Learning Report – Applied System Development Life Cycle and Software Testing

L&T Technology Services

GLOBAL ENGINEERING ACADEMY

Genesis

Document History

Ver. Rel. No.	Release Date	Prepared. By	Reviewed By	To be approved By	Remarks/Revision Details
1		Name/PS No	Name/PS No	Module Owner Name	Comments
2	15/02/21	Shivanshu/99003731			

Table of Contents

Table of Figures

Table of Tables

ACTIVITY 1: SYSTEM/SOFTWARE DEVELOPMENT

https://github.com/99003733/SDLC_N2_Calculator.git (Link to GITHUB REPOSITORY)

Requirements

Introduction

This is a multi-purpose low cost scientific calculator which has near about 4-5 new modes compare to the scientific calculator which already in the market. We have added physics operation, matrix operations, profit loss, finance, permutation and combination, mensuration etc.

Research

Cost Vs Feature Curve

Cost	Pipelayout and design math calculator	Graphic calculator	Advance graphing scientific calculator
	Financial calculator	Scientific calculator	Programmable scientific calculator
	Basic calculator	Printing calculator	Engineering scientific calculator
	Features		

Cost and Features (Our system)

1.Cost is near about 1000-1500 Rs

2.Features included

1. Basic arithmetic operation
2. Matrix operations
3. Combinatorics operations

SWOT ANALYSIS

4W's and 1'H

Who:

Generally businessman, engineers , students and scientist uses calculator but they use different calculator for each purpose.

What:

There are already so many types of calculator that exist in the market already for making our life easier. Few of the calculators we have researched are basic calculator, scientific calculator, financial, graphing ,printing calculator etc.

When:

This requirement of this type of calculator started because firstly manual calculations are difficult.

Where:

It can be used for design analysis of various mechanical equipment's such as spaceships, vehicle's speed and diagnostic analysis etc.

How:

We are going to make functions the necessary physics phenomena's which are difficult to calculate manually.

HIGH LEVEL REQUIREMENTS

High level Requirements:

ID	Requirements	Description	Status
HLRAM001	Physics Calculation	Several Physics functions are implemented	Implementing
HLRAM002	Profit and Loss Calculation	Day to Day use of profit and loss function make it more useful	Implementing
HLRSS003	Basic Arithmetic Calculations	Very basic operations like +,-,/,*	Implementing
HLRSS004	Matrix operation	Several Matrix functions	Future
HLRSS005	Combinatorics Calculation	Permutation and Combination	Implementing
HLRSA006	Addition of Special math functions	Several math operations	Implementing
HLRSA007	Addition of financial calculation	Interest Calculations	Implementing
HLRPK008	Mensuration	Area,Volume	Implementing
HLRPK009	AP,GP,Sum	Mean	Implementing

TABLE1 1.HIGH LEVEL REQUIREMENT

LOW LEVEL REQUIREMENTS

HLRSS003 - LR1	Addition	Taking two numbers as input	Implementing
HLRSS003 - LR2	Subtraction	Taking two numbers as input	Implementing
HLRSS003 - LR3	Multiply	Taking two numbers as input	Implementing
HLRSS003 - LR4	Divide	Taking two numbers as input	Implementing
HLRSS004 - LR1	Matrix Addition	Taking two matrix as input and their dimension	Implementing
HLRSS004 - LR2	Matrix Subtraction	Taking two matrix as input and their dimension	Implementing
HLRSS004 - LR3	Matrix Multiplication	Taking two matrix as input and their dimension	Implementing
HLRSS004 - LR4	Matrix Determinant	Taking a matrix as input and it's dimension	Implementing
HLRSS004 - LR5	Matrix Row or Column sum	Taking a matrix as input and it's dimension with specific row or column	Implementing
HLRSS004 - LR6	Matrix Inverse	Taking a matrix as input and it's dimension	Future
HLRSS005 - LR1	Permutation	Taking input for total no. of objects and for no.of permutations	Implementing
HLRSS006 - LR2	Combination	Taking input for total no. of objects and for no.of permutations	Implementing

