

# GENESIS - Learning Outcome & Mini-project Summary Report



LTTTS  
GLOBAL  
ENGINEERING  
ACADEMY



*L&T Technology Services*



## Details

Ver. Rel. No.	Release Date	Prepared. By	Reviewed By	To be Approved	Remarks/Revision Details
1.0	07/12/20	Sowjanya Sree		Dr. Prithvi Shekhar Pagala	
2.0	07/12/20	Chandra Mounika			
3.0	07/12/20	Mayur Vinod Ghole			

## Contents

### CONTENTS

#### MINIPROJECT -5 [TEAM]

INTRODUCTION & REQUIREMENTS.....	4
4W1H.....	6
SWOT ANALYSIS.....	7
DESIGN.....	8
Testplan.....	11
Git Link.....	12
Git Dashboard.....	12
References.....	15

## TEAM ACTIVITY – SIMPLE CALCULATOR

### Using Agile

#### Introduction

A calculator is a mobile app that performs arithmetic operations on numbers. The simplest calculators can do only addition, subtraction, multiplication, and division. More sophisticated calculators can handle exponential operations, roots, trigonometric functions, and hyperbolic functions. Internally, some calculators perform these functions by repeated processes of addition. Portable, battery-powered calculators are popular with engineers and engineering students. The calculator we have designed will have

- Simple Calculations like addition, subtraction, multiplication, division and modulo division.
- Scientific Operations like nth power of a number, square root of a given number, factorial of a number and multiplicative inverse of a number.

#### Theme

Calculation

#### Epic1

Simple Calculation

##### User Stories1:

- As an accountant.
- I want to add 2 numbers.
- I want to see the result with less time.

##### Test Case:

- Given 2 numbers 3 and 5.
- When I add them.
- Result should be 8 with no time.

##### User Stories2:

- As a primary school teacher.
- I want to teach students about basic addition, subtraction, multiplication ,division, power ,modulo ,square root, factorial, inverse, currency, length, time.
- I want to get the results in less time.

##### Epic2:

Easy Set up and usages.

##### User Stories:

- As a Student.
- I want to reset the calculator
- So that I can start fresh.

**Test Case1:**

- Given I am in the middle of an operation.
- When I press CE (clear everything) key.
- Then the operation should be cancelled.
- And the display should show 0 show that it will be ready for next operation.

**Test Case2:**

- Given that the display status bar on the display shows 'M'.
- When I press CE key.
- Then the memory should get cleared and it should not display 'M'.
- And the display should show '0' for further operations

**Using V Model****Ageing**

Time	Gradation
Before	Analog-User had to interact more
Now	Scientific and digital
Future	Voice enabled input

**Costing**

Type	Cost
Standard	Rs. 250/-
Digital	Rs. 450/-
Scientific	Rs. 890/-

**Requirements:****High Level Requirements:**

ID	Description
HL_01	The calculator has the following keys: 0..9, ., +, -, *, /, ±, =, C, CE
HL_02	Calculator should display correct output
HL_03	The calculator is developed using standard C++ language and should run on all machines supporting g++ compiler.

**Low Level Requirements:**

ID	Description
LL_01	If the calculations are if not possible the calculator must display information helping the user to resolve the issue
LL_02	On encountering divide by 0 operation and operations on imaginary numbers calculator should display error message
LL_03	Should exit when the user tries to enter the choice more than the Specific choice given.

**4W1H:****What:**

- A scientific calculator is a type of electronic calculator, usually but not always handheld, designed to calculate problems in science, engineering, and mathematics.

**Why:**

- Because Modern days calculator includes high end engineering and mathematical computation capabilities.

**Where:**

- It is mainly used in educational and professional settings.

**When:**

- Scientific calculators are used widely in situations that require quick access to certain mathematical functions especially those that were once looked up in mathematical tables such as trigonometric functions or logarithms.

**How:**

- The software inside scientific calculator is capable of doing basic functions of arithmetic operations, logarithms, currency, inverse, length, modulo, power and time.

