

TEAM ID	PNT2022TMID11093
PROJECT NAME	IOT BASED SAFETY GADGET FOR CHILD SAFETY MONITORING AND NOTIFICATION
IBM ID	IBM-Project-6309-1658826065

## INTRODUCTION:

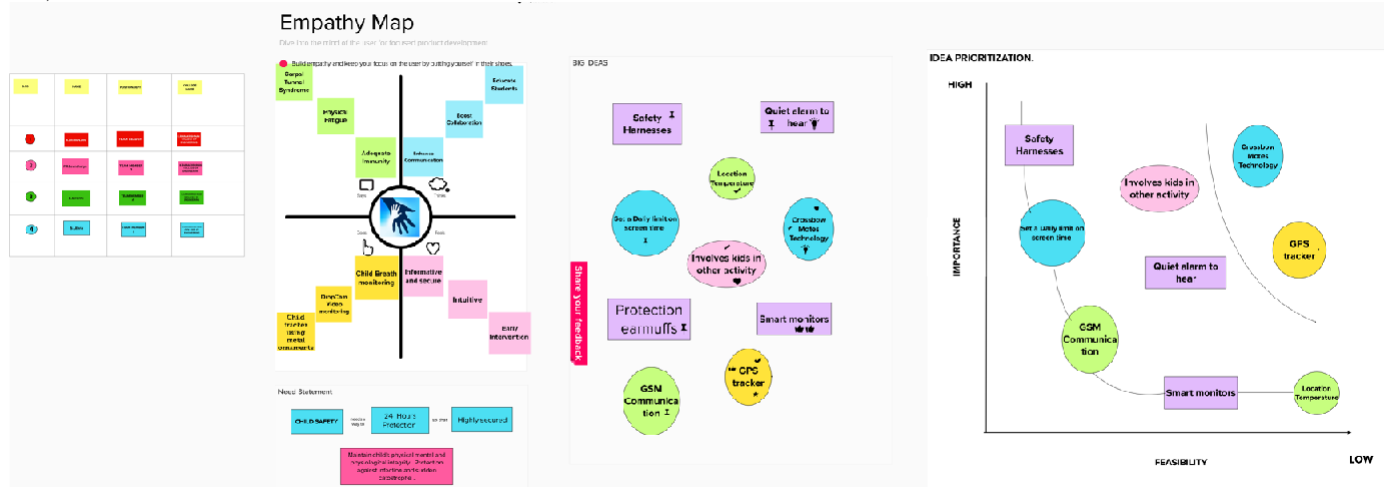
The internet of things (IoT) refers to the set of devices and system that stay interconnected with real-world sensor and to the internet. During years' Child safety is under threat and it is very important to provide a technology-based solution which will help them under panic situations and monitor them using a smart gadget. The proposed system is equipped with GSM and GPS modules for sending and receiving call and SMS between safety gadget and parental phone, the proposed system also consists of Wi-Fi module used to implement IoT and send all the monitoring parameters to the cloud for android app monitoring on parental phone. Android application can be used to track the current location of safety gadget using its location coordinates on parental phone android app and also via SMS request from parent phone to safety gadget. Panic alert system is used during panic situations and automatic SMS alert and phone call is triggered from safety gadget to the parental phone seeking for help and also monitored for plug and unplug from hand, as soon the gadget is unplugged from hand a SMS is triggered to parental phone and the alert parameter is also updated to the cloud.

## 1)IDEATION PHASE

### 1.1)EMPATHY MAP:



## 1.2) IDEATION:



## 1.3) LITERATURE SURVEY:

### IOT BASED SAFETY GADGET FOR CHILD SAFETY MONITORING & NOTIFICATION

#### TEAM DETAILS:

Team Name:

Team Leader:

○ Sri Ranjani K, Department of ECE

Team Members:

○ Sowndharya.P.R, Department of ECE

○ Uthra S, Department of ECE

○ Swarna E, Department of ECE

#### Project Info:

#### System Required:

RAM-Minimum 4GB Processor-Min. Configuration OS-Windows/Linux/MAC

#### Description:

Child tracker helps the parents in continuously monitoring the child's location. They can simply leave their children in school or parks and create a geofence around the particular location. By continuously checking the child's location notifications will be generated if the child crosses the geofence. Notifications will be sent according to the child's location to their parents or caretakers. The entire location data will be stored in the database.