TABLE1 2. LOW LEVEL REQUIREMENTS

UML DESIGN

1. CLASS DIAGRAM(HLR)

High Level Design

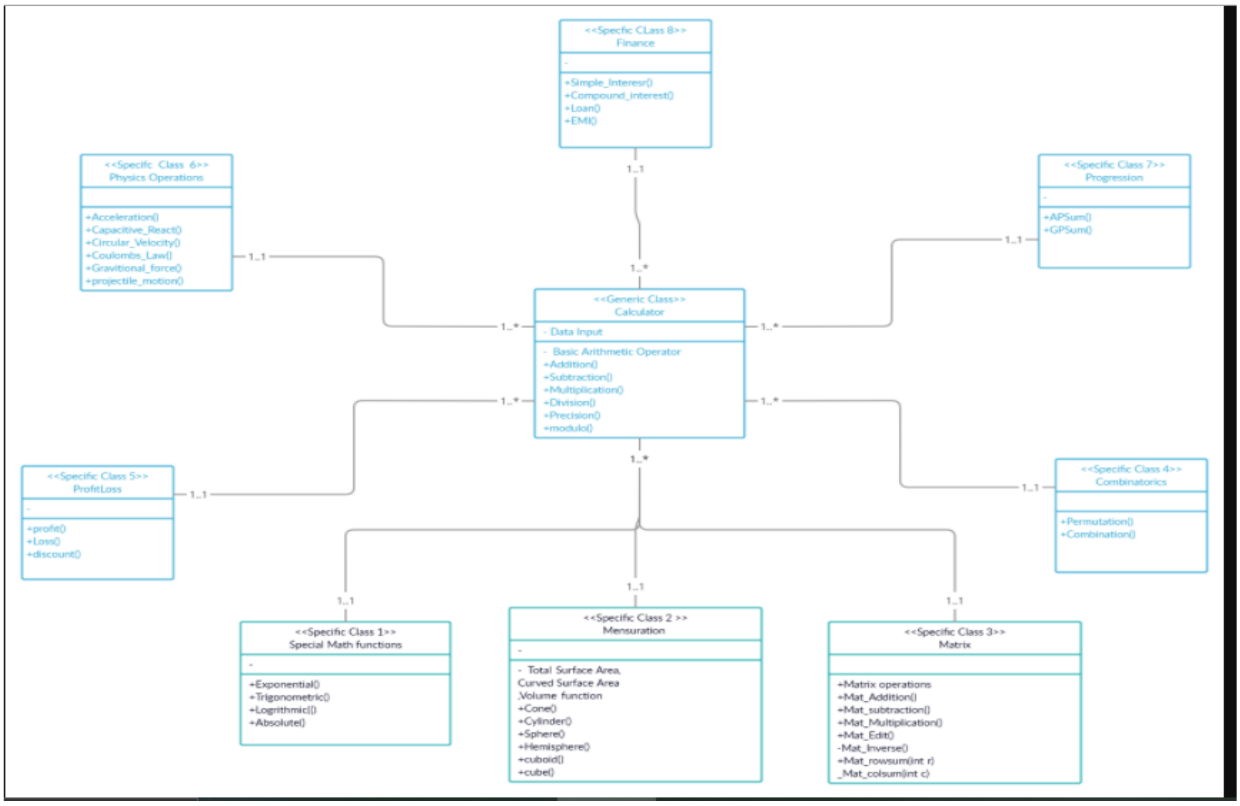

figure1 1 .CLASS DIAGRAM FOR HLR

2. DEPLOYMENT DIAGRAM(LLR)

Low Level Design

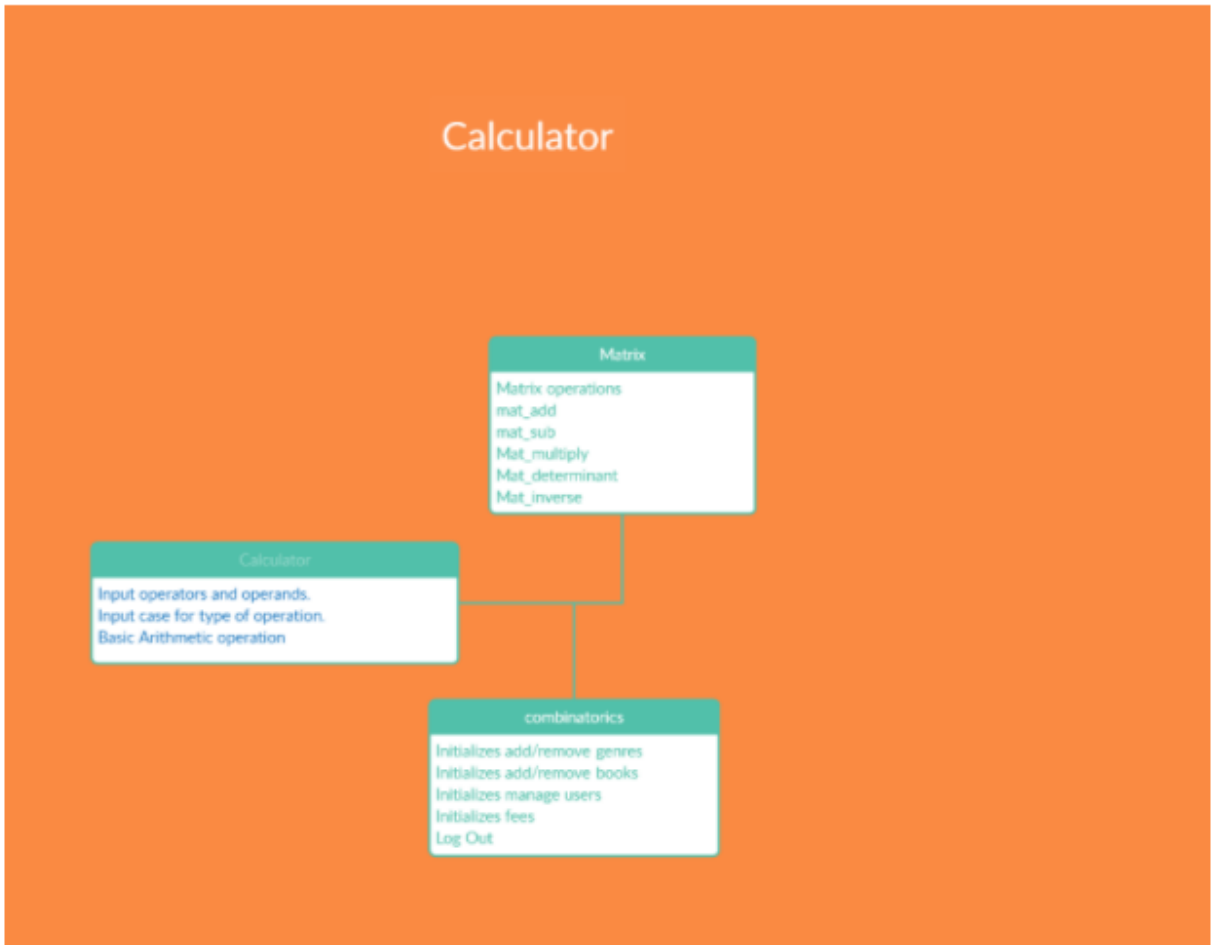

figure1 2. DEPLOYMENT DIAGRAM FOR LOW LLR

3. USE-CASE DIAGRAM(LLR)

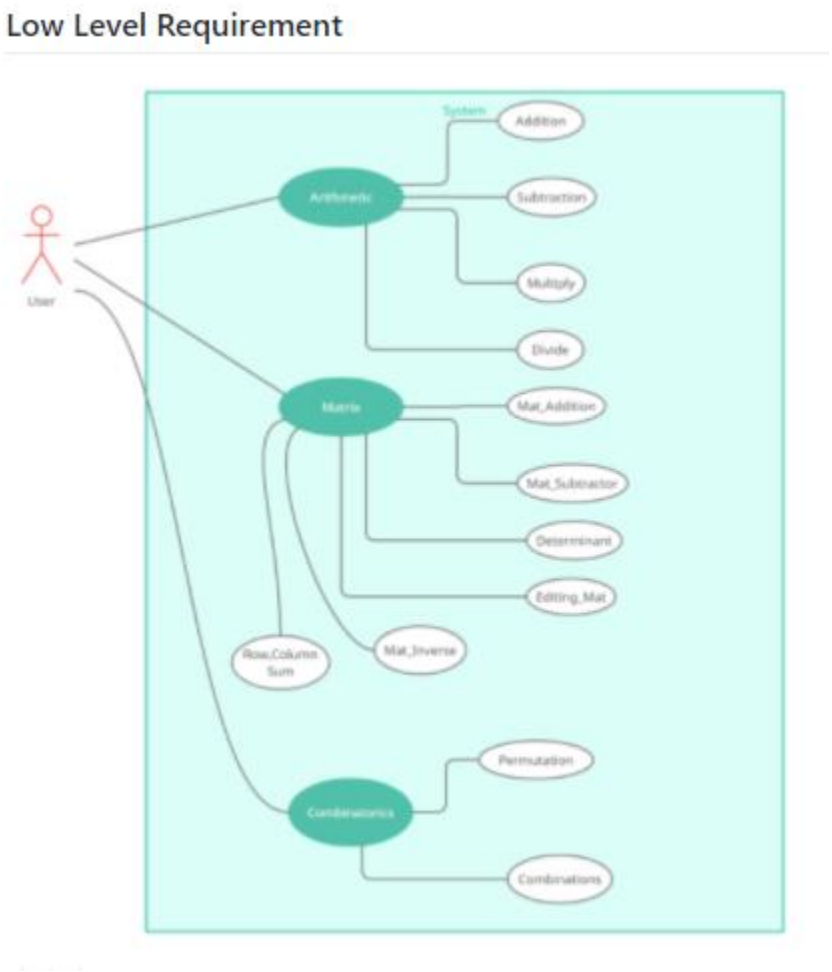

figure1 3. USE-CASE DIAGRAM FOR LLR

TEST PLAN

TEST PLAN:

Table no: High level test plan

Test ID	Description	Exp IN	Exp OUT	Actual Out	Type Of Test
H_01	mode switch working for special operations	mode==1	shows mode menu	shows mode menu	Requirement based
H_02	mode switch working	mode==2	Error	Error	Scenario based

Table no: Low level test plan

Test ID	Description	Exp IN	Exp OUT	Actual Out	Type Of Test
L_011	Adding two numbers	num1= 30, num2=20	result=50	result=50	Requirement based
L_012	Subtracting two numbers	num1= 0, num2=3	result=-3	result=-3	Requirement based
L_013	Multiply two numbers	num1= 1, num2=0	result=0	result=0	Requirement based
L_014	Dividing two numbers	num1= 1, num2=0	Error	Error	Requirement based
L_021	Adding two numbers	num1=750, num2=7500	result=1500	result=8250	Scenario based
L_022	Subtract two numbers	num1=1000, num2=900	result=1	result=1900	Scenario based
L_023	Multiply two numbers	num1=2, num2=5	result=2	result=10	Scenario based
L_024	Dividing two numbers	num1=2, num2=2	result=3	result=1	Scenario based
L_03	Multiplying two 8 digit numbers	num1=100000000,num2=99999999	result=9999999900000000	Error	Boundary based
L_041	Calculating Permutations	n=5,r=1	permres=5	permres=5	Requirement based