**SWOT Analysis**

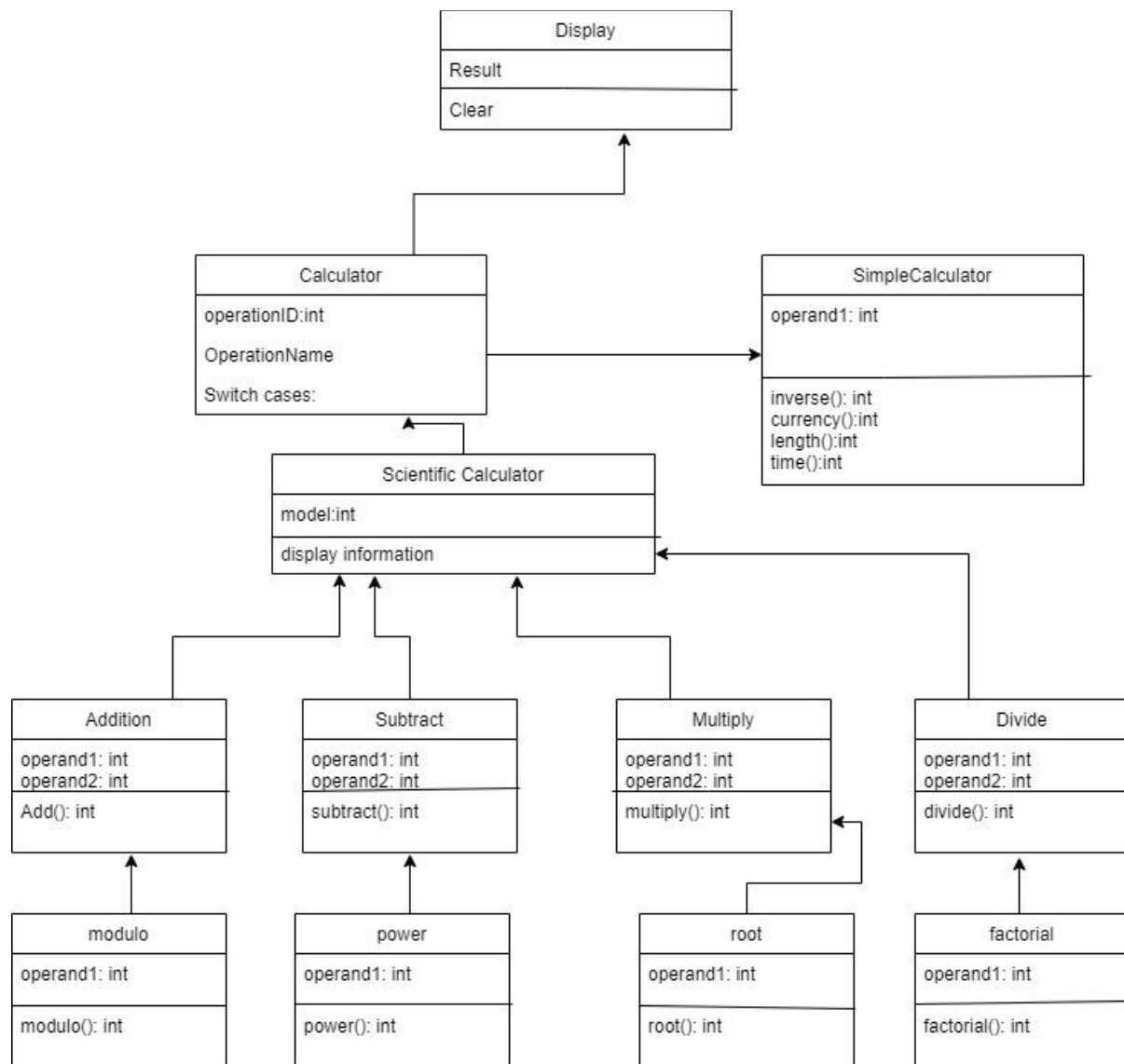
<b>Strength</b>  1. Perform basic arithmetic operations 2. Able to perform calculations for both positive and negative numbers 3. large number calculations	<b>Weakness</b>  1. basic knowledge needed 2. Continuous input should be provided
<b>Opportunities</b> 1. chance to get pro skills in C and C++ and git 2. Programming practice	<b>Threats</b> 1. Fault results for invalid inputs 2. infinite number display problem 3. imaginary numbers can't be displayed

