

Report – Design and implementation of COVID management system in local hospitals.



L&T Technology Services



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Design and implementation of COVID management system in local hospitals

1. System or software development

1.1. Problem Statement

- To build a system which is used to count the Corona virus disease (COVID) cases on daily basis in local hospitals.
- To count various attributes related to covid as follows:
- Number of patients visited, Number of patients tested positive, number of patients tested negative, number of patients died, number of patients recovered, number of people who are home quarantined, number of patients revisited the hospital, number of patients revisited and has been tested positive and negative, number of people in hospital quarantined, number of people who completed isolation, number of people from different state and has been tested positive and negative, number of people infected from primary and secondary contact.

1.2. Research on the project

Coronavirus disease (COVID-19) is an infectious disease caused by a newly discovered coronavirus.

Most people infected with the COVID-19 virus will experience mild to moderate respiratory illness and recover without requiring special treatment. Older people, and those with underlying medical problems like

cardiovascular disease, diabetes, chronic respiratory disease, and cancer are more likely to develop serious illness.

The best way to prevent and slow down transmission is be well informed about the COVID-19 virus, the disease it causes and how it spreads. This needs a system which records the count on the daily basis of covid cases and various parameters associated.

According to the reports by WHO this virus spread is being rapidly growing. So the old style of recording through pen and paper may lead to missing of some important data due to human intervention. Hence there arose a demand for the system which manages the data and keeps the count of data on daily basis.

Hence proposed system can be implemented to satisfy all the demands and needs.

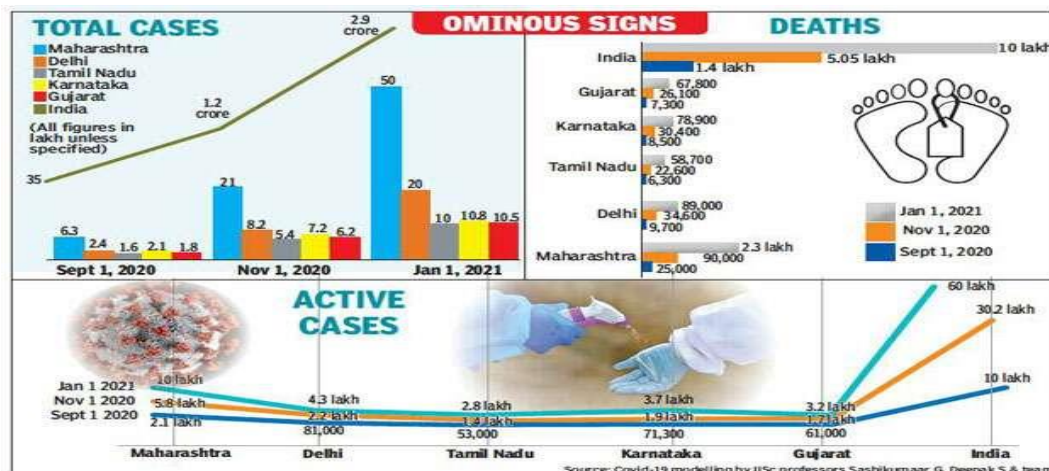


Fig 1.1: Rapidly growing corona cases in various states of India.

1.3 SWOT Analysis

Table 1.1: SWOT Analysis

<ul style="list-style-type: none"> • Strengths • Proper management of data. • Proper calculation of statics from data. • No loss of data. 	<ul style="list-style-type: none"> • Weakness • Network and connectivity issues. • Maintenance and Replacement is costly.
<ul style="list-style-type: none"> • Threats • Competitors both existing and new. • Expensive database. 	<ul style="list-style-type: none"> • Opportunities • Use of new technology to manage data easily. • Does not require more human intervention.

