**IOT Based Health and location Tracking System**

****

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**Project Title:**

IOT Based Health and location Tracking System

**Project description:**

This project helps the headquarters of the army to track the location and become a solider in the war health status. We use IOT devices to track and obtain soldier's health status. Our main concern is to provide protection in the war to the army if anything happens to it. The soldier of the army wears a gadget based on IOT. Our work focuses on tracking the soldier's location with secure communication that is useful for controlling room station to know the soldier's exact location and will guide them accordingly. Control unit uses GPS to find the soldier. If he lost in the battlefield, it is important for the base station to direct the soldier on the right path.

**Method For Requirements Specification:**

* Structured Natural language

**Functional Requirements:**

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| **1** | **Title:** | **Add new soldier (Web panel)** |
| Description: | | User can add soldier details into database |
| Input: | | Click on add soldier button and then input soldier name, father name, address, qualification, phone number, date, Army registration no, rank, device id. |
| Output: | | Display soldier successfully added message. |
| Pre-condition: | | Open All Soldiers list page . |
| Post-condition: | | Information should save in to the database and generate id and 4 digit key for soldier. |
| Action: | | Input all values in required field and click “**Add new soldier”** button. |
| Destination: | | All Soldier list page. |

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| **2** | **Title:** | **Delete soldier (Web panel)** |
| Description: | | Admin can delete soldier by clicking on delete button |
| Input: | | Click on delete soldier button. |
| Output: | | Display soldier successfully deleted message. |
| Pre-condition: | | Open see soldier page. |
| Post-condition: | | Information should delete from database. |
| Action: | | Click on see soldier page and then click on “**delete soldier”** button. |
| Destination: | | All list of soldier page. |

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| **3** | **Title:** | **See All soldiers(Web panel, Android App)** |
| Description: | | User can see all soldiers list and details by click on button |
| Input: | | Click on button |
| Output: | | Display soldiers list on page. |
| Pre-condition: | | Open dashboard page. |
| Post-condition: | | All Soldier list should retrieved from the database and display on page. |
| Action: | | Click on **“see all soldiers”** button |
| Destination: | | same page. |

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| **4** | **Title:** | **See Soldier Details(Web panel, Android App)** |
| Description: | | User can see soldier details. e.g. personal details ,current live location and health status on graph by clicking on see soldier button or solider icon display on map. |
| Input: | | Click on see soldier details button or solider icon display on map. |
| Output: | | Display soldier details on next page. |
| Pre-condition: | | Open all soldiers list page. |
| Post-condition: | | Soldier details page open. |
| Action: | | Click on see soldier details page. |
| Destination: | | Soldier details page. |

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| **5** | **Title:** | **Track Soldier location(Web panel, Android App)** |
| Description: | | User can see soldiers live location on map by selecting particular operation. |
| Input: | | Click on see all operations then select operation. |
| Output: | | Display all soldiers live location in operation on map. |
| Pre-condition: | | Open all operations list page and operation status must not equal to complete. |
| Post-condition: | | All soldiers in operation must display on map and continuously update live location of soldiers. |
| Action: | | Click on track soldiers location. |
| Destination: | | Map page. |

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| **6** | **Title:** | **Add new Operation (Web panel)** |
| Description: | | User can add operation into database |
| Input: | | Click on add operation button and then input operation name, operation description, operation area, operation time, operation date, creation date and time. |
| Output: | | Display operation successfully created message. |
| Pre-condition: | | Open All Operation list page . |
| Post-condition: | | Information should save in to the database and generate id for operation. |
| Action: | | Input all values in required field and click “**Add new Operation”** button. |
| Destination: | | All Operations list page. |

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| **7** | **Title:** | **See All Operations(Web panel, Android App)** |
| Description: | | User can see all operation list and details by click on button |
| Input: | | Click on button |
| Output: | | Display operation list on page. |
| Pre-condition: | | Open dashboard page. |
| Post-condition: | | All operations list should retrieved from the database and display on page. |
| Action: | | Click on **“see all operations”** button |
| Destination: | | same page. |