## Design

### UML Diagrams

#### High Level Behavior Diagram

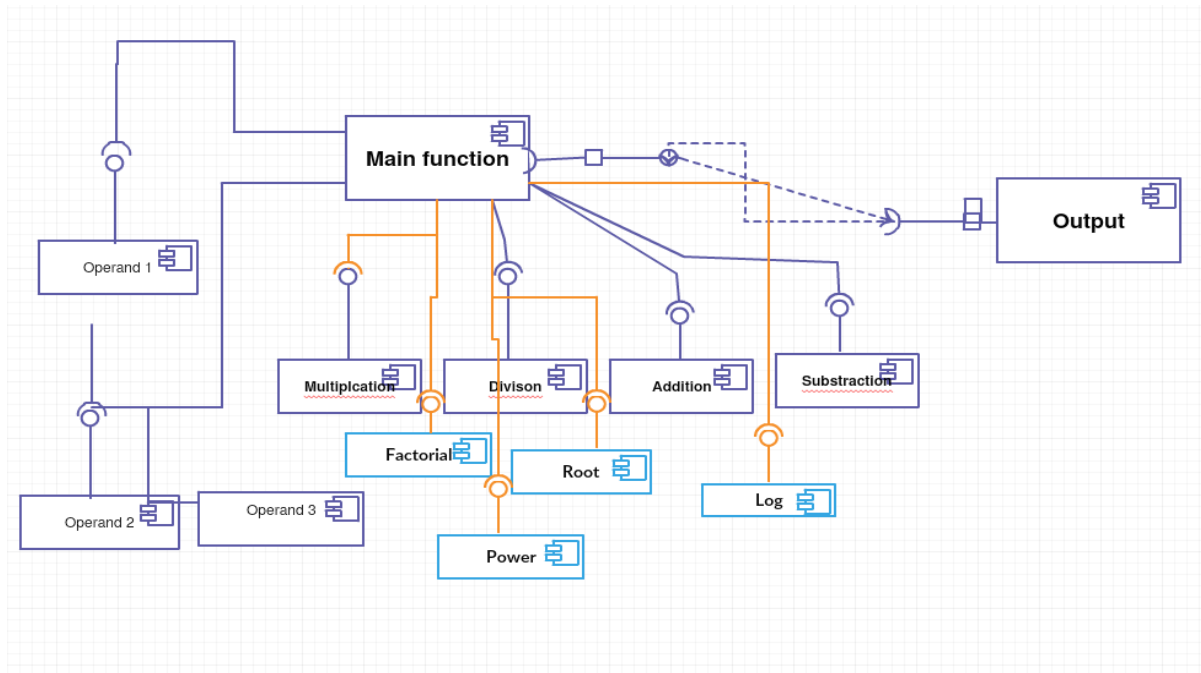
#### Class diagram





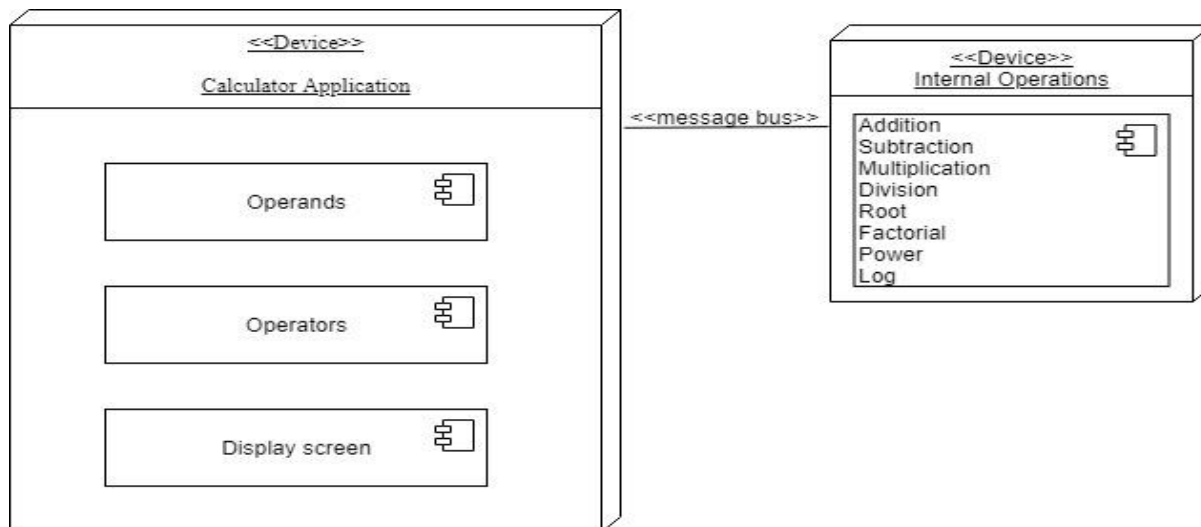
## High Level Structural Diagram

### Composite diagram

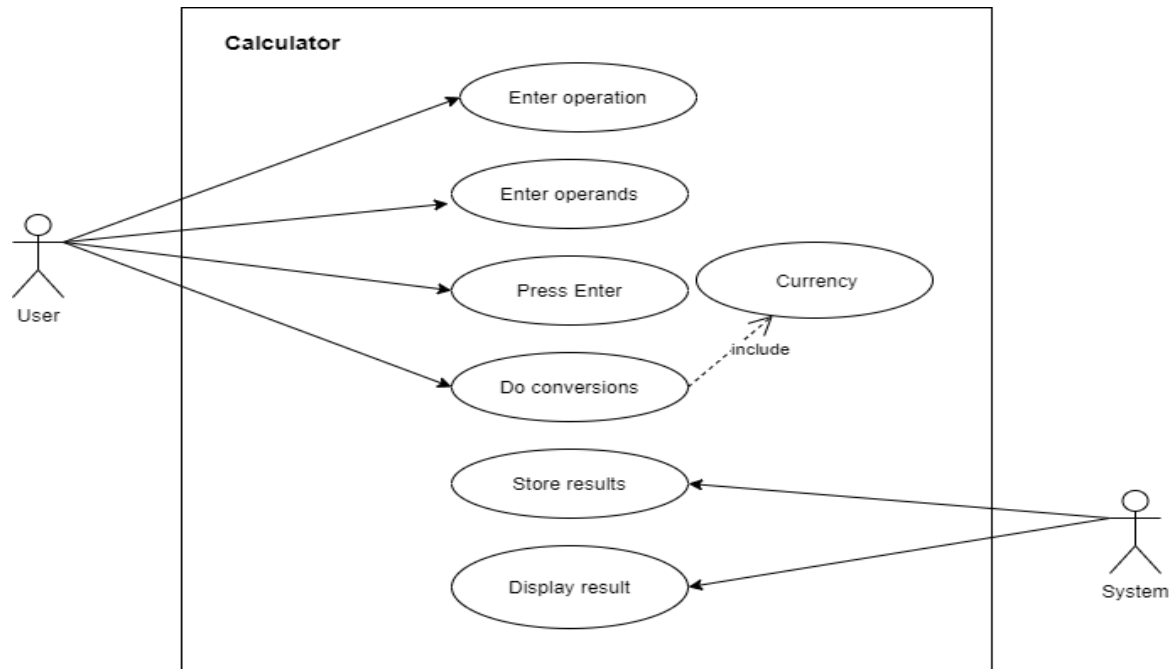


## Low Level UML Diagrams

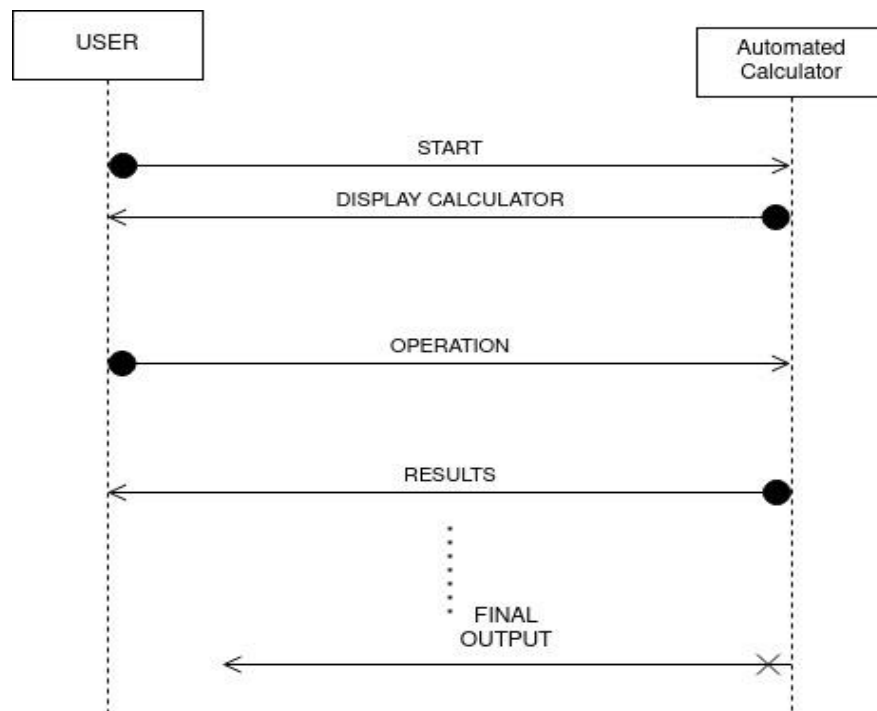
