Monitoring student device details(connected to switch) with raspberry pi and cloud

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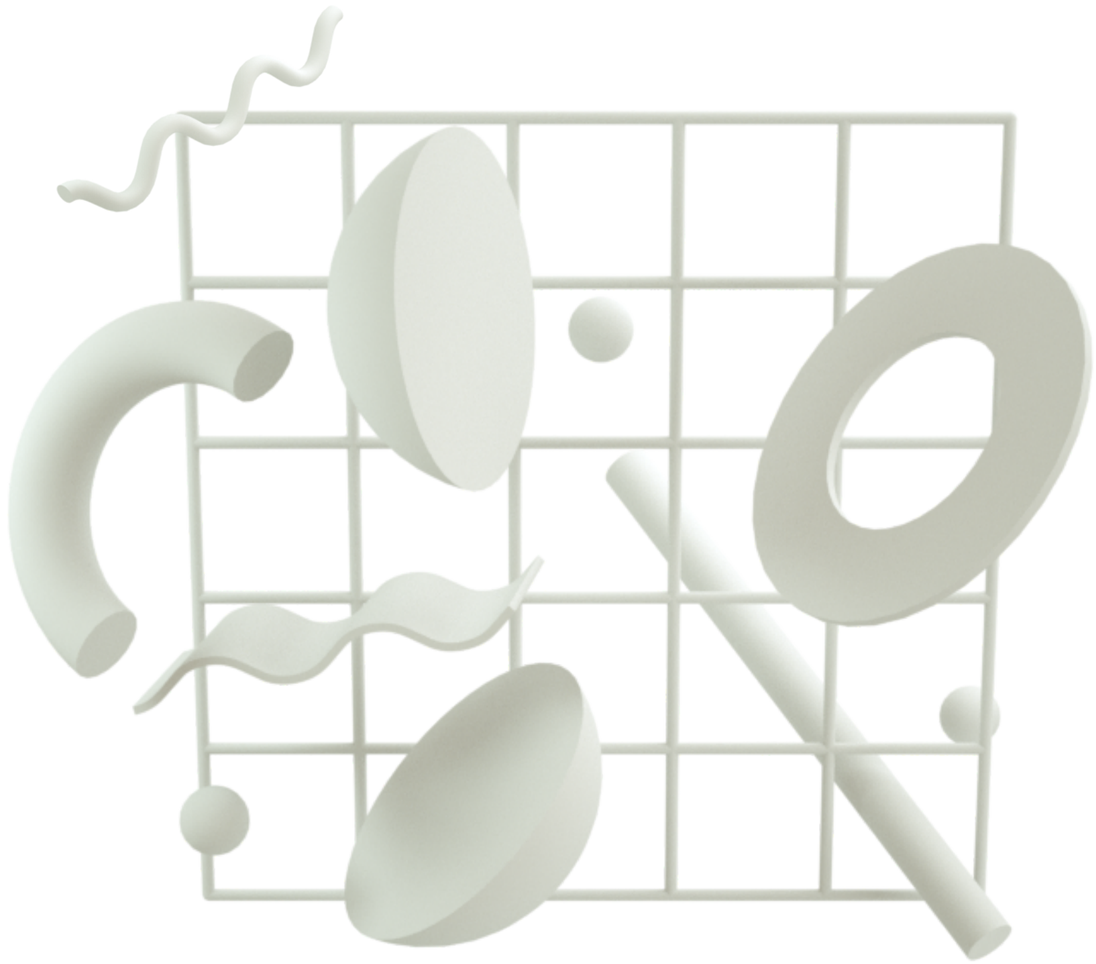
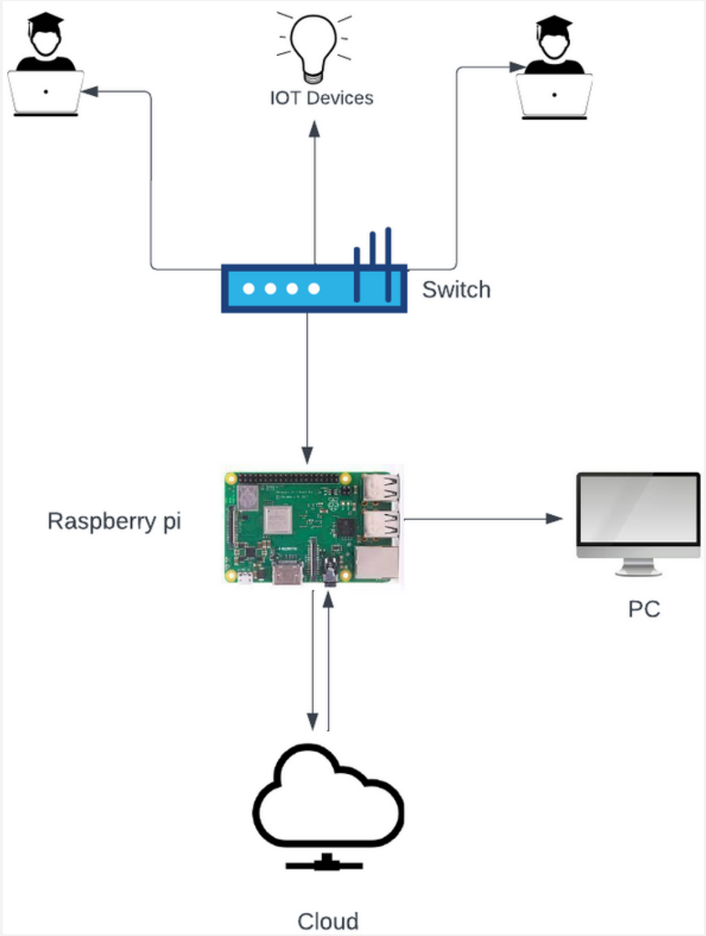


