

# Learning Report – SDLC



GLOBAL  
ENGINEERING  
ACADEMY

Genesis



*L&T Technology Services*



## Document History

Ver. Rel. No.	Release Date	Prepared. By	Reviewed By	To be Approved By	Remarks/Revision Details
1	17/09	Sapthasagar H	Somdatta Das	Pagala Prithvi Sekhar	
	17/09			Srinivas K	

## Contents

<b>CHECKLIST .....</b>	<b>3</b>
<b>ACTIVITY AND TASKS.....</b>	<b>3</b>
<b>ACTIVITY 1– SYSTEM/SOFTWARE DEVELOPMENT .....</b>	<b>3</b>
<b>ACTIVITY 2 –CI WORKFLOW FOR C PROGRAMMING.....</b>	<b>3</b>
<b>ACTIVITY 3 – AGILE ASPECTS .....</b>	<b>3</b>

## Checklist

- Installation of SW on Phone and Desktop
- Additional Aspects ...

## Activity and Tasks

### Activity 1– System/Software Development

- Sub Tasks
- Complete and Evolve

### Activity 2 –CI Workflow for C Programming

- Sub Tasks
- Complete and Evolve

### Activity 3 – Agile Aspects

## Table of Contents

<b>CHECKLIST .....</b>	<b>3</b>
<b>ACTIVITY AND TASKS.....</b>	<b>3</b>
ACTIVITY 1– SYSTEM/SOFTWARE DEVELOPMENT .....	3
ACTIVITY 2 –CI WORKFLOW FOR C PROGRAMMING .....	3
ACTIVITY 3 – AGILE ASPECTS .....	3
<b>DEFINITION:.....</b>	<b>ERROR! BOOKMARK NOT DEFINED.</b>
<b>RESEARCH:- .....</b>	<b>ERROR! BOOKMARK NOT DEFINED.</b>
AGING: .....	<b>ERROR! BOOKMARK NOT DEFINED.</b>
COSTING: .....	<b>ERROR! BOOKMARK NOT DEFINED.</b>
<b>SWOT ANALYSIS OF TELEVISION-.....</b>	<b>ERROR! BOOKMARK NOT DEFINED.</b>
<b>FEATURES OF MY PRODUCT: .....</b>	<b>ERROR! BOOKMARK NOT DEFINED.</b>
<b>LOW-LEVEL REQUIREMENTS: .....</b>	<b>ERROR! BOOKMARK NOT DEFINED.</b>
<b>HIGH-LEVEL REQUIREMENTS: .....</b>	<b>ERROR! BOOKMARK NOT DEFINED.</b>
<b>UML DIAGRAMS:.....</b>	<b>ERROR! BOOKMARK NOT DEFINED.</b>
<b>TEST PLAN:.....</b>	<b>ERROR! BOOKMARK NOT DEFINED.</b>
<b>V-MODEL.....</b>	<b>ERROR! BOOKMARK NOT DEFINED.</b>
REQUIREMENTS: .....	<b>ERROR! BOOKMARK NOT DEFINED.</b>
DESIGN: .....	<b>ERROR! BOOKMARK NOT DEFINED.</b>
<b>INTEGRATED TEST PLAN: .....</b>	<b>ERROR! BOOKMARK NOT DEFINED.</b>
<b>SYSTEM TEST PLAN: .....</b>	<b>ERROR! BOOKMARK NOT DEFINED.</b>
<b>AGILE MODEL: .....</b>	<b>ERROR! BOOKMARK NOT DEFINED.</b>
USER STORY 1:.....	<b>ERROR! BOOKMARK NOT DEFINED.</b>
USER STORY 2:.....	<b>ERROR! BOOKMARK NOT DEFINED.</b>
USER STORY 3:.....	<b>ERROR! BOOKMARK NOT DEFINED.</b>
<b>CI TASK.....</b>	<b>ERROR! BOOKMARK NOT DEFINED.</b>
REQUIREMENTS: .....	<b>ERROR! BOOKMARK NOT DEFINED.</b>
<b>UML DIAGRAM:.....</b>	<b>ERROR! BOOKMARK NOT DEFINED.</b>
<b>FLOW CHART.....</b>	<b>ERROR! BOOKMARK NOT DEFINED.</b>
<b>IMPLEMENTATION:.....</b>	<b>ERROR! BOOKMARK NOT DEFINED.</b>
<b>TEST PLAN:.....</b>	<b>ERROR! BOOKMARK NOT DEFINED.</b>
<b>APPENDIX:CI BASICS- .....</b>	<b>ERROR! BOOKMARK NOT DEFINED.</b>
<b>REFERENCES: .....</b>	<b>ERROR! BOOKMARK NOT DEFINED.</b>

## **SMARTWATCH**

### **1.Requirements**

#### **1.1 Definition:**

A **smartwatch** is a wearable computer in the form of a watch; modern smartwatches provide a local touchscreen interface for daily use, while an associated smartphone app provides for management and telemetry (such as long-term biomonitoring). While early models could perform basic tasks, such as calculations, digital time telling, translations, and game-playing, 2010s smartwatches have more general functionality closer to smartphones, including mobile apps, a mobile operating system and WiFi/Bluetooth connectivity. Some smartwatches function as portable media players, with FM radio and playback of digital audio and video files via a Bluetooth headset. Some models, called 'watch phones' (or vice versa), have mobile cellular functionality like making calls.

#### **1.2 Research:**

##### **1.2.1 Aging and cost gradient**

- First digital watch names PULSAR P1 was introduced by The Hamilton Watch Co in 1972 and it is first ever calculator watch. It has six digits display and stylus was provided to tap the key.
- The first GPS watch Garmin Forerunner 10 in 2003 and it served as a virtual training buddy or digital training coach by providing various clues like speed, distance and pace.it used to cost 150\$.
- First PDA-Personnel Digital Assistant watch was developed in 2003 by Fossil. Fossil's Palm Pilot had a 8MB ram and Palm OS was being used.
- In 2015, The Apple Watch was released and set the scene for a next level of functionality and competition. The cost of apple watches ranges from 170\$ to 460\$.