#### Literature Survey:

- D M. Nandini Priyanka, Smart IoT Device for Child Safety and Tracking and Exploring Engineering (IJITEE) "International Journal of Innovative Technology". Child safety and tracking is a major concern as the more number of crimes on children are reported nowadays. With this motivation, a smart IoT device for child safety and tracking is developed to help the parents to locate and monitor their children. The system is developed using Linkit ONE board programmed in embedded C and interfaced with temperature, heartbeat, touch sensors and also GPS, GSM & digital camera modules. The novelty of the work is that the system automatically alerts the parent/caretaker by sending SMS, when immediate attention is required for the child during emergency. The parameters such as touch, temperature & heartbeat of the child are used for parametric analysis and results are plotted for the same. The above system ensures the safety and tracking of children.

- D Lai Yi Heng, IoT-based Child Security Monitoring System, Asia Pacific University of Technology and Innovation, Technology Park, Bukit Jalil, Kuala Lumpur, Malaysia.

Children's involvement in crime is on the rise today, which makes people more concerned about child protection. The goal of this research is to suggest an Internet of Things-based smart band for child safety. Data collection techniques include semi-structured interviews and online questionnaires. By providing questions electronically and requiring respondents to submit their responses online, the online survey collects feedback. In a semistructured interview, the researcher meets the respondents and poses some preset questions while posing others that were not before thought of. A smart band has been proposed to monitor children's safety based on the information obtained. Parents can take action if something goes wrong because they are aware of what is going remotely thanks to this. In the future, this device will be improved by adding features and software to create.

- D Mr. Raghavendrachar S, Wearable Safety Device for Children, Published by IJRASET in the year of 2022-04-13.

In recent years, attacks on children have increased at an unprecedented rate, leaving the victims in dangerous situations with little opportunities to contact their relatives. The major objective of this project is to develop a child-safe smart wearable device that makes use of cutting-edge technologies. This tactic is therefore seen as the children's wearable sending an SMS to their parents or guardians. Through the use of a GSM module, this initiative uses cutting edge technology to protect the child, making sure that they do not feel alone as they cope with such societal difficulties. The wearable will have an Arduino Nano, GSM, GPS, temperature sensor, heartbeat sensor, and a panic button.

- U Kaushik Gupta, Child Monitoring System – IAGSY, Student, Department Of Information Technology, Thakur Shyamnarayan Degree College, Mumbai, Maharashtra, India in the year of april 2022.

Today's environment is dependent entirely on technology, thus author ought to be ready to address any issue with contextually appropriate IT solutions. This concept suggests a clever Internet of Things-based gadget that can lessen parents' anxiety over knowing the whereabouts of their kids in real-time. The project's goal is to develop a system that will enable parents to monitor their kids when they aren't in their immediate care. This is accomplished by having the child wear a covert WTPS-enabled device that is linked to the parents' smartphone over a mobile network. This child monitoring device enables remote monitoring or tracking of the youngster and their activities. This mechanism has a crucial function. It keeps tabs on the kids' security.

11. Anwaar Al-Lawati, RFID-based System for School Children Transportation Safety Enhancement, Proceedings of the 8th IEEE GCC Conference and Exhibition, Muscat, Oman, 1-4 February, 2015.

In order to improve child safety during everyday transit to and from school, this paper describes a system to track pick-up and drop-off of school children. The bus unit and the school unit are the two basic components of the system. When a child enters or exits the bus, the equipment on the bus can detect it. This information is given to the school department, which determines which of the kids missed the bus or got off early and sends out an alert message in response. A web-based database-driven application that was designed for the system facilitates management and gives authorised individuals relevant information about the kids. To verify the functionality of the suggested system, a full prototype was created and put to the test.

12. Prakriti Agarwal, Survey on Child Safety Wearable Device Using LoT Sensors and Cloud Computing, International Journal of Innovative Science and Research Technology, February 2020.

Due to a child's fragility and the greater prevalence of crimes against children, child safety is a key concern in any community. In order to help parents assure their children's safety, a smart wearable Internet of Things sensor network for tracking a child's environment can be created. Additionally, a method for tracking the child must be included. The fact that this wearable device can be accessible from any mobile device and doesn't require a lot of technological expertise from the user to use is a benefit of its design. This device's objective is to make it easier for a parent or guardian to find their child and ensure their well-being.

