

**PROFESSIONAL TRAINING REPORT**  
**at**  
**Sathyabama Institute of Science and Technology**  
**(DEEMED TO BE UNIVERSITY)**

Submitted in partial fulfilment of the requirements for the award of  
Bachelor of Technology Degree in

**INFORMATION TECHNOLOGY**

By

**BHARATHI R**  
**(REG NO: 37120015)**



**DEPARTMENT OF INFORMATION TECHNOLOGY**  
**SCHOOL OF COMPUTING**  
**SATHYABAMA INSTITUTE OF SCIENCE AND TECHNOLOGY**  
**(DEEMED TO BE UNIVERSITY)**

**JEPPIAAR NAGAR, RAJIV GANDHI SALAI,**

**CHENNAI –600119, TAMILNADU.**

**AUGUST 2020**



# **SATHYABAMA**

**INSTITUTE OF SCIENCE AND TECHNOLOGY**

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Jeppiaar Nagar, Rajiv Gandhi Salai, Chennai - 600 119.

Phone: 044 - 2450 3150 / 51 / 52 / 54 / 55 Fax: 044 - 2450 2344

[www.sathyabama.ac.in](http://www.sathyabama.ac.in)



## **SCHOOL OF COMPUTING**

### **BONAFIDE CERTIFICATE**

This is to certify that this Professional Training Report is the bonafide work of **BHARATHI.R (Reg.No.37120015)** who underwent the professional training in "**SCIENTIFIC CALCULATOR APP**" under our supervision from June 2020 to August 2020.

**Internal Guide**

**Dr. S.REVATHY. M.E., Ph.D.,**

**Head of the Department**

**Dr .R.SUBHASHINI. M.E., Ph.D.,**

---

**Submitted for Viva voce Examination held on \_\_\_\_\_**

**Internal Examiner**

**External Examiner**

### **DECLARATION**

I, **BHARATHI.R (Reg.No:37120015)** hereby declare that the Professional Training Report on “**SCIENTIFIC CALCULATOR APP**” done by me under The Guidance of guide **Dr. S. REVATHY. M.E., Ph.D.**, Dept of IT at Sathyabama Institute of Science and Technology is submitted in partial fulfilment of the requirements for the award of Bachelor of Technology degree in Information Technology.

**DATE:**

**PLACE: CHENNAI**

**SIGNATURE OF THE CANDIDATE**

## ACKNOWLEDGEMENT

I am pleased to acknowledge my sincere thanks to the Board of Management of **SATHYABAMA INSTITUTE OF SCIENCE AND TECHNOLOGY** for their kind encouragement in doing this project and for completing it successfully. I am grateful to them.

I convey my thanks to **Dr. T.Sasikala M.E., Ph.D, Dean**, School of Computing, **Dr.SUBHASHINI M.E., Ph.D.**, Head of the Department of Information and Technology for providing me necessary support and details at the right time during the progressive reviews.

I would like to express my sincere and deep sense of gratitude to my Project **Dr .S.REVATHY, M.E., Ph.D.**, for his valuable guidance, suggestions and constant encouragement paved the way for the successful completion of my project work.

I wish to express my thanks to all Teaching and Non-teaching staff members of the **Department of Information Technology** who were helpful in many ways for the completion of the project.

# TRAINING CERTIFICATE



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Choose your language  
Prioritisation & Impact Assessment

A handwritten signature in blue ink, appearing to read "Tom Brunskill".

**Tom Brunskill**  
CEO, Co-Founder of  
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Enrolment Verification Code RpfQ@n8l8ghWw2AS | User Verification Code W3TLC7EWg7X7yAww3 | Issued by InsideSherpa

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## **ABSTRACT**

This work was centred on the Design and implementation of a simple scientific calculator for education organization. The study traced the calculator system as a tool to completely change mathematical knowledge and sophisticated problems solving strategies had advanced the field of simulated engines in mathematics. This project work also focused principally on numbers and arithmetic operation. This researcher investigated the manual system in detail with a view to finding out the need to automate the system. Interestingly, the end result of a simple scientific calculator system was its ability to process numbers and operators, and provides a useful result. Therefore, this project will help immensely in the following way. Easy calculating of tedious mathematical problems, easy to retrieve errors and it will also be of good assistance to any researcher on these topics.

# TABLE OF CONTENTS

| CHAPTER  | TITLE                                            | PAGE NO |
|----------|--------------------------------------------------|---------|
|          | ABSTRACT                                         | 7       |
|          | LIST OF FIGURES                                  | 10      |
|          | LIST OF TABLES                                   | 11      |
|          | LIST OF ABBREVIATIONS                            | 12      |
| <b>1</b> | <b>INTRODUCTION</b>                              |         |
|          | 1.1 OVERVIEW OF CALCULATOR                       | 13      |
|          | 1.2 IMPORTANCE OF SCIENTIFIC CALCULATOR          | 13      |
| <b>2</b> | <b>AIM AND SCOPE OF THE SYSTEM</b>               |         |
|          | 2.1 OVERVIEW OF THE PROJECT                      | 15      |
|          | 2.2 ADVANTAGES                                   | 15      |
|          | 2.3 LITERATURE REVIEW                            | 15      |
|          | 2.3.1 OVERVIEW OF LITERATURE REVIEW              | 15      |
|          | 2.3.2 PURPOSE OF LITERATURE REVIEW               | 15      |
|          | 2.3.3 LITERATURE REVIEW ON SCIENTIFIC CALCULATOR | 16      |
| <b>3</b> | <b>EXPERIMENTAL METHODS</b>                      |         |
|          | 3.1 HARDWARE REQUIREMENT                         | 17      |
|          | 3.2 SOFTWARE REQUIREMENT                         | 17      |
|          | 3.3 LANGUAGES USED                               | 17      |
|          | 3.3.1 XML                                        | 17      |
|          | 3.3.2 JAVA                                       | 18      |
|          | 3.4 METHODOLOGY                                  | 20      |
|          | 3.4.1 ARITHMETIC OPERATIONS                      | 20      |
|          | 3.4.2 TRIGONOMETRIC OPERATIONS                   | 21      |
|          | 3.4.3 OTHER OPERATIONS                           | 21      |
| <b>4</b> | <b>RESULTS AND PERFORMANCE ANALYSIS</b>          |         |
|          | 4.1 RESULT                                       | 23      |
|          | 4.2 PERFORMANCE ANALYSIS                         | 27      |
| <b>5</b> | <b>SUMMARY AND CONCLUSION</b>                    |         |
|          | 5.1 SUMMARY                                      | 28      |
|          | 5.2 CONCLUSION                                   | 28      |
|          | <b>APPENDIX</b>                                  |         |
|          | A.SOURCE CODE                                    | 30      |
|          | <b>REFERENCES</b>                                | 29      |

