify as well as magnify the text . In the project the font used is arial

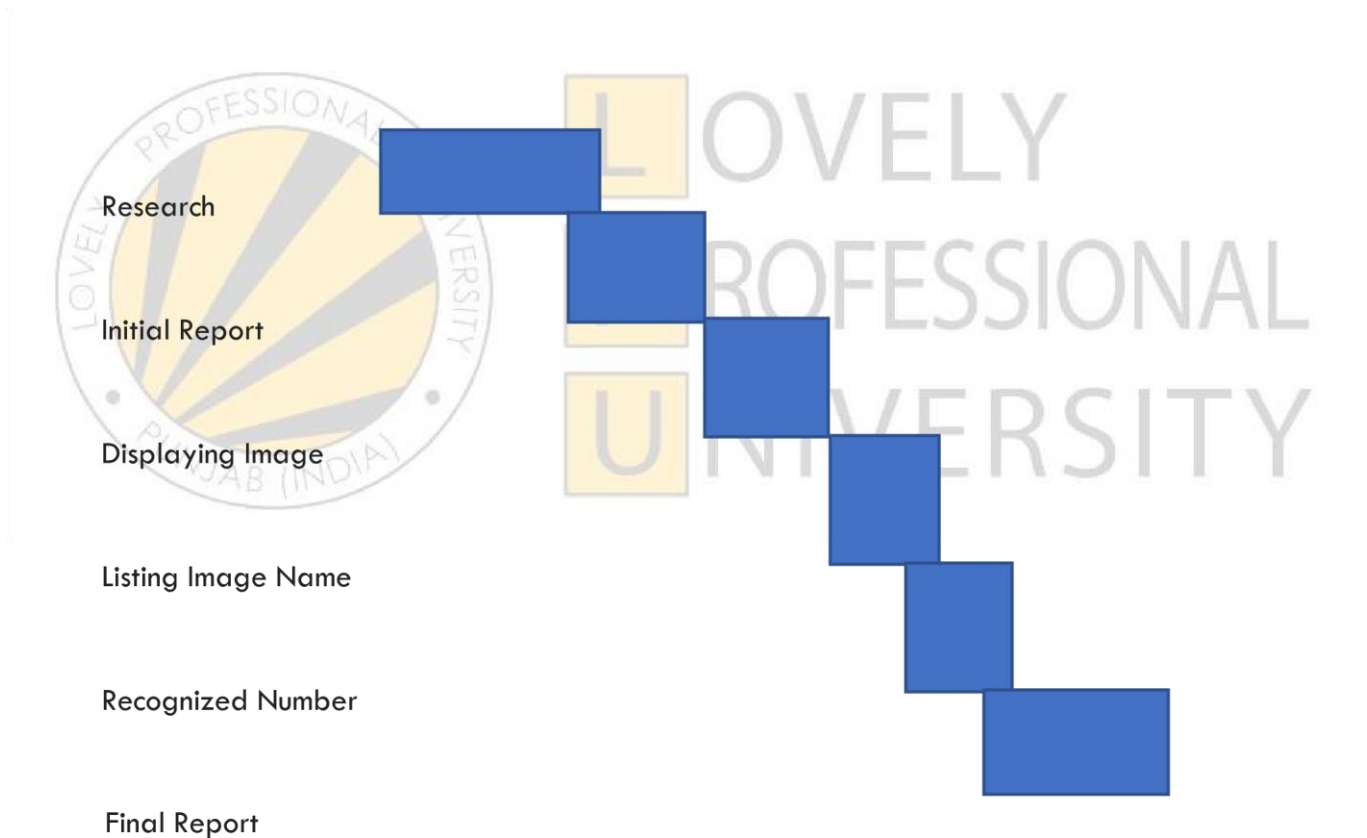
CONCLUSION

In this project we have developed a **Scientific Calculator** which can be used by various people like layman person, an engineering student or a school student. Not only it can be used to perform all basic mathematic problems but also it can also be used to perform logarithmic as well as trigonometric problems. This project taught us the value of programming language. It showed us how basic applications that we run in our mobile phones such as calendars, alarm clock etc. are made. With this project we learnt the various modules of tkinter (toolkit of python). Various attributes are used to make the project which we learnt during the course of this project.

GANTT CHART

Each module is complete within the given data as mentioned below.

29/9 30/9 15/10 20/10 27/10 3/11 9 /11



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