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IOT Lab Equipment Distribution System

Abstract

This paper describes 'IOT Lab Equipment Distribution System' for those students, teachers, and members of BDU who are authorized in this sector. This system is represented by a website and its database. All the design, logical functionality of this system is made with the help of Html, CSS, Javascript, MySQL, PPH, JQuery, AJAX. All the logical functionality is covered in this system that are required to complete the lab equipment distribution transition between students, teachers and lab attendant. The objective of this system is to make easier for BDU students, teachers and lab attendant to make a complete transition for IOT lab equipment distribution where students, teachers and lab attendant's record are stored, having personal profile, teachers permission functionality is included, equipment apply datetime, providing datetime, return datetime is stored, having search option and so on. This system also takes confirmation by student and lab attendant at that time when equipment is hand over between student and teacher. This all transition is performed without no risk factor. With a successful implementation, we get a complete system through which we can keep our all record well that are related with IOT lab equipment distribution process.

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Chapter 1

Introduction

1.1 Background

When small or big organization, academic or non-academic institute provide their members of those organization's shareable resource then it must be trace that who are used the resources, how many he/she used, when he/she take and when he/she return etc. so that all the member of those authorized sector can use the resources after a short period of time. Information store has a significant impact in all the sector of our life. The way information is stored plays a major role in how easy it is to control access, use and protect. When information in an organization is acquired, handled, and disposed of appropriately at the end of its lifespan, it decreases the risk of theft, security breaches, and physical damage for a sector of the organization. So the best way to store information that make information relevant for use, search as well as reserved it with ensuring security.

1.2 Problem Statement

The existing system is completely manual involving a lot of paper work and calculation and therefore may be erroneous. This may lead to inconsistency and inaccuracy in the maintenance of data. As it is written in notebook with hand-writing it takes a lot of time to store a information. There are having insecurity issue between student, teacher and lab attendant. For taking IOT lab equipment, all student should maintain serial line to take equipment from the lab room one by one. And they are not informed about the equipment that are available in the lab room. To know about the availability of an equipment a student must need to ask this to lab attendant. To Overcome this problem we have designed a Computerized system. The computerization of the 'IOT Lab Equipment Distribution System' will reduce a lot of paperwork and hence the load on the Lab attendant. These system is designed with complete functionality that's are required for lab equipment distribution transition between authorized students, teachers and lab attendant of BDU.

1.3 Objectives of the work

- Creating a platform by which a student know about the lab equipment availability. According this a student can apply for their needed equipment.
- Using it a student can get teachers permission easily without meet with the teacher and also teacher can know about students need on equipment and their purpose.
- Lab attendant can know about a students need on equipment and also teachers permission status on this particular request.
- Lab attendant not to note any information, all the information are stored into database automatically and show into webpage properly.
- This website has confirmation process that makes lab attendant and students privacy more secure.
- This website's important records are non-editable that's makes this more secure.

1.4 Significance of the study on this project

The use of technology is increasing day by day which is making people's life system easier. Similarly, along with other service sectors, the use of technology by which one can store, maintain, control a large amount of data so easily has become urgent as people have to work in a organization with various people with various data exchange. By studying and implementing this project, we can make an application by which we can store our important record, read record, make edit, insertion and delete operation, permission exchange, confirmation process is implemented successfully. Specially, I have made this project for BDU's that sector where IOT lab equipment is distributed to students. By studying this project anyone can know about this project and can inplement and upgrade this project.

Chapter 2

System Requirement and Design

2.1 Hardware Specification

Server: Processor-7th generation i5, RAM-128MB, Hard disk-20GB (Minimum)

Client: Processor-7th generation i5, Ram-128MB, Hard disk- 20GB (Minimum)

2.2 Software Specification

2.2.1 Requirement

Platform - Windows 8-11

Software – VS Code, XAMPP

Frontend - Html, Css

Backend - Php, MySQL

And also Javascript, JQuery, AJAX

2.2.2 Software

VS Code : Visual Studio Code is a streamlined code editor with support for development operations like debugging, task running, and version control. It aims to provide just the tools a developer needs for a quick code-build-debug cycle and leaves more complex workflows to fuller featured IDEs, such as Visual Studio IDE.

Xampp: XAMPP is a software distribution which provides the Apache web server, MySQL database (actually MariaDB), Php and Perl (as command-line executables and Apache modules) all in one package. XAMPP is simply a local host or server. This local server runs on your personal computer, whether it's a desktop or a laptop. It is used to test clients or websites before publishing them to a remote web server.[9]

2.2.3 Frontend

HTML: HTML (HyperText Markup Language) is the most basic building block of the Web. It defines the meaning and structure of web content. ... "Hypertext" refers to links that connect web pages to one another, either within a single website or between websites. Links are a fundamental aspect of the Web [5]. HTML is heavily used for creating pages that are displayed on the world wide web. Every page contains a set of HTML tags, including hyperlinks which are used for connecting to other pages. Every page that we witness on the world wide web is written using a version of HTML code [6].

CSS: Stands for "Cascading Style Sheet." Cascading style sheets are used to format the layout of Web pages. CSS is the language for describing the presentation of Web pages, including colors, layout, and fonts. For example, CSS can be used to define the cell padding of table cells, the style, thickness, and color of a table's border, and the padding around images or other objects.[7]

2.2.4 Backend

PHP: PHP (Hypertext Preprocessor) is known as a general-purpose scripting language that can be used to develop dynamic and interactive websites. It was among the first server-side languages that could be embedded into HTML, making it easier to add functionality to web pages without needing to call external files for data.[8]

MySQL : MySQL is an open source relational database management system. For WordPress sites, that means it helps you store all your blog posts, users, plugin information, etc. It stores that information in separate “tables” and connects it with “keys”, which is why it's relational.

2.3 Process flowchart

The following process design is made after a detailed analysis of logical functions of our “IOT Lab Equipment Distribution System”.

- At first student apply about some equipment that he/she needed with their purpose.
- Teacher see students need, purpose and provide permission.
- If teacher’s permission is granted, then student go to Lab attendant to inform it and take his/her needed equipment.
- Lab attendant provide equipment to student and set provide date-time with the confirmation of that particular student.
- At last student return the equipment and lab attendant set the return time.

The systems process flowchart is shown in figure below:

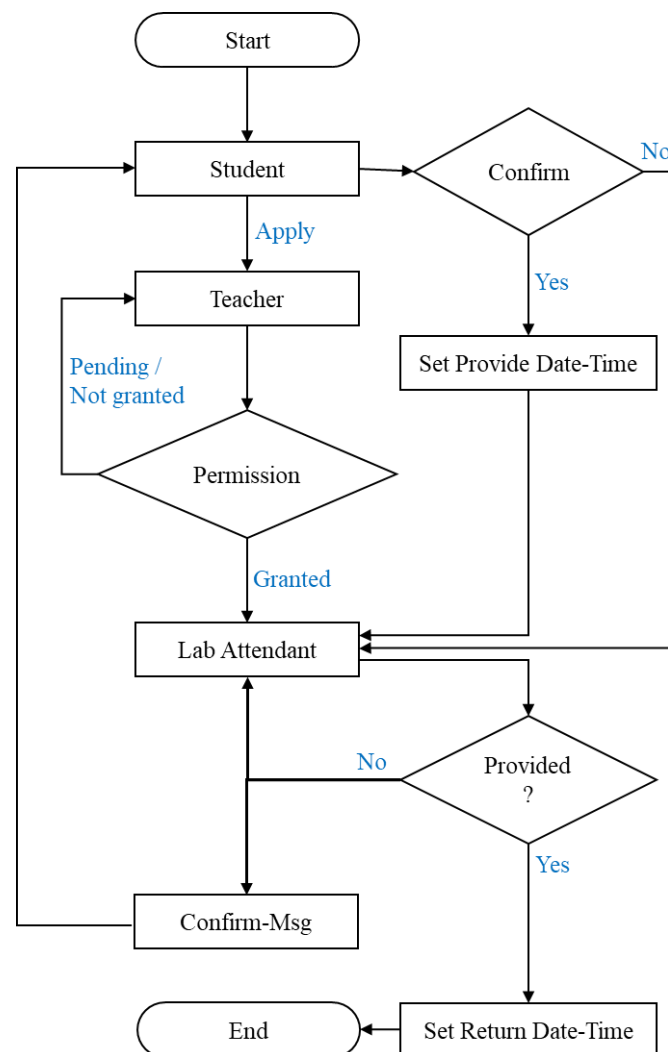


Figure 2.1: Process flowchart

2.4 Database Conceptual Design

2.4.1 Entity Relationship Diagram

ER diagram provides entities (i.e. data object), properties, and associated methods, in order to describing the conceptual model of the real world. The basic elements of ER diagram are constituted by entities, attributes and links. The representation is as following:

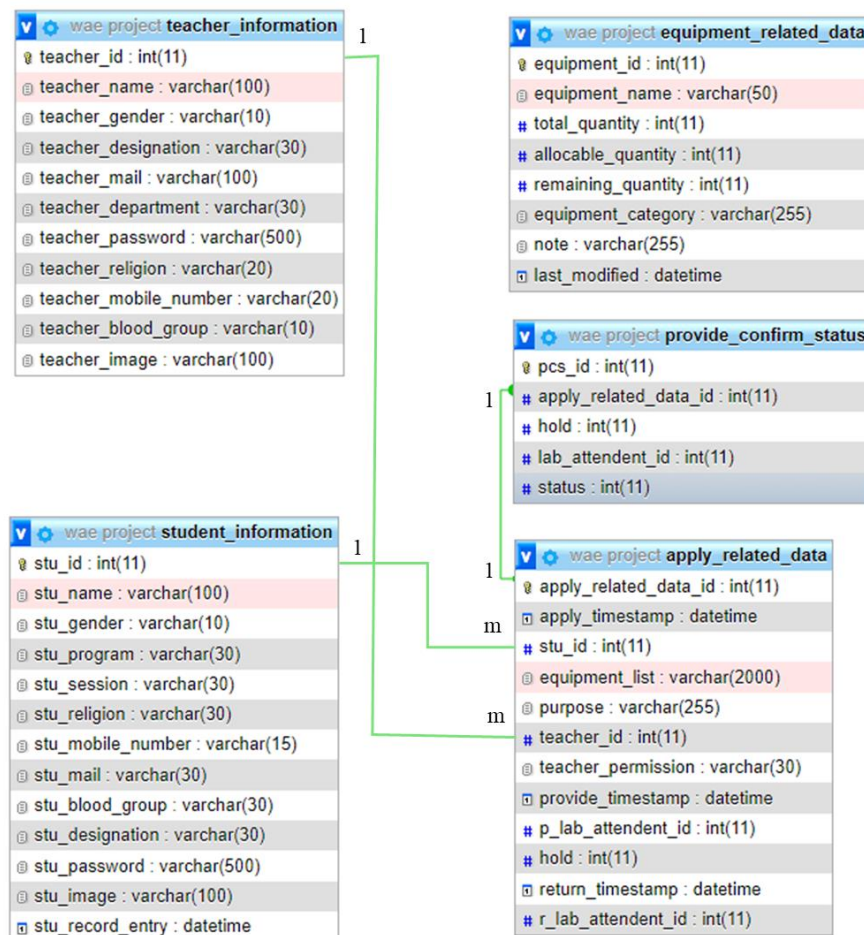


Figure 2.2: database diagram of our system

2.4.2 Entities and Attributes

There are 5 entity of our project. That are: student_information, teacher_information, apply_related_data, equipment_related_data, provide_confirm_Status. All the entites has their own attributes. Firstly, The ‘student_information’ entity has 13 attributes. Secondly, The ‘teacher_information’ entity has 11 attributes. Thirdly, The ‘apply_related_data’ entity has 12 attributes. Fourthly, The ‘equipment_related_data’ entity has 8 attributes. At last, The ‘provide_confirm_Status’ entity has 5 attributes

2.4.3 Cardinalities

student_information and apply_related_data entity are connected with one-to-many relationship. That's mean, One student can apply more than one time. teacher_information and apply_related_data entity are connected with one-to-many relationship. This means, Many apply can be held under one teachers reference. provide_confirm_Status and apply_related_data entity are connected with one-to-one relationship.