## LIST OF FIGURES

| FIGURE NO | FIGURE NAME         | PAGE NO |
|-----------|---------------------|---------|
| 3.1       | XML Processor       | 18      |
| 3.2       | Architecture of JVM | 20      |
| 4.1       | App icon in mobile  | 23      |
| 4.2       | User Interface      | 24      |
| 4.3       | Tan Input           | 25      |
| 4.4       | Tan Output          | 25      |
| 4.5       | Factorial Input     | 26      |
| 4.6       | Factorial Output    | 26      |
| 4.7       | Square root Input   | 27      |
| 4.8       | Square root Output  | 27      |

## LIST OF TABLES

| TABLE NO | TABLE NAME              | PAGE NO |
|----------|-------------------------|---------|
| 3.1      | Arithmetic Operation    | 21      |
| 3.2      | Trigonometric Operation | 21      |
| 3.3      | Other Operation         | 22      |

## LIST OF ABBREVIATIONS

|      |                              |
|------|------------------------------|
| JVM  | - Java Virtual Machine       |
| RAM  | - Random Access Memory       |
| OS   | - Operating System           |
| JDK  | - Java Development Kit       |
| AVD  | - Android Virtual device     |
| SDK  | - Software Development Kit   |
| XML  | - eXtensible Markup Language |
| HTML | - Hypertext Markup Language  |

# CHAPTER 1

## INTRODUCTION

### 1.1 OVERVIEW OF CALCULATOR

A calculator is a device that performs arithmetic operations on numbers. The simplest calculators can do only addition, subtraction, multiplication, and division. Internally, some calculators actually perform all of these functions by repeated processes of addition.

A calculator is a machine which allows people to do math operations more easily. For example, most calculators will add, subtract, multiply, and divide. Some also do square roots, and more complex calculators can help with calculus and draw function graphs. Calculators are found everywhere.

In addition to general purpose calculators, there are those designed for specific markets. For example, there are scientific calculators which include trigonometric and statistical calculations. Some calculators even have the ability to do computer algebra. Graphing calculators can be used to graph functions defined on the real line, or higher-dimensional Euclidean space. As of 2016, basic calculators cost little, but scientific and graphing models tend to cost more.

### 1.2 IMPORTANCE OF SCIENTIFIC CALCULATOR

A scientific calculator is a type of electronic calculator, usually but not always handheld, designed to calculate problems in science, engineering, and mathematics. They have completely replaced slide rules in traditional applications, and are widely used in both education and professional settings.

Basic calculators are great for solving simple equations with one or two variables, but scientific calculators allow you to input a problem that has an order of operations. If you enter one of these equations into a

regular calculator, it won't be able to correctly determine which numbers should be addressed first.

Calculators are simply a tool students use to help solve problems. Since they eliminate tedious computations and algebraic manipulations that discourage many students, calculators allow more students to solve problems and appreciate the power and value of mathematics in the world today.

## **CHAPTER 2**

### **AIM AND SCOPE OF THE SYSTEM**

#### **2.1 OVERVIEW OF PROJECT**

A Scientific Calculator is useful for situations where we need to calculate some complex things like logs or trigonometry. In such cases, the normal calculator won't be useful for us. So therefore, we are here to develop a Scientific Calculator.

This calculator will have the following

- ❑ First, it will have a screen to display the user inputs and by default, it will display a '0'.
- ❑ Then there will be another screen that shows the result and the operator..
- ❑ Then we will have the keys that will have numbers as well as the operators on it.
- ❑ In order to use the calculator, we need to put the input and select the operation then the result will be generated.

#### **2.2 ADVANTAGES**

- ❖ Simple interface
- ❖ User friendly
- ❖ Fast results

#### **2.3 LITERATURE REVIEW**

##### **2.3.1 OVERVIEW OF LITERATURE REVIEW**

A literature review synthesizes scholarly literature on a topic by evaluating a selection of sources. It describes common themes, but must also demonstrate the author's understanding of the literature through critical analysis, as well as identify gaps and/or controversies in the research.

##### **2.3.2 PURPOSE OF LITERATURE REVIEW**

- To help **define** the focus of your research topic.
- To **identify** research already conducted in your field of interest, find gaps in existing scholarship, and avoid repetition of previous research.
- To **become familiar** with significant earlier research and with current progress and/or controversy in your field of interest.
- To **diagnose** the strengths and weaknesses in the works pertaining to your field of interest.

### 2.3.3 LITERATURE REVIEW ON SCIENTIFIC CALCULATOR

Xin (2009) points out that the use of calculators has a technological contribution to make to learning because it makes learning and teaching attractive, helpful, and proficient for the future (Xin, 2009). Investigation into this topic has helped the researcher to identify the aspects that were covered and their findings, to link previous findings with the researcher's own findings, and to provide well-informed recommendations.