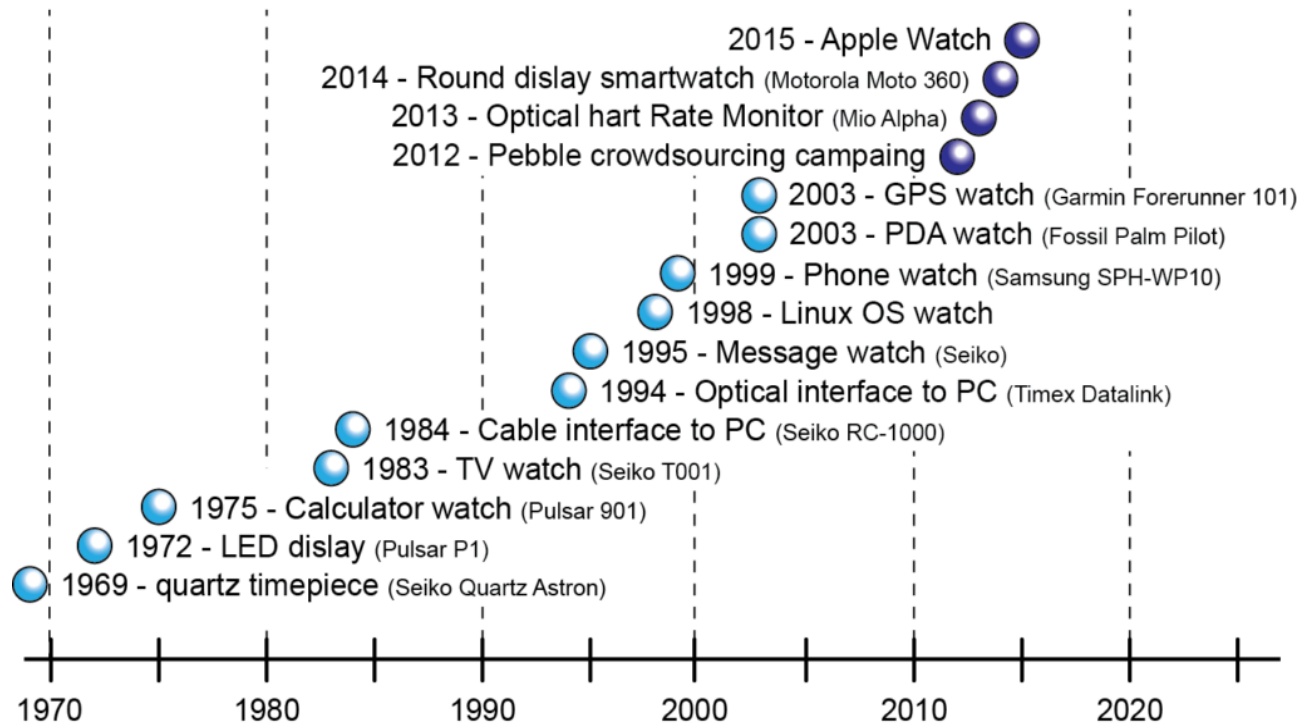


Fig 1.2.a Aging of smartwatch

### 1.3 Defining System

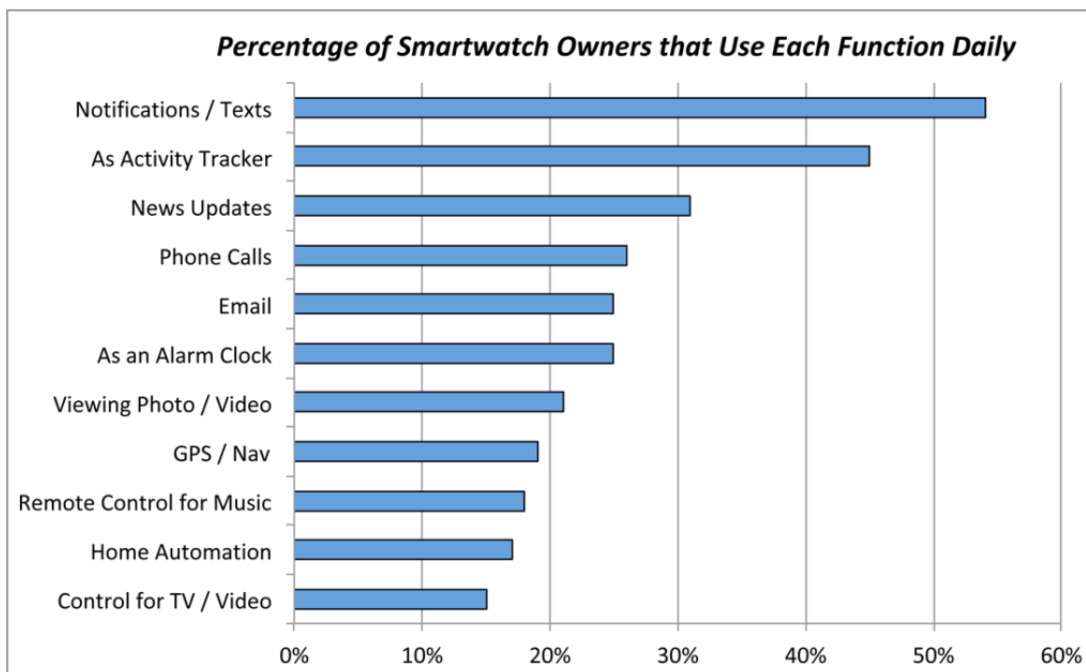


Fig 1.3.a

Customer usage of smartwatch for different tasks.

- Showing the time is no longer a primary function of smartwatches and customers who would buy smartwatches uses it for other activities also. So we should improve the performance of the tasks which are used repeatedly.
- A good Display.
- Storage should be more.
- User friendly and regional languages are available.
- NFC, 802.11 b/g/n WiFi, Bluetooth 5.0, and GPS.
- Sensors: Accelerometer, barometer, gyro, ECG electrode, optical heart rate, ambient light.
- Other features: IP68 and 5 ATM dust and water resistant, integrated microphone and speaker.
- Battery: Battery is the main thing which should concentrate and at least up to 30 hours battery life is expected.

### 1.3 SWOT Analysis:

#### Strengths:

- Innovation and design of the product.
- Long battery life.
- Made in India.
- Public interest and hype.

#### Weakness:

- New at market.
- Low profit margins

#### Opportunity:

- Increasing demand.
- Changing customer needs.

Threats:

- Lack of demand.
- Many competitors.
- Rapid technology growth.

## 1.5 Requirements

### 1.5.1 High level requirements

ID	Description
1	OLED display
2	Battery backup
3	Bluetooth connectivity
4	Accelerometer
5	Gyroscope

### 1.5.2 Low level requirements

ID	Description
1	NFC
2	Wi-Fi connectivity
3	Bluetooth 5.0
4	GPS
5	Accelerometer
6	Barometer
7	ECG electrode
8	Gyroscope
9	optical heart rate
10	ambient light
11	IP68 and 5 ATM dust and water resistant