1.4 REQUIREMENTS

1.4.1 HIGH LEVEL REQUIREMENTS

Table 1.2: High level requirements

ID	Description
HL1	Patients visited
HL2	Patients infected
HL3	Patients died
HL4	Patients recovered
HL5	Patients revisited
HL6	Patients Quarantined
HL7	Patients from different state
HL8	Patients infected from contacting other people
HL9	Percentage calculation for parameters

1.4.2 LOW LEVEL REQUIREMENTS

Table 1.3: Low level requirements

ID	Description
HL1_L1	Addition of people visiting hospital
HL2_L1	Patients infected and tested positive after the test
HL2_L2	Patients visited the hospital and tested negative after the test
HL3_L1	Patients who had tested positive before and has died
HL4_L1	Patients who had tested positive before and has recovered
HL5_L1	Patients revisited the hospital and are tested positive
HL5_L2	Patients revisited the hospital and are tested negative
HL6_L1	Patients who have tested positive and are home quarantined

HL6_L2	Patients who have tested positive and are hospital quarantined
HL6_L3	Patients who have completed 14 days isolation
HL7_L1	Patients visiting from different state and being tested positive
HL7_L2	Patients visiting from different state and being tested negative
HL8_L1	Patients infected from primary contact
HL8_L2	Patients infected from secondary contact
HL9_L1	Percentage calculation of infected rate
HL9_L2	Percentage calculation of death rate
HL9_L3	Percentage calculation of recovery rate