2.5 Logic model design

Logic model design task is to convert the basic ER diagram of the conceptual models to logical structure of the consistent data model which was supported by DBMS products. In this paper, the user view method is used to standard tables. All the keywords of tables are listed. The contact and constraint relation is description by data collection chart. The design result of the user view is summarized. All of user view tables are composed to a complex database system. The logic design of database as following:

- ⇒ student_information(stu_id, stu_name, stu_gender, stu_program, stu_session, stu_religion, stu_mobile_number, stu_mail, stu_blood_group, stu_designation, stu_password, stu_image, stu_record_entry)
- ⇒ teacher_information(teacher_id, teacher_name, teacher_gender, teacher_designation, teacher_mail, teacher_department, teacher_password, teacher_religion, teacher_mobile_number, teacher_blood_group, teacher_image)
- ⇒ provide_confirm_status(pcs_id, apply_related_data_id (FK), hold, lab_attendant_id, status)
- ⇒ equipment_related_data(equipment_id, equipment_name, total_quantity, allocable_quantity, remaining_quantity, equipment_category, note, last_modified)
- ⇒ apply_related_data(apply_related_data_id, apply_timestamp, stu_id (FK), equipment_list, purpose, teacher_id (FK), teacher_permission, provide_timestamp, p_lab_attendant_id, hold, return_timestamp, r_lab_attendant_id)

2.6 Physical design of the database

The physical structure of the database mainly refers to record format, record organization and record access methods. Obviously, the physical design of the database entirely dependent on a given hardware environment and database products. In relational model system, the physical design is relatively simple because the file format is a single record

type file which contains only index mechanism, space size, block size, etc.[13]

Mainly physical database tables design as shown below:

--> student_information table:


#	Name	Type	Collation	Attributes	Null	Default
<input type="checkbox"/> 1	stu_id 	int(11)			No	None
<input type="checkbox"/> 2	stu_name	varchar(100)	utf8mb4_general_ci		Yes	NULL
<input type="checkbox"/> 3	stu_gender	varchar(10)	utf8mb4_general_ci		Yes	NULL
<input type="checkbox"/> 4	stu_program	varchar(30)	utf8mb4_general_ci		Yes	NULL
<input type="checkbox"/> 5	stu_session	varchar(30)	utf8mb4_general_ci		Yes	NULL
<input type="checkbox"/> 6	stu_religion	varchar(30)	utf8mb4_general_ci		Yes	NULL
<input type="checkbox"/> 7	stu_mobile_number	varchar(15)	utf8mb4_general_ci		Yes	NULL
<input type="checkbox"/> 8	stu_mail	varchar(30)	utf8mb4_general_ci		Yes	NULL
<input type="checkbox"/> 9	stu_blood_group	varchar(30)	utf8mb4_general_ci		Yes	NULL
<input type="checkbox"/> 10	stu_designation	varchar(30)	utf8mb4_general_ci		No	Student
<input type="checkbox"/> 11	stu_password	varchar(500)	utf8mb4_general_ci		No	None
<input type="checkbox"/> 12	stu_image	varchar(100)	utf8mb4_general_ci		No	None
<input type="checkbox"/> 13	stu_record_entry	datetime			Yes	current_timestamp()

Figure 2.3: Datatype of student_information table

--> teacher_information table:


#	Name	Type	Collation	Attributes	Null	Default
<input type="checkbox"/> 1	teacher_id 	int(11)			No	None
<input type="checkbox"/> 2	teacher_name	varchar(100)	utf8mb4_general_ci		Yes	NULL
<input type="checkbox"/> 3	teacher_gender	varchar(10)	utf8mb4_general_ci		No	None
<input type="checkbox"/> 4	teacher_designation	varchar(30)	utf8mb4_general_ci		Yes	NULL
<input type="checkbox"/> 5	teacher_mail	varchar(100)	utf8mb4_general_ci		Yes	NULL
<input type="checkbox"/> 6	teacher_department	varchar(30)	utf8mb4_general_ci		No	None
<input type="checkbox"/> 7	teacher_password	varchar(500)	utf8mb4_general_ci		No	None
<input type="checkbox"/> 8	teacher_religion	varchar(20)	utf8mb4_general_ci		No	None
<input type="checkbox"/> 9	teacher_mobile_number	varchar(20)	utf8mb4_general_ci		No	None
<input type="checkbox"/> 10	teacher_blood_group	varchar(10)	utf8mb4_general_ci		No	None
<input type="checkbox"/> 11	teacher_image	varchar(100)	utf8mb4_general_ci		No	None

Figure 2.4: Datatype of teacher_information table

--> apply_related_data table:

#	Name	Type	Collation	Attributes	Null	Default
<input type="checkbox"/> 1	apply_related_data_id	int(11)			No	None
<input type="checkbox"/> 2	apply_timestamp	datetime			Yes	NULL
<input type="checkbox"/> 3	stu_id	int(11)			Yes	NULL
<input type="checkbox"/> 4	equipment_list	varchar(2000)	utf8mb4_general_ci		Yes	NULL
<input type="checkbox"/> 5	purpose	varchar(255)	utf8mb4_general_ci		Yes	NULL
<input type="checkbox"/> 6	teacher_id	int(11)			Yes	NULL
<input type="checkbox"/> 7	teacher_permission	varchar(30)	utf8mb4_general_ci		Yes	Pending
<input type="checkbox"/> 8	provide_timestamp	datetime			Yes	NULL
<input type="checkbox"/> 9	p_lab_attendent_id	int(11)			Yes	NULL
<input type="checkbox"/> 10	hold	int(11)			No	0
<input type="checkbox"/> 11	return_timestamp	datetime			Yes	NULL
<input type="checkbox"/> 12	r_lab_attendent_id	int(11)			Yes	NULL

Figure 2.5: Datatype of apply_related_data table

--> equipment_related_data table:

#	Name	Type	Collation	Attributes	Null	Default
<input type="checkbox"/> 1	equipment_id	int(11)			No	None
<input type="checkbox"/> 2	equipment_name	varchar(50)	utf8mb4_general_ci		No	None
<input type="checkbox"/> 3	total_quantity	int(11)			No	0
<input type="checkbox"/> 4	allocable_quantity	int(11)			No	0
<input type="checkbox"/> 5	remaining_quantity	int(11)			No	None
<input type="checkbox"/> 6	equipment_category	varchar(255)	utf8mb4_general_ci		No	Sensor
<input type="checkbox"/> 7	note	varchar(255)	utf8mb4_general_ci		Yes	NULL
<input type="checkbox"/> 8	last_modified	datetime			No	current_timestamp()

Figure 2.6: Datatype of equipment_related_data table

--> provide_confirm_Status table:

#	Name	Type	Collation	Attributes	Null	Default
<input type="checkbox"/> 1	pcs_id	int(11)			No	None
<input type="checkbox"/> 2	apply_related_data_id	int(11)			Yes	NULL
<input type="checkbox"/> 3	hold	int(11)			No	0
<input type="checkbox"/> 4	lab_attendent_id	int(11)			Yes	NULL
<input type="checkbox"/> 5	status	int(11)			Yes	0

Figure 2.7: Datatype of provide_confirm_Status table

Chapter 3

Implementation

3.1 Database Overview with image

--> Converting ER diagram to table, we get 6 tables, that's are shown in figure below.

Table	Action
<input type="checkbox"/> apply_related_data	★ Browse Structure Search Insert Empty Drop
<input type="checkbox"/> equipment_related_data	★ Browse Structure Search Insert Empty Drop
<input type="checkbox"/> provide_confirm_status	★ Browse Structure Search Insert Empty Drop
<input type="checkbox"/> student_information	★ Browse Structure Search Insert Empty Drop
<input type="checkbox"/> teacher_information	★ Browse Structure Search Insert Empty Drop
5 tables	Sum

Figure 3.1: List of table of database

--> student_information Table:

stu_id	stu_name	stu_gender	stu_program	stu_session	stu_religion	stu_mobile_number	stu_mail	stu_blood_group	stu_designation
1801016	Saurav Joarder	Male	IOT	2018-19	Islam	9761121828	1801016@iot.bdu.ac.bd	o-ve	Student
1801028	Pallab Kumar	Male	IOT	2018-19	Islam	9761121838	1801028@iot.bdu.ac.bd	ab-ve	Student
1801029	Md. Mehedi Hasan	Male	IOT	2018-19	Islam	9761121808	1801029@iot.bdu.ac.bd	b-ve	Student
1801034	Md. Abdus Sabur	Male	IOT	2018-19	Islam	9761121798	1801034@iot.bdu.ac.bd	o+ve	Student
1801040	Md. Rowshan Kabir Akash	Male	IOT	2018-19	Islam	9761121788	1801040@iot.bdu.ac.bd	a+ve	Student
1801042	Sumon Ahemed	Male	IOT	2018-19	Islam	9761121778	1801042@iot.bdu.ac.bd	a-ve	Student
1901001	Md. Al-Amin Islam	Male	IOT	2019-20	Islam	9761122334	1901001@iot.bdu.ac.bd	o+ve	Student
1901002	Sadat Hasnat Sabbir	Male	IOT	2019-20	Islam	9761122335	1901002@iot.bdu.ac.bd	a+ve	Student
1901003	Shakil Ahmed	Male	IOT	2019-20	Islam	9761122314	1901003@iot.bdu.ac.bd	a-ve	Student
1901004	D. M. Khalid Mahmud	Male	IOT	2019-20	Islam	9761122308	1901004@iot.bdu.ac.bd	o-ve	Student

Figure 3.2: student_information table with values

--> teacher_information Table:

teacher_id	teacher_name	teacher_gender	teacher_designation	teacher_mail	teacher_department	teacher_password	teacher_religion	teacher_mobile_number
1	Nurjahan Nipa	Female	Lecturer	nurjahan@iot.bdu.ac.bd	ICT	123	Islam	01768053215
2	Farzana Akter	Female	Lecturer	farzana@iot.bdu.ac.bd	ICT	123	Islam	01778393988
3	Samsuddin Ahmed	Male	Assistant Professor	samsuddin@iot.bdu.ac.bd	ICT	123	Islam	01778393988
4	Suman Saha	Male	Lecturer	sumon@iot.bdu.ac.bd	ICT	123	Hinduism	01778393988
5	Md. Habibur Rahman	Male	Lecturer	habibur@iot.bdu.ac.bd	ICT	123	Islam	01778393988
6	Mahedi Hasan	Male	Lab Attendent	mehedi@iot.bdu.ac.bd	ICT	123	Islam	01778393988
7	Johirul Islam	Male	Lab Attendent	johirul@iot.bdu.ac.bd	ICT	123	Islam	01778393988

Figure 3.3: teacher_information table with values

--> apply_related_data Table:

apply_related_data_id	apply_timestamp	stu_id	equipment_list	purpose	teacher_id	teacher_permission	provide_timestamp
5	2022-07-14 15:12:30	1901050	Light Cup-2	NULL	2	Granted	2022-07-15 15:16:00
6	2022-07-14 15:29:15	1901050	Reed Switch,Relay,RGB LED-2,2,2	NULL	1	Granted	2022-07-15 15:30:00
10	2022-07-14 17:27:35	1901050	Heartbeat Sensor,IR Emission,Laser Emitter-1,2,3	NULL	1	Granted	2022-08-01 17:51:00
12	2022-07-24 23:25:54	1801042	NodeMCU-2	NULL	1	Granted	NULL
13	2022-07-24 23:27:37	1801042	Hall Magnetic Sensor-1	NULL	1	Granted	2022-07-24 23:57:00
15	2022-07-25 12:31:09	1901050	Arduino Uno,Auduino Mega-5,4	NULL	1	Granted	2022-07-25 12:32:00
18	2022-07-31 11:34:10	1901050	Arduino Uno,NodeMCU-5,5	NULL	2	Granted	2022-07-31 11:36:00

Figure 3.4: apply_related_data table with values

--> equipment_related_data Table:

equipment_id	equipment_name	total_quantity	allocable_quantity	remaining_quantity	equipment_category	note
1	Arduino Uno	20	15	14	Micro-Controller	Box no 1
2	DHT11	20	15	11	Sensor	Box no 2
4	Arduino Mega	20	15	10	Micro-Controller	Box no 3
5	JoyStick	20	15	10	Sensor	Box no 5
6	Flame Sensor	20	15	10	Sensor	Box no 6
7	RGB LED	20	15	10	Sensor	Box no 7
8	Heartbeat Sensor	20	15	11	Sensor	Box no 8

Figure 3.5: equipment_related_data table with values

--> provide_confirm_Status Table:

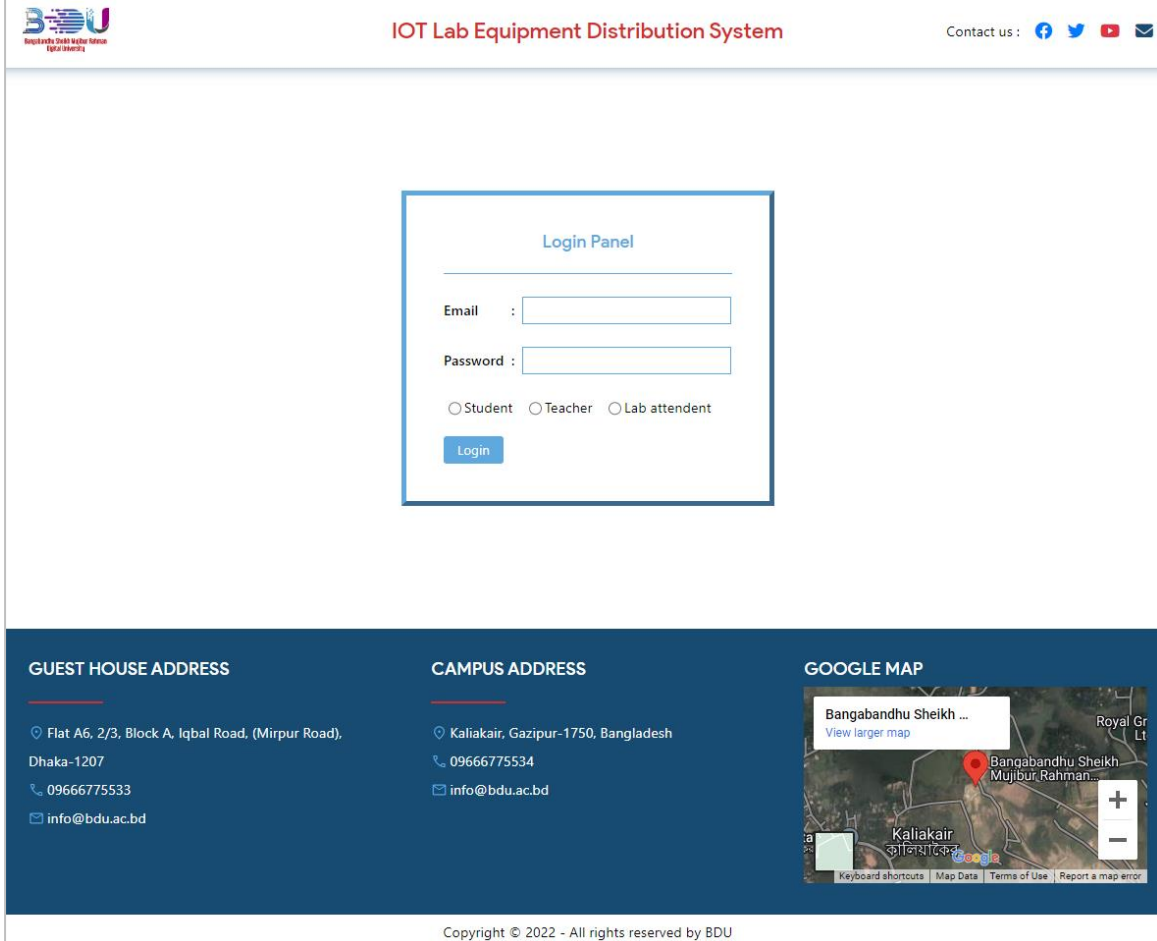
pcs_id	apply_related_data_id	hold	lab_attendent_id	status
1	21	0	NULL	0
2	22	0	NULL	0
3	23	0	NULL	0
4	24	0	6	0
5	25	0	NULL	0
10	31	0	6	2
11	32	0	NULL	0
13	33	0	7	2

Figure 3.6: provide_confirm_Status table with values

3.2 Website Overview with image

3.2.1 Login Page

This is the login page by which authorized student, teacher and Lab attendant can login this system.