## 2.Design

### 2.1 High level diagrams

#### 2.1.1 Structural diagrams

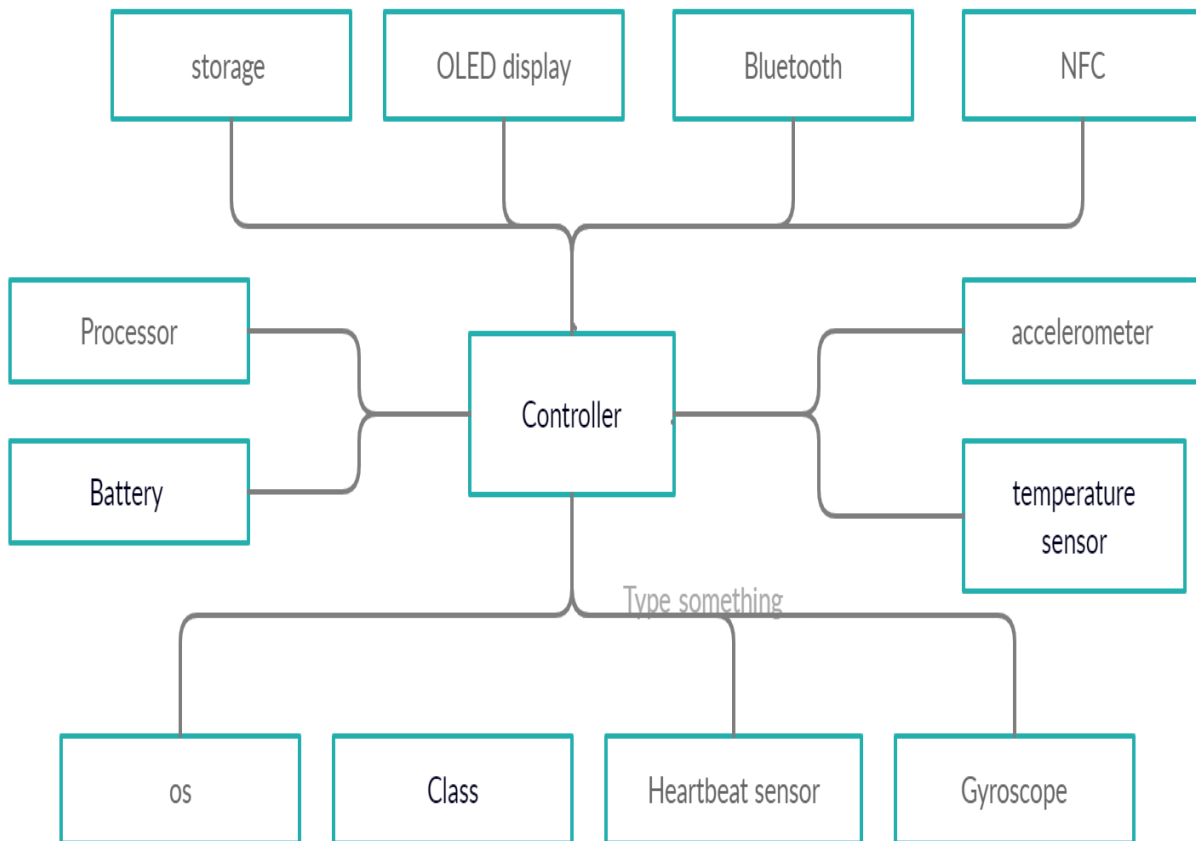


Fig.2.1.1.a Architecture of a the system

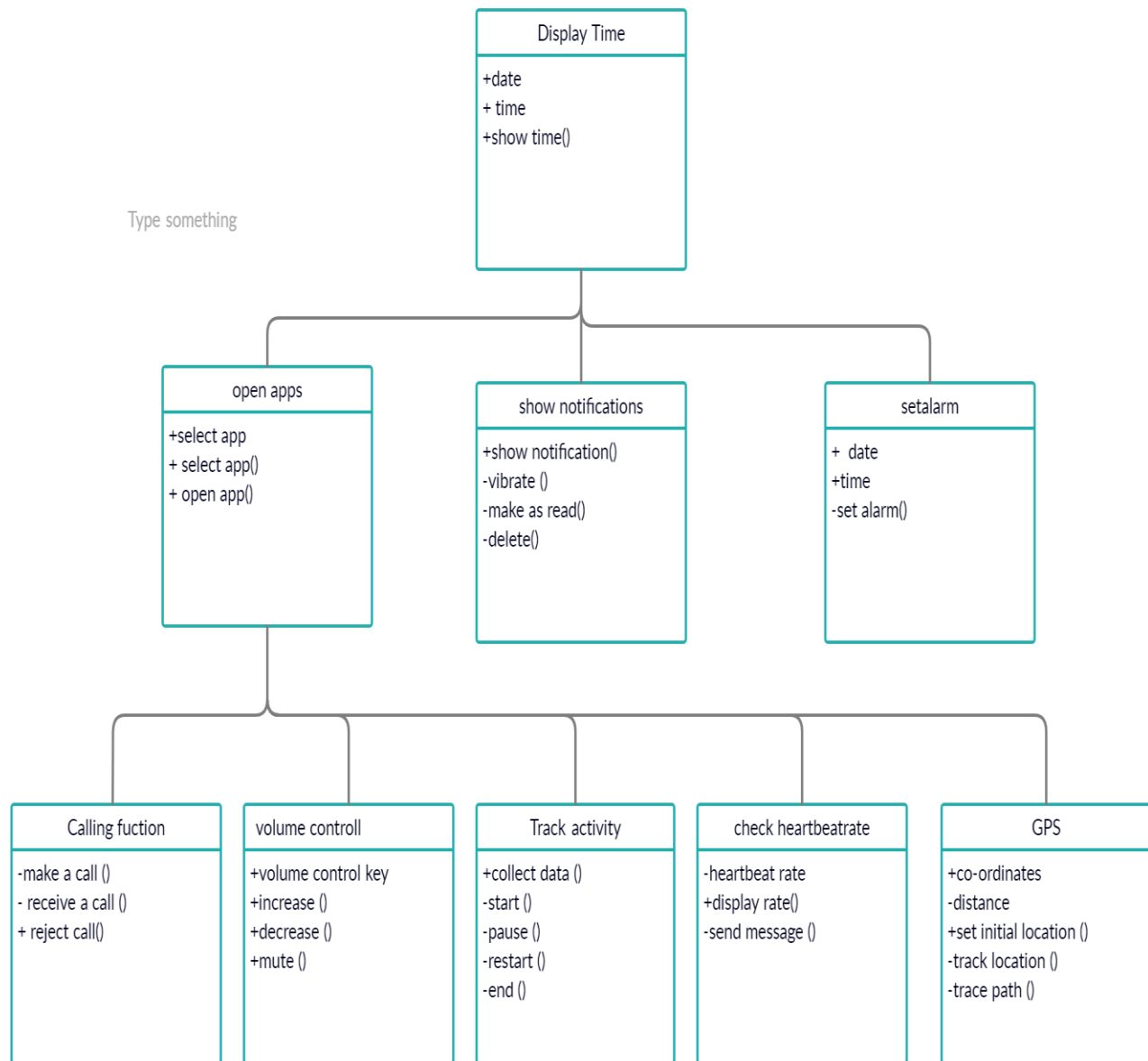


Fig 2.1.1.b Class diagram of system

## 2.1.2 Behavioral diagrams

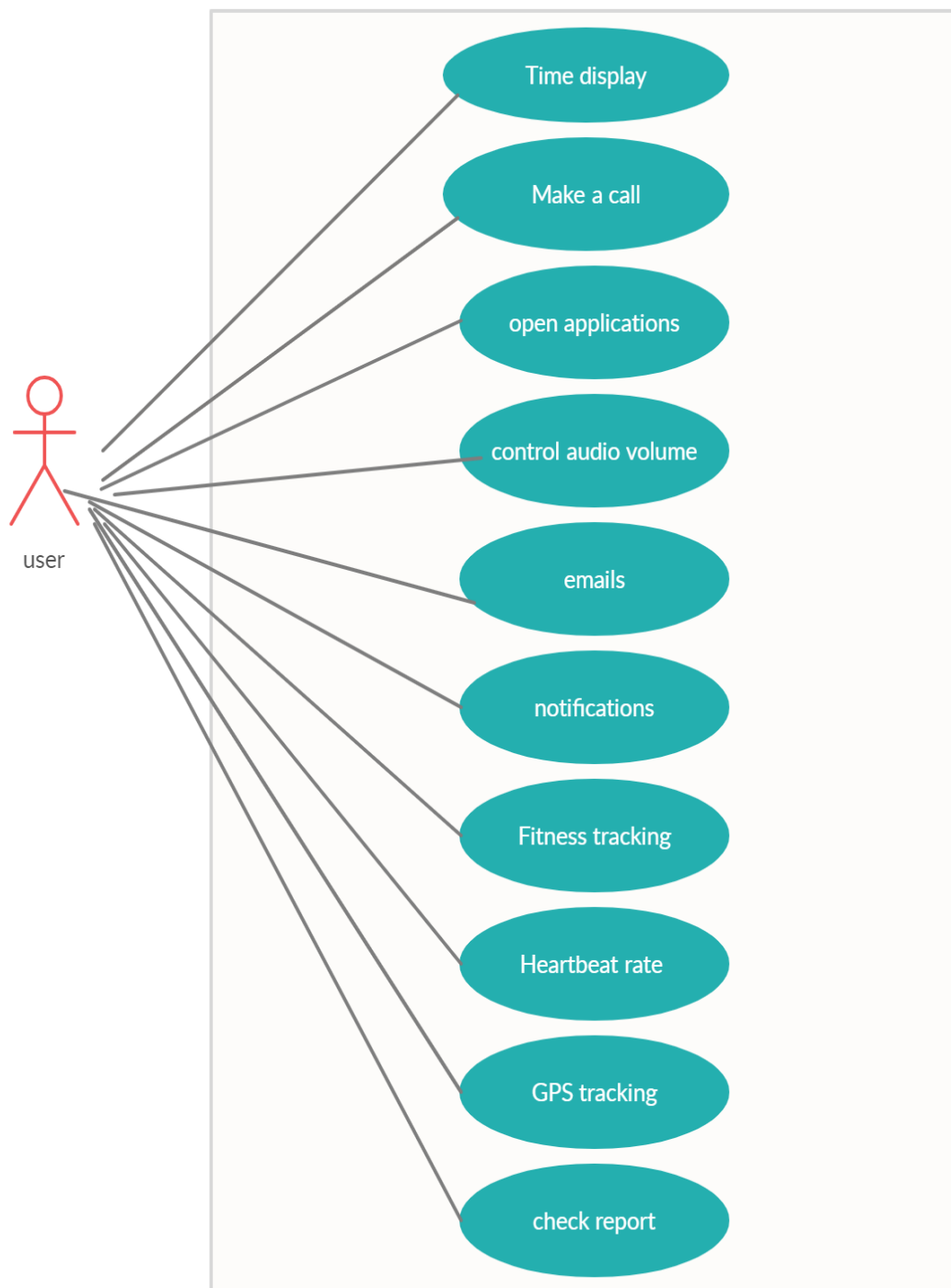


Fig 2.1.2.a Use case diagram of the system

## 2.2 Low level diagram

### 2.2.1 Structural diagrams

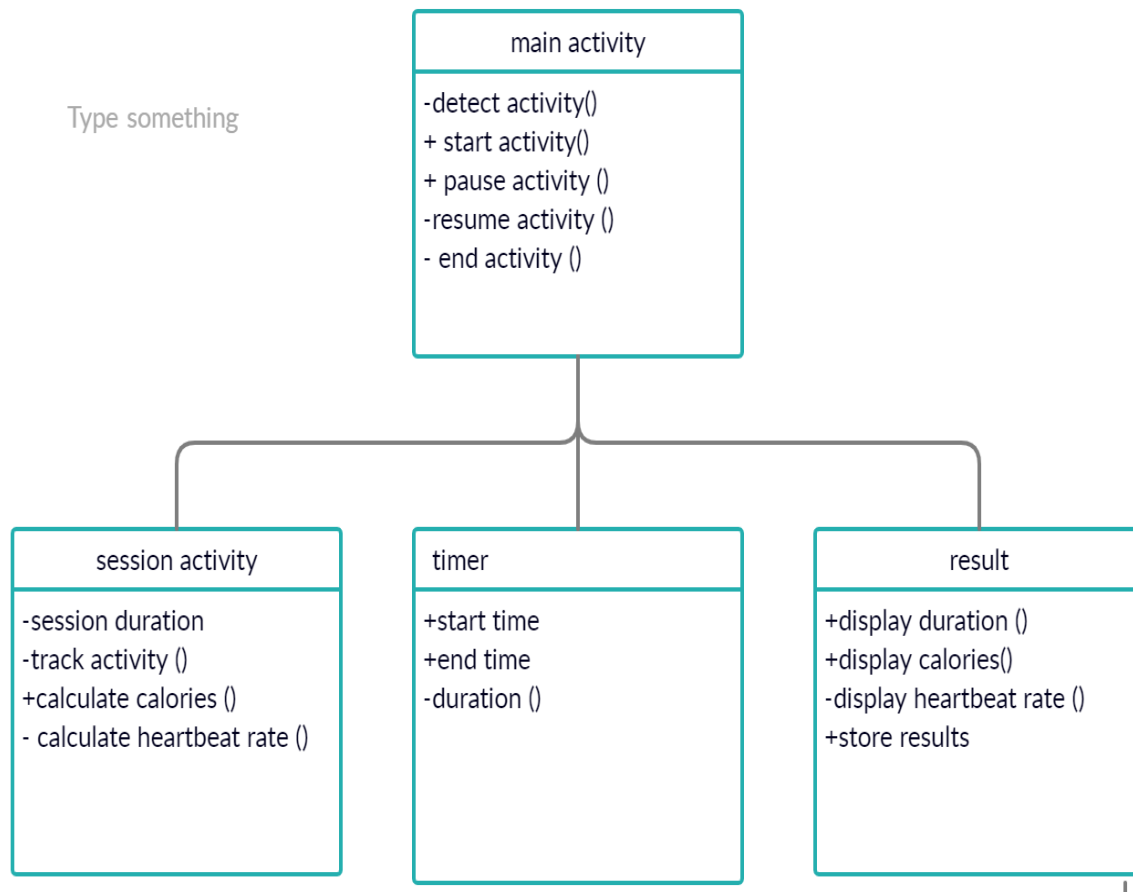


Fig 2.2.1.a class diagram of accelerometer

## 2.2.2 Behavioral diagrams

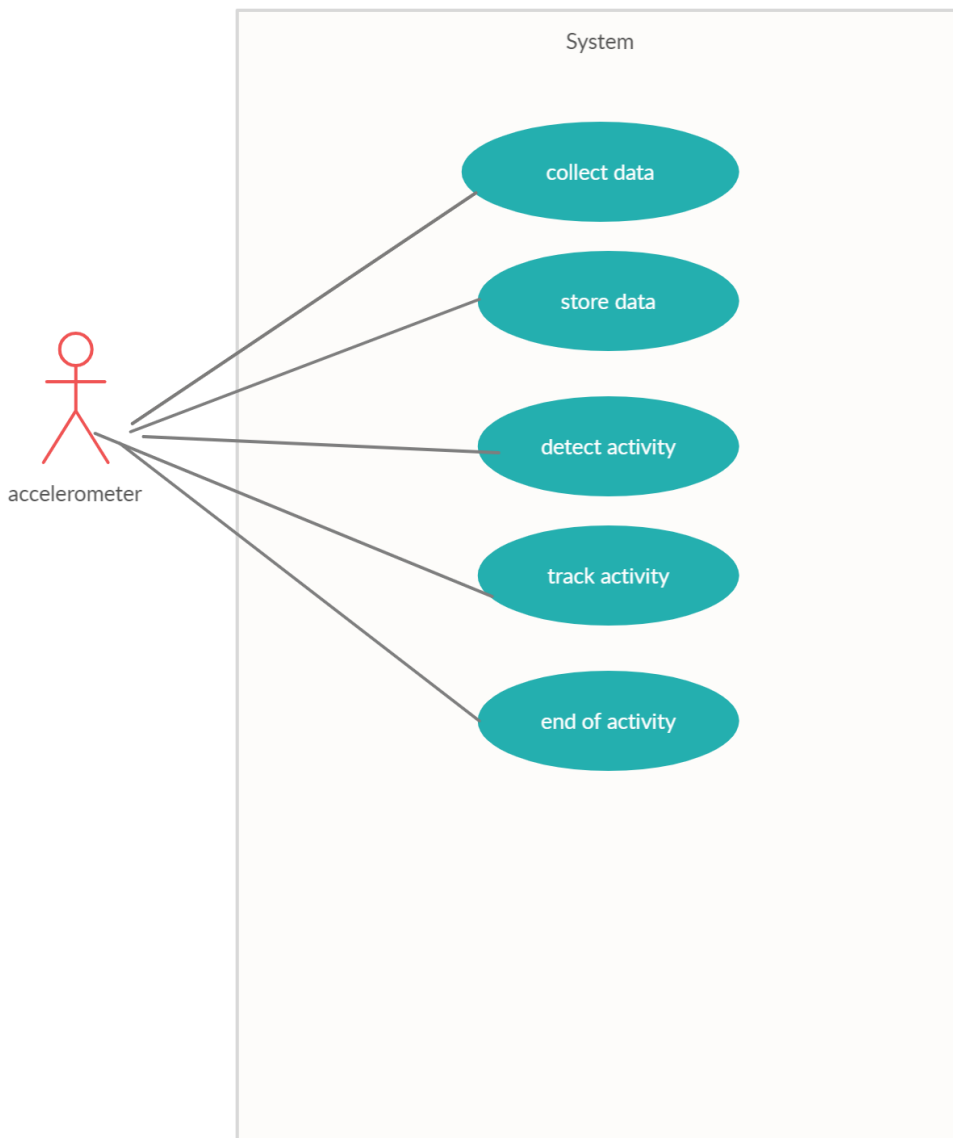


Fig 2.2.2.a Use case diagram of accelerometer

Type something

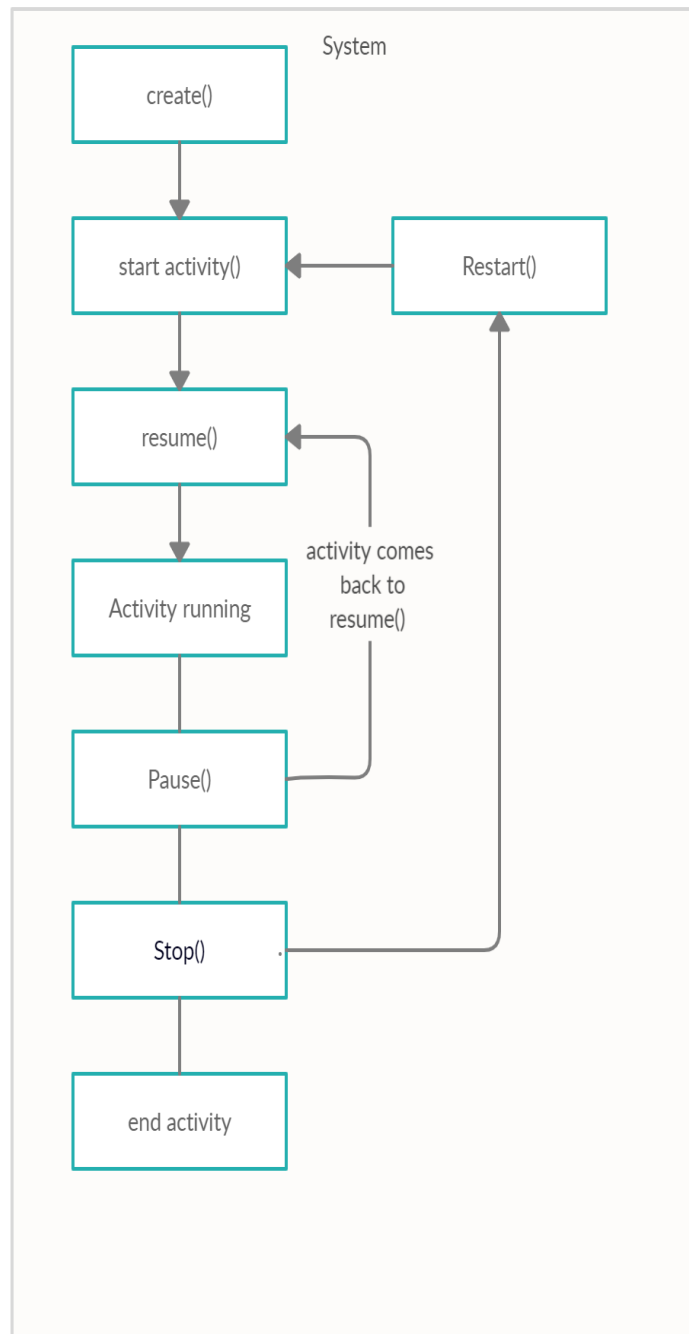