Unfortunately, the researcher could not find recent research that measures the effectiveness of calculators since most of the investigation into this topic was carried out at the time that calculators were introduced, which was about fifteen to twenty years ago. However, most of the recent research is qualitative, basing arguments on what has already been found, and mostly intended to change teachers' and parents' attitudes towards calculators. However, previous research studies were not based on the South African context. However, this research differs in that it investigates the effectiveness of a calculator with regard to teaching and learning fractions at Grade 8 level (13-15 year olds) in South Africa. Additionally, the researcher embraced the advantages and disadvantages that previous research gathered in terms of the use of calculators in mathematics education, its established advantages as noted by (Hembree & Dessart, 1986), and the myths (Pomeranz, 1997) associated with its use, thereby considering the full use of calculators in the classroom.

## CHAPTER 3

### EXPERIMENTAL METHODS

#### 3.1 HARDWARE REQUIREMENTS

- ❖ Laptop with 4GB RAM
- ❖ Mouse
- ❖ Keyboard
- ❖ 4G Wi-Fi connection

#### 3.2 SOFTWARE REQUIREMENTS

- ❖ Windows 10 OS
- ❖ JDK 1.7
- ❖ Android Studio
- ❖ Gradle Scripts
- ❖ AVD and SDK tools

#### 3.3 LANGUAGES USED

- ❖ XML
- ❖ Java

##### 3.3.1 XML

- ❖ XML stands for extensible Mark-up Language
- ❖ XML is a mark-up language much like HTML

- ❖ XML was designed to store and transport data
- ❖ XML was designed to be self-descriptive

Syntax of an XML program:

```

<root>
  <child>
    <subchild>.....</subchild>

  </child>

</root>

```

The following figure shows block diagram of the XML processor

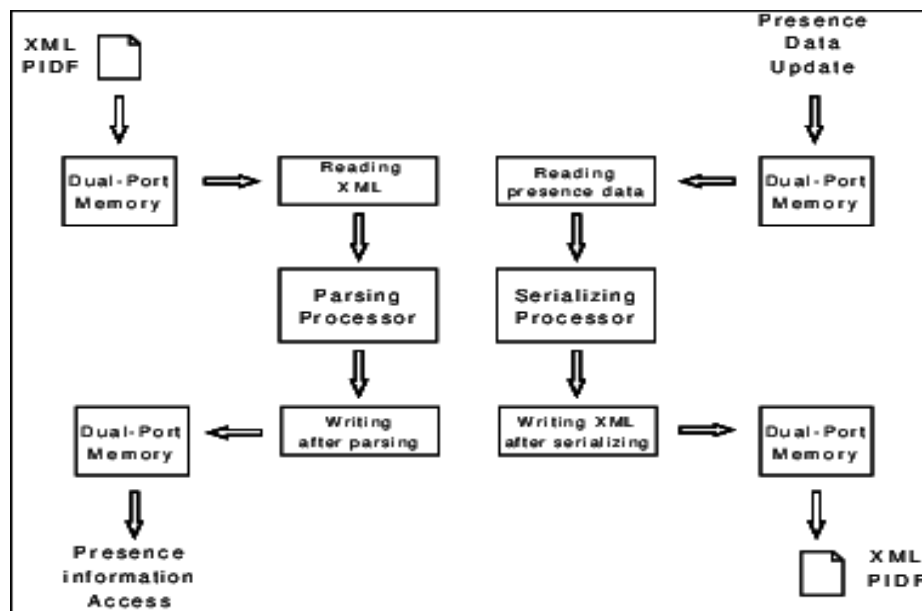


Figure 3.1: XML processor

### 3.3.2 JAVA

JAVA was developed by Sun Microsystems Inc in 1991, later acquired by Oracle Corporation. It was developed by James Gosling and Patrick Naughton. It is a simple programming language. Writing, compiling and

debugging a program is easy in java. It helps to create modular programs and reusable code.

## Java Virtual Machine (JVM)

This is generally referred as JVM. Before, we discuss about JVM lets see the phases of program execution. Phases are as follows: we write the program, then we compile the program and at last we run the program.

- 1) Writing of the program is of course done by java programmer like you and me.
- 2) Compilation of program is done by javac compiler, javac is the primary java compiler included in java development kit (JDK). It takes java program as input and generates java bytecode as output.
- 3) In third phase, JVM executes the bytecode generated by compiler. This is called program run phase.

So, now that we understood that the primary function of JVM is to execute the bytecode produced by compiler. Each operating system has different JVM, however the output they produce after execution of bytecode is same across all operating systems. That is why we call java as platform independent language.

