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GENESIS –Applied SDLC And Testing Mini-Project

Scientific Calculator

Team04

Scientific Calculator



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| **Ver. Rel. No.** | **Release Date** | **Prepared. By** | **Reviewed By** | **To be Approved** | **Remarks/Revision Details** |
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**Details**

SCIENTIFIC CALCULATOR

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# Activity 5 – Mini-Project Report

# Requirements

## State of the Art

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.

In certain context such as higher education, scientific calculators have been superseded by graphing calculators, which offer a superset of scientific calculator functionality along with the ability to graph input data and write and store programs for the device. There is also some overlap with the financial calculator market.

### Aging

* The first scientific calculator that included all of the basic ideas above was the programmable Hewlett-Packard HP-9100A,[[1]](https://en.wikipedia.org/wiki/Scientific_calculator#cite_note-1) released in 1968.
* The HP-35, introduced on February 1, 1972, was Hewlett-Packard's first pocket calculator and the world's first handheld scientific calculator.
* Texas Instruments (TI), after the production of several units with scientific notation, introduced a handheld scientific calculator on January 15, 1974, in the form of the SR-50.
* Casio, Canon and Sharp have also been major players, with Casio's fx series (beginning with the Casio fx-1 in 1972[[5]](https://en.wikipedia.org/wiki/Scientific_calculator#cite_note-5)) being a very common brand, used particularly in schools. Casio is also a major player in the graphing calculator market, and was the first company to produce one (Casio fx-7000G).

### Costing

Most of the online calculators are free of cost. Physical calculators cost vary from approximately 500 to 12000 Indian rupees.