### Deployment Diagram



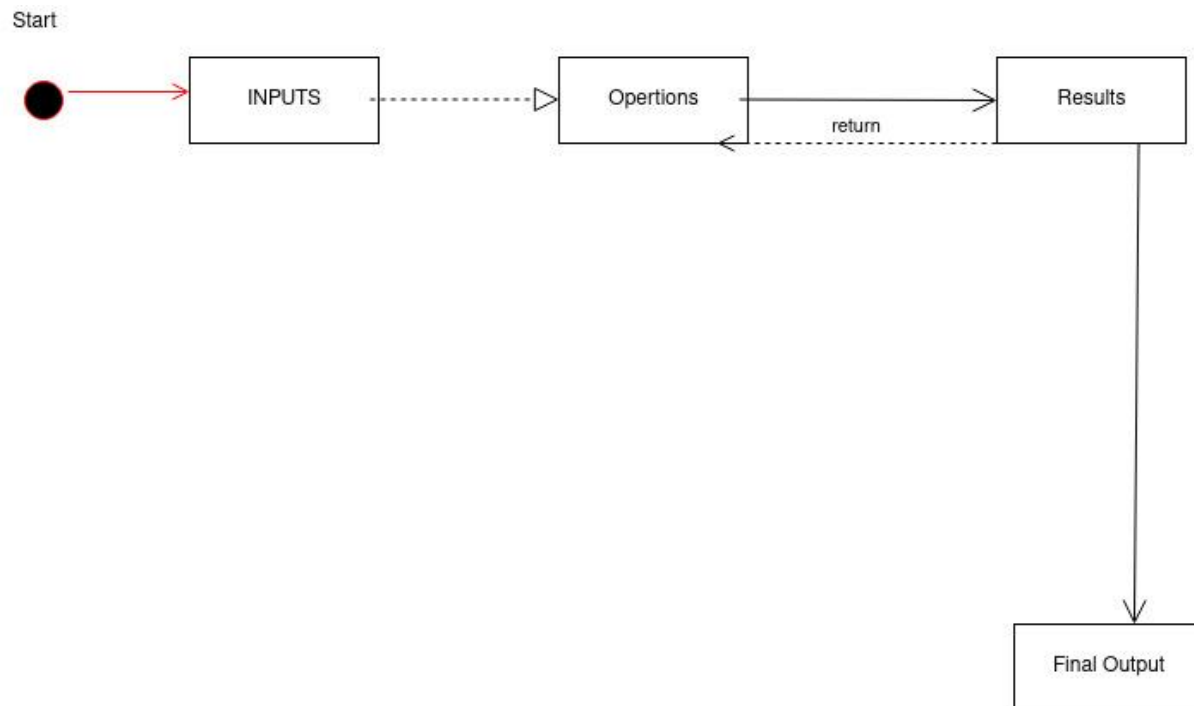
## UseCase Diagram



## Interaction Diagram



## State Machine Diagram



## Test Plan

### High level Testing

ID	Description	Precondition	Expected Input	Expected Output	Actual Output
HL_01	Input method	Accept the input from key	Correct input	Display accepted input	Displayed accepted input