Fig 2.2.2.b Activity diagram of accelerometer

### 3. Test Plan

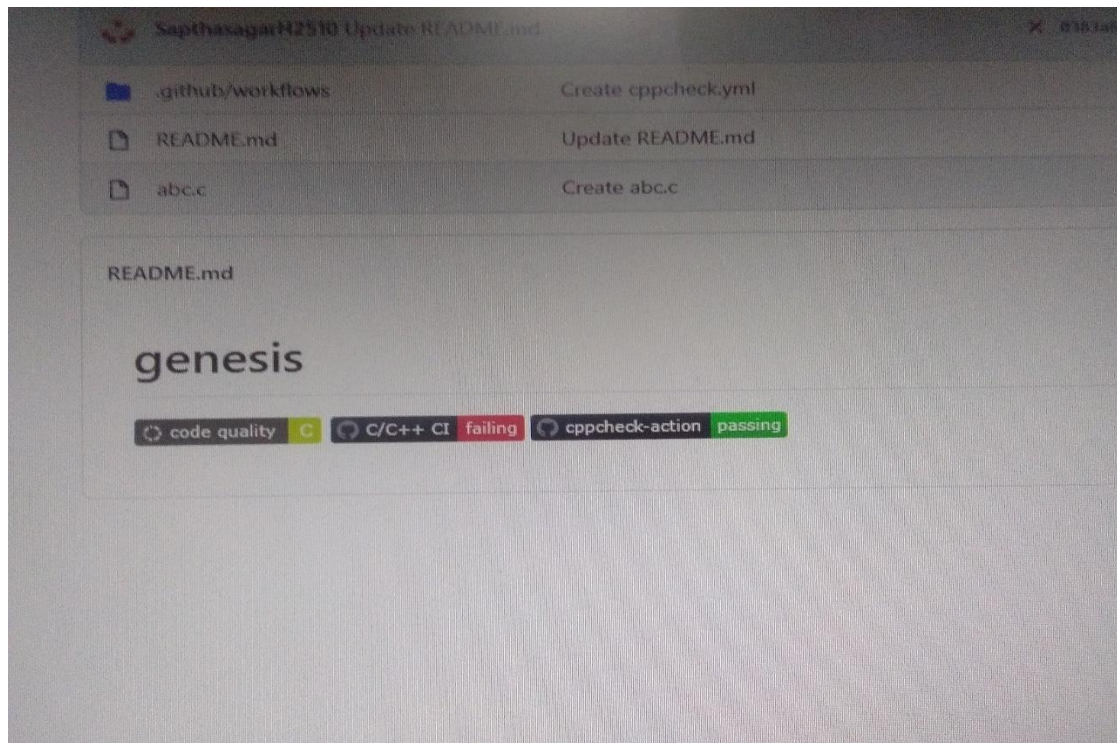
<b>ID</b>	<b>Description</b>	<b>Pre-condition</b>	<b>Expected input</b>	<b>Expected output</b>	<b>Actual output</b>
1	Bluetooth	Remove the pairing between smartphone and smartwatch.	Unpairing the smartwatch with the smartphone.	smartwatch app offers some offline functionality.	smartwatch app offers some offline functionality.
2	connectivity	Activate flight mode.	Activate flight mode on smartphone but not on the smartwatch.	Connection between the smartphone and watch will be lost. But the app must still work with the data that is available on the watch and popup an error text.	Connection between the smartphone and watch will be lost. But the app still works with the data that is available on the watch and popup an error text.
3	Notifications	Pushing a notification	Send all the supported push notification types to the smartphone and have a smartwatch paired.	All supported push types must be visible on the smartwatch. The information must be readable.	All supported push types are visible on the smartwatch. The information is readable.
4	Battery	Battery usage	Check the battery state during the	The battery consumption must be	The battery consumption is appropriate to its usage.