The screenshot displays the login interface of the IOT Lab Equipment Distribution System. At the top, the header includes the BDU logo, the system name "IOT Lab Equipment Distribution System", and social media contact links. The main content area features a "Login Panel" with input fields for "Email" and "Password", and radio buttons for "Student", "Teacher", and "Lab attendant". A "Login" button is positioned below these options. The footer is divided into three sections: "GUEST HOUSE ADDRESS" (Flat A6, 2/3, Block A, Iqbal Road, Dhaka-1207, 09666775533, info@bdu.ac.bd), "CAMPUS ADDRESS" (Kaliakair, Gazipur-1750, Bangladesh, 09666775534, info@bdu.ac.bd), and a "GOOGLE MAP" showing the location of Bangabandhu Sheikh Mujibur Rahman Digital University. A copyright notice "Copyright © 2022 - All rights reserved by BDU" is at the bottom.

IOT Lab Equipment Distribution System

Contact us : [f](#) [t](#) [y](#) [e](#)

Login Panel

Email :

Password :

☐ Student ☐ Teacher ☐ Lab attendant

[Login](#)

GUEST HOUSE ADDRESS

Flat A6, 2/3, Block A, Iqbal Road, (Mirpur Road),
Dhaka-1207
09666775533
info@bdu.ac.bd

CAMPUS ADDRESS

Kaliakair, Gazipur-1750, Bangladesh
09666775534
info@bdu.ac.bd

GOOGLE MAP

Bangabandhu Sheikh ...
View larger map

Royal Gr
Lt

Bangabandhu Sheikh
Mujibur Rahman

Kaliakair
কালিয়াকৈর

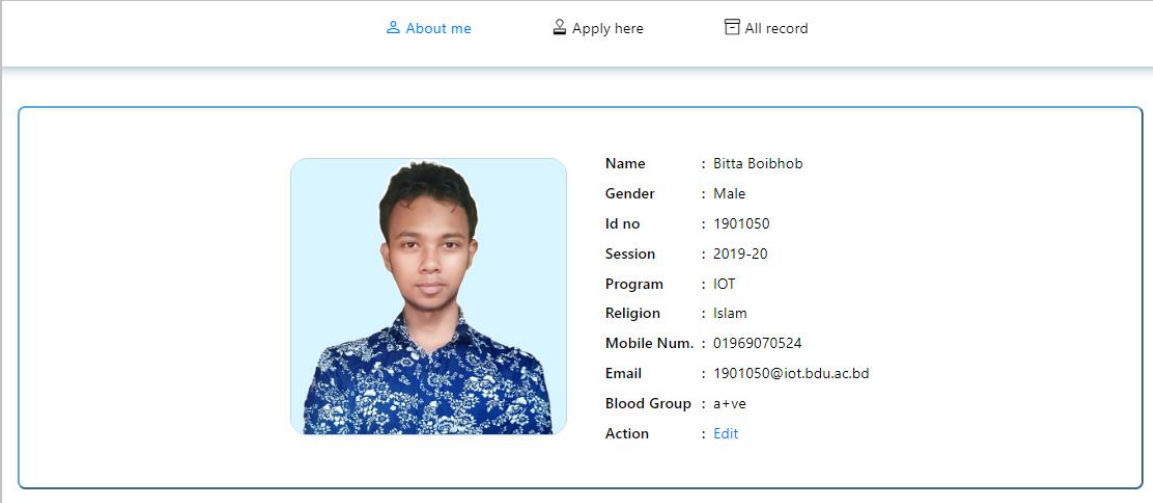
Keyboard shortcuts | Map Data | Terms of Use | Report a map error

Copyright © 2022 - All rights reserved by BDU

Figure 3.7: Login page of website

3.2.2 Student's Dashboard

This is student dashboard's 'About me' section where information about logged in student is shown here.




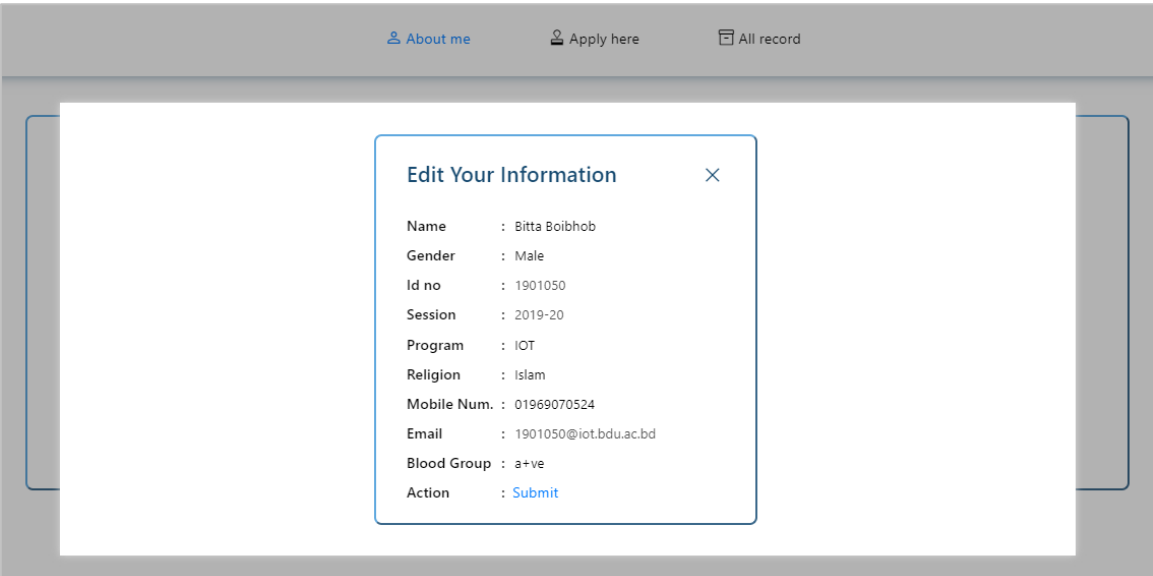
	Name : Bitta Boibhob
	Gender : Male
	Id no : 1901050
	Session : 2019-20
	Program : IOT
	Religion : Islam
	Mobile Num. : 01969070524
	Email : 1901050@iot.bdu.ac.bd
	Blood Group : a+ve
	Action : Edit

Figure 3.8: Student dashboard's about me section

By clicking edit button a student can edit his/her information.



Edit Your Information ×

Name	: Bitta Boibhob
Gender	: Male
Id no	: 1901050
Session	: 2019-20
Program	: IOT
Religion	: Islam
Mobile Num.	: 01969070524
Email	: 1901050@iot.bdu.ac.bd
Blood Group	: a+ve
Action	: Submit

Figure 3.9: Student dashboard's edit information section

The second section of student's dashboard is 'Apply here' section. Here equipment name, allocable quantity is show which a student select this, and also select reference teacher and fillup purpose section and also have a submit button.

[About me](#)
[Apply here](#)
[All record](#)

Select equipment, Provide quantity & Submit now

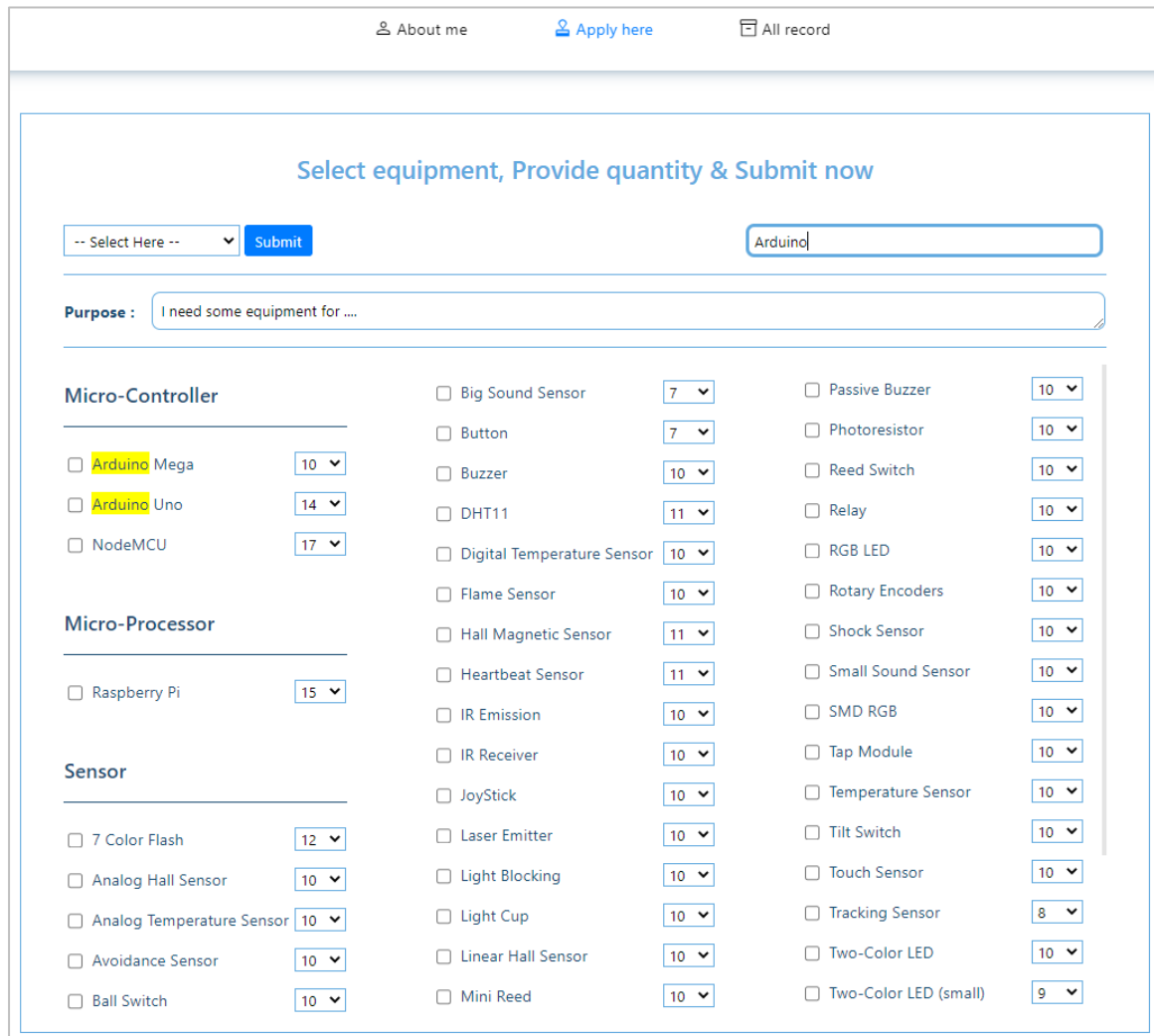
-- Select Here --
Submit
Search Here

Purpose : I need some equipment for

Micro-Controller <ul style="list-style-type: none"> <input type="checkbox"/> Arduino Mega 10 <input type="checkbox"/> Arduino Uno 14 <input type="checkbox"/> NodeMCU 17 	<input type="checkbox"/> Big Sound Sensor 7 <input type="checkbox"/> Button 7 <input type="checkbox"/> Buzzer 10 <input type="checkbox"/> DHT11 11 <input type="checkbox"/> Digital Temperature Sensor 10 <input type="checkbox"/> Flame Sensor 10 <input type="checkbox"/> Hall Magnetic Sensor 11 <input type="checkbox"/> Heartbeat Sensor 11 <input type="checkbox"/> IR Emission 10 <input type="checkbox"/> IR Receiver 10 <input type="checkbox"/> JoyStick 10 <input type="checkbox"/> Laser Emitter 10 <input type="checkbox"/> Light Blocking 10 <input type="checkbox"/> Light Cup 10 <input type="checkbox"/> Linear Hall Sensor 10 <input type="checkbox"/> Mini Reed 10	<input type="checkbox"/> Passive Buzzer 10 <input type="checkbox"/> Photoresistor 10 <input type="checkbox"/> Reed Switch 10 <input type="checkbox"/> Relay 10 <input type="checkbox"/> RGB LED 10 <input type="checkbox"/> Rotary Encoders 10 <input type="checkbox"/> Shock Sensor 10 <input type="checkbox"/> Small Sound Sensor 10 <input type="checkbox"/> SMD RGB 10 <input type="checkbox"/> Tap Module 10 <input type="checkbox"/> Temperature Sensor 10 <input type="checkbox"/> Tilt Switch 10 <input type="checkbox"/> Touch Sensor 10 <input type="checkbox"/> Tracking Sensor 8 <input type="checkbox"/> Two-Color LED 10 <input type="checkbox"/> Two-Color LED (small) 9
Micro-Processor <ul style="list-style-type: none"> <input type="checkbox"/> Raspberry Pi 15 		
Sensor <ul style="list-style-type: none"> <input type="checkbox"/> 7 Color Flash 12 <input type="checkbox"/> Analog Hall Sensor 10 <input type="checkbox"/> Analog Temperature Sensor 10 <input type="checkbox"/> Avoidance Sensor 10 <input type="checkbox"/> Ball Switch 10 		

Figure 3.10: Student dashboard's Apply section

This section have a search bar by which a student can search his/her needed equipment. When text is match that highlighted with yellow color.