## What Why Where When How

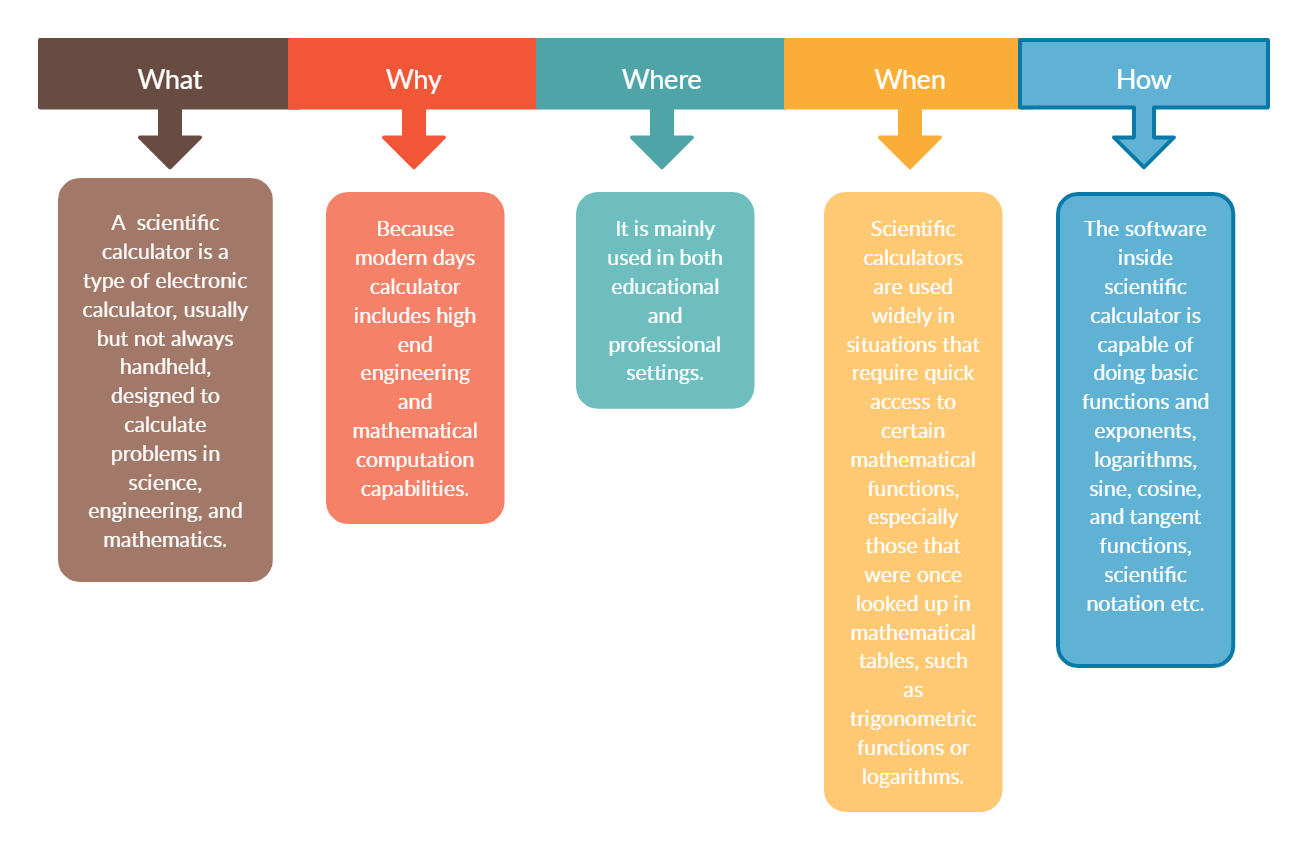


Figure 1 What Why Where When How

## My Product

### High Level Requirements

Table 1 High Level Requirements

|  |  |
| --- | --- |
| Requirement ID | Description |
| HLR10 | The program shall be able to compute basic trigonometric functions. |
| HLR20 | The program shall be able to compute hyperbolic functions. |
| HLR30 | The program shall be able to compute temperature conversions. |
| HLR40 | The program shall be able to compute arithmetic functions. |

### Low Level Requirements

Table 2Low Level Requirements

|  |  |
| --- | --- |
| Requirement ID | Description |
| LLR11 | The program shall be able to compute the sine function. |
| LLR12 | The program shall be able to compute the cosine function. |
| LLR13 | The program shall be able to compute the tangent function. |
| LLR21 | The program shall be able to compute the hyperbolic sine function. |
| LLR22 | The program shall be able to compute the hyperbolic cosine. |
| LLR23 | The program shall be able to compute the hyperbolic tangent function. |
| LLR31 | The program shall be able to perform conversion between Celsius to Fahrenheit. |
| LLR32 | The program shall be able to perform conversion between Celsius to Kelvin. |
| LLR33 | The program shall be able to perform conversion between Fahrenheit to Celsius. |
| LLR34 | The program shall be able to perform conversion between Fahrenheit to Kelvin. |
| LLR35 | The program shall be able to perform conversion between Kelvin to Celsius. |
| LLR36 | The program shall be able to perform conversion between Kelvin to Fahrenheit. |
| LLR41 | The program shall be able to perform the add operation. |
| LLR42 | The program shall be able to perform the subtract operation. |
| LLR43 | The program shall be able to perform the multiply operation. |
| LLR44 | The program shall be able to perform the divide operation. |
| LLR45 | The program shall be able to perform the square root operation. |
| LLR46 | The program shall be able to perform the modulus operation. |
| LLR47 | The program shall be able to perform the factorial operation. |
| LLR48 | The program shall be able to perform the exponent operation. |

## SWOT Analysis

Table 3 SWOT Analysis

|  |  |
| --- | --- |
| **Strength**   * Can solve complicated problems easily * It gives more accurate results | **Weakness**   * Can’t calculate complex values * Fixed Accuracy |
| **Opportunities**   * It can be integrated with smart devices | **Threats**   * Calculators integrated with smart devices poses some amount of security threads |