			testing activities.	appropriate to its usage.	
5	Gestures	Checking gestures	Test the different gestures.	All supported and used gestures must work.	All supported and used gestures are working.
6	Language	Changing language	Change the language of the smartphone.	Smartwatch will switch to language same as the mobile and same apply to the apps that are running on the watch.	Smartwatch will switch to language same as the mobile and same apply to the apps that are running on the watch.
7	Language	Changing language	Change the language of the smartphone that is not supported by the app.	Not supported languages must switch to the default app language on both sides.	Not supported languages must switch to the default app language on both sides.
8	<b>GPS</b>	Switching GPS off	If app relies on GPS data, switch GPS off.	The app must handle the state that GPS is off. The app must show a useful text to the user.	The app must handle the state that GPS is off. The app must show a useful text to the user.
9	Sensors	Testing sensors	Test all supported sensors	All supported sensors must work as expected.	All supported sensors must work as expected.
10	Inputs	Input methods	Test the different input	The supported input methods	The supported input methods



			methods like buttons, touch screen	must be working functionally.	are working functionally.
--	--	--	------------------------------------	-------------------------------	---------------------------

## 4.Git



10 results

Event	Status	Branch	Actor
✓ Update README.md cppcheck-action #4: Commit 0383a63 pushed by SapthasagarH2510	master	19 hours ago 39s	...
✗ Update README.md C/C++ CI #6: Commit 0383a63 pushed by SapthasagarH2510	master	19 hours ago 16s	...
✓ Update README.md cppcheck-action #3: Commit 09c1143 pushed by SapthasagarH2510	master	19 hours ago 36s	...
✗ Update README.md C/C++ CI #5: Commit 09c1143 pushed by SapthasagarH2510	master	19 hours ago 18s	...
✓ Merge pull request #1 from codacy-badger/codacy-bad... cppcheck-action #2: Commit 85e9e69 pushed by SapthasagarH2510	master	19 hours ago 55s	...
✗ Merge pull request #1 from codacy-badger/codacy-bad... C/C++ CI #4: Commit 85e9e69 pushed by SapthasagarH2510	master	19 hours ago 18s	...
✗ Add a Codacy badge to README.md C/C++ CI #3: Pull request #1 opened by codacy-badger	codacy-badger	19 hours ago 16s	...
✓ Create cppcheck.yml cppcheck-action #1: Commit c243169 pushed by SapthasagarH2510	master	19 hours ago 50s	...
✗ Create cppcheck.yml C/C++ CI #2: Commit c243169 pushed by SapthasagarH2510	master	19 hours ago 17s	...

## 5. Agile Aspects

### 5.1 User story

ID	Description
1	As a user and a professional swimmer, I want the smartwatch to be waterproof so that I can track my details like time taken to swim and distance covered and also the pace.
2	As a user, I want my smartwatch to be multitasking so that I can do check-list, write memos and reply to my calls.
3	As a user, I listen to music a lot so I want to control the music volume through my smartwatch and even change the songs.

### 5.2 Test Plans

ID	Description	Pre-condition	Expected input	Expected output	Actual output
1	Water proof	Checking waterproof use	Check whether the watch is functional even after it is under water	The watch is functional and waterproof up to 50m	The watch is functional and waterproof up to 50m
2	Apps	Checking apps	Assign several tasks at a time like memos, check-list.	The device is functional and working properly.	The device is functional and working properly.
3	Volume	Volume control through watch	Vary the volume of the music.	The volume control is functional.	The volume control is functional.

## **Activity 1 and 2**

### **1.Requirements**

#### **1.1 Definition:**

A device that performs logic and arithmetic digital operations based on numerical data which are entered by pressing numerical and control keys. Also known as calculating machine. A calculator is a device 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, logarithms, trigonometric functions, and hyperbolic functions.

#### **1.2 Research:**

##### **1.2.1 Aging and cost gradient**

- The first mainframe computers, using firstly vacuum tubes and later transistors in the logic circuits, appeared in the 1940s and 1950s. This technology was to provide a stepping stone to the development of electronic calculators.
- The Casio Computer Company, in Japan, released the Model 14-A calculator in 1957, which was the world's first all-electric (relatively) compact calculator. It did not use electronic logic but was based on relay technology, and was built into a desk.
- In October 1961, the world's first all-electronic desktop calculator, the British Bell Punch/ Sum lock Comptometer.
- By 1970, a calculator could be made using just a few chips of low power consumption, allowing portable models powered from rechargeable batteries. The first handheld calculator was a 1967 prototype called "Cal Tech", whose development was led by Jack Kilby at Texas Instruments in a research project to produce a portable calculator
- In 1971 Pico Electronics.<sup>[36]</sup> and General Instrument also introduced their first collaboration in ICs, a full single chip calculator IC for the Monroe Royal Digital III calculator. Pico was a spinout by five GI design engineers whose vision was to create single chip calculator ICs.
- Personal computers often come with a calculator utility program that emulates the appearance and functions of a calculator, using the graphical user interface to portray a calculator. One such example is Windows Calculator.

### 1.3 Defining System

- Provide operations for the user to select one at a time.
- Can be used to perform any process that consists of a sequence of steps each of which applies one of these operations.
- Can do some of the advanced calculations which normal calculators can't do like finding square root of the number, inverse and factorial of a given number.
- It can calculate power of a number where we have to declare the number and the value of the power.
- Conversion of currency from dollars to Indian rupees.
- It can also convert length from foot to inches.

### 1.3 SWOT Analysis:

#### Strengths:

- Innovation and design of calculator
- User friendly
- Made in India
- Fast and efficient results

#### Weakness:

- New at market
- Massive competition.

#### Opportunity:

- Increasing demand.
- Conversion operation is not available in normal calculator so it can make out a difference.

Threats:

- Lack of demand.
- Many competitors.
- Rapid technology growth.