Select equipment, Provide quantity & Submit now

-- Select Here --

Purpose :

Micro-Controller

- ☐ **Arduino** Mega
- ☐ **Arduino** Uno
- ☐ NodeMCU

Micro-Processor

- ☐ Raspberry Pi

Sensor

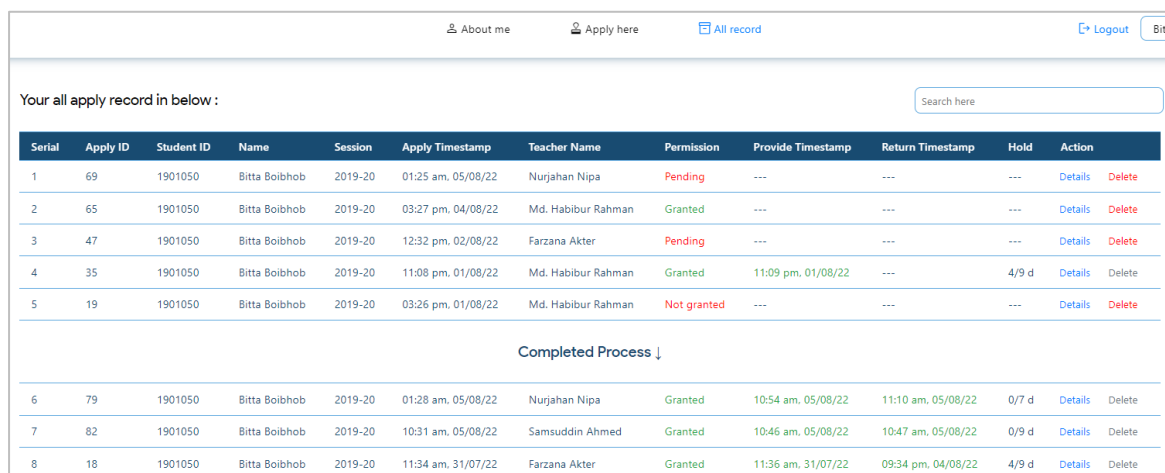
- ☐ 7 Color Flash
- ☐ Analog Hall Sensor
- ☐ Analog Temperature Sensor
- ☐ Avoidance Sensor
- ☐ Ball Switch

- ☐ Big Sound Sensor
- ☐ Button
- ☐ Buzzer
- ☐ DHT11
- ☐ Digital Temperature Sensor
- ☐ Flame Sensor
- ☐ Hall Magnetic Sensor
- ☐ Heartbeat Sensor
- ☐ IR Emission
- ☐ IR Receiver
- ☐ JoyStick
- ☐ Laser Emitter
- ☐ Light Blocking
- ☐ Light Cup
- ☐ Linear Hall Sensor
- ☐ Mini Reed

- ☐ Passive Buzzer
- ☐ Photoresistor
- ☐ Reed Switch
- ☐ Relay
- ☐ RGB LED
- ☐ Rotary Encoders
- ☐ Shock Sensor
- ☐ Small Sound Sensor
- ☐ SMD RGB
- ☐ Tap Module
- ☐ Temperature Sensor
- ☐ Tilt Switch
- ☐ Touch Sensor
- ☐ Tracking Sensor
- ☐ Two-Color LED
- ☐ Two-Color LED (small)

Figure 3.11: Search bar in apply section

The third section of student's dashboard is 'All record'. Here a student can see his/her apply related all information and so on. This tab has a table of two section. First section is for incompleted record and second section is for completed record.



Your all apply record in below :

Serial	Apply ID	Student ID	Name	Session	Apply Timestamp	Teacher Name	Permission	Provide Timestamp	Return Timestamp	Hold	Action
1	69	1901050	Bitta Boibhob	2019-20	01:25 am, 05/08/22	Nurjahan Nipa	Pending	---	---	---	Details Delete
2	65	1901050	Bitta Boibhob	2019-20	03:27 pm, 04/08/22	Md. Habibur Rahman	Granted	---	---	---	Details Delete
3	47	1901050	Bitta Boibhob	2019-20	12:32 pm, 02/08/22	Farzana Akter	Pending	---	---	---	Details Delete
4	35	1901050	Bitta Boibhob	2019-20	11:08 pm, 01/08/22	Md. Habibur Rahman	Granted	11:09 pm, 01/08/22	---	4/9 d	Details Delete
5	19	1901050	Bitta Boibhob	2019-20	03:26 pm, 01/08/22	Md. Habibur Rahman	Not granted	---	---	---	Details Delete

Completed Process ↓

6	79	1901050	Bitta Boibhob	2019-20	01:28 am, 05/08/22	Nurjahan Nipa	Granted	10:54 am, 05/08/22	11:10 am, 05/08/22	0/7 d	Details Delete
7	82	1901050	Bitta Boibhob	2019-20	10:31 am, 05/08/22	Samsuddin Ahmed	Granted	10:46 am, 05/08/22	10:47 am, 05/08/22	0/9 d	Details Delete
8	18	1901050	Bitta Boibhob	2019-20	11:34 am, 31/07/22	Farzana Akter	Granted	11:36 am, 31/07/22	09:34 pm, 04/08/22	4/9 d	Details Delete

Figure 3.12 Student dashboard's All record section

‘All record’ section have a single search bar.

Your all apply record in below :

Serial	Apply ID	Student ID	Name	Session	Apply Timestamp	Teacher Name	Permission	Provide Timestamp	Return Timestamp	Hold	Action
1	69	1901050	Bitta Boibhob	2019-20	01:25 am, 05/08/22	Nurjahan Nipa	Pending	---	---	---	Details Delete
2	47	1901050	Bitta Boibhob	2019-20	12:32 pm, 02/08/22	Farzana Akter	Pending	---	---	---	Details Delete

No Completed Record To Show

Figure 3.13: All record sections Search bar

When a student pressed ‘Details’ button, then he/she can see more information about a particular apply id insert a modal.

Your all apply record in below :

About me
Apply here
All record
Logout

Serial	Apply ID	Student ID	Name	Session	Apply Timestamp	Teacher Name	Permission	Provide Timestamp	Return Timestamp	Hold	Action
1	65	1901050	Bitta Boibhob	2019-20	01:50 am, 06/08/22	Nurjahan Nipa	Granted	02:23 am, 06/08/22	02:26 am, 06/08/22	4/9 d	Details Delete
2	35	1901050	Bitta Boibhob	2019-20	11:08 pm, 01/08/22	Md. Habibur Rahman	Granted	11:09 pm, 01/08/22	---	4/9 d	Details Delete
3	85	1901050	Bitta Boibhob	2019-20	03:27 pm, 04/08/22	Md. Habibur Rahman	Granted	---	---	---	Details Delete
4	83	1901050	Bitta Boibhob	2019-20	03:27 pm, 04/08/22	Md. Habibur Rahman	Granted	---	---	---	Details Delete
5	79	1901050	Bitta Boibhob	2019-20	03:26 pm, 01/08/22	Md. Habibur Rahman	Not granted	---	---	---	Details Delete
6	82	1901050	Bitta Boibhob	2019-20	03:26 pm, 01/08/22	Md. Habibur Rahman	Not granted	---	---	---	Details Delete

Record in details in below :

Name : Bitta Boibhob	Id : 1901050	Session : 2019-20
Apply Id : 83	Apply Timestamp : 01:50 am, 06/08/22	Teacher Name : Nurjahan Nipa
Permission : Granted	Provide Timestamp : 02:23 am, 06/08/22	Return Timestamp : 02:26 am, 06/08/22
Hold : 0/7 days	Provided By : Mahedi Hasan	Returned By : Mahedi Hasan
Purpose : I need it for MCIOT Project.		
Equipment Name & Quantity :		
Arduino Mega = 3		
Arduino Uno = 3		
NodeMCU = 2		

Figure 3.14: Open a modal when Details button is clicked

A student can delete its record from here. But when equipment is provided to him/her then a student can't delete that particular record.

localhost-dir BDU Web-related File ext. converter Others Overleaf

localhost says
Are you sure to delete?

Your all apply record in below :

Serial	Apply ID	Student ID	Name	Session	Apply Timestamp	Teacher Name	Permission	Provide Timestamp	Return Timestamp	Hold	Action
1	69	1901050	Bitta Boibhob	2019-20	01:25 am, 05/08/22	Nurjahan Nipa	Pending	---	---	---	Details Delete
2	65	1901050	Bitta Boibhob	2019-20	03:27 pm, 04/08/22	Md. Habibur Rahman	Granted	---	---	---	Details Delete
3	47	1901050	Bitta Boibhob	2019-20	12:32 pm, 02/08/22	Farzana Akter	Pending	---	---	---	Details Delete
4	35	1901050	Bitta Boibhob	2019-20	11:08 pm, 01/08/22	Md. Habibur Rahman	Granted	11:09 pm, 01/08/22	---	4/9 d	Details Delete
5	19	1901050	Bitta Boibhob	2019-20	03:26 pm, 01/08/22	Md. Habibur Rahman	Not granted	---	---	---	Details Delete

Figure 3.15: Having Delete Operation into student dashboard

3.2.3 Teacher's Dashboard

This is teacher dashboard's 'About me' section where information about logged in teacher is shown here.

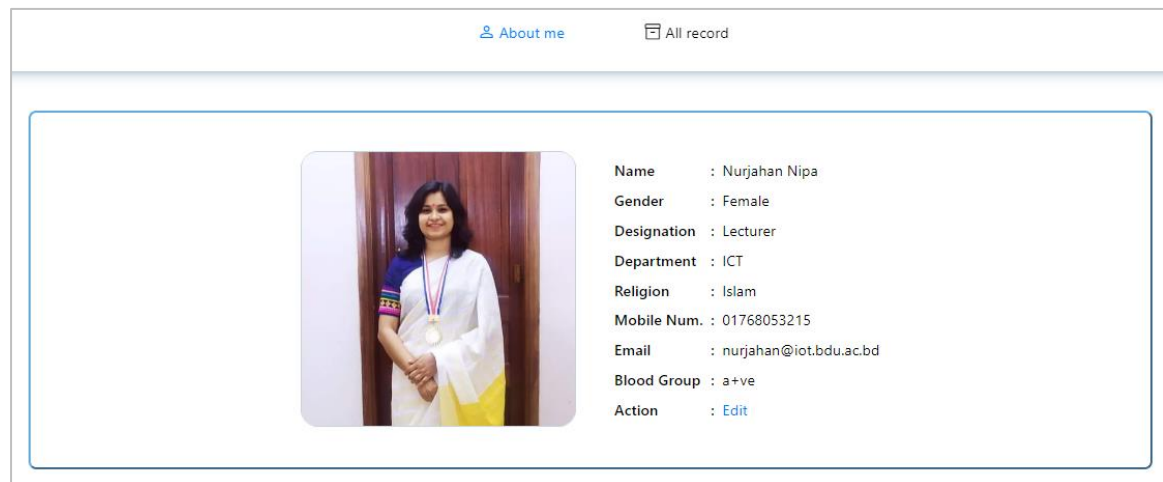


Figure 3.16 : Teacher dashboard's about me section

By clicking edit button a teacher can edit his/her information.

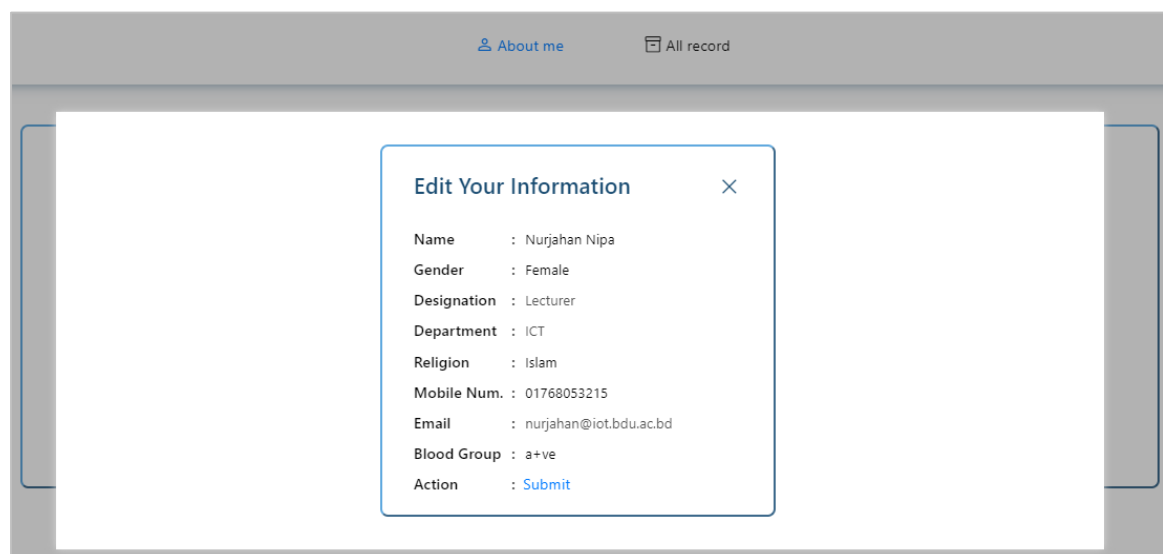


Figure 3.17: Teacher dashboard's edit information section

The second section of teacher's dashboard is 'All record'. Here a teacher can see apply related all information of those student who apply to this logged in teacher. This tab has a table of two section. First section is for incompleted record and second section is for completed record.