The following figure shows the architecture of JVM

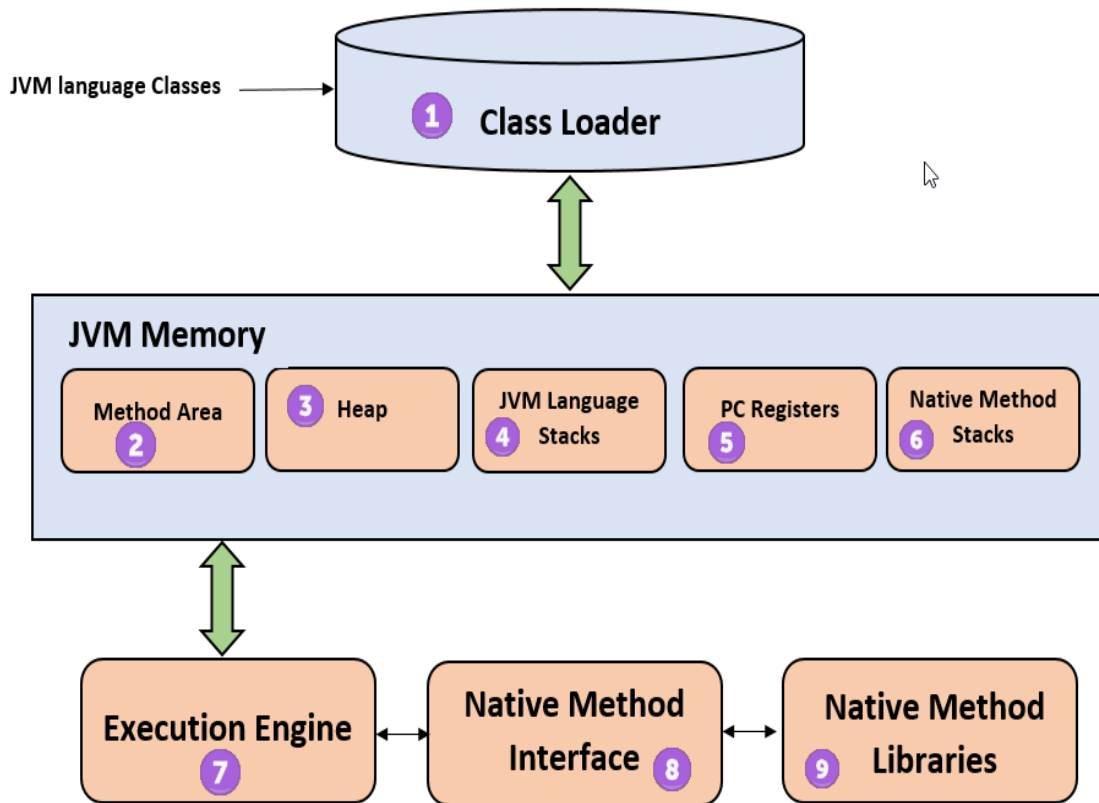


Figure 3.2 Architecture of JVM

### 3.4 METHODOLOGY:

The methodology of the project starts with creating the user interface layout .This layouts are created in the xml files and the initialization of all the methods, functions are done in the java file.

The main operations available in the app are:

- ❖ Arithmetic operations
- ❖ Trigonometric operations
- ❖ Other operations

#### 3.4.1 ARITHMETIC OPERATIONS

The arithmetic operations available in the app are: addition (+), subtraction(-), multiplication(\*) and division(/).

Table 3.1 Arithmetic Operation

| Operation      | Symbol | Input 1 | Input 2 | Output |
|----------------|--------|---------|---------|--------|
| Addition       | +      | 2       | 3       | 5      |
| Subtraction    | -      | 8       | 2       | 6      |
| Multiplication | *      | 3       | 10      | 30     |
| Division       | /      | 10      | 2       | 5      |

### 3.4.2 TRIGONOMETRIC OPERATIONS

The trigonometric operations available in the app are: sin, cos and tan.

Table 3.2 Trigonometric operations

| Operation | Input | Output |
|-----------|-------|--------|
| sin       | 0     | 0      |
| cos       | 0     | 1      |
| tan       | 45    | 1      |

### 3.4.3 OTHER OPERATIONS

The other operations available in the app are: log , ln , square root, power , factorial.

Table 3.3 Other operations

| Operation   | Input 1 | Input 2 | Output         |
|-------------|---------|---------|----------------|
| Log         | 10      | -       | 1              |
| ln          | 16      | -       | 2.772588722239 |
| Power       | 2       | 5       | 32             |
| Square root | 36      | -       | 6              |
| Factorial   | 5       | -       | 120            |

## CHAPTER 4

### RESULT AND PERFORMANCE ANALYSIS

#### 4.1 RESULT

The result of the project is found to be good as expected. All the functions are working well without any errors or problems. The simple user interface gives users to work out problems faster and get the results easily. The following figure shows how the app looks on a mobile.

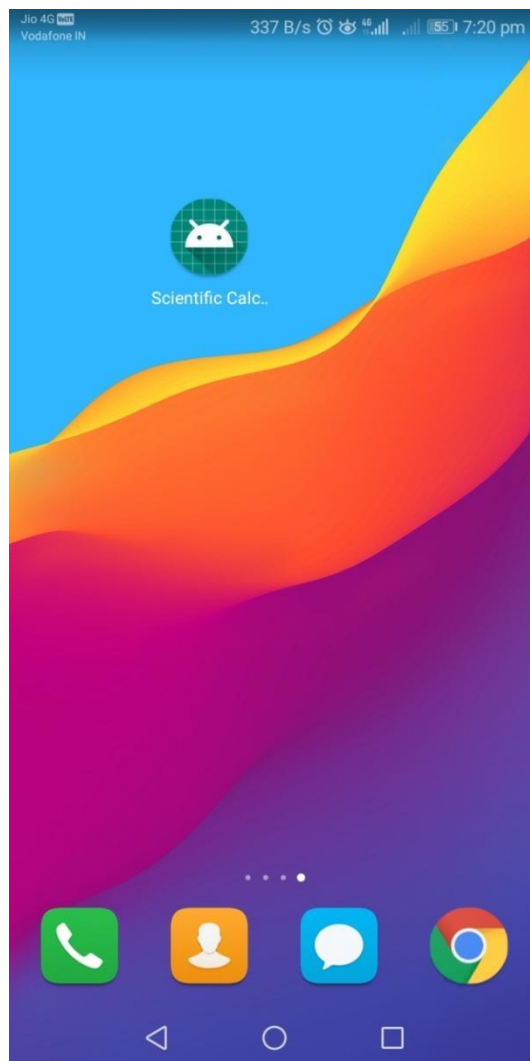


Fig 4.1 App icon in mobile

The following figure shows how the user interface looks like



Fig 4.2 User Interface

The following figures show tan value of a number



Fig4.3 Tan input



Fig 4.4 Tan output

The following figure shows factorial of a number



Fig 4.5 Factorial input



Fig 4.6 Factorial output

The following figures show the square root of a number.



Fig 4.7 Square root input



Fig 4.8 Square root output

## 4.2 PERFORMANCE ANALYSIS

The app "Scientific Calculator" works well in all the aspects and produces correct results for all types of operations like addition, subtraction, multiplication, division, sin, cos, tan, square root, factorial, etc. The app also shows errors for any invalid inputs. So our app is working smoothly as expected.

## **CHAPTER 5**

### **SUMMARY AND CONCLUSION**

#### **5.1SUMMARY**

I succeeded in achieving the goals that I set out for my project, namely to make a useful app “Scientific Calculator: using Java and XML. The language java provides a great platform to develop android apps. The android app for scientific calculation will be useful for many. And also it was achieved successfully.