HL_02	Perform math operation	Correct calculation	Correct operands and operators are clicked by the user	Display result of performed operation	Displayed result of performed operation
HL_03	display	Display output	Display output and appropriate error message	Display result with clear visibility	Displayed with clear visibility

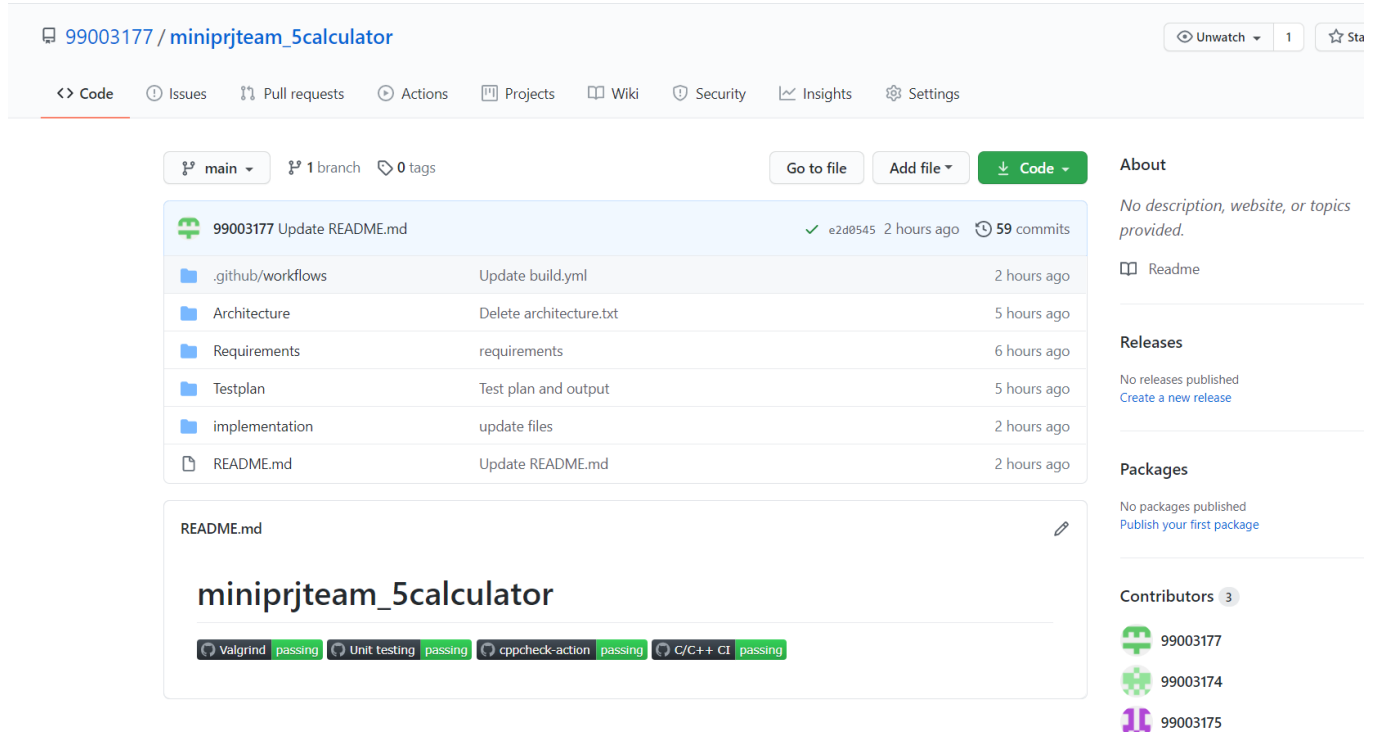
**Low Level Testing**

ID	Description	Precondition	Expected Input	Expected Output	Actual Output
LL_01	Divide by 0	denominator for the division operation is zero	Give input for the denominator as zero	Error message	Error
LL_02	Exit	Check condition	Correct input	When user tries to enter choice more than specific choice	It prints "Thankyou. Exiting the application"