13. N. Manjunatha, IoT Based Smart Gadget for Child Safety and Tracking, International Journal of Research in Engineering, Science and Management Volume-3, Issue-6, June-2020.

This study focuses on designing a device that can track a child's whereabouts using GPS, as well as having a panic button that can warn

the parent by using a GSM module to call for help. Android parental software is created to control and track the device at any time. Smart gadget device is always linked to parental phone, which can receive and make calls as well as send and receive SMS on gadget via GSM module. Wireless technology is also implemented on device, which is useful to find the gadget within a region of monitoring range; if gadget moves out of monitoring range, alert will be triggered on finding gadget, helping you keep a virtual eye on child.

14. Dipali Badgujar, Smart and Secure IoT based Child Monitoring System, INTERNATIONAL RESEARCH JOURNAL OF ENGINEERING AND TECHNOLOGY.

IoT is continually improving, and at the same time, its security is improving. In this proposed system, the primary focus is on child remote monitoring. We also use radar devices and obstacle sensors to detect alerts when children enter danger zones or are approaching dangerous objects. Alerts are then sent to the caregiver via mobile device in the form of an alarm or notification. We use a basic necklace that is handed to the baby for sensing purposes, with a waterproof ultrasonic obstacle sensor installed inside of it so that the locket may inform the caregiver via a mobile device, and a solar panel for battery backup.

15. Mohammad Jahangir Alam, Child tracking and hidden activities observation system through mobile app, Indonesian Journal of Electrical Engineering and Computer Science, June 2021.

Information technology is causing the world to change quickly, and everyone is working hard to keep up with this race through their

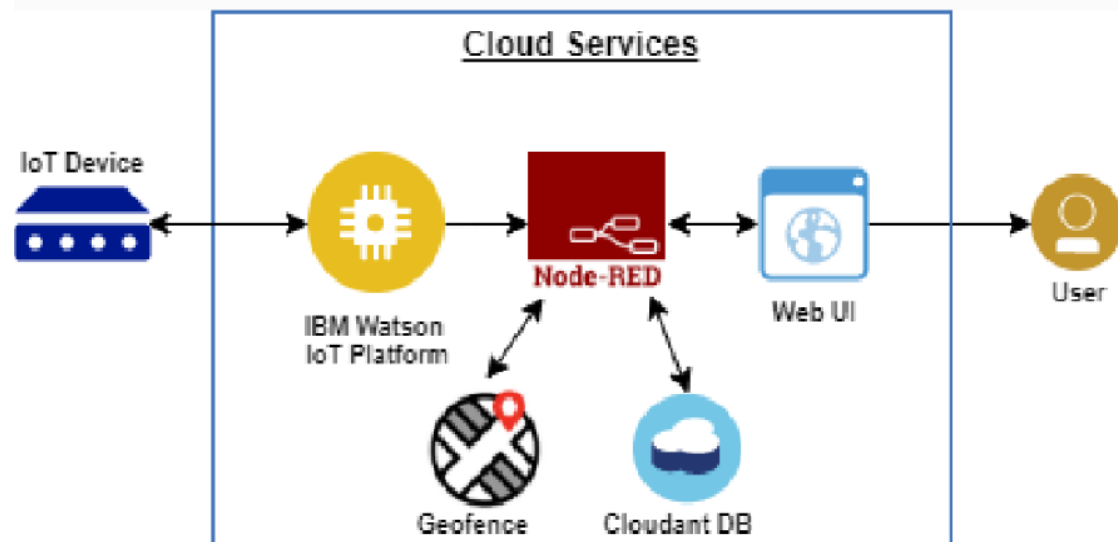
employment and businesses. Nowadays, parents spend more time at work than they do at home, yet they are constantly concerned and afraid for their kids because of the misuse of technology and the law and order situation in the nation. In order to relieve their burden, parents want to be able to follow and monitor their child's whereabouts and activities from any location. But due to a variety of factors, it is not always possible for parents to personally watch over their children. This study outlines a technology that will enable parents to track their kids' whereabouts and activity using a mobile phone.

- Diagambar Tachav, Missing Person Detection System in IoT, 2017 International Conference on Computing, Communication, Control and Automation (ICCCUEEA).