#### **5.2 CONCLUSION**

Technology is introducing new innovations day by day, thus reducing the time required to do things. My project is a first step to do simple calculations as well as some complex scientific calculations. As this will be available as software, no need for physical calculators at all. So I believe that this became a good and simple project.

## . REFERENCES

- [1] .B. DeRenzi, "Improving Community Health Worker Performance through Automated SMS," 5th ICTD, 2012, pp. 25-34.
- [2].J. Chen, L. Subramanian, E. Brewer, "SMS-Based Web Search for Low-end Mobile Devices," 16th MobiCom, 2010, pp. 125-135.
- [3]. Kuldeep Yadav, "SMSAssassin: Crowd sourcing Driven Mobile-based System for SMS Spam Filtering," Workshop Hotmobile, 2011, pp. 1-6.
- [4].M. Densmore, "Experiences with Bulk SMS for Health Financing in AUganda," ACM CHI, 2012, pp. 383-398.
- [5].M. Teófilo, "MobileDeck: Turning SMS into a Rich User Experience," 6th MobiSys, No. 33, 2009

[1]<https://www.codecademy.com/>

[2]<https://www.github.com/>

[3]<https://www.codepen.com/>

[4]<https://www.w3schools.com/>

[1]<https://www.theclassroom.com/>

## APPENDIX

### SOURCE CODE:

#### CODES IN XML FILES

//activity\_main.xml

```
<?xml version="1.0" encoding="utf-8"?>
```

```
<LinearLayout xmlns:android="http://schemas.android.com/apk/res/android"
```

```
    xmlns:app="http://schemas.android.com/apk/res-auto"
```

```
    xmlns:tools="http://schemas.android.com/tools"
```

```
    android:layout_width="match_parent"
```

```
    android:layout_height="match_parent"
```

```
    android:orientation="vertical"
```

```
    android:weightSum="9"
```

```
    tools:context=".MainActivity">
```

```
<TextView
```

```
    android:id="@+id/input_user"
```

```
    android:layout_width="match_parent"
```

```
    android:layout_height="0dp"
```

```
    android:layout_weight="2"
```

```
    android:background="@drawable/bgcolor2"
```

android:gravity="center|end"

android:hint="0"

android:maxLength="14"

android:padding="10dp"

android:textColor="#000000"

android:textColorHint="#000000"

android:textSize="50sp" />

<TextView

android:id="@+id/sign\_user"

android:layout\_width="match\_parent"

android:layout\_height="0dp"

android:layout\_weight="1"

android:gravity="center|end"

android:padding="10dp"

android:textColor="#000000"

android:textColorHint="#000000"

android:background="@drawable/bgcolor"

android:textSize="32sp" />

<LinearLayout

android:layout\_width="match\_parent"

android:layout\_height="0dp"

android:layout\_weight="1"

android:background="@drawable/background\_btn1"

android:orientation="horizontal"

android:weightSum="5">

<Button

style="@style/Widget.AppCompat.Button.Borderless"

android:layout\_width="0dp"

android:layout\_height="match\_parent"

android:layout\_weight="1"

android:onClick="btn\_log"

android:text="log"

android:textAllCaps="false"

android:textColor="@color/WhiteText"

android:textSize="30sp" />

<Button

style="@style/Widget.AppCompat.Button.Borderless"

android:layout\_width="0dp"

android:layout\_height="match\_parent"

android:layout\_weight="1"

android:onClick="btn\_In"

android:text="In"

android:textAllCaps="false"

android:background="@drawable/background\_btn1"

android:textColor="@color/WhiteText"

android:textSize="30sp" />

<Button

style="@style/Widget.AppCompat.Button.Borderless"

android:layout\_width="0dp"

android:layout\_height="match\_parent"

android:layout\_weight="1"

android:onClick="btn\_power"

```
android:background="@drawable/background_btn1"
```

```
android:text="x"
```

```
android:textAllCaps="false"
```

```
android:textColor="@color/WhiteText"
```

```
android:textSize="30sp" />
```

```
<Button
```

```
style="@style/Widget.AppCompat.Button.Borderless"
```

```
android:layout_width="0dp"
```

```
android:layout_height="match_parent"
```

```
android:layout_weight="1"
```

```
android:onClick="btn_root"
```

```
android:text="√"
```

```
android:background="@drawable/background_btn1"
```

```
android:textAllCaps="false"
```

```
android:textColor="@color/WhiteText"
```

```
android:textSize="30sp" />
```

```
<Button
```

style="@style/Widget.AppCompat.Button.Borderless"

android:layout\_width="0dp"

android:layout\_height="match\_parent"

android:layout\_weight="1"

android:onClick="btn\_factorial"

android:background="@drawable/background\_btn1"

android:text="!"

android:textAllCaps="false"

android:textColor="@color/WhiteText"

android:textSize="30sp" />

</LinearLayout>

<LinearLayout

android:layout\_width="match\_parent"

android:layout\_height="0dp"

android:layout\_weight="1"

android:background="@drawable/background\_btn1"

android:gravity="center"

android:orientation="horizontal"

android:weightSum="5">

<Button

style="@style/Widget.AppCompat.Button.Borderless"

android:layout\_width="0dp"

android:layout\_height="match\_parent"

android:layout\_weight="2"

android:onClick="btn\_sin"

android:text="sin"

android:textAllCaps="false"

android:background="@drawable/background\_btn1"

android:textColor="@color/WhiteText"

android:textSize="30sp" />

<Button

style="@style/Widget.AppCompat.Button.Borderless"

```
android:layout_width="0dp"

android:layout_height="match_parent"

android:layout_weight="1"

android:onClick="btn_cos"

android:text="cos"

android:textAllCaps="false"

android:textColor="@color/WhiteText"

android:background="@drawable/background_btn1"

android:textSize="30sp" />
```