Topic of project

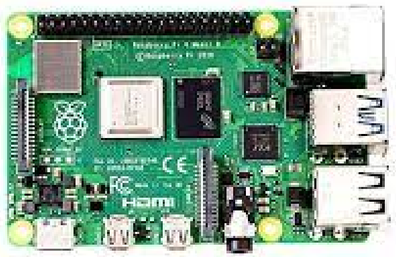
"Monitoring student device details(connected to switch) with raspberry pi on cloud"

Extension of previous project “authentication of IOT devices in smart labs using raspberry pi”.



Devices Used

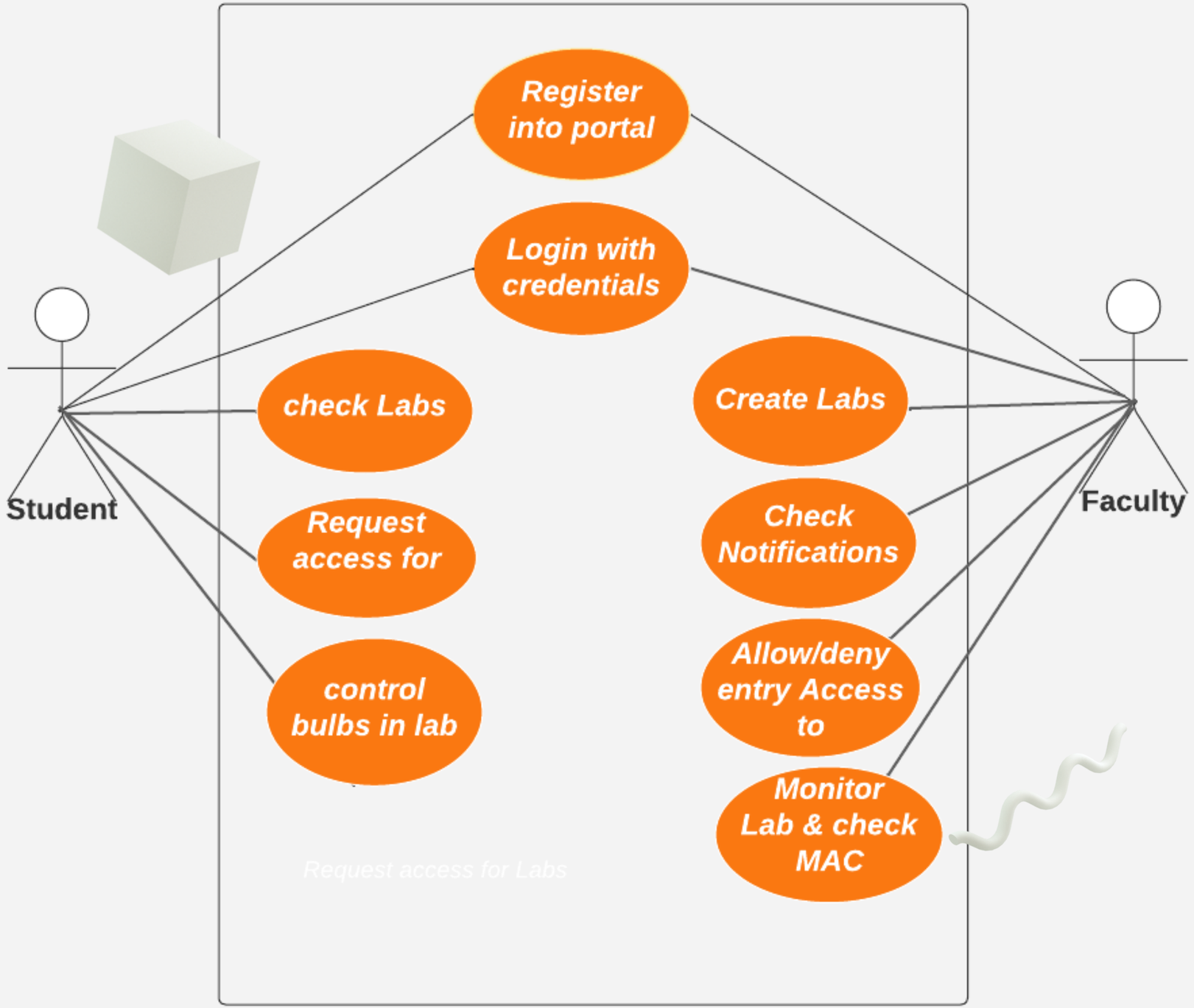
Philips Hue bridge



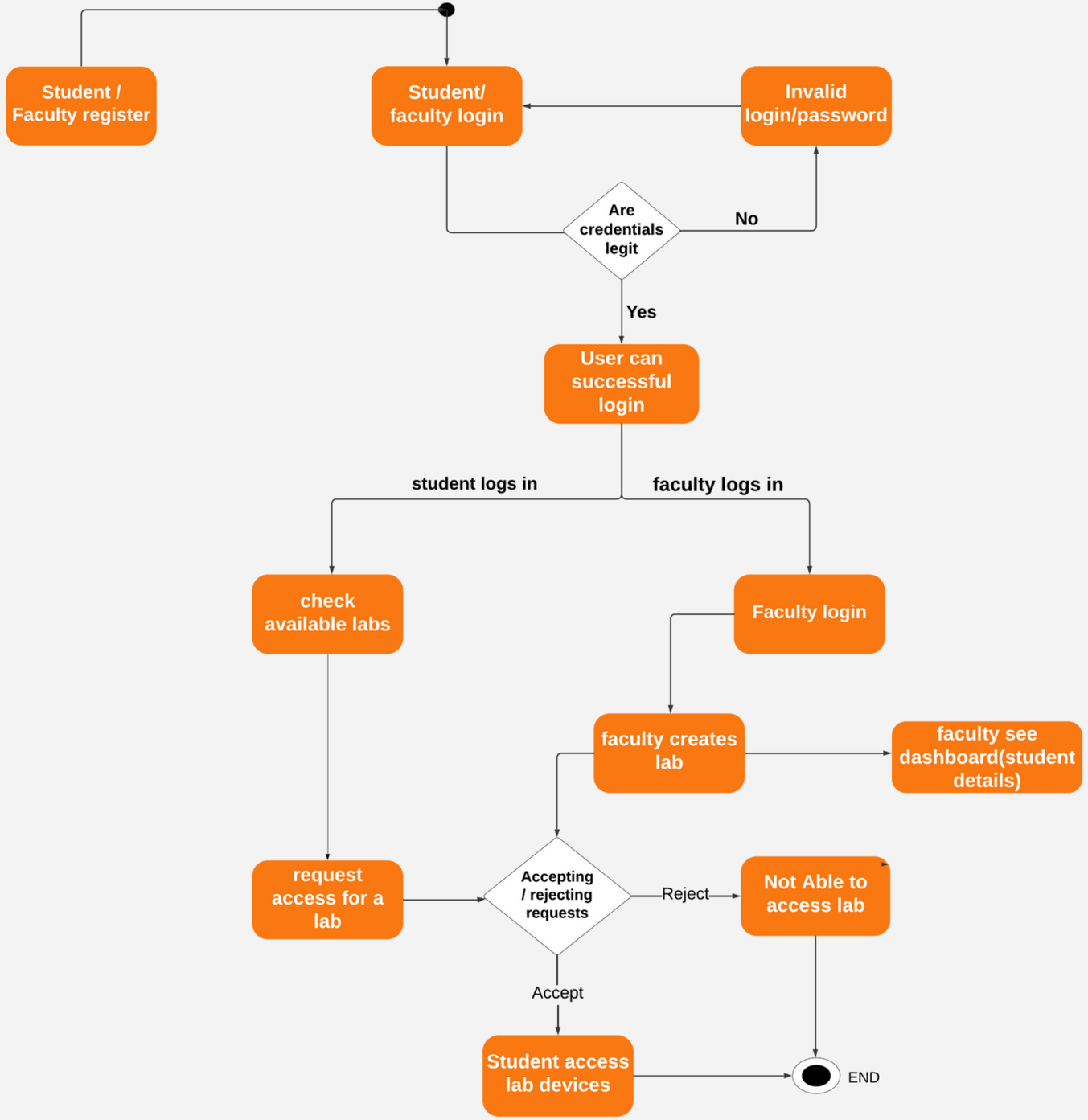
Raspberry Pi

Bulb

USE CASE DIAGRAM



ACTIVITY DIAGRAM



Main stages of project

Stage 1 - Using api of hue bridge to control iot devices.

Stage 2 - Making webapp for creating and accessing labs.

Stage 3 - Improving website with adding database in cloud.

Stage 4 - Collecting students information and showing it in dashboard collecting students mac address, operating system, browser details,device type,etc.