2.0 Design

2.1 Structural design

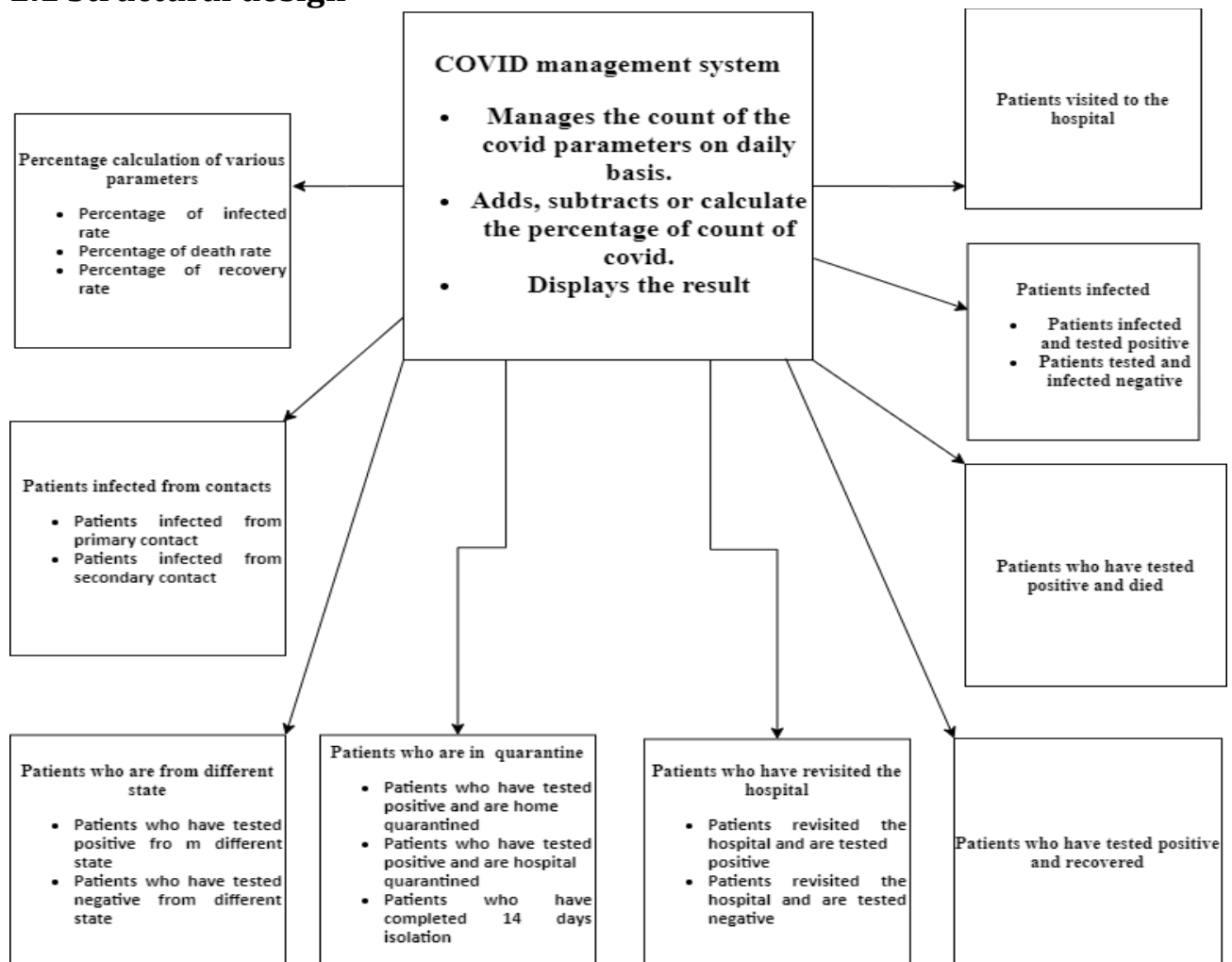


Fig 2.1: Class diagram for COVID management system

2.2 Behavioral design

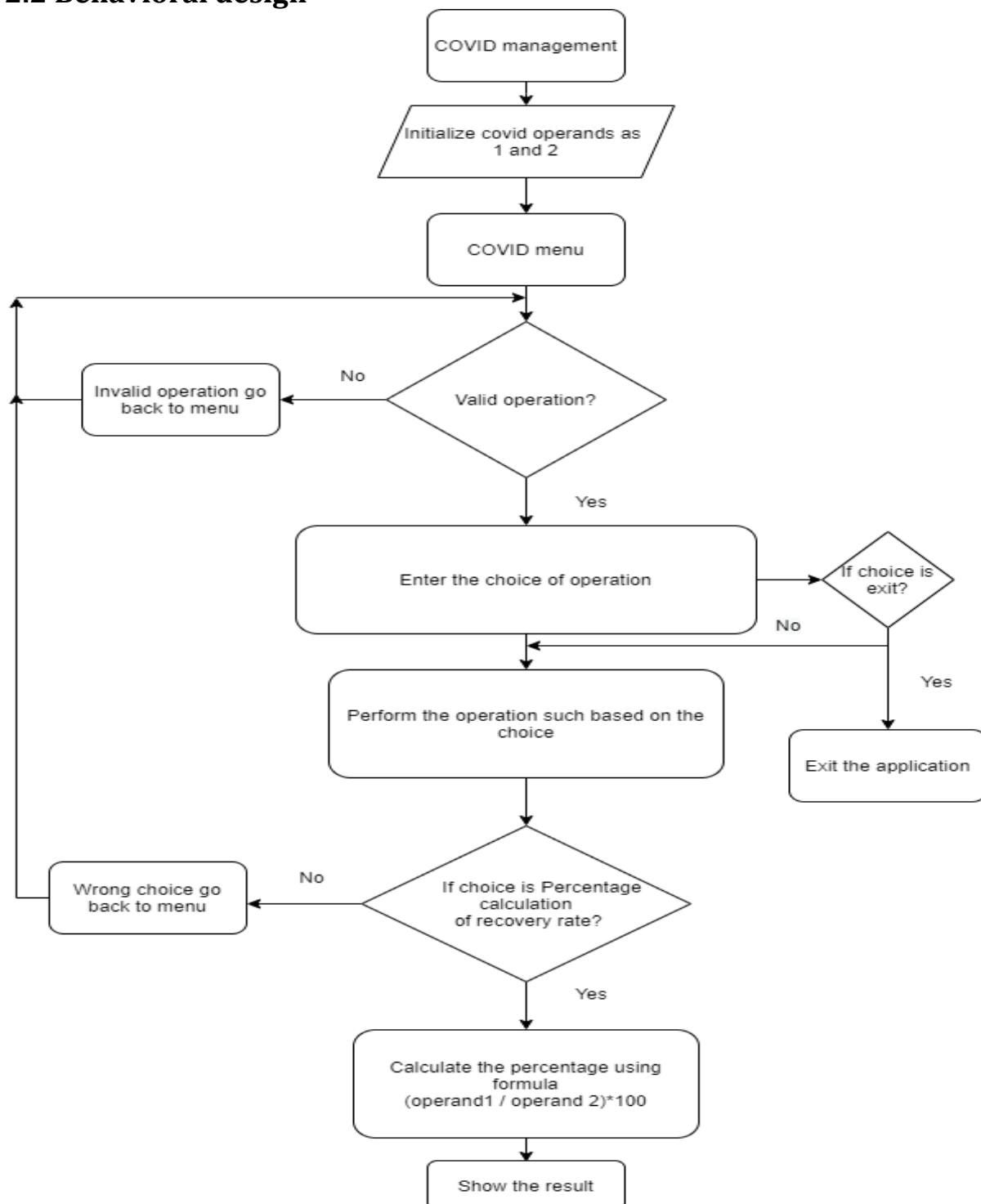


Fig 2.2: Flow chart to calculate the percentage calculation of recovery rate

3.0 Test plan

Table 3.1: Test plan for Covid management system

ID	Description	Pre-Condition	Expected Input	Expected Output	Actual Output
HL1_L1_1	Number of patients visited	Choose visits from all the covid operations	Two int operands	Sum of the two operands	
HL1_L1_1	Number of patients visited	Choose visits from all the covid operations	Any one operand is not valid	Error value as the return value	
HL2_L1_1	Number of patients visited and tested positive	Choose infected positive from all covid operations	Two int operands	Sum of the two operands	
HL2_L1_1	Number of patients visited and tested positive	Choose infected positive from all covid operations	Any one operand is not valid	Error value as the return value	
HL2_L2_1	Number of patients visited and tested negative	Choose infected negative from all covid operations	Two int operands	Subtract the two operands	
HL2_L2_1	Number of patients visited and tested negative	Choose infected negative from all covid operations	Any one operand is not valid	Error value as the return value	
HL3_L1_1	Number of patients tested positive and died	Choose infected positive and died from all operations	Two int operands	Sum of the two operands	
HL3_L1_2	Number of patients tested positive and died	Choose infected positive and died from all operations	Any one operand is not valid	Error value as the return value	
HL4_L1_1	Number of patients tested positive and recovered	Choose infected positive and recovered from all operations	Two int operands	Subtract the two operands	
HL4_L1_1	Number of patients tested positive and recovered	Choose infected positive and recovered from all operations	Any one operand is not valid	Error value as the return value	
HL5_L1_1	Number of patients revisited the hospital and tested positive	Choose revisited and positive from all operations	Two int operands	Sum of the two operands	