# Design

## Behavioral Diagrams

### C:\Users\TRAINING\AppData\Local\Microsoft\Windows\INetCache\Content.Word\Use Case.jpgHigh Level Use Case Diagram

Figure Behavioral High-Level Use Case Diagram

### Low Level Activity Diagram

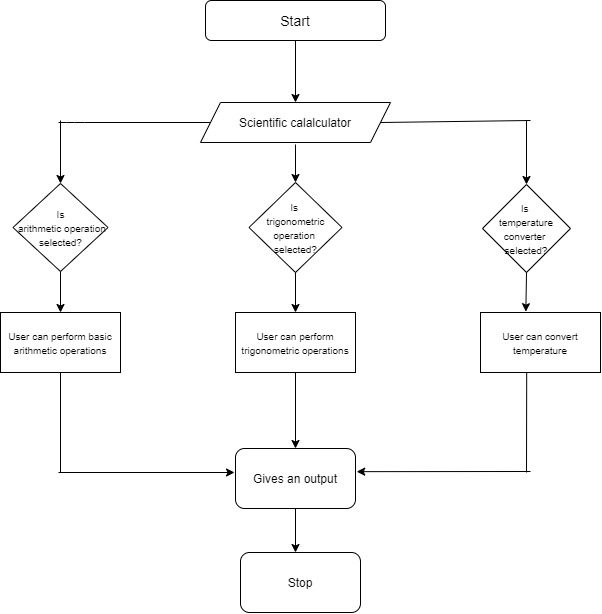


Figure Behavioral Low-Level Activity Diagram

### Low Level Sequence Diagram

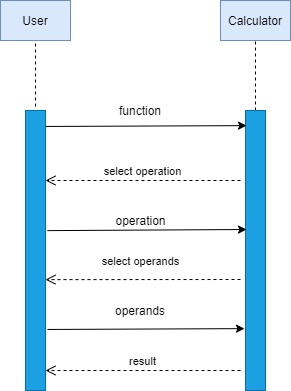


Figure Behavioral Low-Level Sequence Diagram

## Structural Diagram

### High Level Component Diagram

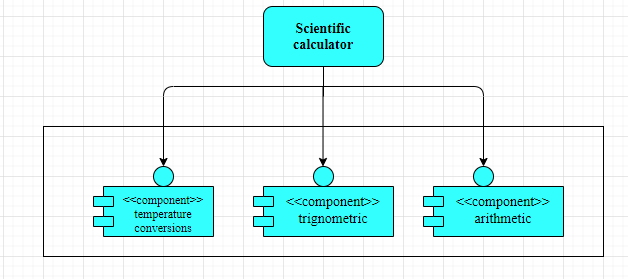


Figure Structural High-Level Component Diagram

### Low Level Deployment Diagram

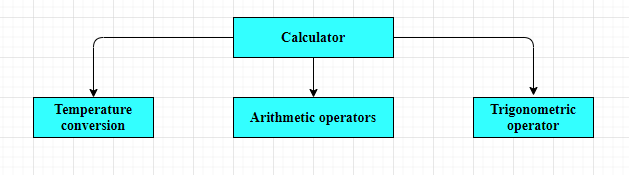


Figure Structural Low-Level Deployment Diagram

### Low Level Class Diagram

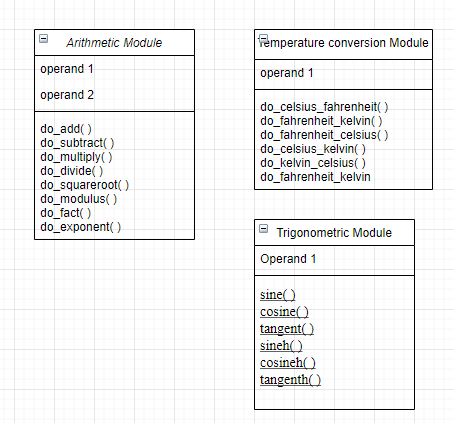


Figure Structural Low-Level Class Diagram

# Test Plan

## High Level Test Plan

Table 4 High Level Test Plan

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Test Case ID | Test Scenario | Test Steps | Test Data | Expected Results | Actual Results |
| HLTP10 | Test whether the trigonometric functions are working correctly. | 1. Enter the inputs to test the sine, cosine and tangent functions. | 1. Sin90 2. Cos90 3. Tan90 | 1. 1 2. 0 3. 1 |  |
| HLTP20 | Test whether the hyperbolic functions are working correctly. | 1. Enter the inputs to test the sinh, cosh, tanh functions. | 1. Sinh0 2. Cosh0 3. Tanh0 | 1. 0 2. 0 3. 0 |  |
| HLTP30 | Test whether the temperature conversion functions are working correctly | 1. Enter the input to test the celsius\_fahrenheit,fahrenheit\_kelvin,fahrenheit\_celsius,celsius\_kelvin,kelvin\_celsius,fahrenheit\_kelvin functions | 1. celsius\_fahrenheit(100)  2. fahrenheit\_kelvin(100)  3. fahrenheit\_celsius(100)  4. celsius\_kelvin(100)  5. kelvin\_celsius(100)  6. fahrenheit\_kelvin(100) | 1. 212 2. -279 3. 37.7 4. 373 5. -173 6. 310 |  |
| HLTP40 | Test whether the arithmetic operations are working correctly | Enter the input to test add, subtract, multiply, divide, square root, modulus, factorial, exponent functions. | 1. add(5,7) 2. subtract (5,2) 3. multiply(10,10) 4. divide(10,2) 5. square root(100) 6. modulus(5,2) 7. factorial(5) 8. 8. exponent(1) | 1. 12 2. 3 3. 100 4. 5 5. 10 6. 1 7. 120 8. 2.7 |  |

## Low Level Test Plan

Table 5 Low Level Test Plan

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Test Case ID | Test Scenario | Test Steps | Test Data | Expected Results | Actual Results |
| LLTP11 | Test whether the sine function is working correctly. | 1. Enter the input for sine function. | 1. 90 2. 0 | 1. 1 2. 0 |  |
| LLTP12 | Test whether the cosine function is working correctly. | 1. Enter the input for cosine function. | 1. 0 2. 90 | 1. 1 2. 0 |  |
| LLTP13 | Test whether the tangent function is working correctly. | 1. Enter the input for tangent function. | 1. 90 2. 45 | 1. 1 2. 1 |  |
| LLTP21 | Test whether the hyperbolic sine function is working correctly. | 1. Enter the input for hyperbolic sine function. | 1. 0 2. 7 | 1. 0 2. 548.316123 |  |
| LLTP22 | Test whether the hyperbolic cosine function is working correctly. | 1. Enter the input for hyperbolic cosine function. | 1. 0 2. 1 | 1. 0 2. 1.54308063 |  |
| LLR23 | Test whether the hyperbolic tangent function is working correctly. | 1. Enter the input for hyperbolic tangent function. | 1. 0 2. 2 | 1. 0 2. 0.96402758 |  |