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| **8** | **Title:** | **Assign operation to soldiers (Web panel)** |
| Description: | | User can assign operation to soldiers by clicking a add soldiers button and select soldiers and click add button. |
| Input: | | Select operation then click on add soldiers button then select soldiers |
| Output: | | Display all soldiers list added in operation on operation details page. |
| Pre-condition: | | select operation and operation status must not equal to complete. |
| Post-condition: | | All selected soldiers must assigned to operation. |
| Action: | | Perform all action mention in Input and click “**Add ”** button. |
| Destination: | | Operation details page. |

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| **9** | **Title:** | **Complete operation (Web panel)** |
| Description: | | User can complete operation after ending of operation. |
| Input: | | Click on operation and change status in progress to complete;. |
| Output: | | Show Operation Status is complete . |
| Pre-condition: | | Select operation and operation status must not equal to complete. |
| Post-condition: | | Operation must close and changed status to complete. |
| Action: | | Perform all action mention in input. |
| Destination: | | Operation details page. |

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| **10** | **Title:** | **Injury Alert (IOT Based Gadget)** |
| Description: | | User can wear this gadget in operation through this gadget based get location and health data |
| Input: | | Press button if soldier is injured. |
| Output: | | Display help Message Sent successfully. |
| Pre-condition: | | IOT device must start and running correctly and user must logged in . |
| Post-condition: | | Alert notification is must display on web panel and android app and near soldier IOT device screen. |
| Action: | | Perform action mention in input. |
| Destination: | | Home screen on IOT device. |

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| **11** | **Title:** | **Show location and Health data (IOT Based Gadget)** |
| Description: | | User can see his location and heartbeat, temperature and environment humidity on gadget screen. |
| Input: | | None |
| Output: | | Display location and heartbeat, temperature and environment humidity on gadget screen. |
| Pre-condition: | | IOT device must start and running correctly and user must logged in . |
| Post-condition: | | All correct data display on screen. |
| Action: | | None |
| Destination: | | Home screen on IOT device. |

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| **12** | **Title:** | **Login (Web panel, Android App)** |
| Description: | | User can login using email address and password. |
| Input: | | Email address, password. |
| Output: | | Display user successfully logged in. |
| Pre-condition: | | Open web panel. |
| Post-condition: | | Must open dashboard page. |
| Action: | | Input all values in required field and click “**login”** button. |
| Destination: | | Dashboard page. |

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| **13** | **Title:** | **Login (IOT Based Gadget )** |
| Description: | | User must login for using device. |
| Input: | | 4 digit key |
| Output: | | Display user successfully logged in. |
| Pre-condition: | | Turn on device. |
| Post-condition: | | Show soldier health and location. |
| Action: | | Input key and click “**ok”** button. |
| Destination: | | Main page. |

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| **14** | **Title:** | **Add Observer (Web panel)** |
| Description: | | user can add observer details into database |
| Input: | | Click on add observer button and then input observer name, father name, address, qualification, phone number, date, Army registration no, rank, email, password. |
| Output: | | Display observer successfully added message. |
| Pre-condition: | | Open All Observer list page. |
| Post-condition: | | Information should save in to the database and generate id for observer. |
| Action: | | Input all values in required field and click “**Add new observer”** button. |
| Destination: | | All Observer list page. |

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| **15** | **Title:** | **See All Observer(Web panel)** |
| Description: | | User can see all observer list and details by click on button |
| Input: | | Click on button |
| Output: | | Display observer list on page. |
| Pre-condition: | | Open dashboard page. |
| Post-condition: | | All observer list should retrieved from the database and display on page. |
| Action: | | Click on **“see all observer”** button |
| Destination: | | same page. |