HL5_L1_2	Number of patients revisited the hospital and tested positive	Choose revisited and positive from all operations	Any one operand is not valid	Error value as the return value	
HL5_L2_1	Number of patients revisited the hospital and tested negative	Choose revisited and negative from all	Two int operands	Subtract the two operands	

		operations			
HL5_L2_2	Number of patients revisited the hospital and tested negative	Choose revisited and negative from from all operations	Any one operand is not valid	Error value as the return value	
HL6_L1_1	Number of patients who are home quarantined	Choose infected positive and home quarantined from all operations	Two int operands	Sum of the two operands	
HL6_L1_2	Number of patients who are home quarantined	Choose infected positive and home quarantined from all operations	Any one operand is not valid	Error value as the return value	
HL6_L2_1	Number of patients who are hospital quarantined	Choose infected positive and hospital quarantined from all operations	Two int operands	Sum of the two operands	
HL6_L2_2	Number of patients who are hospital quarantined	Choose infected positive and hospital quarantined from all operations	Any one operand is not valid	Error value as the return value	
HL6_L3_1	Number of patients who have completed 14 days isolation	Choose infected positive and completed 14 days isolation from all operations	Two int operands	Sum of the two operands	
HL6_L3_2	Number of patients who have completed 14 days isolation	Choose infected positive and completed 14 days isolation from all operations	Any one operand is not valid	Error value as the return value	
HL7_L1_1	Number of patients who are different state and tested positive	Choose infected positive from different state from all operations	Two int operands	Sum of the two operands	
HL7_L1_2	Number of patients who are different state and tested positive	Choose infected positive from different state from all operations	Any one operand is not valid	Error value as the return value	
HL7_L2_1	Number of patients who are different state and	Choose infected negative from	Two int operands	Sum of the two operands	