L_042	Calculating Combinations	n=2,r=1	combres=2	combres=2	Requirement based
L_051	Calculating Permutations	n=6,r=4	permres=10	permres=15	Scenario based
L_052	Calculating Combinations	n=10,r=4	combres=40	combres=210	Scenario based
L_06	For both Permutation and combination	n=2, r=5	Error	Error	Boundary based
L_091	For Matrix Determinant	[10 ,20 ,30; 5, 6, 7; 1, 0, 0]	Det=80	Det=80	Requirement based
L_092	Matrix Addition	MAT1=[9 ,30 ,10 ;-2 ,8 ,10 ;10 ,-5 ,50], MAT2=[10 ,9 ,-5 ;8 ,2 ,0 ;30 ,4 ,10]	ADD_MAT=[19 ,39 ,5 ;6 ,10 ,10 ;40 ,-1, 60]	ADD_MAT=[19 ,39 ,5 ;6 ,10 ,10 ;40 ,-1, 60]	Requirement based
L_092	Matrix Subtraction	MAT1=[9 ,3 ,10 ;-2 ,8 ,10 ;10 ,-5 ,50], MAT2=[1 ,9 ,-5 ;8 ,2 ,0 ;30 ,4 ,10]	SUB_MAT=[8 ,-6 ,15 ;-10 ,6 ,10 ;-20 ,-9 , 40]	SUB_MAT=[8 ,-6 ,15 ;-10 ,6 ,10 ;-20 ,-9 , 40]	Requirement based
L_093	Matrix addition or subtraction	am=2 , an=3 ,bm=2 ,bn=2	Error	Error	Scenario based
L_094	Matrix multiply	am=1 , an=3 ,bm=2 ,bn=1	Error	Error	Scenario based

TABLE1 3. TEST PLAN

GIT

GIT ISSUES

Contributors List and Summary

PS No.	Name	Features	Issuess Raised	Issues Resolved	No Test Cases	Test Case Pass
99003731	Shivanshu	arithmetic,matrix,combinatorics	2 No	1 No	17 No	6 No
99003733	Aditya	Physics, profit and loss	1 No	3 No	15 No	6 No