Device Authentication

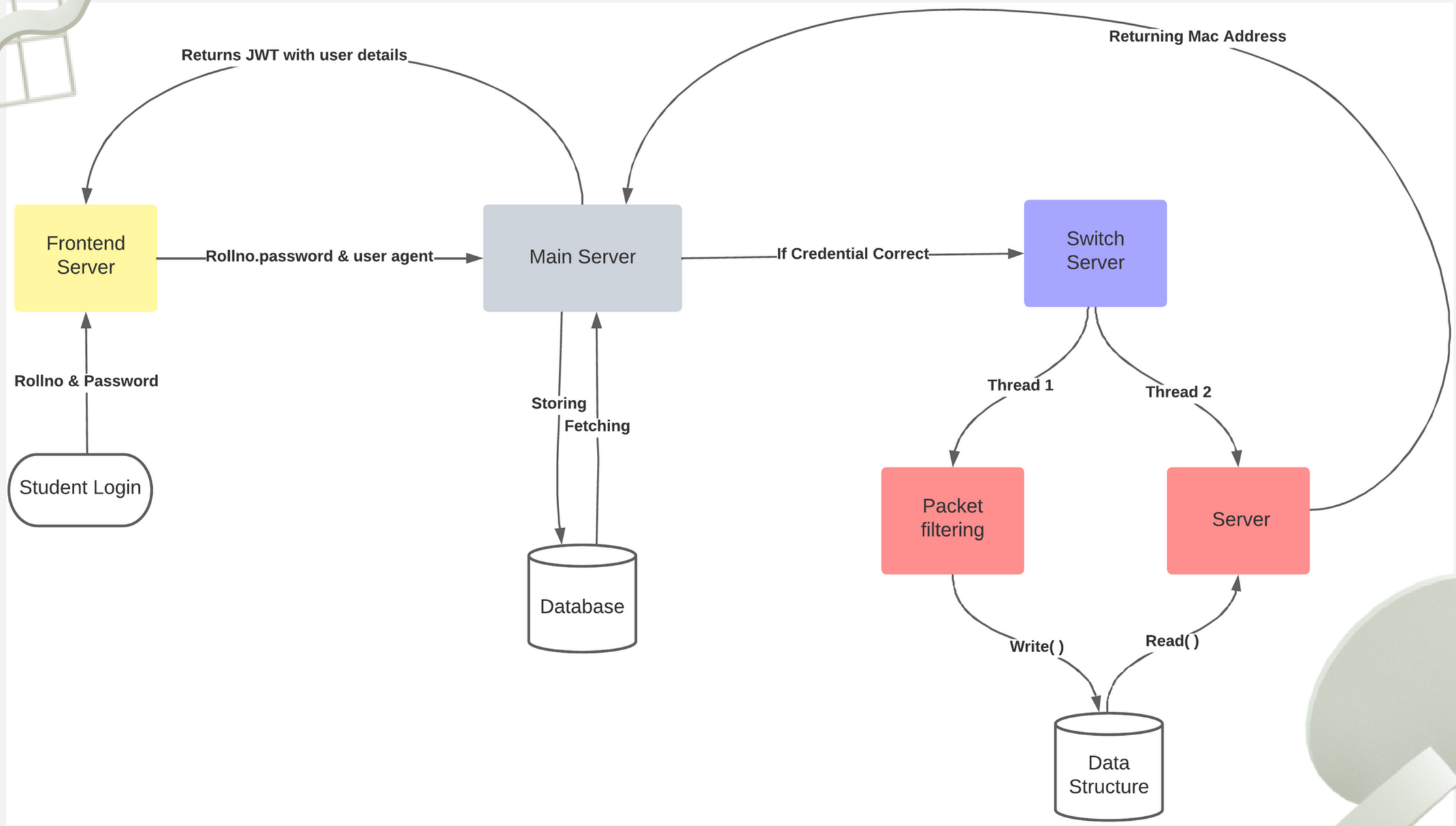
- The device prepares a JSON Web Token (JWT), the JWT is signed with the private key from the authentication flow.
- The connection is closed when the JWT expires.

Methodology for mapping student mac address with student roll no.

- Making a packet sniffer and web server .
- One one thread :
  - Capturing packets and filtering tcp packets containing login information.
  - Storing login information along with mac address in a data structure.

- One second thread :
  - Creating a web server for providing mac address information for successfully login students.