The rate of missing persons has increased as a result of India's rapid economic expansion. India needs to pay special attention to finding the missing and recognising them in order to reduce the number of people who go missing. The Internet of Things (IoT) is a collection of mechanical, electronic, and human devices that are linked together and equipped with the ability to share data. The Internet of Things (IoT) is a network of sensors where data is transferred over a system without the need for any type of human-to-human or human-to-PC connection. We suggest an innovative IoT platform for missing person detection. The suggested structure would be implemented over the entire smart city or region. This framework allows for the identification of missing people, the transmission of live photographs of those who have been found missing.

## 2)PROJECT DESIGN PHASE-I:

### 2.1)ARCHITECTURE:



## 2.2)PROBLEM SOLUTION-FIT:

IOT Based Smart Waste Management for Metropolitan cities					
<p>Define CS, fit into CC</p> <p>Focus on J&amp;P, tap into C</p> <p>Identify strong TR &amp; EM</p>	<b>1. CUSTOMER SEGMENT(S)</b> <b>CS</b> Who is your customer? <b>Adults of every house who wants to have clean space are our customer.</b>	<b>6. CUSTOMER CONSTRAINTS</b> <b>CC</b> What constraints prevent your customers from taking action or limit their choices of solutions? <b>As it is a web app it needs network to work properly it is effective without network connection.</b>	<b>5. AVAILABLE SOLUTIONS</b> <b>AS</b> Which solutions are available to the customers when they face the problem or need to get the job done? What have they tried in the past? What pros & cons do these solutions have? <b>When the notification option is not working then the customer can send call or message to customer care number.</b>	Explore AS, differentiate	
	<b>2. JOBS-TO-BE-DONE / PROBLEMS</b> <b>J&amp;P</b> Which jobs-to-be-done (or problems) do you address for your customers? <b>Growing pressure in outdated waste management infrastructures, with declining level of capital investment and maintenance.</b>	<b>9. PROBLEM ROOT CAUSE</b> <b>RC</b> What is the real reason that this problem exists? What is the back story behind the need to do this job? <b>This problem arises due to the over usage of things and that causes the dumping of wastes in home and the respective house owners throws those wastes in street.</b>	<b>7. BEHAVIOUR</b> <b>BE</b> What does your customer do to address the problem and get the job done? <b>The sensor senses the level of waste in the bin and sends the notification to the authority to collect the waste if the bin is full.</b>	Focus on J&P, tap into C	
	<b>3. TRIGGERS</b> <b>TR</b> What triggers customers to act? i.e. seeing their neighbour installing <b>Seeing how neighbours are having a clean environment after installing it people will be waiting for getting it installed in each house.</b>	<b>10. YOUR SOLUTION</b> <b>SL</b> If you are working on an existing business, write down your current solution first, fill in the canvas, and check how much it fits reality. If you are working on a new business proposition, then keep it blank until you fill in the canvas and come up with a solution that fits within customer limitations, solves a problem and matches customer behaviour. <b>Our Solution is to manage the waste efficiently by indicating the garbage level to the user as well as authenticated person to collect it and proceed to further process with the garbage.</b>	<b>8. CHANNELS of BEHAVIOUR</b> <b>CH</b> ONLINE What kind of actions do customers take online? <b>If it is in online mode, if the bin is full it sends a message to the customer and then the customer can intimate to the authority.</b>	Extract online & offline CH or BE	
	<b>4. EMOTIONS: BEFORE / AFTER</b> <b>EM</b> How do customers feel when they face a problem or a job and afterwards? <b>Before due to dumping of waste people would feel unhygienic and smell produced by the waste will make people live an unhealthy life.</b> <b>After installing they will feel at ease as it provides a clean home</b>		OFFLINE What kind of actions do customers take offline? <b>If it is in offline mode, the waste collecting truck collects garbage from home.</b>		