	tested negative	different state from all operations			
HL7_L2_2	Number of patients who are different state and tested negative	Choose infected negative from different state from all operations	Any one operand is not valid	Error value as the return value	
HL8_L1_1	Number of patients who are affected from primary contact	Choose infected from primary contact from all operations	Two int operands	Sum of the two operands	
HL8_L1_2	Number of patients who are affected from primary contact	Choose infected from primary contact from all operations	Any one operand is not valid	Error value as the return value	
HL8_L2_1	Number of patients who are affected from secondary contact	Choose infected from secondary contact from all operations	Two int operands	Sum of the two operands	
HL8_L2_2	Number of patients who are affected from secondary contact	Choose infected from secondary contact from all operations	Any one operand is not valid	Error value as the return value	
HL9_L1_1	Percentage of infected rate	Choose percentage of infected rate from all operations	Two non zero int operands	Percentage of two operands	
HL9_L1_2	Percentage of infected rate	Choose percentage of infected rate from all operations	Two int operands with divisor 0	Divide by 0 error	
HL9_L2_1	Percentage of death rate	Choose percentage of death rate from all operations	Two non zero int operands	Percentage of two operands	
HL9_L2_2	Percentage of death rate	Choose percentage of death rate from all operations	Two int operands with divisor 0	Divide by 0 error	
HL9_L3_1	Percentage of recovery rate	Choose percentage of recovery rate from all operations	Two non zero int operands	division of two operands	
HL9_L3_2	Percentage of recovery	Choose	Two int operands	Divide by 0 error	

	rate	percentage of recovery rate from all operations	with divisor 0		
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4.0 Test cases

Table 4.1: Test cases for Covid management system

ID	Description	Pre-Condition	Expected Input	Expected Output	Actual Output	Test Result
HL1_L1_1	Number of patients visited	Choose visits from all the covid operations	Two int operands visits(10, 20)	30	30	PASS
HL1_L1_1	Number of patients visited	Choose visits from all the covid operations	Two int operands visits(750, 7500)	8250	1500	FAIL
HL2_L1_1	Number of patients visited and tested positive	Choose infected positive from all covid operations	Two int operands positive(0, 3)	3	3	PASS
HL2_L1_1	Number of patients visited and tested positive	Choose infected positive from all covid operations	Two int operands positive(1000, 900)	1900	1	FAIL
HL2_L2_1	Number of patients visited and tested negative	Choose infected negative from all covid operations	Two int operands negative(10, 3)	7	7	PASS
HL2_L2_1	Number of patients visited and tested negative	Choose infected negative from all covid operations	Two int operands negative(1000, 900)	100	1	FAIL
HL3_L1_1	Number of patients tested positive and died	Choose infected positive and died from all operations	Two int operands died(20, 7)	27	27	PASS
HL3_L1_2	Number of patients tested positive and died	Choose infected positive and died from all operations	Two int operands died(100, 2500)	2600	1025	FAIL
HL4_L1_1	Number of patients tested positive and recovered	Choose infected positive and recovered from all operations	Two int operands recovered(16, 3)	13	13	PASS
HL4_L1_1	Number of patients tested positive and recovered	Choose infected positive and recovered from all operations	Two int operands recovered(1080, 900)	180	106	FAIL
HL5_L1_1	Number of patients	Choose revisited	Two int	56	56	PASS