Challenges Faced and How Was It Overcome

1. Case Sensitive issue.
2. Make file issue.
3. File integration issue.

GIT COMMITS

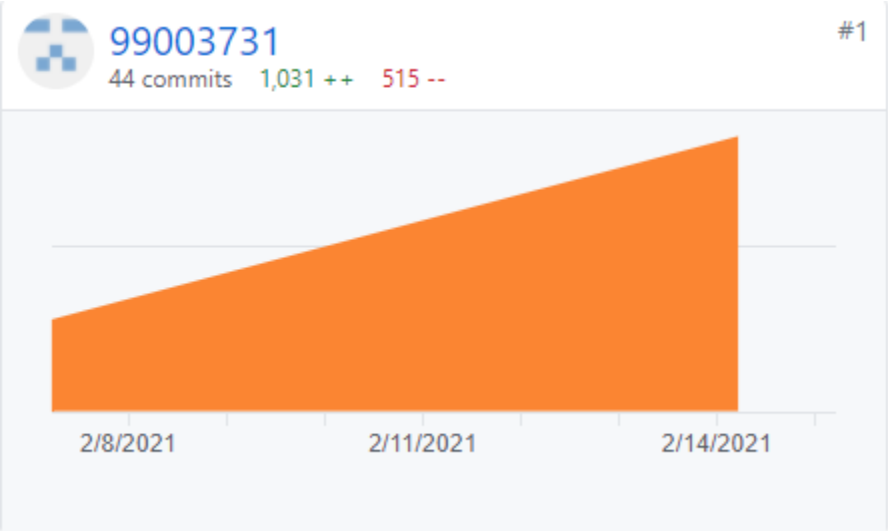

figure1 4.GIT COMMITS

GIT MAKE FILE

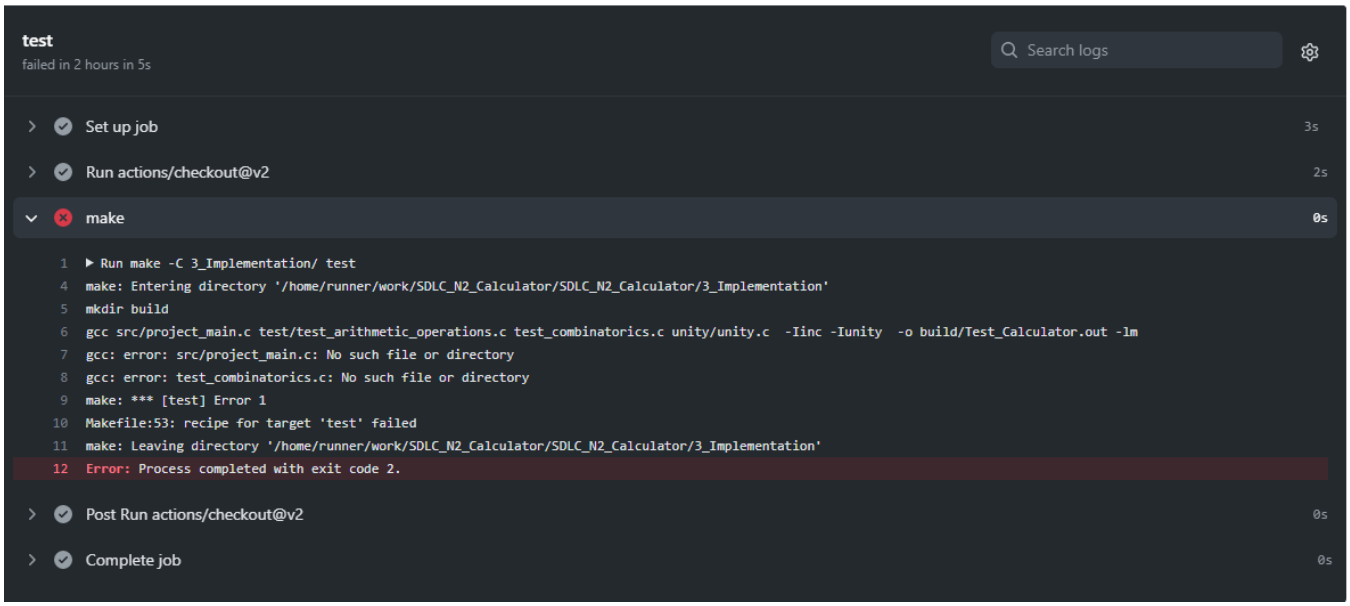

figure1 5.GIT MAKE FILE

GIT CODE QUALITY(CPP CHECK)