## 1.5 Requirements

### 1.5.1 High level requirements

ID	Description
1	Minimum of 2 GB RAM
2	Windows 7 and more
3	Latest version of chrome
4	Intel i3 processor

### 1.5.2 Low level requirements

ID	Description
1	LAN or Wi-Fi
2	C compiler
3	Processor intel i3 and above
4	Latest version of chrome
5	Graphical User interface
6	Working keys

## 2.Design

### 2.1 High level diagrams

#### 2.1.1 Structural diagrams

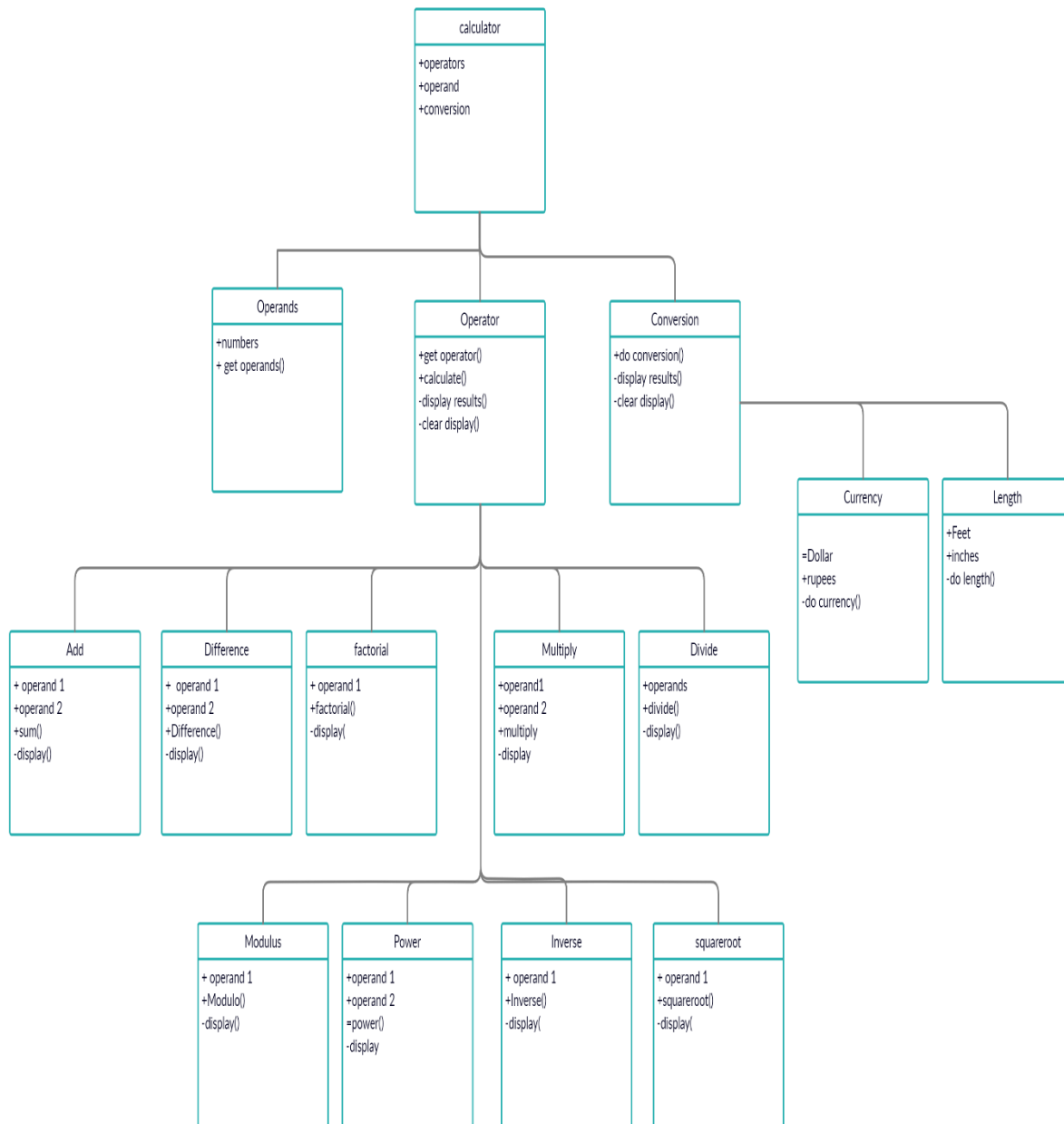


Fig 2.1.1.a Class diagram of calculator

## 2.1.2 Behavioral diagrams



Fig 2.1.2.a Use case diagram of the calculator



## 2.2 Low level diagram

### 2.2.1 Structural diagrams

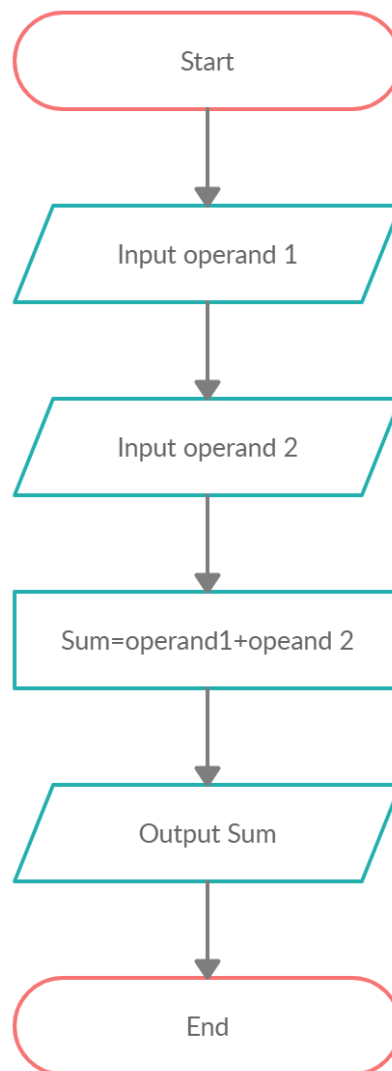


Fig 2.2.1.a Flowchart of addition operator

## 2.2.2 Behavioral diagrams

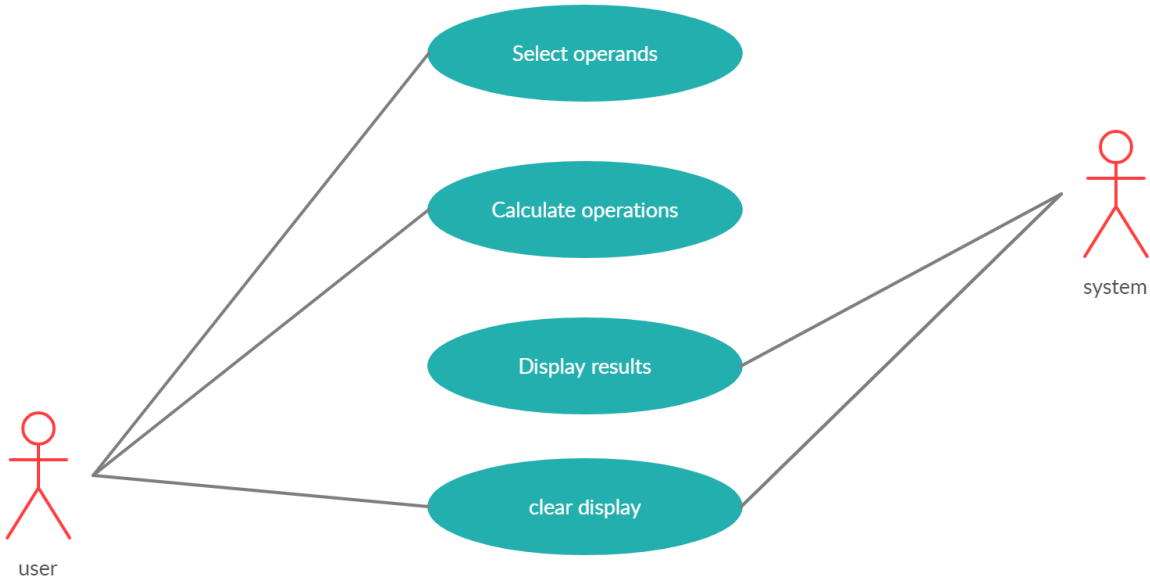


Fig 2.2.2.a Use case diagram of an operation

### 3.Test Plan

ID	Description	Pre-condition	Expected input	Expected output	Actual output
1	Numeric keys	Check if all the numeric keys are working.	Checking numeric keys from 0-9.	Every key should be functional.	Every key is functional and working properly.
2	Special Keys	Check if the arithmetic keys are working.	Checking every operational keys like ( +, -, *, %, / ) are working.	Every key should be functional.	Every key is functional and working properly.
3	Clear	Clearing display.	Select clear key.	The display screen should clear the previous outputs.	The display screen is cleared from the previous outputs.
4	Add	Checking Addition operation.	Give two numbers as inputs.	The Sum of two numbers should be displayed.	The sum of two numbers is displayed in the output screen.
5	Difference	Checking Subtraction operation.	Give two numbers as inputs.	The difference between two numbers should be displayed.	The difference between two numbers is displayed.
6	Multiplication	Checking Multiplication operation.	Take two numbers as inputs.	The Product of the numbers	The Product of the numbers

				should be displayed.	is displayed as output.
7	Division	Checking Division operation.	Take two numbers as inputs	The quotient of the given inputs should be displayed.	The quotient of the given inputs is displayed.