<Button

```
style="@style/Widget.AppCompat.Button.Borderless"

android:layout_width="0dp"

android:layout_height="match_parent"

android:layout_weight="2"

android:onClick="btn_tan"

android:text="tan"

android:textAllCaps="false"

android:background="@drawable/background_btn1"
```

```
android:textColor="@color/WhiteText"
```

```
android:textSize="30sp" />
```

```
</LinearLayout>
```

```
<LinearLayout
```

```
    android:layout_width="match_parent"
```

```
    android:layout_height="0dp"
```

```
    android:layout_weight="1"
```

```
    android:orientation="horizontal"
```

```
    android:weightSum="5">
```

```
<Button
```

```
    style="@style/Widget.AppCompat.Button.Borderless"
```

```
    android:layout_width="0dp"
```

```
    android:layout_height="match_parent"
```

```
    android:layout_weight="1"
```

```
    android:background="@drawable/background_btn1"
```

```
android:onClick="btn_7"

android:text="7"

android:textColor="@color/WhiteText"

android:textSize="32sp" />
```

```
<Button
```

```
style="@style/Widget.AppCompat.Button.Borderless"

android:layout_width="0dp"

android:layout_height="match_parent"

android:layout_weight="1"

android:background="@drawable/background_btn1"

android:onClick="btn_8"

android:text="8"

android:textColor="@color/WhiteText"

android:textSize="32sp" />
```

```
<Button
```

```
style="@style/Widget.AppCompat.Button.Borderless"

android:layout_width="0dp"
```

```
android:layout_height="match_parent"

android:layout_weight="1"

android:background="@drawable/background_btn1"

android:onClick="btn_9"

android:text="9"

android:textColor="@color/WhiteText"

android:textSize="32sp" />
```

```
<Button
```

```
style="@style/Widget.AppCompat.Button.Borderless"

android:layout_width="0dp"

android:layout_height="match_parent"

android:layout_weight="1"

android:background="@drawable/background_btn2"

android:onClick="btn_add"

android:text="+"

android:textColor="@color/WhiteText"

android:textSize="32sp" />
```

```
<ImageButton  
  
    style="@style/Widget.AppCompat.Button.Borderless"  
  
    android:layout_width="0dp"  
  
    android:layout_height="match_parent"  
  
    android:layout_weight="1"  
  
    android:background="@drawable/background_btn2"  
  
    android:onClick="btn_delete"  
  
    android:src="@drawable/ic_backspace_black_24dp" />
```

```
</LinearLayout>
```

```
<LinearLayout  
  
    android:layout_width="match_parent"  
  
    android:layout_height="0dp"  
  
    android:layout_weight="1"  
  
    android:orientation="horizontal"  
  
    android:weightSum="5">
```

```
<Button
```

```
style="@style/Widget.AppCompat.Button.Borderless"

android:layout_width="0dp"

android:layout_height="match_parent"

android:layout_weight="1"

android:background="@drawable/background_btn1"

android:onClick="btn_4"

android:text="4"

android:textColor="@color/WhiteText"

android:textSize="32sp" />
```

<Button

```
style="@style/Widget.AppCompat.Button.Borderless"

android:layout_width="0dp"

android:layout_height="match_parent"

android:layout_weight="1"

android:background="@drawable/background_btn1"

android:onClick="btn_5"

android:text="5"

android:textColor="@color/WhiteText"
```

```
android:textSize="32sp" />
```

```
<Button
```

```
style="@style/Widget.AppCompat.Button.Borderless"
```

```
android:layout_width="0dp"
```

```
android:layout_height="match_parent"
```

```
android:layout_weight="1"
```

```
android:background="@drawable/background_btn1"
```

```
android:onClick="btn_6"
```

```
android:text="6"
```

```
android:textColor="@color/WhiteText"
```

```
android:textSize="32sp" />
```

```
<Button
```

```
style="@style/Widget.AppCompat.Button.Borderless"
```

```
android:layout_width="0dp"
```

```
android:layout_height="match_parent"
```

```
android:layout_weight="1"
```

```
android:background="@drawable/background_btn2"
```

```
android:onClick="btn_subtract"

android:text="-"

android:textColor="@color/WhiteText"

android:textSize="32sp" />
```

```
<Button
```

```
style="@style/Widget.AppCompat.Button.Borderless"

android:layout_width="0dp"

android:layout_height="match_parent"

android:layout_weight="1"

android:background="@drawable/background_btn2"

android:onClick="btn_clear"

android:text="C"

android:textColor="@color/WhiteText"

android:textSize="30sp" />
```

```
</LinearLayout>
```

```
<LinearLayout
```

android:layout\_width="match\_parent"

android:layout\_height="0dp"

android:layout\_weight="2"

android:orientation="horizontal"

android:weightSum="5">

<LinearLayout

android:layout\_width="0dp"

android:layout\_height="match\_parent"

android:layout\_weight="4"

android:orientation="vertical"

android:weightSum="2">

<LinearLayout

android:layout\_width="match\_parent"

android:layout\_height="0dp"

android:layout\_weight="1"

android:orientation="horizontal"

android:weightSum="4">

<Button

style="@style/Widget.AppCompat.Button.Borderless"

android:layout\_width="0dp"

android:layout\_height="match\_parent"

android:layout\_weight="1"

android:background="@drawable/background\_btn1"

android:onClick="btn\_1"

android:text="1"

android:textColor="@color/WhiteText"

android:textSize="32sp" />

<Button

style="@style/Widget.AppCompat.Button.Borderless"

android:layout\_width="0dp"

android:layout\_height="match\_parent"

android:layout\_weight="1"

android:background="@drawable/background\_btn1"

android:onClick="btn\_2"

android:text="2"

android:textColor="@color/WhiteText"

android:textSize="32sp" />

<Button

style="@style/Widget.AppCompat.Button.Borderless"

android:layout\_width="0dp"

android:layout\_height="match\_parent"

android:layout\_weight="1"

android:background="@drawable/background\_btn1"

android:onClick="btn\_3"

android:text="3"

android:textColor="@color/WhiteText"

android:textSize="32sp" />

<Button

style="@style/Widget.AppCompat.Button.Borderless"

android:layout\_width="0dp"