[About me](#)
[All record](#)
[Logout](#)
Nurjahan Nipa

All record in below :

Column : Apply Timestamp
 From : mm/dd/yyyy To : 08/06/2022
 Session : All
 Search here

Serial	Apply ID	Student ID	Name	Session	Apply Timestamp	Teacher Name	Permission	Provide Timestamp	Return Timestamp	Hold	Action
1	69	1901050	Bitta Boibhob	2019-20	01:25 am, 05/08/22	Nurjahan Nipa	Pending	---	---	---	Details
2	12	1801042	Sumon Ahemed	2018-19	11:25 pm, 24/07/22	Nurjahan Nipa	Granted	---	---	---	Details
Completed Process ↓											
3	79	1901050	Bitta Boibhob	2019-20	01:28 am, 05/08/22	Nurjahan Nipa	Granted	10:54 am, 05/08/22	11:10 am, 05/08/22	0/7 d	Details
4	13	1801042	Sumon Ahemed	2018-19	11:27 pm, 24/07/22	Nurjahan Nipa	Granted	11:57 pm, 24/07/22	05:42 pm, 04/08/22	11/9 d	Details
5	61	1901050	Bitta Boibhob	2019-20	07:42 pm, 02/08/22	Nurjahan Nipa	Granted	07:50 pm, 02/08/22	07:54 pm, 02/08/22	0/9 d	Details
6	10	1901050	Bitta Boibhob	2019-20	05:27 pm, 14/07/22	Nurjahan Nipa	Granted	05:51 pm, 01/08/22	05:53 pm, 01/08/22	0/9 d	Details
7	15	1901050	Bitta Boibhob	2019-20	12:31 pm, 25/07/22	Nurjahan Nipa	Granted	12:32 pm, 25/07/22	12:34 pm, 25/07/22	0/9 d	Details
8	6	1901050	Bitta Boibhob	2019-20	03:29 pm, 14/07/22	Nurjahan Nipa	Granted	03:30 pm, 15/07/22	03:30 pm, 15/07/22	0/9 d	Details

Figure 3.18: Teacher dashboard's All record section

‘All record’ section have multiple search bar by which a teacher can filter and search data.

All record in below :
 Column : Apply Timestamp
 From : mm/dd/yyyy To : 08/06/2022
 Session : 2019-20
 Bitta

Serial	Apply ID	Student ID	Name	Session	Apply Timestamp	Teacher Name	Permission	Provide Timestamp	Return Timestamp	Hold	Action
1	69	1901050	Bitta Boibhob	2019-20	01:25 am, 05/08/22	Nurjahan Nipa	Pending	---	---	---	Details
Completed Process ↓											
2	79	1901050	Bitta Boibhob	2019-20	01:28 am, 05/08/22	Nurjahan Nipa	Granted	10:54 am, 05/08/22	11:10 am, 05/08/22	0/7 d	Details
3	61	1901050	Bitta Boibhob	2019-20	07:42 pm, 02/08/22	Nurjahan Nipa	Granted	07:50 pm, 02/08/22	07:54 pm, 02/08/22	0/9 d	Details
4	15	1901050	Bitta Boibhob	2019-20	12:31 pm, 25/07/22	Nurjahan Nipa	Granted	12:32 pm, 25/07/22	12:34 pm, 25/07/22	0/9 d	Details
5	10	1901050	Bitta Boibhob	2019-20	05:27 pm, 14/07/22	Nurjahan Nipa	Granted	05:51 pm, 01/08/22	05:53 pm, 01/08/22	0/9 d	Details
6	6	1901050	Bitta Boibhob	2019-20	03:29 pm, 14/07/22	Nurjahan Nipa	Granted	03:30 pm, 15/07/22	03:30 pm, 15/07/22	0/9 d	Details

Figure 3.19: All record sections Search bar

When a teacher pressed ‘Details’ button, then he/she can see more information about a particular apply id insert a modal. There are a dropdown manu by which a teacher can granted or not granted a student’s apply request.

[About me](#)
[All record](#)
[Logout](#)
Nurjahan Nipa

All record in below :

Serial	Apply ID	Student ID	Name	Session	Apply Timestamp	Teacher Name	Permission	Provide Timestamp	Return Timestamp	Hold	Action
1	86	1901050	Bitta Boibhob	2019-20	10:13 am, 06/08/22	Nurjahan Nipa	Pending	---	---	---	Details
2	12	1801042	Sumon Ahemed	2018-19	11:25 pm, 24/07/22	Nurjahan Nipa	Granted	---	---	---	Details
3	83	1901050	Bitta Boibhob	2019-20	01:28 am, 05/08/22	Nurjahan Nipa	Granted	10:54 am, 05/08/22	11:10 am, 05/08/22	0/7 d	Details
4	79	1901050	Bitta Boibhob	2019-20	07:42 pm, 02/08/22	Nurjahan Nipa	Granted	07:50 pm, 02/08/22	07:54 pm, 02/08/22	0/9 d	Details
5	13	1801042	Sumon Ahemed	2018-19	11:27 pm, 24/07/22	Nurjahan Nipa	Granted	11:57 pm, 24/07/22	05:42 pm, 04/08/22	11/9 d	Details

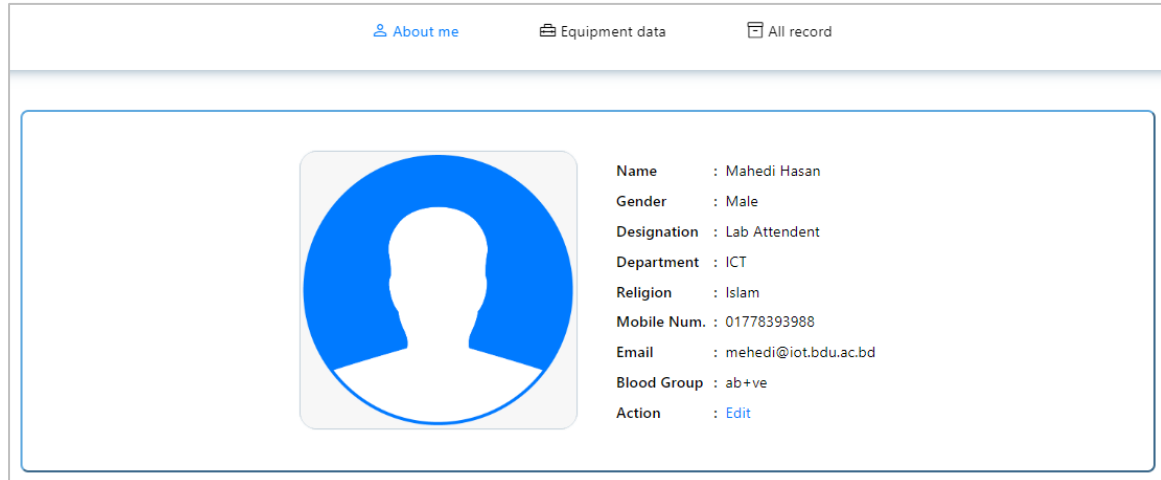
Record in details in below :

Name : Bitta Boibhob	Id : 1901050	Session : 2019-20
Apply Id : 86	Apply Timestamp : 10:13 am, 06/08/22	Teacher Name : Nurjahan Nipa
Permission : Pending	Provide Timestamp : ---	Return Timestamp : ---
Hold : ---	Provided By : ---	Returned By : ---
Purpose : I need some equipment for MCIOT Project		
Equipment Name & Quantity :		
Arduino Mega = 3		
Arduino Uno = 2		

Figure 3.20 : Open a modal when Details button is clicked

3.2.4 Lab Attendant's Dashboard

This is lab attendant dashboard's 'About me' section where information about logged in lab attendant is shown here.




About me		Equipment data	All record
		<p>Name : Mahedi Hasan</p> <p>Gender : Male</p> <p>Designation : Lab Attendent</p> <p>Department : ICT</p> <p>Religion : Islam</p> <p>Mobile Num. : 01778393988</p> <p>Email : mehedi@iot.bdu.ac.bd</p> <p>Blood Group : ab+ve</p> <p>Action : Edit</p>	

Figure 3.21: Lab attendant dashboard's about me section

The second section of lab attendant's dashboard is 'Equipment data'. Here has a small dashboard bar that show equipment related information and the table also.

About me

Equipment data

All record

Total Equipment800

Total Allocable Qty.600

Total Remaining Qty.404

Total Equipment Given196

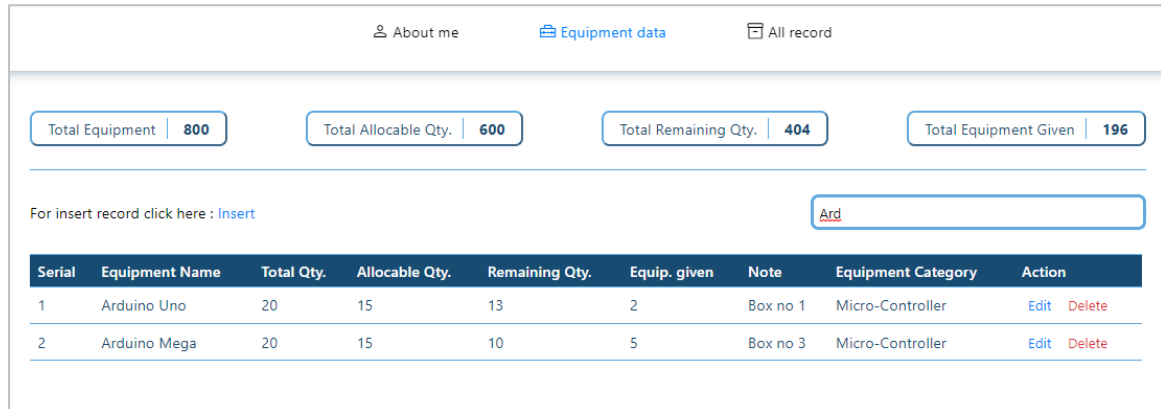
For insert record click here : [Insert](#)

Search here

Serial	Equipment Name	Total Qty.	Allocable Qty.	Remaining Qty.	Equip. given	Note	Equipment Category	Action
1	7 Color Flash	20	15	12	3	Box no 14	Sensor	Edit Delete
2	Analog Hall Sensor	20	15	10	5	Box no 39	Sensor	Edit Delete
3	Analog Temperature Sensor	20	15	10	5	Box no 22	Sensor	Edit Delete
4	Arduino Mega	20	15	10	5	Box no 3	Micro-Controller	Edit Delete
5	Arduino Uno	20	15	13	2	Box no 1	Micro-Controller	Edit Delete
6	Avoidance Sensor	20	15	10	5	Box no 35	Sensor	Edit Delete
7	Ball Switch	20	15	10	5	Box no 21	Sensor	Edit Delete
8	Big Sound Sensor	20	15	7	8	Box no 17	Sensor	Edit Delete

Figure 3.22: Equipment data is shown

There has a single search bar by which equipment related data can be searched.



Navigation: About me | **Equipment data** | All record

Summary: Total Equipment | 800 | Total Allocable Qty. | 600 | Total Remaining Qty. | 404 | Total Equipment Given | 196

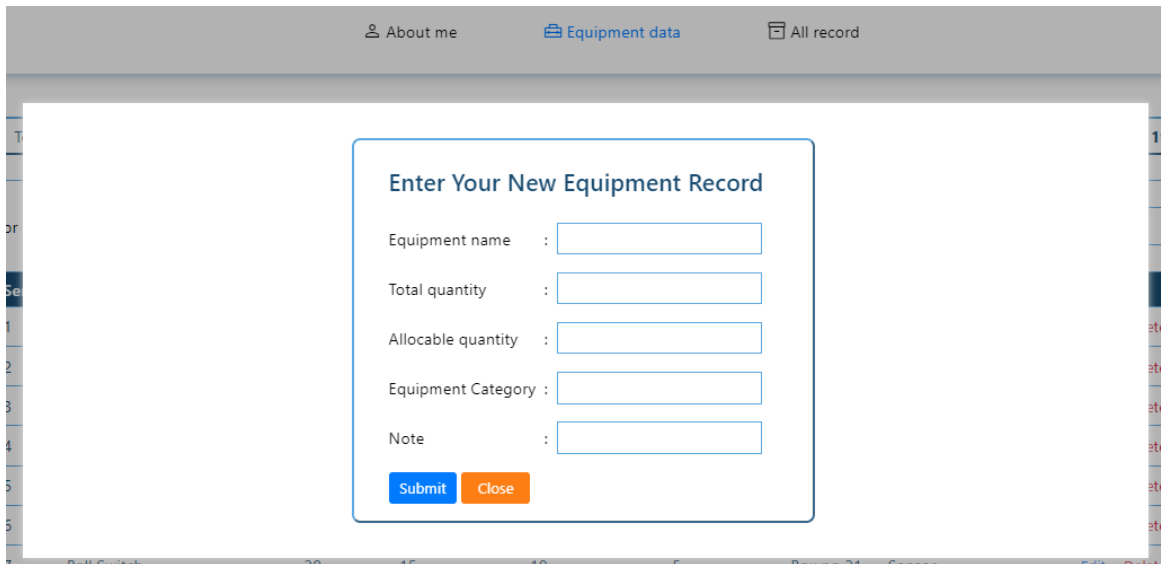
For insert record click here : [Insert](#)

Search:

Serial	Equipment Name	Total Qty.	Allocable Qty.	Remaining Qty.	Equip. given	Note	Equipment Category	Action
1	Arduino Uno	20	15	13	2	Box no 1	Micro-Controller	Edit Delete
2	Arduino Mega	20	15	10	5	Box no 3	Micro-Controller	Edit Delete

Figure 3.23: Equipment data Searched

A lab attendant can insert data by clicking insert button. Then a modal is opened with a form. By submitting this a new record create.



Navigation: About me | **Equipment data** | All record

Enter Your New Equipment Record

Equipment name :

Total quantity :

Allocable quantity :

Equipment Category :

Note :

[Submit](#) [Close](#)

Figure 3.24: New equipment data Insertion

A lab attendant can edit data by clicking edit button. Then a modal is opened with a form. By submitting this data is updated for a particular equipment id.