8	<i>Modulus</i>	Checking Modulus operation.	Take a number as input.	The modulus value of the input should be displayed.	The modulus value of the given input is displayed in output.
9	Square root	Checking Square root operation.	Take a number as input.	The Square root of a number should be displayed.	The Square root of the input is displayed.
10	Inverse	Checking Inverse operation.	Take a number as input.	The inverse of the number should be displayed.	The inverse of the number is printed as output.
11	Power	Checking power of a number operation.	Take two numbers as input and value of power.	The value of power of number should be displayed.	The value of power of the inputs is displayed as output.
12	Factorial	Checking Factorial of a number operation.	Take a number as input.	The factorial of the input number should be displayed.	The factorial of the input number is displayed.

13	Currency	Verifying Currency conversion	Give an amount as input in dollars.	Should convert the amount from dollars to Indian rupees.	The given amount in dollars is converted into rupees and printed as output display.
14	Length	Verifying Length conversion	Give length in foot as a input.	Should convert the length from foot to inches.	The given length in foot is converted into inches and displayed.
15	Copy	Checking copy and paste operation.	Copy a number and try to paste on inputs.	The copy and paste operation should be working functionally.	The copy and paste operation is working functionally.

## Activity 2

### 4.GIT

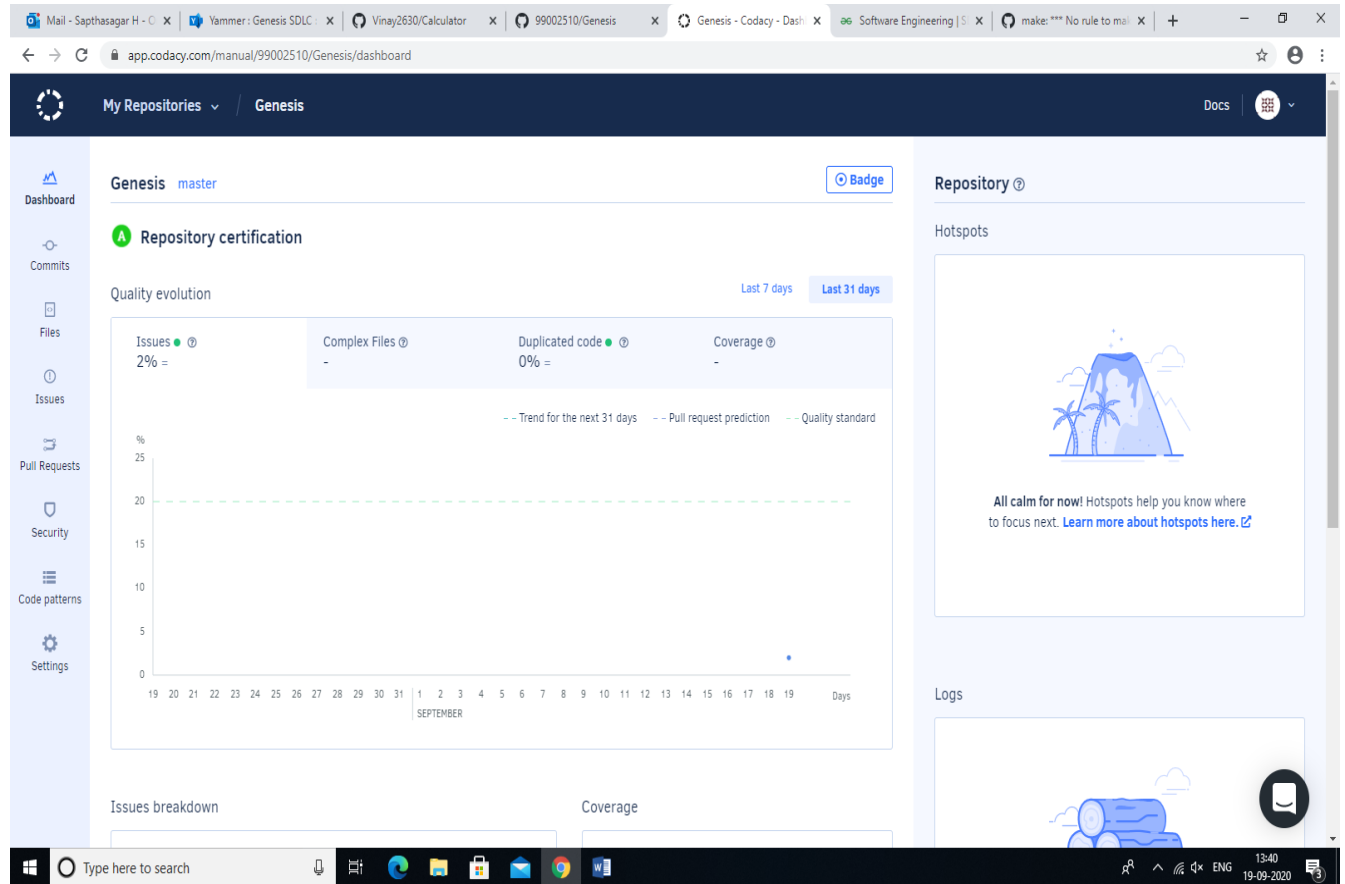


Fig 4.1 Code quality

<https://github.com/99002510/Genesis>

## References

1. <https://en.wikipedia.org/wiki/Calculator>
2. <https://www.stateworks.com>
3. [https://en.wikipedia.org/wiki/Software\\_calculator](https://en.wikipedia.org/wiki/Software_calculator)
4. <https://onecore.net/sample-test-cases-for-calculator.html>
5. [https://github.com/stepin654321/MiniProject\\_Template](https://github.com/stepin654321/MiniProject_Template)