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| **16** | **Title:** | **See Observer Details(Web panel, Android App)** |
| Description: | | User can see observer details. |
| Input: | | Click on see observer details button; |
| Output: | | Display observer details on next page. |
| Pre-condition: | | Open all observer list page. |
| Post-condition: | | Observer details page open. |
| Action: | | Click on see observer details page. |
| Destination: | | observer details page. |

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| **17** | **Title:** | **Delete Observer (Web panel)** |
| Description: | | User can delete observer by clicking on delete button |
| Input: | | Click on delete observer button. |
| Output: | | Display observer successfully deleted message. |
| Pre-condition: | | Open see observer page. |
| Post-condition: | | Information should delete from database. |
| Action: | | Click on see observer page and then click on “**delete observer”** button. |
| Destination: | | All list of observer page. |

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| **18** | **Title:** | **See operation Details (Web panel, Android App)** |
| Description: | | User can see operation details |
| Input: | | Click on see operation details . |
| Output: | | Display operation details on next page. |
| Pre-condition: | | Open all operations list page. |
| Post-condition: | | operation details page open. |
| Action: | | Click on see operation details page. |
| Destination: | | operation details page. |

**Non Functional Requirements:**

1. **Usability**

Our System is very simple and easy to use. Estimate time required to learn Observer role is 4 to 5 minutes. Estimate time required to learn device functionality for Soldier is 4 to 5 minutes.

1. **Reliability**

Our system may 95% approx. reliable for getting real time location and live health data because through GPS module we cannot get 100% exact location and also health data. IOT device may stop working after damaging or slow internet connection.

1. **Integrity**

Our System has two user Admin and observer. Observer can see information about soldier and operation. He cannot delete, edit and create anything only admin can do these task.

1. **Performance**

Our System depends on high internet connection. If internet is slow then we cannot get properly real time location and health data of soldier.

1. **Security**

Our system demands high security requirement. If any data is leak

from our system it may cause high lose. So We are implementing DES algorithm for data encryption between server and IOT device. And for IOT device to IOT device we are implementing Rail fence and play fair algorithm.

**External Interface Requirements:**

**Hardware:**

1. Temperature Sensor
2. Heart Beat Sensor
3. Humidity Sensor
4. Arduino board
5. Battery
6. Button
7. 4x4 key pad
8. GSM Module
9. GPS Module
10. Display Screen

**Database:**

1. MongoDB

**Communication protocol:**

1. DES Algorithm
2. Playfair Algorithm
3. Rail fence Algorithm

**Chapter Summary:**

In this chapter we define functional and not functional requirements. In this chapter we define our system has two user admin and observer. We are improving security by implementing DES algorithm. Our system performance depends on Internet speed.

**Use case (Full Dress):**

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| Use Case | **Add new soldier (Web panel)** |
| Primary Actors | Administrator |
| Secondary Actor | None |
| Purpose | Admin can add soldier details into database |
| Pre-condition: | Open All Soldiers list page. |
| Post-condition: | Information should save in to the database and generate id for soldier. |
| Reference: | Admin must login. |

**Main Success Scenario**

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| --- | --- |
| 1**.** User click button ” **Add new soldier** ” on dashboard page. | 2. Add new soldier page is open. |
| 3**.** User will enter soldier name, father name, address, qualification, phone number, date, Army registration no, rank, device id and click on “**Add soldier**” button . | 4. System get all values from input field and save into database.  a. If data is saved then it show message  “Soldier Successfully Added”.  b. if data is not saved then it show error  message. |

**2.**

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| --- | --- |
| Use Case | **Delete soldier (Web panel)** |
| Primary Actors | Administrator |
| Secondary Actor | None |
| Purpose | User can delete soldier by clicking on delete button |
| Pre-condition: | Open see soldier details page. |
| Post-condition: | Information should delete from database.. |
| Reference: | Admin must login. |