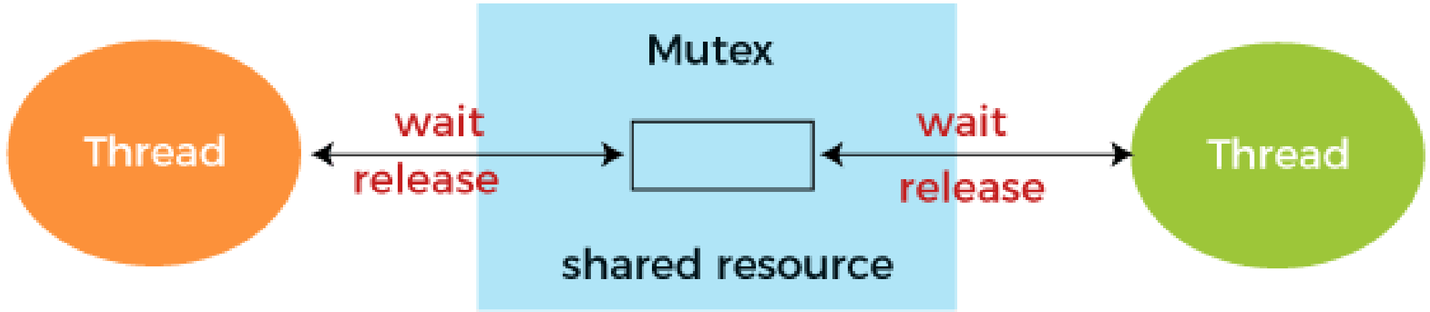
Methodology



Problem of synchronisation

If web-server is reading details from our stored data and at the same time, if data is changed after packet capturing, then corruption of data can happen.

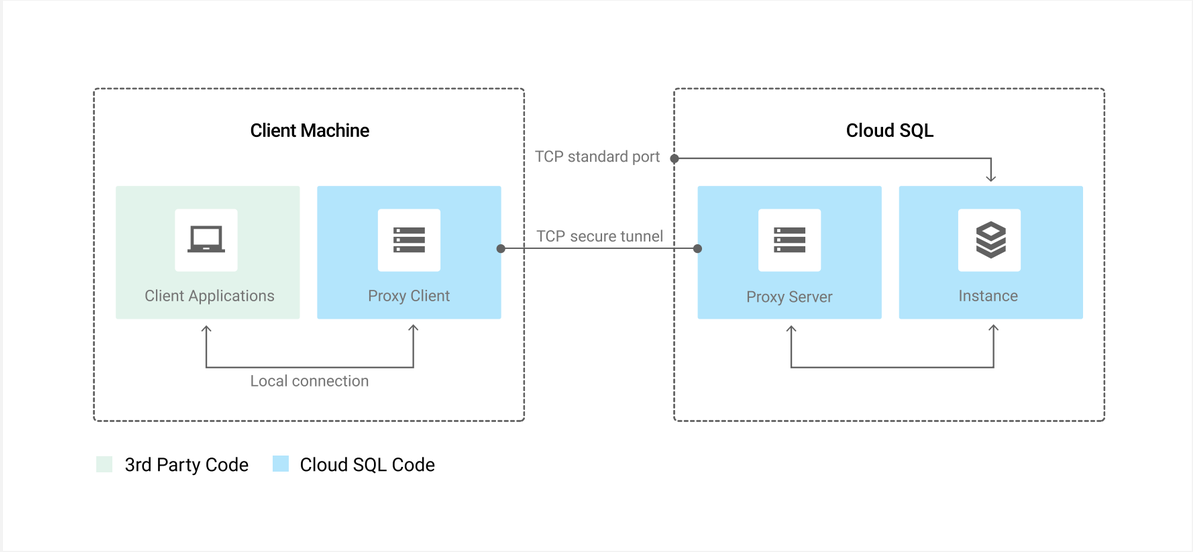
To avoid this we use mutex() lock.
In mutex, we lock the variable that is going to be changed, and if at the same time, another program want to change the variable, it has to wait until unlock.



Cloud Sql

Cloud SQL Auth proxy

The Cloud SQL Auth proxy works by having a local client running in the local environment.
The Cloud SQL Auth proxy uses a secure tunnel to communicate with its companion process running on the server. Each connection established through the Cloud SQL Auth proxy creates one connection to the Cloud SQL instance.



Result

STUDENTS CURRENTLY IN LAB

Roll No.	Mac Address	Operating system	Browser	Mobile
IIT2020024	10:3F:44:11:10:77	Android	Chrome	1
MIT2021105	C0:95:6D:49:8F:C1	Mac OS X	Chrome	0

THANK YOU!