android:layout\_height="match\_parent"

android:layout\_weight="1"

android:background="@drawable/background\_btn2"

android:onClick="btn\_multiply"

android:text="x"

android:textColor="@color/WhiteText"

android:textSize="32sp" />

</LinearLayout>

<LinearLayout

android:layout\_width="match\_parent"

android:layout\_height="0dp"

android:layout\_weight="1"

android:orientation="horizontal"

android:weightSum="4">

<View

android:layout\_width="0dp"

android:layout\_height="match\_parent"

android:layout\_weight="0"

android:background="@drawable/background\_btn1" />

<Button

style="@style/Widget.AppCompat.Button.Borderless"

android:layout\_width="0dp"

android:layout\_height="match\_parent"

android:layout\_weight="2"

android:background="@drawable/background\_btn1"

android:onClick="btn\_0"

android:text="0"

android:textColor="@color/WhiteText"

android:textSize="32sp" />

<Button

style="@style/Widget.AppCompat.Button.Borderless"

android:layout\_width="0dp"

android:layout\_height="match\_parent"

android:layout\_weight="1"

```
android:background="@drawable/background_btn1"
```

```
android:onClick="btn_dot"
```

```
android:text="."
```

```
android:textColor="@color/WhiteText"
```

```
android:textSize="32sp" />
```

```
<Button
```

```
style="@style/Widget.AppCompat.Button.Borderless"
```

```
android:layout_width="0dp"
```

```
android:layout_height="match_parent"
```

```
android:layout_weight="1"
```

```
android:background="@drawable/background_btn2"
```

```
android:onClick="btn_divide"
```

```
android:text="÷"
```

```
android:textColor="@color/WhiteText"
```

```
android:textSize="32sp" />
```

```
</LinearLayout>
```

```
</LinearLayout>
```

```
<LinearLayout
```

```
    android:layout_width="0dp"
```

```
    android:layout_height="match_parent"
```

```
    android:layout_weight="1"
```

```
    android:orientation="vertical"
```

```
    android:weightSum="1">
```

```
<Button
```

```
    style="@style/Widget.AppCompat.Button.Borderless"
```

```
    android:layout_width="match_parent"
```

```
    android:layout_height="0dp"
```

```
    android:layout_weight="1"
```

```
    android:background="@drawable/background_btn2"
```

```
    android:onClick="btn_equal"
```

```
    android:text=""
```

```
    android:textColor="@color/WhiteText"
```

```
    android:textSize="32sp" />
```

```
</LinearLayout>
```

```
</LinearLayout>
```

```
</LinearLayout>
```

```
//border.xml
```

```
<?xml version="1.0" encoding="utf-8"?>
```

```
<LinearLayout xmlns:android="http://schemas.android.com/apk/res/android"
```

```
    android:layout_width="match_parent"
```

```
    android:layout_height="match_parent"
```

```
    android:shape="rectangle">
```

```
</LinearLayout>
```

CODES IN JAVA:

```
//MainActivity.java
```

```
package com.dataflair.scientificcalc;
```

```
import androidx.appcompat.app.AppCompatActivity;
```

```
import android.annotation.SuppressLint;
```

```
import android.os.Bundle;
```

```
import android.view.View;
```

```

import android.widget.TextView;

public class MainActivity extends AppCompatActivity {

    TextView user_input, sign_Box;

    Double num1, num2, answer;
    String sign, val_1, val_2;
    boolean has_Dot;

    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_main);

        user_input = (TextView) findViewById(R.id.input_user);
        sign_Box = (TextView) findViewById(R.id.sign_user);

        has_Dot = false;

    }

    @SuppressWarnings("SetTextI18n")
    public void btn_0(View view) {
        user_input.setText(user_input.getText() + "0");
    }

    @SuppressWarnings("SetTextI18n")
    public void btn_1(View view) {
        user_input.setText(user_input.getText() + "1");
    }
}

```

```
@SuppressWarnings("SetTextI18n")
public void btn_2(View view) {
    user_input.setText(user_input.getText() + "2");
}
```

```
@SuppressWarnings("SetTextI18n")
public void btn_3(View view) {
    user_input.setText(user_input.getText() + "3");
}
```

```
@SuppressWarnings("SetTextI18n")
public void btn_4(View view) {
    user_input.setText(user_input.getText() + "4");
}
```

```
@SuppressWarnings("SetTextI18n")
public void btn_5(View view) {
    user_input.setText(user_input.getText() + "5");
}
```

```
@SuppressWarnings("SetTextI18n")
public void btn_6(View view) {
    user_input.setText(user_input.getText() + "6");
}
```

```
@SuppressWarnings("SetTextI18n")
public void btn_7(View view) {
    user_input.setText(user_input.getText() + "7");
}
```

```

@SuppressLint("SetTextI18n")
public void btn_8(View view) {
    user_input.setText(user_input.getText() + "8");
}

```

```

@SuppressLint("SetTextI18n")
public void btn_9(View view) {
    user_input.setText(user_input.getText() + "9");
}

```

```

@SuppressLint("SetTextI18n")
public void btn_dot(View view) {
    if (!has_Dot) {
        if (user_input.getText().equals("")) {

            user_input.setText("0.");
        } else {

            user_input.setText(user_input.getText() + ".");
        }

        has_Dot = true;
    }
}

```

```

public void btn_add(View view) {
    sign = "+";
    val_1 = user_input.getText().toString();
    user_input.setText(null);
    sign_Box.setText("+");
}

```

```

        has_Dot = false;
    }

    public void btn_subtract(View view) {
        sign = "-";
        val_1 = user_input.getText().toString();
        user_input.setText(null);
        sign_Box.setText("-");
        has_Dot = false;
    }

    public void btn_multiply(View view) {
        sign = "*";
        val_1 = user_input.getText().toString();
        user_input.setText(null);
        sign_Box.setText("x");
        has_Dot = false;
    }

    public void btn_divide(View view) {
        sign = "/";
        val_1 = user_input.getText().toString();
        user_input.setText(null);
        sign_Box.setText("÷");
        has_Dot = false;
    }

    @SuppressWarnings("SetTextI18n")
    public void btn_log(View view) {
        sign = "log";
        user_input.setText(null);
    }