ID	Description	Expected input	Expected output	Actual output	Result
T1	Addition	add(10,20)	30	30	Passed
T2	Subtraction	subtract(0,3)	-3	-3	Passed
T3	Multiplication	multiply(1,0)	0	0	Passed
T4	Division	divide(1,0)	0	0	Passed
T5	Inverse	Inverse(1)	1	1	Passed
T6	Modulo Division	modulo(1,0)	0	0	Passed
T7	Length	length(2)	24	24	Passed
T8	Time	time(2)	120	120	Passed
T9	Factorial	Factorial(5)	120	120	Passed
T10	Square Root	Squareroot(100)	10	10	Passed
T11	Currency	Currency(1)	74	74	Passed
T12	Power	power(10,2)	100	100	Passed

## IMAGES:

### BADGES:



The screenshot shows the GitHub repository page for '99003177 / miniprjteam\_5calculator'. The repository is in the 'main' branch with 1 branch and 0 tags. The repository has 59 commits and was last updated 2 hours ago. The repository contains the following files and folders:

File/Folder	Description	Last Update
.github/workflows	Update build.yml	2 hours ago
Architecture	Delete architecture.txt	5 hours ago
Requirements	requirements	6 hours ago
Testplan	Test plan and output	5 hours ago
implementation	update files	2 hours ago
README.md	Update README.md	2 hours ago

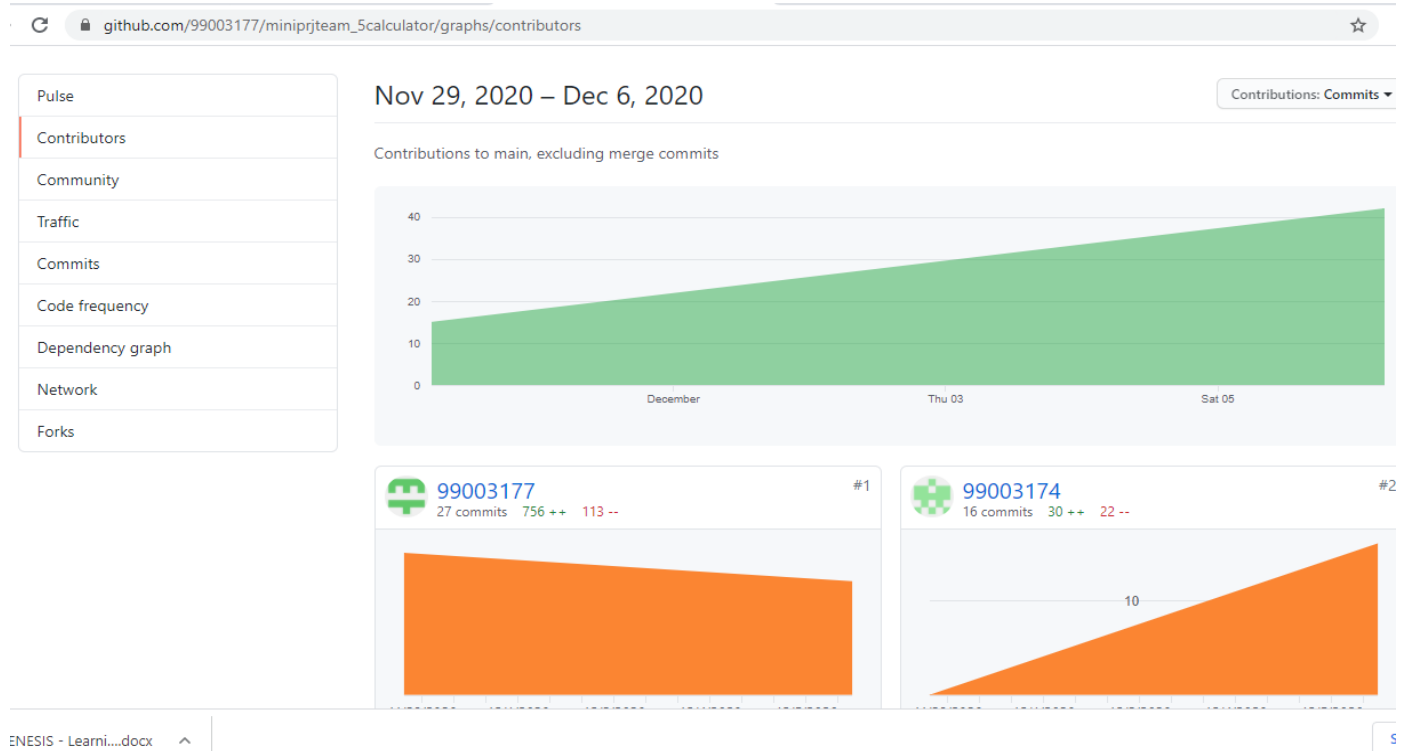
The README.md file is displayed, showing the repository name 'miniprjteam\_5calculator' and several badges indicating the status of various checks:

- Valgrind: passing
- Unit testing: passing
- cppcheck-action: passing
- C/C++ CI: passing

On the right side of the repository page, there are sections for 'About', 'Releases', 'Packages', and 'Contributors'. The 'About' section states 'No description, website, or topics provided.' The 'Releases' section states 'No releases published' and provides a link to 'Create a new release'. The 'Packages' section states 'No packages published' and provides a link to 'Publish your first package'. The 'Contributors' section lists three contributors: 99003177, 99003174, and 99003175.

Git Link: [99003177/miniprjteam\\_5calculator \(github.com\)](https://github.com/99003177/miniprjteam_5calculator)

## Contributions:



## UNIT-TESTING:

99003177 / miniprjteam\_5calculator

Unwatch 1 Star

Code Issues Pull requests **Actions** Projects Wiki Security Insights Settings

Update README.md  
main e2d0545

Unit testing on: push 1

build

build  
succeeded 2 hours ago in 16s

make test

```

12
13
14 Suite: Calculator
15 Test: add ...passed
16 Test: subtract ...passed
17 Test: multiply ...passed
18 Test: divide ...passed
19 Test: modulo ...passed
20 Test: power ...passed
21 Test: squareroot ...passed
22 Test: factorial ...passed
23 Test: inverse ...passed
24 Test: currency ...passed
25 Test: length ...passed
26 Test: time ...passed
27
28 Run Summary:  Type  Total  Ran  Passed  Failed  Inactive
29           suites    1      1    n/a      0      0
30           tests   12     12     12      0      0
31           asserts  12     12     12      0      n/a
32
33 Elapsed time = 0.000 seconds
34 make: Leaving directory '/home/runner/work/miniprjteam_5calculator/miniprjteam_5calculator/implementation'
```

Workflows:

Using the Hello World guide, you'll start a branch, write comments, and open a pull request.

Read the guide

99003177 / miniprjteam\_5calculator

Unwatch 1 Star 0

<> Code

Issues

Pull requests

Actions

Projects

Wiki

Security

Insights

Settings


main miniprjteam\_5calculator / .github / workflows /

Go to file Add file

99003177 Update build.yml ✓ b483ed4 2 hours ago History

..

build.yml	Update build.yml	2 hours ago
cppcheck.yml	Create cppcheck.yml	yesterday
unittest.yml	Update unittest.yml	23 hours ago
valgrind.yml	Update valgrind.yml	23 hours ago

 © 2020 GitHub, Inc.

Terms

Privacy

Security

Status

Help

Contact GitHub

Pricing

API

Training

Blog

Abc

### REFERENCES:

- [1] <https://codeforwin.org/2015/06/c-program-to-create-simple-calculator-using-switch-case.html>
- [2] <https://scanftree.com/programs/c/simple-calculator-using-switch-statement-in-c/>