**Main Success Scenario**

|  |  |
| --- | --- |
| 1**.** User click ”**See all soldier button** ” | 2. All soldier list retrieved from database and show on page. |
| 3**.** User will select required soldier . | 4. Soldier details page is open and soldier data is show on this page |
| 5. User click on delete button. | 6. System delete soldier from database.  a. If data is delete then it show message  “Soldier Successfully deleted”.  b. if data is not delete then it show error  message. |

**3.**

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| --- | --- |
| Use Case | **See All soldiers (Web panel, Android App)** |
| Primary Actors | Administrator, Observer |
| Secondary Actor | None |
| Purpose | User can see all soldiers list and details |
| Pre-condition: | Open dashboard page. |
| Post-condition: | All Soldiers list should retrieved from the database and display on page. |
| Reference: | User must login. |

**Main Success Scenario**

|  |  |
| --- | --- |
| 1**.** User click ”**See all soldiers button** ” | 2. All soldiers list retrieved from database and show on page. |

**4.**

|  |  |
| --- | --- |
| Use Case | **See All Operation(Web panel, Android App)** |
| Primary Actors | Administrator, Observer |
| Secondary Actor | None |
| Purpose | User can see all Operations list and details |
| Pre-condition: | Open dashboard page. |
| Post-condition: | All Operations list should retrieved from the database and display on page. |
| Reference: | User must login. |

**Main Success Scenario**

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| --- | --- |
| 1**.** User click ”**See all Operations button** ” | 2. All Operations list retrieved from database and show on page. |

**5.**

|  |  |
| --- | --- |
| Use Case | **See All Observers(Web panel)** |
| Primary Actors | Administrator |
| Secondary Actor | None |
| Purpose | User can see all Observers list and details |
| Pre-condition: | Open All Observers list page. |
| Post-condition: | All Observers list should retrieved from the database and display on page. |
| Reference: | Admin must login. |

**Main Success Scenario**

|  |  |
| --- | --- |
| 1**.** User click ”**See all Observers button** ” | 2. All Observers list retrieved from database and show on page. |

**6.**

|  |  |
| --- | --- |
| Use Case | **See Soldier Details (Web panel, Android App)** |
| Primary Actors | Administrator, Observer |
| Secondary Actor | None |
| Purpose | User can see soldier details. e.g. personal details ,current live location and health status on graph by clicking on see soldier button. |
| Pre-condition: | Open all soldiers list page. |
| Post-condition: | Soldier details page open. |
| Reference: | User must login. |

**Main Success Scenario**

|  |  |
| --- | --- |
| 1**.** User click ”**See all Soldiers button** ” | 2. All Soldiers list retrieved from database and show on page. |
| 3**.** User will select required soldier . | 4. Soldier details page is open and soldier data is show on this page.  a. If soldier is active in operation then  current location and health data is show  on graph.  b. If soldier is not active in operation then  last location and health data is show  on graph.  . |

**7.**

|  |  |
| --- | --- |
| Use Case | **See Operation Details (Web panel, Android App)** |
| Primary Actors | Administrator, Observer |
| Secondary Actor | None |
| Purpose | User can see Operation details. |
| Pre-condition: | Open all Operations list page. |
| Post-condition: | Operation details page open. |
| Reference: | User must login. |

**Main Success Scenario**

|  |  |
| --- | --- |
| 1**.** User click ”**See all Operations button** ” | 2. All Operation list retrieved from database and show on page. |
| 3**.** User will select required Operation. | 4. Operation details page is open and operation data is show on this page.  . |

**8.**

|  |  |
| --- | --- |
| Use case | **Track soldier location(Web panel, Android App)** |
| Primary Actors | Administrator, Observer |
| Secondary Actor | None |
| Purpose | User can see soldiers live location on map by selecting particular operation |
| Pre-condition: | Open all operations list page and operation status must not equal to complete. |
| Post-condition: | All soldiers in operation must display on map and continuously update live location of soldiers. |
| Reference: | User must login. |