# CI / CD

## GitHub Dashboard

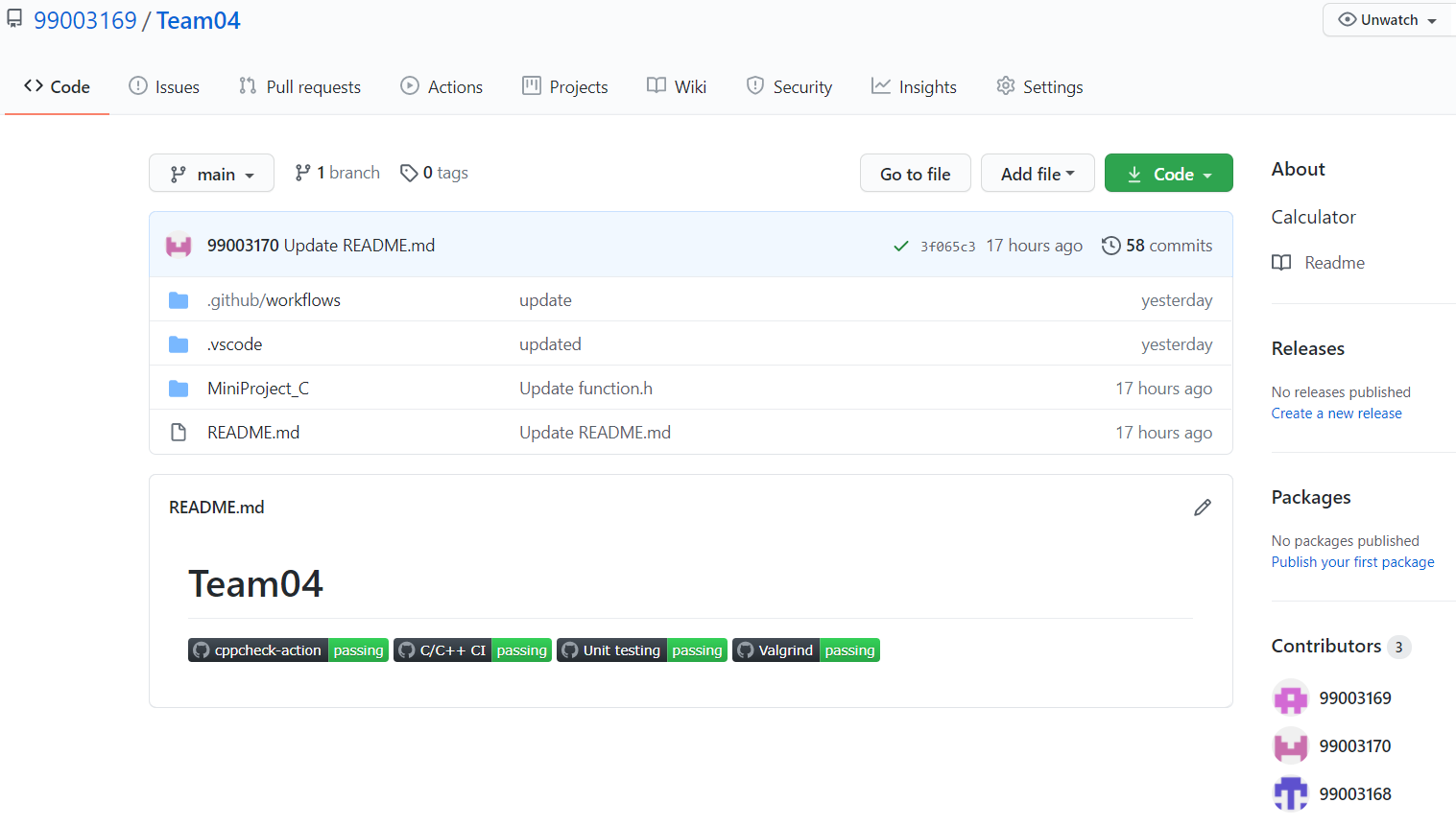


Figure GitHub Dashboard

## GitHub Link

[99003169/Team04: Calculator (github.com)](https://github.com/99003169/Team04)

# Reference

* [Calculator - Wikipedia](https://en.wikipedia.org/wiki/Calculator)