## 2.3)PROPOSED SOLUTION TEMPLATE:

**Project Design Phase-I**  
**Proposed Solution Template**

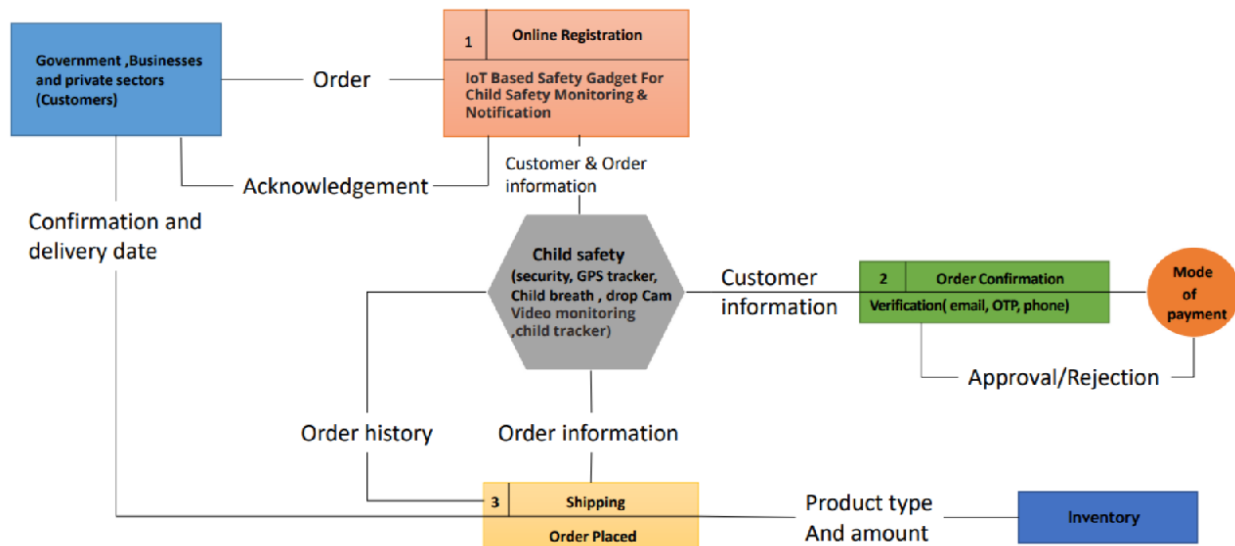
Date	30 September 2022
Team ID	PNT2022TMD11093
Project Name	IOT based safety gadget for child safety monitoring and notification
Maximum Marks	7 Marks

**Proposed Solution Template:**  
Project team shall fill the following information in proposed solution template.

S.No.	Parameter	Description
1.	Problem Statement (Problem to be solved)	Economic condition and aims to focus on their child's future and career, we provide an IOT based gadget for child safety monitoring and Notification.
2.	Idea / Solution description	Android-based remedy for real-time monitoring of youngsters by their parents. Various gadgets are connected via internet channels with a single device. The concerned gadget has an internet connection to the server.
3.	Novelty / Uniqueness	Child safety measures that contain two major gadgets: BLE and smart devices. Listener apparatus The system also has an Android application. Specifically, the Parental app that will be created and deployed on family phone.
4.	Social Impact / Customer Satisfaction	The parents can use tool to track their in real time or to protect women. The suggested remedy moves the problem location offering from the GSM module. It permits the parents to receive the whereabouts of their child through SMS.
5.	Business Model (Revenue Model)	<ul style="list-style-type: none"> <li>GPS Tracking</li> <li>Health Monitoring System</li> <li>Panic alert systems</li> <li>Web camera monitoring system</li> </ul>
6.	Scalability of the Solution	Small solar panels can be installed to change the system. For maximizing the power of a smart device's battery and backup batteries

### 3)PROJECT DESIGN PHASE-II:

#### 3.1)DATA FLOW DIAGRAM:



#### 3.2)FUNCTIONAL AND NON FUNCTIONAL REQUIREMENTS:

##### Project Design Phase-II Solution Requirements (Functional & Non-functional)

Date	11 October 2022
Team ID	PNT2022TMID11093
Project Name	IOT BASED DEVICE FOR CHILD SAFETYMONITORING AND NOTIFICATION
Maximum Marks	4 Marks

##### Functional Requirements:

Following are the functional requirements of the proposed solution.

FR No.	Functional Requirement (Epic)	Sub Requirement (Story / Sub-Task)
FR-1	User Requirements	A smart device will be given to the parents/guardian in order to ensure the safety of the children.
FR-2	User Registration	Manual Registration Through a Website or Gmail
FR-3	User Confirmation	Phone Confirmation Email confirmation OTP authentication
FR-4	Payments options	No payment required
FR-5	Product Delivery and installation	The installation fee will be determined with respect to the circumstances of the children and the parent.
FR-6	Product Feedback	Through a website via Gmail



### Non-functional Requirements:

Following are the non-functional requirements of the proposed solution.