**Main Success Scenario**

|  |  |
| --- | --- |
| 1**.** User click ”**See all Operations button** ” | 2. All operations list retrieved from database and show on page. |
| 3. User select required operation. | 4. All soldiers location in operation are showing on map. |
| 3**.** User will select any soldier icon on map to see soldier details. | 4. Soldier details page is open and soldier data is show on this page.  a. If soldier is active in operation then  current location and health data is show  on graph.  b. If soldier is not active in operation then  last location and health data is show  on graph. |

**9.**

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| --- | --- |
| Use case | **Add new Operation** |
| Primary Actors | Administrator |
| Secondary Actor | None |
| Purpose | Admin can add operation into database |
| Pre-condition: | Open All Operation list page. |
| Post-condition: | Information should save in to the database and generate id for operation. |
| Reference: | Admin must login. |

**Main Success Scenario**

|  |  |
| --- | --- |
| 1**.** User click button ” **Add Operation**” on dashboard page. | 2. Add new soldier page is open. |
| 3**.** User will enter operation name, operation description, operation area, operation time, operation date, creation date and time and click on “**Add Operation**” button . | 4. System get all values from input field and save into database.  a. If data is saved then it show message  “Operation Successfully Created”.  b. if data is not saved then it show error  message. |

**10.**

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| --- | --- |
| Use Case | **Delete Observer (Web panel)** |
| Primary Actors | Administrator |
| Secondary Actor | None |
| Purpose | Admin can delete Observer by clicking on delete button |
| Pre-condition: | Open see Observer details page. |
| Post-condition: | Information should delete from database.. |
| Reference: | Admin must login. |

**Main Success Scenario**

|  |  |
| --- | --- |
| 1**.** User click ”**See all Observer button** ” | 2. All Observer list retrieved from database and show on page. |
| 3**.** User will select required Observer. | 4. Observer details page is open and observer data is show on this page |
| 5. User click on delete button. | 6. System delete Observer from database.  a. If data is delete then it show message  “observer Successfully deleted”.  b. if data is not delete then it show error  message |

**11.**

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| --- | --- |
| Use case | **Assign operation to soldiers(Web panel)** |
| Primary Actors | Administrator |
| Secondary Actor | None |
| Purpose | User can assign operation to soldiers by clicking a add soldiers button and select soldiers and click add button. |
| Pre-condition: | select operation and operation status must not equal to complete. |
| Post-condition: | All selected soldiers must assigned to operation. |
| Reference: | Admin must login. |

**Main Success Scenario**

|  |  |
| --- | --- |
| 1**.** User click ”**See all Operations button** ” | 2. All Operation list retrieved from database and show on page. |
| 3**.** User will select required Operation. | 4. Operation details page is open and operation data is show on this page.  . |
| 5. Userclick on add Soldiers in operation. | 6. All soldier list are showing on page. |
| 7. UserSelect soldiers and click add soldiers button. | 8. All selected soldiers are assigned to operation.  a. If soldiers are assigned then it show  message “Soldiers Successfully  Assigned”.  b. If soldiers are not assigned then it  show error message. |

**12.**

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| --- | --- |
| Use case | **Complete operation(Web panel)** |
| Primary Actors | Administrator |
| Secondary Actor | None |
| Purpose | User can complete operation after ending of operation. |
| Pre-condition: | Select operation and operation status must not equal to complete. |
| Post-condition: | Operation must close and changed status to complete. |
| Reference: | Admin must login. |

**Main Success Scenario**

|  |  |
| --- | --- |
| 1**.** User click ”**See all Operations button** ” | 2. All Operation list retrieved from database and show on page. |
| 3**.** User will select required Operation. | 4. Operation details page is open and operation data is show on this page.  . |
| 5. Userclick on complete operation button. | 6. Operation status is changed to complete in database. |