```

```

        sign_Box.setText("log");
        has_Dot = false;
    }

```

```

@SuppressLint("SetTextI18n")
public void btn_ln(View view) {
    sign = "ln";
    user_input.setText(null);
    sign_Box.setText("ln");
    has_Dot = false;
}

```

```

public void btn_power(View view) {
    sign = "power";
    val_1 = user_input.getText().toString();
    user_input.setText(null);
    has_Dot = false;
    sign_Box.setText("x^n");
}

```

```

public void btn_factorial(View view) {
    sign = "factorial";
    user_input.setText(null);
    has_Dot = false;
    sign_Box.setText("!");
}

```

```

@SuppressLint("SetTextI18n")
public void btn_sin(View view) {
    sign = "sin";
    user_input.setText(null);
}

```

```

        has_Dot = false;
        sign_Box.setText("sin");
    }

    @SuppressWarnings("SetTextI18n")
    public void btn_cos(View view) {
        sign = "cos";
        user_input.setText(null);
        has_Dot = false;
        sign_Box.setText("cos");
    }

    @SuppressWarnings("SetTextI18n")
    public void btn_tan(View view) {
        sign = "tan";
        user_input.setText(null);
        has_Dot = false;
        sign_Box.setText("tan");
    }

    public void btn_root(View view) {
        sign = "root";
        user_input.setText(null);
        has_Dot = false;
        sign_Box.setText("√");
    }

    @SuppressWarnings("SetTextI18n")
    public void btn_equal(View view) {
        if (sign == null) {
            sign_Box.setText("Error!");
        }
    }

```

```

    } else if (user_input.getText().equals("")) {
        sign_Box.setText("Error!");
    } else if ((sign.equals("+") || sign.equals("-") || sign.equals("*") ||
sign.equals("/")) && val_1.equals("")) {
        sign_Box.setText("Error!");
    } else {
        switch (sign) {
            default:
                break;
            case "log":
                val_1 = user_input.getText().toString();
                num1 = Double.parseDouble(val_1);
                user_input.setText(Math.log10(num1) + "");
                sign = null;
                sign_Box.setText(null);
                break;
            case "ln":
                val_1 = user_input.getText().toString();
                num1 = Double.parseDouble(val_1);
                user_input.setText(Math.log(num1) + "");
                sign = null;
                sign_Box.setText(null);
                break;
            case "power":
                num1 = Double.parseDouble((val_1));
                val_2 = user_input.getText().toString();
                num2 = Double.parseDouble(val_2);
                user_input.setText(Math.pow(num1, num2) + "");
                sign = null;
                sign_Box.setText(null);
                break;
        }
    }

```

```

case "root":
    val_1 = user_input.getText().toString();
    num1 = Double.parseDouble((val_1));
    user_input.setText(Math.sqrt(num1) + "");
    sign = null;
    sign_Box.setText(null);
    break;

case "factorial":
    val_1 = user_input.getText().toString();
    num1 = Double.parseDouble((val_1));
    int i = Integer.parseInt(val_1) - 1;

    while (i > 0) {
        num1 = num1 * i;
        i--;
    }

    user_input.setText(num1 + "");
    sign = null;
    sign_Box.setText(null);
    break;

case "sin":
    val_1 = user_input.getText().toString();
    num1 = Double.parseDouble((val_1));
    user_input.setText(Math.sin(num1) + "");
    sign = null;
    sign_Box.setText(null);
    break;

case "cos":
    val_1 = user_input.getText().toString();
    num1 = Double.parseDouble((val_1));

```

```

        user_input.setText(Math.cos(num1) + "");
        sign = null;
        sign_Box.setText(null);
        break;
    case "tan":
        val_1 = user_input.getText().toString();
        num1 = Double.parseDouble((val_1));
        user_input.setText(Math.tan(num1) + "");
        sign = null;
        sign_Box.setText(null);
        break;
    case "+":
        val_2 = user_input.getText().toString();
        num1 = Double.parseDouble(val_1);
        num2 = Double.parseDouble(val_2);
        answer = num1 + num2;
        user_input.setText(answer + "");
        sign = null;
        sign_Box.setText(null);
        break;
    case "-":
        val_2 = user_input.getText().toString();
        num1 = Double.parseDouble(val_1);
        num2 = Double.parseDouble(val_2);
        answer = num1 - num2;
        user_input.setText(answer + "");
        sign = null;
        sign_Box.setText(null);
        break;
    case "*":
        val_2 = user_input.getText().toString();

```

```

        num1 = Double.parseDouble(val_1);
        num2 = Double.parseDouble(val_2);
        answer = num1 * num2;
        user_input.setText(answer + "");
        sign = null;
        sign_Box.setText(null);
        break;
    case "/":
        val_2 = user_input.getText().toString();
        num1 = Double.parseDouble(val_1);
        num2 = Double.parseDouble(val_2);
        answer = num1 / num2;
        user_input.setText(answer + "");
        sign = null;
        sign_Box.setText(null);
        break;
    }

}

}
}

```

```

public void btn_delete(View view) {
    if (user_input.getText().equals("")) {
        user_input.setText(null);
    } else {
        int len = user_input.getText().length();
        String s = user_input.getText().toString();
        if (s.charAt(len - 1) == '.') {
            has_Dot = false;

```

```
        user_input.setText(user_input.getText().subSequence(0,  
user_input.getText().length() - 1));
```

```
    } else {  
        user_input.setText(user_input.getText().subSequence(0,  
user_input.getText().length() - 1));  
    }  
}  
}
```

```
public void btn_clear(View view) {
```

```
    user_input.setText(null);  
    sign_Box.setText(null);  
    val_1 = null;  
    val_2 = null;  
    sign = null;  
    has_Dot = false;  
}
```

```
}
```