FR No.	Non-Functional Requirement	Description
NFR-1	Usability	Have clear product instructions and a self-explanatory product that is simple to use.
NFR-2	Security	Cloud data must be contained within the network, collapsing to be avoided, Real-time avoidance should be avoided, and the device will be constantly monitored.
NFR-3	Reliability	Hardware is frequently tested.
NFR-4	Performance	The smart device will provide a better user experience and deliver accuracy output.
NFR-5	Availability	All of the functions that the user demands will be provided, depending on the needs of the consumer.

### 3.3) TECHNOLOGY ARCHITECTURE:



### 3.4) JOURNEY MAP:



### 4) PROJECT PLANNING PHASE:

#### 4.1)MILESTONE & ACTIVITY LIST:

##### MILESTONE LIST AND ACTIVITY LIST



Date	09 <sup>th</sup> NOVEMBER 2022
Team ID	PN120221MD11093
Project Name	IOT based safety Gadget for child safety monitoring and notification
Maximum Marks	2 Marks

Milestone Name	Activities	Milestone Number	Description	Completion Date	Status
Prerequisites			Create the IBM account and download the necessary software for your chosen category of the project	28/08/2022	Completed
Ideation Phase	Literature Survey	1	Literature survey on the selected project by gathering and referring research paper and publications	17/09/2022	Completed
	Empathy Map	1	Create an empathy map that list the user's pains and gains	16/10/2022	Completed
Project Phase -1	Solution Architecture	2	Prepare Solution architecture diagram for the proposed solution	01/10/2022	Completed
	Problem Solution Fit	2	Prepare Solution Fit Document for the proposed solution	01/10/2022	Completed
Project Phase -2	Customer Journey Map	3	Prepare a customer journey map to understand how the user interact and experience your product	08/10/2022	Completed

	Data Flow Diagram	3	Draw the data flow diagram for you proposed solution	16/10/2022	Completed
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	Solution Requirements	3	Create a solution requirement document for the proposed solution	11/10/2022	Completed
	Technology Stack	3	Prepare the technology stack diagram for the proposed solution	16/10/2022	Completed
Project Planning	Milestone And Activity List	4	Create a document to show your milestones as well as activity in your development cycle	08/11/2022	Completed
	Sprint Delivery Plan	4	Create a sprint plan for the project	07/11/2022	Completed
Project Development Phase	Sprint-1	5	Delivery of the sprint-1	09/11/2022	On Going
	Sprint-2	6	Delivery of the sprint-2	09/11/2022	On Going
	Sprint-3	7	Delivery of the sprint-3	14/11/2022	On Going
	Sprint-4	8	Delivery of the sprint-4	19/11/2022	On Going

#### 4.2)SPRINT DELIVERY:

**Project Planning Phase**  
**Project Planning Template (Product Backlog, Sprint Planning, Stories, Story points)**

Date	20 October 2022
Team ID	PNT2022/MII11093
Project Name	Project- IoT Based Safety Gadget for Child Safety Monitoring & Notification
Maximum Marks	8 Marks

**Product Backlog, Sprint Schedule, and Estimation (4 Marks)**

Use the below template to create product backlog and sprint schedule

Sprint	Functional Requirement (Epic)	User Story Number	User Story / Task	Story Points	Priority	Team Members
Sprint 1	User Registration	USN-1	Registration through website Registration through app	2	High	K SRI RANJANI
Sprint-1	User Confirmation	USN-2	Confirmation via Email Confirmation via OTP	1	High	P.R. SOWNDHARIYA
Sprint-2	User login	USN-3	Setting up User Id and password	2	Low	S UTHRA
Sprint 2	App permission	USN-4	Grant the permission for the app to access location, contact etc..	2	Medium	E SWARNA
Sprint-3	Interface with the Device	USN-5	Connecting the device with the registered app with the device ID.	1	High	K SRI RANJANI P R SOWNDHARIYA