**13.**

|  |  |
| --- | --- |
| Use case | **Injury Alert (IOT Based Gadget)** |
| Primary Actors | Soldier |
| Secondary Actor | Noe |
| Purpose | User can wear this gadget in operation through this gadget based get location and health data. |
| Pre-condition: | IOT device must start and running correctly. |
| Post-condition: | Alert notification is must display on web panel and android app and near soldier IOT device screen. |
| Reference: | Soldiers must login. |

**Main Success Scenario**

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| --- | --- |
| 1**.** User click on red button for injury alert. | 2. Alert send to the based station and near soldier.  a. If alert are sent then it show  message “Successfully  sent” on screen.  b. If alert are not sent then it show  message “retry again” on screen. |

**14.**

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| Use case | **Show location and Health data(IOT Based Gadget)** |
| Primary Actors | Soldier |
| Secondary Actor | None |
| Purpose | User can see his location and heartbeat, temperature and environment humidity on gadget screen |
| Pre-condition: | IOT device must start and running correctly. |
| Post-condition: | All correct data display on screen. |
| Reference: | Soldiers must login. |

**Main Success Scenario**

|  |  |
| --- | --- |
| 1**.** User can see on screen. | 2. Automatically showing current location and health data on screen |

**15.**

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| --- | --- |
| Use case | **Add new Observer** |
| Primary Actors | Administrator |
| Secondary Actor | None |
| Purpose | Admin can add Observer into database |
| Pre-condition: | Open All Observers list page. |
| Post-condition: | Information should save in to the database and generate id for Observer. |
| Reference: | Admin must login. |

**Main Success Scenario**

|  |  |
| --- | --- |
| 1**.** User click button ” **Add** **Observer**” on dashboard page. | 2. Add new Observer page is open. |
| 3**.** User will enter Observer name, operation description, observer name, father name, address, qualification, phone number, date, Army registration no, rank, email, password and click on “**Add Observer**” button . | 4. System get all values from input field and save into database.  a. If data is saved then it show message  “Observer Successfully added”.  b. if data is not saved then it show error  message. |

**16.**

|  |  |
| --- | --- |
| Use Case | **See Observer Details (Web panel)** |
| Primary Actors | Administrator |
| Secondary Actor | None |
| Purpose | User can see Operation details. |
| Pre-condition: | Open all Observers list page. |
| Post-condition: | Observer details page open. |
| Reference: | Admin must login. |

**Main Success Scenario**

|  |  |
| --- | --- |
| 1**.** User click ”**See all Observer button** ” | 2. All Observer list retrieved from database and show on page. |
| 3**.** User will select required observer. | 4. Observer details page is open and observer data is show on this page.  . |

**17.**

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| --- | --- |
| Use Case | **Login (Web panel, Android App)** |
| Primary Actors | Administrator, Observer |
| Secondary Actor | None |
| Purpose | User can login into web panel. |
| Pre-condition: | Open web panel. |
| Post-condition: | Dashboard page is open. |
| Reference: | none. |

**Main Success Scenario**

|  |  |
| --- | --- |
| 1**.** open web panel | 2.Show login page. |
| 3**.** User input Email address, password. And click on login button. | 4. Get email and password and verify from database.  a. If data is correct then it show message  “Successfully logged in”.  b. if data is not correct then it show  “invalid email and password “ message |