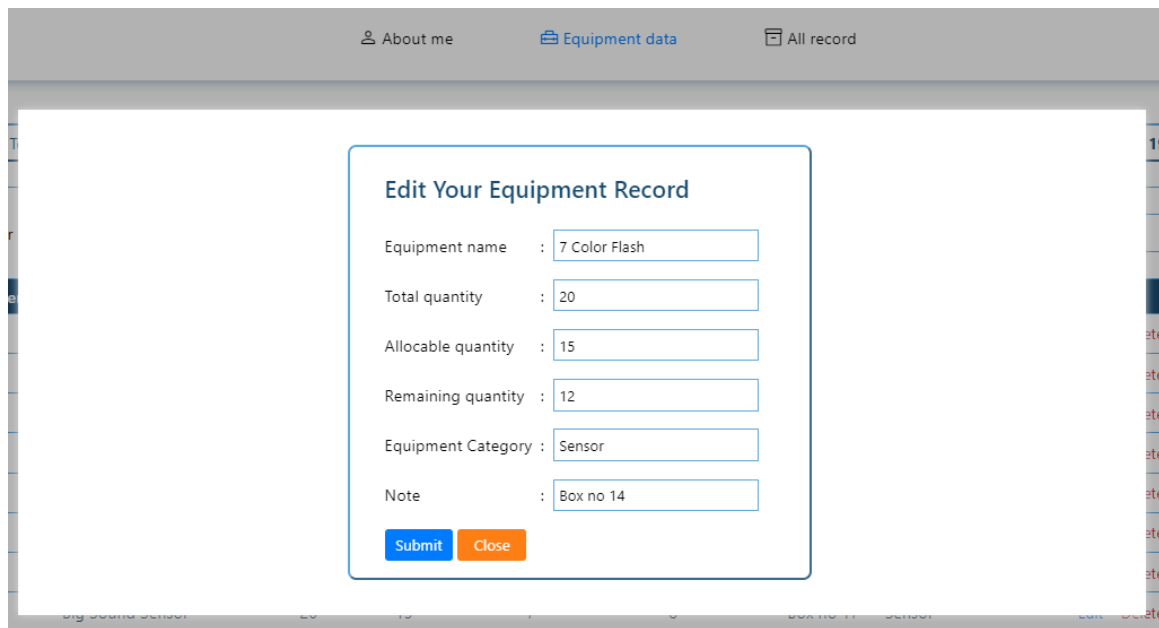
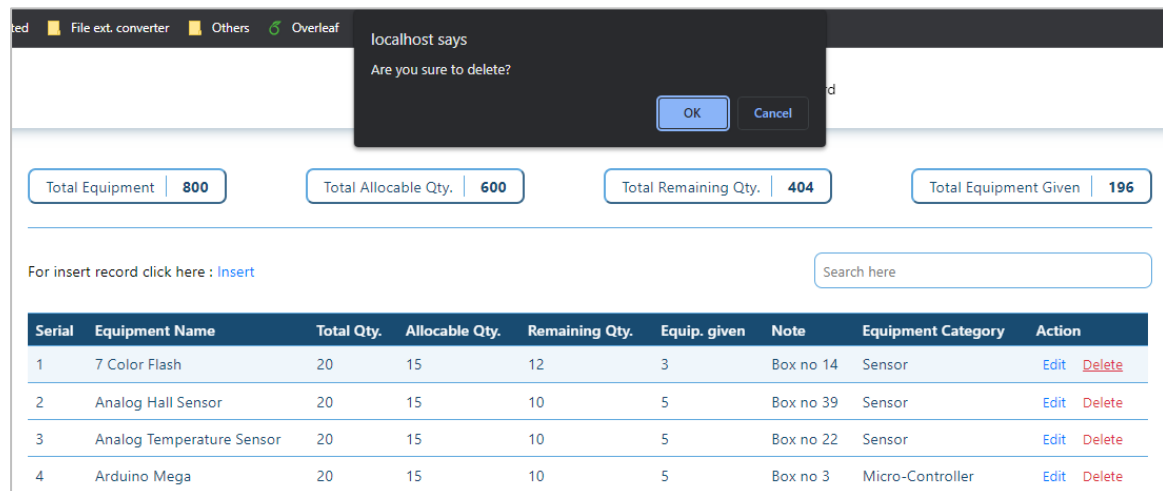


Figure 3.25: Edit equipment data

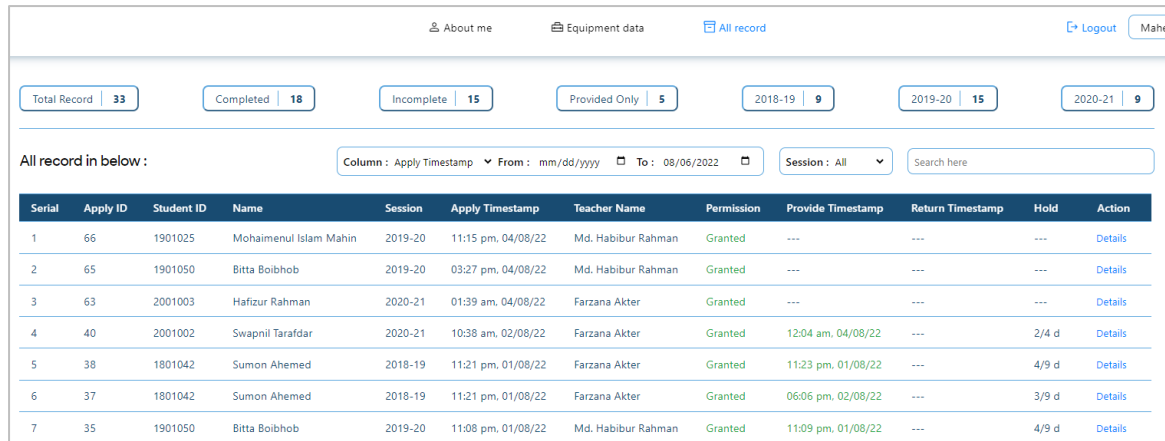
The table also contain 'delete' button. By clicking this a lab attendant can delete a record.



Serial	Equipment Name	Total Qty.	Allocable Qty.	Remaining Qty.	Equip. given	Note	Equipment Category	Action
1	7 Color Flash	20	15	12	3	Box no 14	Sensor	Edit Delete
2	Analog Hall Sensor	20	15	10	5	Box no 39	Sensor	Edit Delete
3	Analog Temperature Sensor	20	15	10	5	Box no 22	Sensor	Edit Delete
4	Arduino Mega	20	15	10	5	Box no 3	Micro-Controller	Edit Delete

Figure 3.26: Delete equipment data

The third section of lab attendant's dashboard is 'All record'. Here a lab attendant can see apply related all information of those student whose apply request is granted by teacher. This tab has a table of two section. First section is for incomplected record and second section is for completed record.



Dashboard showing 'All record' section with filters and a table of records.

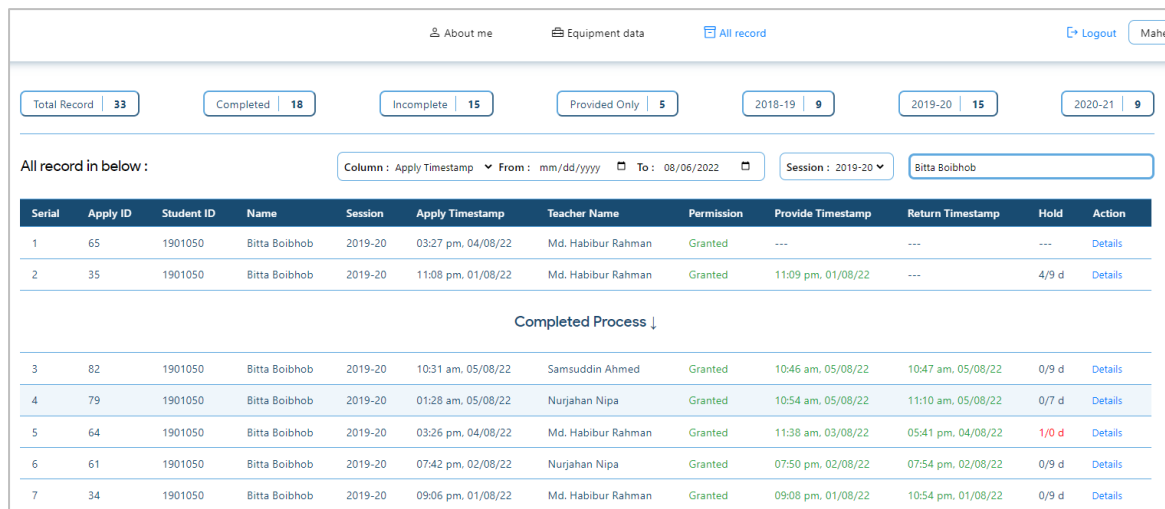
Filters: Total Record: 33, Completed: 18, Incomplete: 15, Provided Only: 5, 2018-19: 9, 2019-20: 15, 2020-21: 9.

Search filters: Column: Apply Timestamp, From: mm/dd/yyyy, To: 08/06/2022, Session: All, Search here.

Serial	Apply ID	Student ID	Name	Session	Apply Timestamp	Teacher Name	Permission	Provide Timestamp	Return Timestamp	Hold	Action
1	66	1901025	Mohaimenul Islam Mahin	2019-20	11:15 pm, 04/08/22	Md. Habibur Rahman	Granted	---	---	---	Details
2	65	1901050	Bitta Boibhob	2019-20	03:27 pm, 04/08/22	Md. Habibur Rahman	Granted	---	---	---	Details
3	63	2001003	Hafizur Rahman	2020-21	01:39 am, 04/08/22	Farzana Akter	Granted	---	---	---	Details
4	40	2001002	Swapnil Tarafdar	2020-21	10:38 am, 02/08/22	Farzana Akter	Granted	12:04 am, 04/08/22	---	2/4 d	Details
5	38	1801042	Sumon Ahemed	2018-19	11:21 pm, 01/08/22	Farzana Akter	Granted	11:23 pm, 01/08/22	---	4/9 d	Details
6	37	1801042	Sumon Ahemed	2018-19	11:21 pm, 01/08/22	Farzana Akter	Granted	06:06 pm, 02/08/22	---	3/9 d	Details
7	35	1901050	Bitta Boibhob	2019-20	11:08 pm, 01/08/22	Md. Habibur Rahman	Granted	11:09 pm, 01/08/22	---	4/9 d	Details

Figure 3.27: Lab attendant dashboard's All record section

'All record' section have multiple search bar by which a lab attendant can filter and search data.



Dashboard showing 'All record' section with filters and a table of records.

Filters: Total Record: 33, Completed: 18, Incomplete: 15, Provided Only: 5, 2018-19: 9, 2019-20: 15, 2020-21: 9.

Search filters: Column: Apply Timestamp, From: mm/dd/yyyy, To: 08/06/2022, Session: 2019-20, Bitta Boibhob.

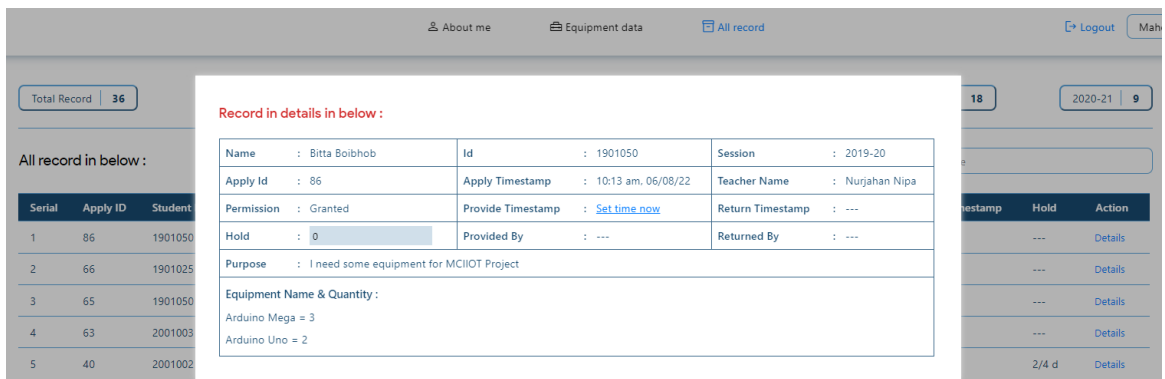
Serial	Apply ID	Student ID	Name	Session	Apply Timestamp	Teacher Name	Permission	Provide Timestamp	Return Timestamp	Hold	Action
1	65	1901050	Bitta Boibhob	2019-20	03:27 pm, 04/08/22	Md. Habibur Rahman	Granted	---	---	---	Details
2	35	1901050	Bitta Boibhob	2019-20	11:08 pm, 01/08/22	Md. Habibur Rahman	Granted	11:09 pm, 01/08/22	---	4/9 d	Details

Completed Process ↓

Serial	Apply ID	Student ID	Name	Session	Apply Timestamp	Teacher Name	Permission	Provide Timestamp	Return Timestamp	Hold	Action
3	82	1901050	Bitta Boibhob	2019-20	10:31 am, 05/08/22	Samsuddin Ahmed	Granted	10:46 am, 05/08/22	10:47 am, 05/08/22	0/9 d	Details
4	79	1901050	Bitta Boibhob	2019-20	01:28 am, 05/08/22	Nurjahan Nipa	Granted	10:54 am, 05/08/22	11:10 am, 05/08/22	0/7 d	Details
5	64	1901050	Bitta Boibhob	2019-20	03:26 pm, 04/08/22	Md. Habibur Rahman	Granted	11:38 am, 03/08/22	05:41 pm, 04/08/22	1/0 d	Details
6	61	1901050	Bitta Boibhob	2019-20	07:42 pm, 02/08/22	Nurjahan Nipa	Granted	07:50 pm, 02/08/22	07:54 pm, 02/08/22	0/9 d	Details
7	34	1901050	Bitta Boibhob	2019-20	09:06 pm, 01/08/22	Md. Habibur Rahman	Granted	09:08 pm, 01/08/22	10:54 pm, 01/08/22	0/9 d	Details

Figure 3.28: Data searched in All record section

When a lab attendant click on 'Details' button, then he/she can see more information about a particular apply id insert a modal. There are 3 input section by which a lab attendant set hold time in days, set provide time and set return time.



Modal showing details for a record.

Record in details in below:

Name	: Bitta Boibhob	Id	: 1901050	Session	: 2019-20
Apply Id	: 86	Apply Timestamp	: 10:13 am, 06/08/22	Teacher Name	: Nurjahan Nipa
Permission	: Granted	Provide Timestamp	: Set time now	Return Timestamp	: ---
Hold	: 0	Provided By	: ---	Returned By	: ---
Purpose	: I need some equipment for MCIOT Project				
Equipment Name & Quantity	: Arduino Mega = 3 Arduino Uno = 2				

Figure 3.29: Open a modal when Details button is clicked

3.3 Working Procedure

3.3.1 Process Flowchart

This is the flowchart where the full process from student apply to return equipment is shown.