Sprint	Functional Requirement (Epic)	User Story Number	User Story / Task	Story Points	Priority	Team Members
Sprint-3	Setting Geo-location	USN-6	Creating the Geo-location area in the map	2	Low	S UTHRA
Sprint-4	Database	USN-7	Location history is stored in the cloud Can be accessed from the dashboard.	2	High	E SWARNA
Sprint-4	Tracking location	USN-8	Tracking the location through app. Tracking the location through website.	2	High	K SRI RANJANI

**Project Tracker, Velocity & Burndown Chart: (4 Marks)**

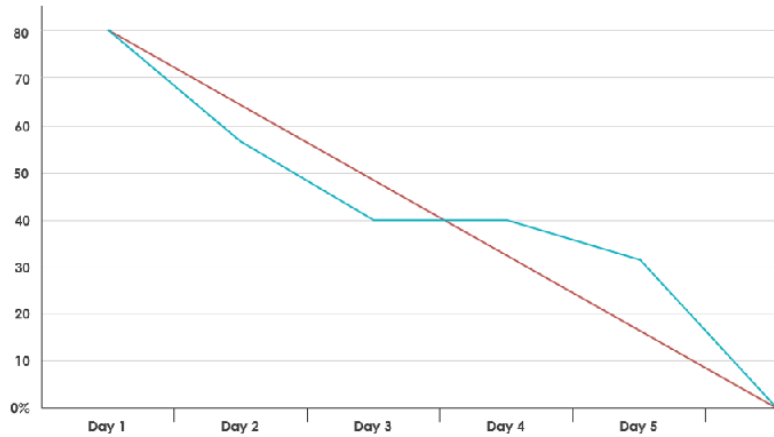
Sprint	Total Story Points	Duration	Sprint Start Date	Sprint End Date (Planned)	Story Points Completed (as on Planned End Date)	Sprint Release Date (Actual)
Sprint-1	20	6 Days	24 Oct 2022	29 Oct 2022	20	05 Nov 2022
Sprint-2	20	6 Days	31 Oct 2022	06 Nov 2022	20	08 Nov 2022
Sprint-3	20	6 Days	07 Nov 2022	12 Nov 2022	20	14 Nov 2022
Sprint-4	20	6 Days	14 Nov 2022	19 Nov 2022	20	19 Nov 2022

Velocity:

$$AV = \frac{\text{sprint duration}}{\text{velocity}} = \frac{20}{10} = 2$$

Imagine we have a 10-day sprint duration, and the velocity of the team is 20 (points per sprint). Let's calculate the team's average velocity (AV) per iteration unit (story points per day)

**BURN DOWN CHART :**



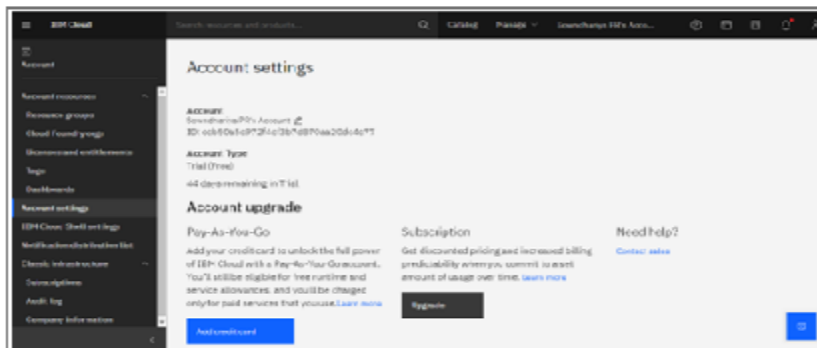
## 5)PREREQUISTES:

### IBM CLOUD SERVICE

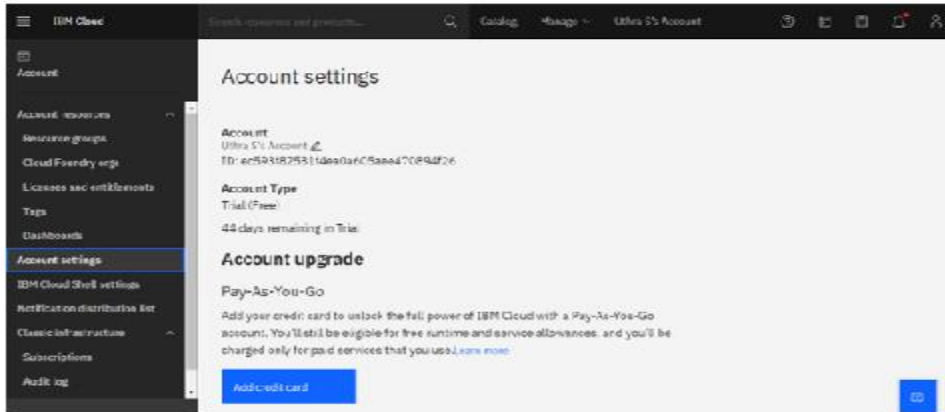
K.SRIRANJANI'S ACCOUNT



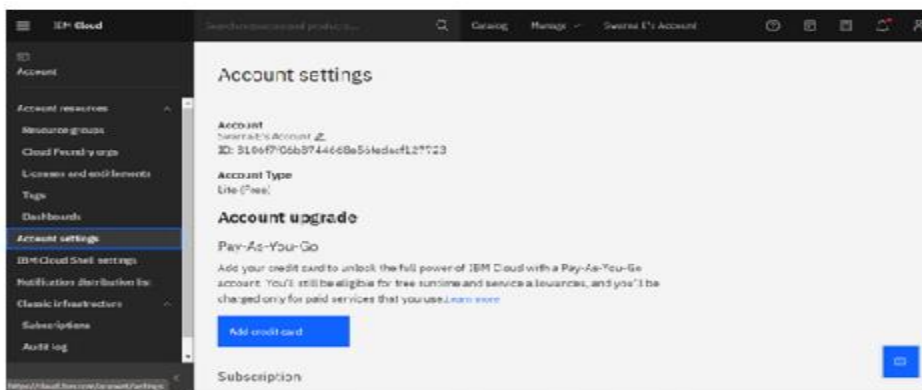
PR. SOWNDHARIYA'S ACCOUNT



S.UTHRA'S ACCOUNT



F SWARNA'S ACCOUNT



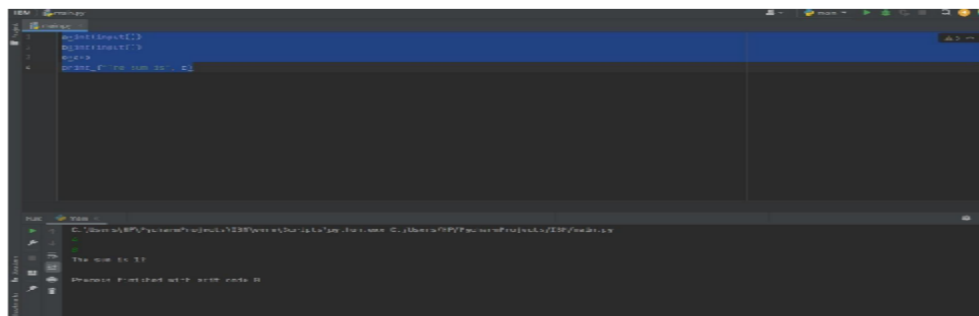
## 6)PYTHON SCRIPT:

### DEVELOP A PYTHON SCRIPT

Date	21-10-2022
Team ID	PNT2022TMID11093
Project Name	IOT based safety gadget for child safety monitoring and notification
Maximum Marks	4 Marks
Submitted By	K SRI RANJANI PR SOWNDHARIYA S UTHRA E SWARNA

#### SCRIPT:

```
s=int(input())
b=int(input())
c=a+b
print ("The sum is", c)
```



## **CONCLUSION:**

This research demonstrates Smart IoT device for child safety and tracking, to help the parents to locate and monitor their children. If any abnormal readings are detected by the sensor, then an SMS and phone call is triggered to the parents mobile. Also, updated to the parental app through the cloud. The system is equipped with GSM and GPS modules for sending and receiving call, SMS between safety gadget and parental phone. The system also consists of Wi-Fi module used to implement IoT and send all the monitored parameters to the cloud for android app monitoring on parental phone. Panic alert system is used during panic situations alerts are sent to the parental phone, seeking for help also the alert parameters are updated to the cloud. Boundary monitoring system is implemented on safety gadget with the help of BEACON technology, as soon as the safety gadget moves far away from the BLE listener gadget an alert is provided to itself.

## **DEMO LINK:**

**<https://youtu.be/w-f0Rb9oVNA>**