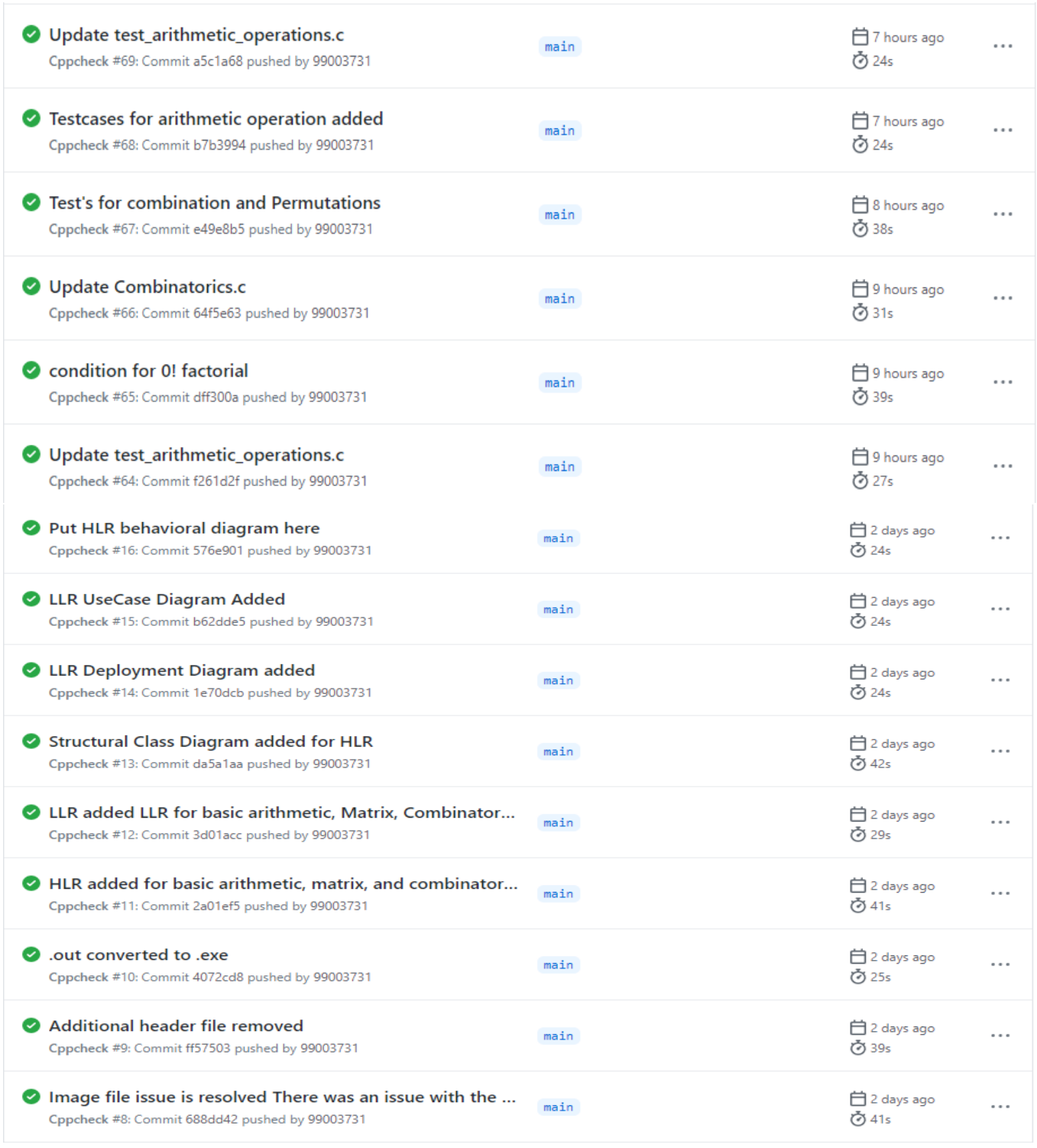

figure1 6. GIT CPP CHECK

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2. https://guides.github.com/features/mastering-markdown/)
3. https://github.com/ejwa/gitinspector.git
4. https://docs.github.com/en/actions/learn-github-action
5. https://stackedit.io/app#
6. https://creately.com/

ACTIVITY 2: AGILE METHODOLOGY

THEME

The theme is designing a calculator with certain features according to the specific requirements. The target customers for the calculator are students, engineers ,scientist's etc .

EPIC

Epic according to the requirements provided are:

1. Basic Arithmetic Operations.
2. Permutation and Combination.
3. Matrix Operations.

USER STORY

BASIC ARITHMETIC OPERATIONS:

1. Addition, Subtraction, Multiplication, Divide output should be of 14 digits.
2. Divide by zero shows error.

PERMUTATION AND COMBINATION:

1. Ensuring the total no. of objects(n)>=no. of permutations or combinations(r).
2. Output Should be less than 14 digits.

MATRIX OPERATIONS:

1. Checking matrix is square matrix for determining it's determinant.
2. Matrix can have maximum dimension as 3x3.
3. Matrix of same dimension's can be added or subtracted.