	revisited the hospital and tested positive	and positive from all operations	operands revisitedpos(23, 33)			
HL5_L1_2	Number of patients revisited the hospital and tested positive	Choose revisited and positive from all operations	Two int operands revisitedpos(1900, 990)	1890	1999	FAIL
HL5_L2_1	Number of patients revisited the hospital and tested negative	Choose revisited and negative from all operations	Two int operands revisitedneg(80, 70)	10	10	PASS
HL5_L2_2	Number of patients revisited the hospital and tested negative	Choose revisited and negative from from all operations	Two int operands revisitedneg(1450, 900)	550	1999	FAIL
HL6_L1_1	Number of patients who are home quarantined	Choose infected positive and home quarantined from all operations	Two int operands homequarant(18, 70)	88	88	PASS
HL6_L1_2	Number of patients who are home quarantined	Choose infected positive and home quarantined from all operations	Two int operands homequarant(1450, 900)	550	1999	FAIL
HL6_L2_1	Number of patients who are hospital quarantined	Choose infected positive and hospital quarantined from all operations	Two int operands hospquarant(80, 20)	100	100	PASS
HL6_L2_2	Number of patients who are hospital quarantined	Choose infected positive and hospital quarantined from all operations	Two int operands hospquarant(1386, 800)	586	166	FAIL
HL6_L3_1	Number of patients who have completed 14 days isolation	Choose infected positive and completed 14 days isolation from all operations	Two int operands compisolation(8050, 50)	8100	8100	PASS
HL6_L3_2	Number of patients who have completed 14 days isolation	Choose infected positive and completed 14 days isolation from all operations	Two int operands compisolation(1550, 800)	750	1458	FAIL
HL7_L1_1	Number of patients who are different state and tested positive	Choose infected positive from different state from all operations	Two int operands diffstatepos(80, 100)	180	180	PASS
HL7_L1_2	Number of patients who are different state and tested positive	Choose infected positive from different state from all operations	Two int operands diffstatepos(2650, 200)	2850	2665	FAIL

HL7_L2_1	Number of patients who are different state and tested negative	Choose infected negative from different state from all operations	Two int operands diffstateneg(150, 100)	50	50	PASS
HL7_L2_2	Number of patients who are different state and tested negative	Choose infected negative from different state from all operations	Two int operands diffstateneg(2900, 200)	2700	2905	FAIL
HL8_L1_1	Number of patients who are affected from primary contact	Choose infected from primary contact from all operations	Two int operands primecon(800, 800)	1600	1600	PASS
HL8_L1_2	Number of patients who are affected from primary contact	Choose infected from primary contact from all operations	Two int operands primecon(1780, 200)	1980	3560	FAIL
HL8_L2_1	Number of patients who are affected from secondary contact	Choose infected from secondary contact from all operations	Two int operands seccon(900, 80)	980	980	PASS
HL8_L2_2	Number of patients who are affected from secondary contact	Choose infected from secondary contact from all operations	Two int operands seccon(2500, 40)	2540	2540	PASS
HL9_L1_1	Percentage of infected rate	Choose percentage of infected rate from all operations	Two int operands infectedrate(200, 200)	100	100	PASS
HL9_L1_2	Percentage of infected rate	Choose percentage of infected rate from all operations	Two int operands infectedrate(32, 500)	64	26	FAIL
HL9_L2_1	Percentage of death rate	Choose percentage of death rate from all operations	Two int operands deathrate(10, 20)	50	50	PASS
HL9_L2_2	Percentage of death rate	Choose percentage of death rate from all operations	Two int operands deathrate(8, 32)	25	32	FAIL
HL9_L3_1	Percentage of recovery rate	Choose percentage of recovery rate from all operations	Two int operands recoveryrate(30, 40)	75	75	PASS
HL9_L3_2	Percentage of recovery rate	Choose percentage of recovery rate from all operations	Two int operands recoveryrate(400, 100)	40	200	FAIL

5.0 REFERENCES

1. https://www.who.int/emergencies/diseases/novel-coronavirus-2019?gclid=CjwKCAjwh7H7BRBBEiwAPXjadhjzgsODRX4AOjdcZzMG83HwVn88f4AFoBTIOChppcXxt11HgziFiRoC1mkQAvD_BwE
2. <https://www.guru99.com/test-case.html>
3. <https://softwaretestingfundamentals.com/test-plan/>
4. https://www.researchgate.net/figure/SWOT-Analysis-results-after-decentralization-process_tbl2_273851878
5. <https://timesofindia.indiatimes.com/city/bengaluru/worst-case-scenario-india-to-have-35l-cases-by-sept-1/articleshow/76987434.cms>