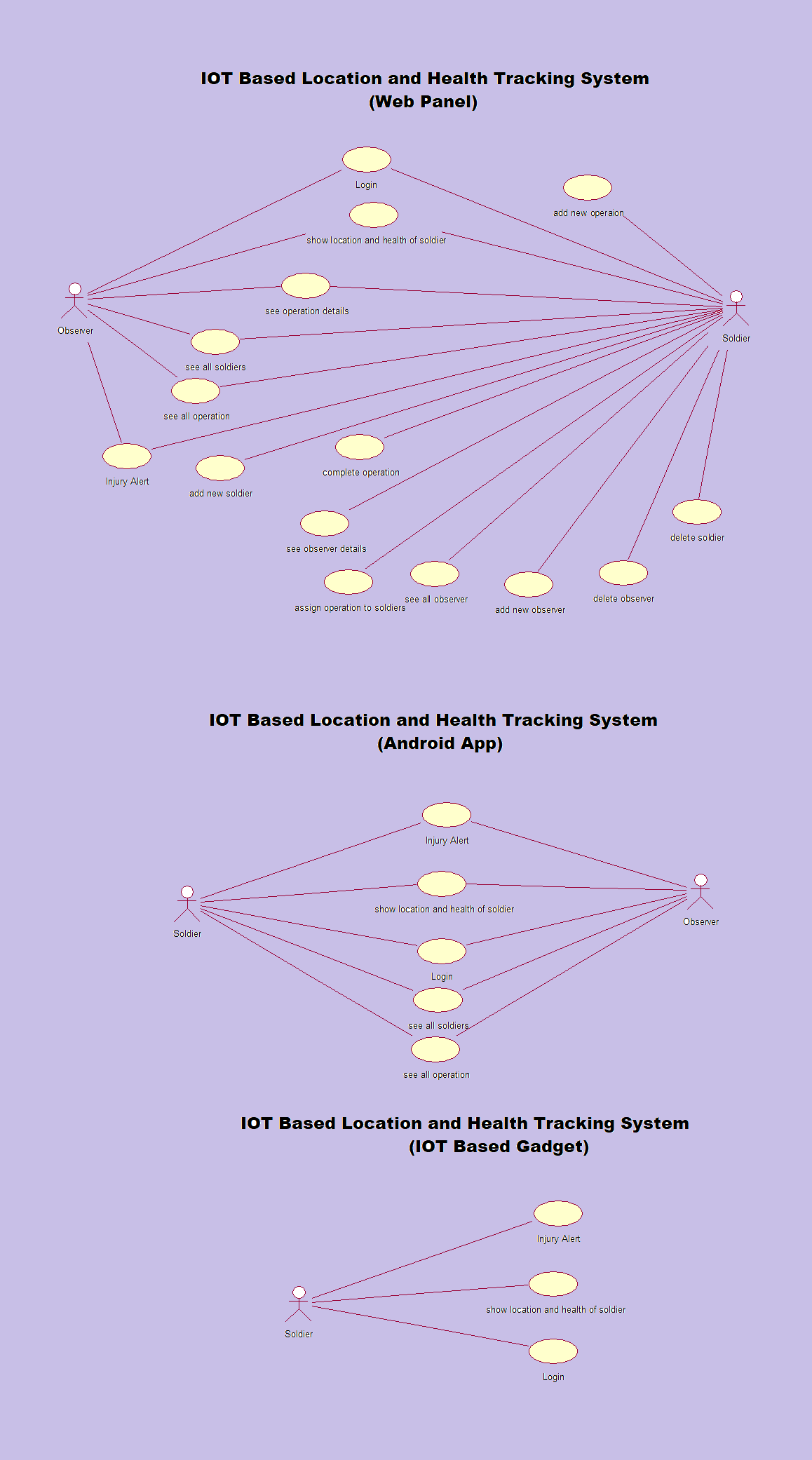
**18.**

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| --- | --- |
| Use Case | **Login (IOT Based Gadget)** |
| Primary Actors | Soldier |
| Secondary Actor | None |
| Purpose | User can login into Device. |
| Pre-condition: | Turn on device |
| Post-condition: | Health and location is show on screen. |
| Reference: | none. |

**Main Success Scenario**

|  |  |
| --- | --- |
| 1**.** turn on device | 2. Get data from local database and check login attempt is less than 3 than show login page else turn of machine |
| 3. if login page is open than user input 4 digit key. | 4. Get input key and device id and verify from based station database.  a. If data is correct then it show location  and health data on screen.  b. if data is not correct then it show  “invalid key “ message and after 3  wrong attempt device will off. |

**USE CASE Diagram:**

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