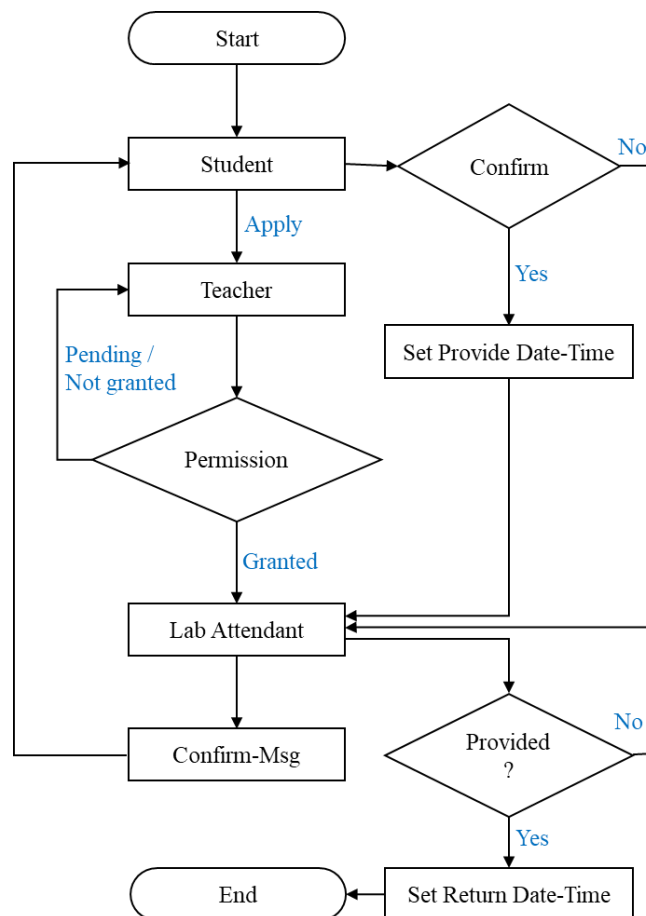
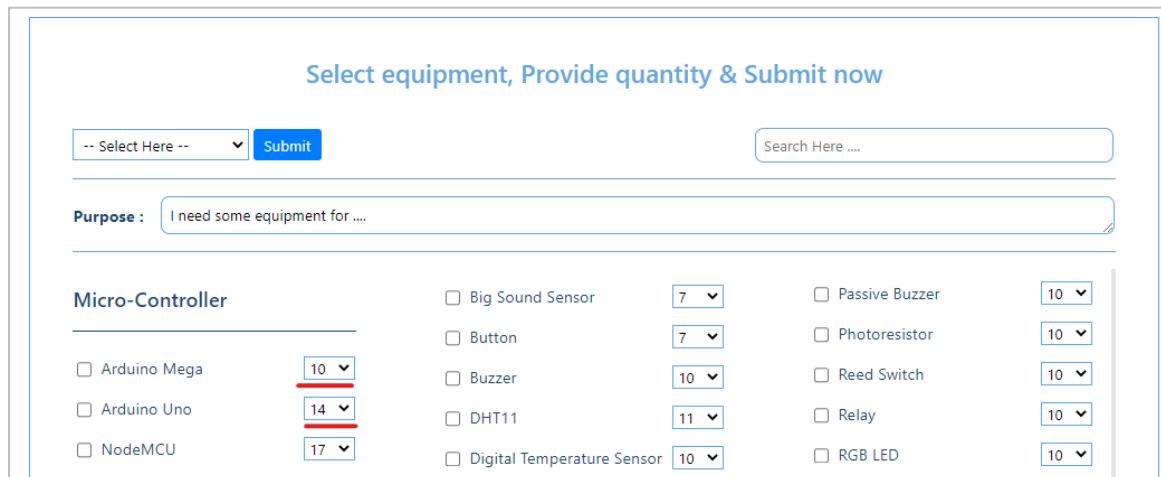


Figure 3.30: Process flowchart

3.3.2 Process in website

Note the previous quantity in below.



Select equipment, Provide quantity & Submit now

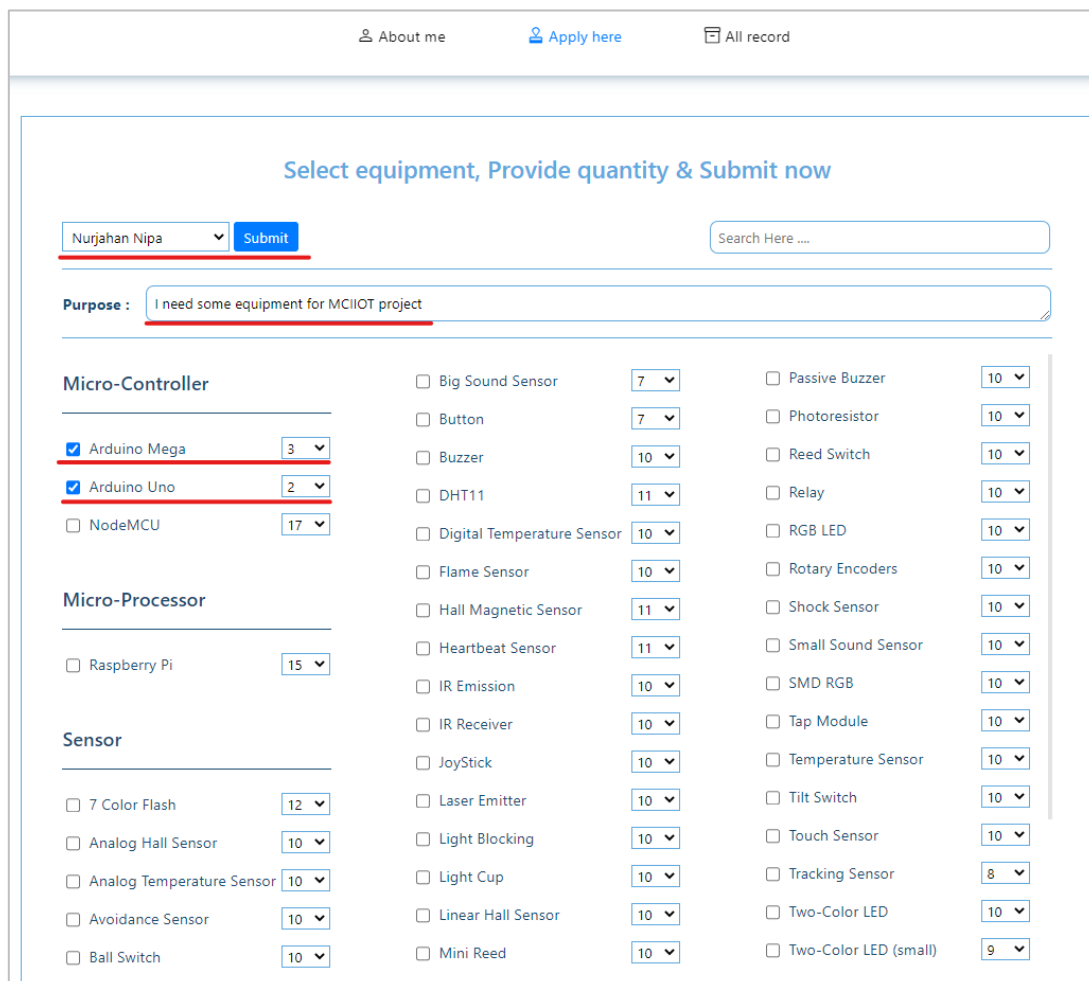
-- Select Here --

Purpose :

Micro-Controller		
<input type="checkbox"/> Arduino Mega	<input type="text" value="10"/>	
<input type="checkbox"/> Arduino Uno	<input type="text" value="14"/>	
<input type="checkbox"/> NodeMCU	<input type="text" value="17"/>	
<input type="checkbox"/> Big Sound Sensor	<input type="text" value="7"/>	<input type="checkbox"/> Passive Buzzer
<input type="checkbox"/> Button	<input type="text" value="7"/>	<input type="checkbox"/> Photoresistor
<input type="checkbox"/> Buzzer	<input type="text" value="10"/>	<input type="checkbox"/> Reed Switch
<input type="checkbox"/> DHT11	<input type="text" value="11"/>	<input type="checkbox"/> Relay
<input type="checkbox"/> Digital Temperature Sensor	<input type="text" value="10"/>	<input type="checkbox"/> RGB LED

Figure 3.31: Equipment quantity

Step 1 (Student) : At first a student logged into its account. From the apply section, he/she select his/her needed equipment, provide quantity, write his purpose, select teacher and then submit his/her application.



Select equipment, Provide quantity & Submit now

Nurjahan Nipa

Purpose :

Micro-Controller		
<input checked="" type="checkbox"/> Arduino Mega	<input type="text" value="3"/>	
<input checked="" type="checkbox"/> Arduino Uno	<input type="text" value="2"/>	
<input type="checkbox"/> NodeMCU	<input type="text" value="17"/>	
Micro-Processor		
<input type="checkbox"/> Raspberry Pi	<input type="text" value="15"/>	
Sensor		
<input type="checkbox"/> 7 Color Flash	<input type="text" value="12"/>	
<input type="checkbox"/> Analog Hall Sensor	<input type="text" value="10"/>	
<input type="checkbox"/> Analog Temperature Sensor	<input type="text" value="10"/>	
<input type="checkbox"/> Avoidance Sensor	<input type="text" value="10"/>	
<input type="checkbox"/> Ball Switch	<input type="text" value="10"/>	
<input type="checkbox"/> Big Sound Sensor	<input type="text" value="7"/>	<input type="checkbox"/> Passive Buzzer
<input type="checkbox"/> Button	<input type="text" value="7"/>	<input type="checkbox"/> Photoresistor
<input type="checkbox"/> Buzzer	<input type="text" value="10"/>	<input type="checkbox"/> Reed Switch
<input type="checkbox"/> DHT11	<input type="text" value="11"/>	<input type="checkbox"/> Relay
<input type="checkbox"/> Digital Temperature Sensor	<input type="text" value="10"/>	<input type="checkbox"/> RGB LED
<input type="checkbox"/> Flame Sensor	<input type="text" value="10"/>	<input type="checkbox"/> Rotary Encoders
<input type="checkbox"/> Hall Magnetic Sensor	<input type="text" value="11"/>	<input type="checkbox"/> Shock Sensor
<input type="checkbox"/> Heartbeat Sensor	<input type="text" value="11"/>	<input type="checkbox"/> Small Sound Sensor
<input type="checkbox"/> IR Emission	<input type="text" value="10"/>	<input type="checkbox"/> SMD RGB
<input type="checkbox"/> IR Receiver	<input type="text" value="10"/>	<input type="checkbox"/> Tap Module
<input type="checkbox"/> JoyStick	<input type="text" value="10"/>	<input type="checkbox"/> Temperature Sensor
<input type="checkbox"/> Laser Emitter	<input type="text" value="10"/>	<input type="checkbox"/> Tilt Switch
<input type="checkbox"/> Light Blocking	<input type="text" value="10"/>	<input type="checkbox"/> Touch Sensor
<input type="checkbox"/> Light Cup	<input type="text" value="10"/>	<input type="checkbox"/> Tracking Sensor
<input type="checkbox"/> Linear Hall Sensor	<input type="text" value="10"/>	<input type="checkbox"/> Two-Color LED
<input type="checkbox"/> Mini Reed	<input type="text" value="10"/>	<input type="checkbox"/> Two-Color LED (small)

Figure 3.32: Student select equipment quantity and apply

We see that the quantity is decreased.

Select equipment, Provide quantity & Submit now

-- Select Here -- Submit

Search Here

Purpose : I need some equipment for

Micro-Controller

- ☐ Arduino Mega 7
- ☐ Arduino Uno 12
- ☐ NodeMCU 17

- ☐ Big Sound Sensor 7
- ☐ Button 7
- ☐ Buzzer 10
- ☐ DHT11 11
- ☐ Digital Temperature Sensor 10

- ☐ Passive Buzzer 10
- ☐ Photoresistor 10
- ☐ Reed Switch 10
- ☐ Relay 10
- ☐ RGB LED 10

Figure 3.33 : Equipment quantity decreased

A student can check his apply record into his/her dashboard's 'All record' section.

[About me](#)
[Apply here](#)
[All record](#)
[Logout](#)
Bitta Boib

Your all apply record in below :

Serial	Apply ID	Student ID	Name	Session	Apply Timestamp	Teacher Name	Permission	Provide Timestamp	Return Timestamp	Hold	Action
1	86	1901050	Bitta Boibhob	2019-20	10:13 am, 06/08/22	Nurjahan Nipa	Pending	---	---	---	Details Delete
2	65	1901050	Bitta Boibhob	2019-20	03:27 pm, 04/08/22	Md. Habibur Rahman	Granted	---	---	---	Details Delete
3	35	1901050	Bitta Boibhob	2019-20	11:08 pm, 01/08/22	Md. Habibur Rahman	Granted	11:09 pm, 01/08/22	---	4/9 d	Details Delete
Completed Process ↓											
4	85	1901050	Bitta Boibhob	2019-20	09:24 am, 06/08/22	Samsuddin Ahmed	Granted	09:25 am, 06/08/22	09:26 am, 06/08/22	0/10 d	Details Delete
5	83	1901050	Bitta Boibhob	2019-20	01:50 am, 06/08/22	Nurjahan Nipa	Granted	02:23 am, 06/08/22	02:26 am, 06/08/22	0/7 d	Details Delete

Figure 3.34: Pending Record show into table

A student can see details about his/her apply record by clicking 'Details' button.

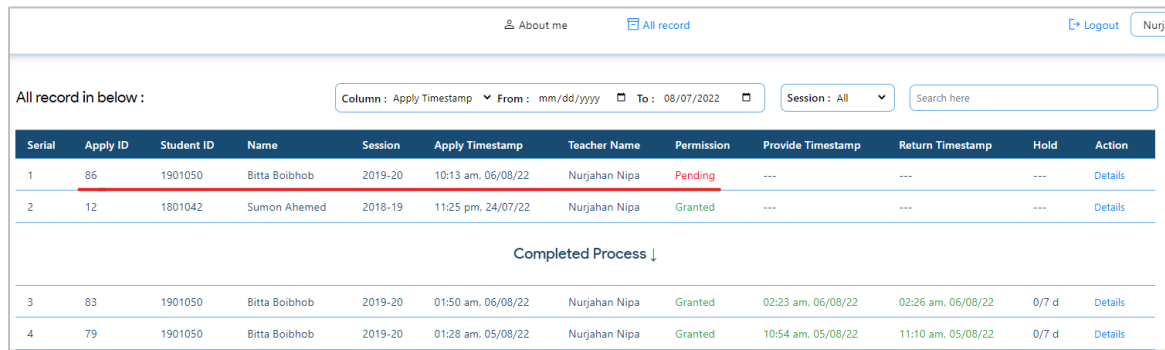
[About me](#)
[Apply here](#)
[All record](#)

Record in details in below :

Name :	Bitta Boibhob	Id :	1901050	Session :	2019-20
Apply Id :	86	Apply Timestamp :	10:13 am, 06/08/22	Teacher Name :	Nurjahan Nipa
Permission :	Pending	Provide Timestamp :	---	Return Timestamp :	---
Hold :	---	Provided By :	---	Returned By :	---
Purpose : I need some equipment for MCIIOT Project					
Equipment Name & Quantity :					
Arduino Mega = 3					
Arduino Uno = 2					

Figure 3.35: Record show in details into modal

Step 2 (Teacher) : When student apply to a teacher, then those particular teacher can see the pending record on his/her dashboard's 'All record' section.



All record in below :

Column : Apply Timestamp From : mm/dd/yyyy To : 08/07/2022 Session : All Search here

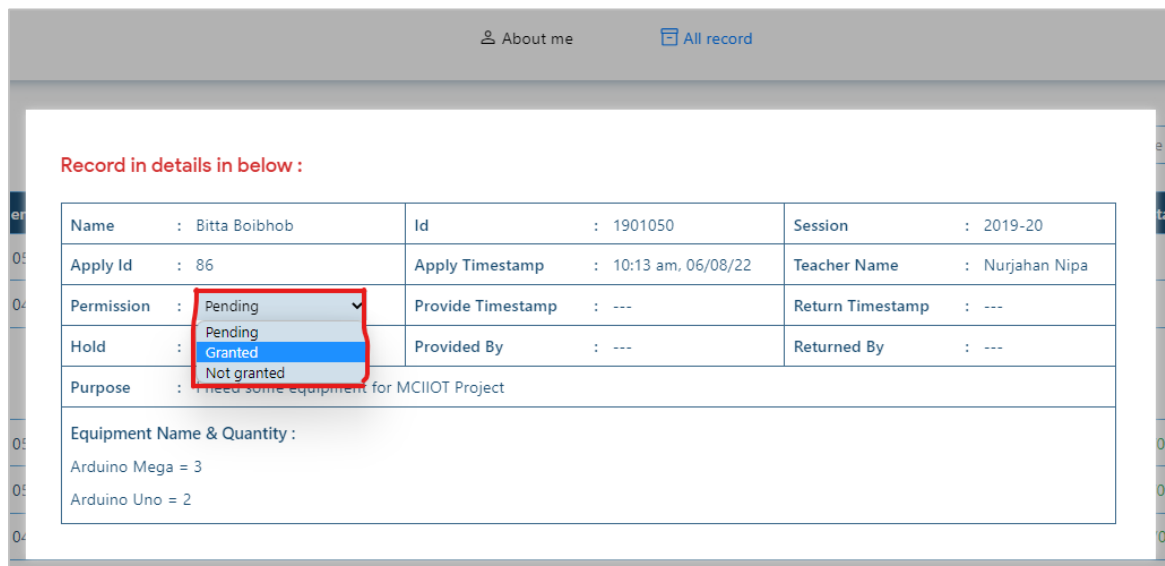
Serial	Apply ID	Student ID	Name	Session	Apply Timestamp	Teacher Name	Permission	Provide Timestamp	Return Timestamp	Hold	Action
1	86	1901050	Bitta Boibhob	2019-20	10:13 am, 06/08/22	Nurjahan Nipa	Pending	---	---	---	Details
2	12	1801042	Sumon Ahemed	2018-19	11:25 pm, 24/07/22	Nurjahan Nipa	Granted	---	---	---	Details

Completed Process ↓

3	83	1901050	Bitta Boibhob	2019-20	01:50 am, 06/08/22	Nurjahan Nipa	Granted	02:23 am, 06/08/22	02:26 am, 06/08/22	0/7 d	Details
4	79	1901050	Bitta Boibhob	2019-20	01:28 am, 05/08/22	Nurjahan Nipa	Granted	10:54 am, 05/08/22	11:10 am, 05/08/22	0/7 d	Details

Figure 3.36: Pending record is shown

Now the teacher, click on 'Details' button and Granted the application if there has no objection.

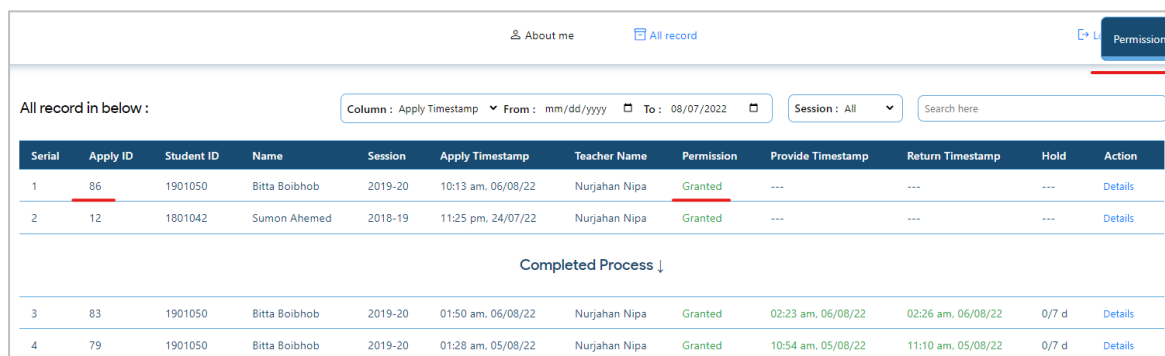


Record in details in below :

Name : Bitta Boibhob	Id : 1901050	Session : 2019-20
Apply Id : 86	Apply Timestamp : 10:13 am, 06/08/22	Teacher Name : Nurjahan Nipa
Permission : Pending	Provide Timestamp : ---	Return Timestamp : ---
Hold : Pending	Provided By : ---	Returned By : ---
Purpose : I need some equipment for MCIOT Project		
Equipment Name & Quantity :		
Arduino Mega = 3		
Arduino Uno = 2		

Figure 3.37: Teacher provide his/her permission

Permission granted is submitted that a teacher can see in the table.



All record in below :

Column : Apply Timestamp From : mm/dd/yyyy To : 08/07/2022 Session : All Search here

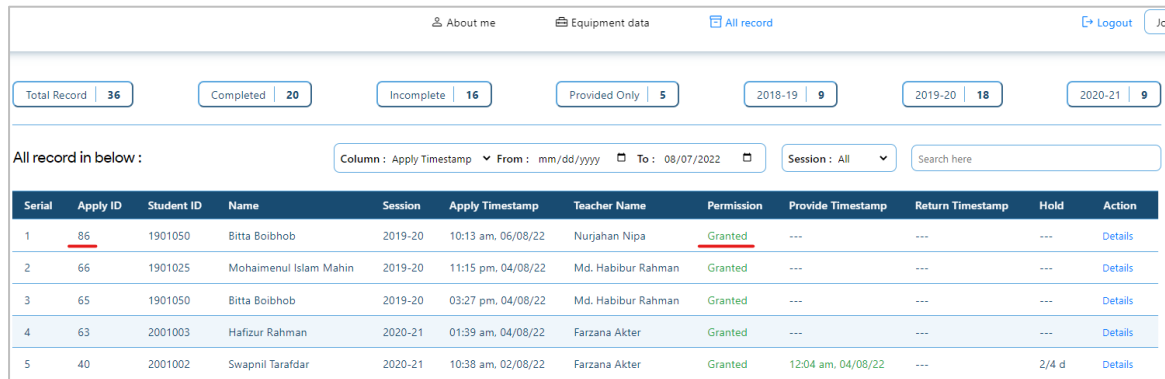
Serial	Apply ID	Student ID	Name	Session	Apply Timestamp	Teacher Name	Permission	Provide Timestamp	Return Timestamp	Hold	Action
1	86	1901050	Bitta Boibhob	2019-20	10:13 am, 06/08/22	Nurjahan Nipa	Granted	---	---	---	Details
2	12	1801042	Sumon Ahemed	2018-19	11:25 pm, 24/07/22	Nurjahan Nipa	Granted	---	---	---	Details

Completed Process ↓

3	83	1901050	Bitta Boibhob	2019-20	01:50 am, 06/08/22	Nurjahan Nipa	Granted	02:23 am, 06/08/22	02:26 am, 06/08/22	0/7 d	Details
4	79	1901050	Bitta Boibhob	2019-20	01:28 am, 05/08/22	Nurjahan Nipa	Granted	10:54 am, 05/08/22	11:10 am, 05/08/22	0/7 d	Details

Figure 3.38: Granted Record is shown in table

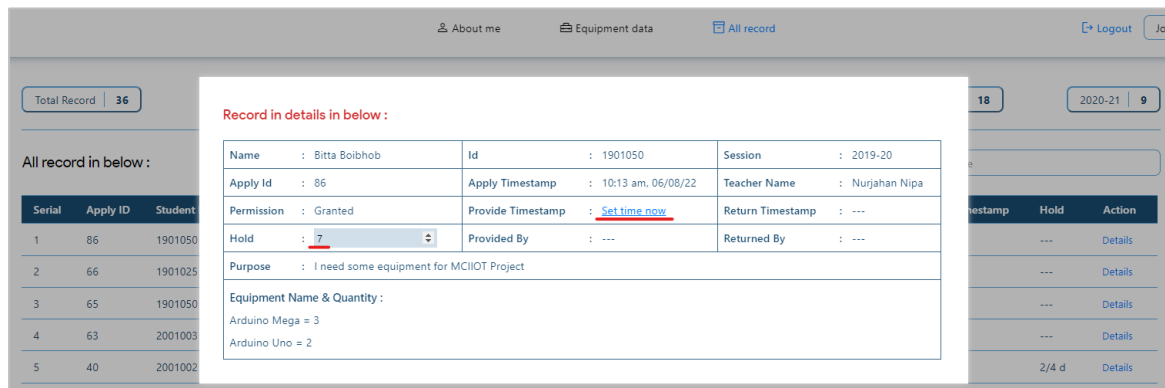
Step 3 (Lab Attendant) : When teacher permission is granted then record will show in lab attendant dashboard's 'All record' section. The student inform lab attendant with his/her apply id.



Serial	Apply ID	Student ID	Name	Session	Apply Timestamp	Teacher Name	Permission	Provide Timestamp	Return Timestamp	Hold	Action
1	86	1901050	Bitta Boibhob	2019-20	10:13 am, 06/08/22	Nurjahan Nipa	Granted	---	---	---	Details
2	66	1901025	Mohaimenul Islam Mahin	2019-20	11:15 pm, 04/08/22	Md. Habibur Rahman	Granted	---	---	---	Details
3	65	1901050	Bitta Boibhob	2019-20	03:27 pm, 04/08/22	Md. Habibur Rahman	Granted	---	---	---	Details
4	63	2001003	Hafizur Rahman	2020-21	01:39 am, 04/08/22	Farzana Akter	Granted	---	---	---	Details
5	40	2001002	Swapnil Tarafdar	2020-21	10:38 am, 02/08/22	Farzana Akter	Granted	12:04 am, 04/08/22	---	2/4 d	Details

Figure 3.39: Only granted record show into lab attendant's dashboard

Lab attendant set the day the student want to hold and set the provide date-time.



Name	Id	Session
Bitta Boibhob	1901050	2019-20

Apply Id	Apply Timestamp	Teacher Name
86	10:13 am, 06/08/22	Nurjahan Nipa

Permission	Provide Timestamp	Return Timestamp
Granted	Set time now	---

Hold	Provided By	Returned By
7	---	---

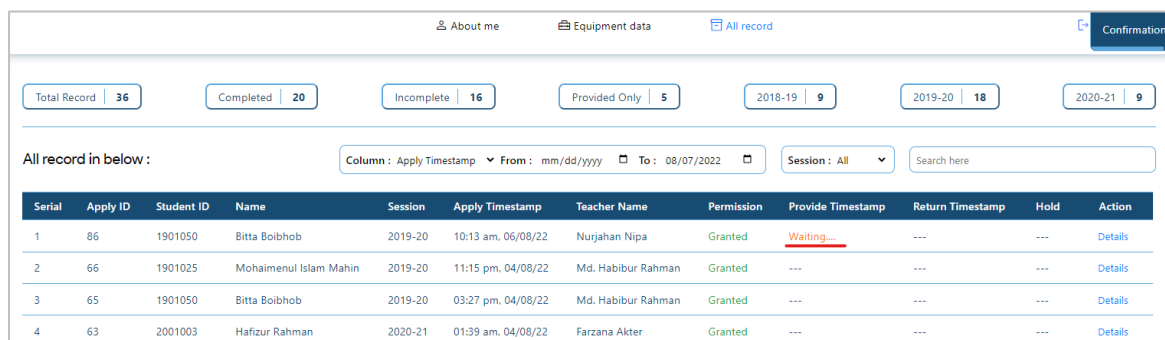
Purpose : I need some equipment for MCIIOT Project

Equipment Name & Quantity :

Arduino Mega = 3
Arduino Uno = 2

Figure 3.40: Provide timestamp setup option

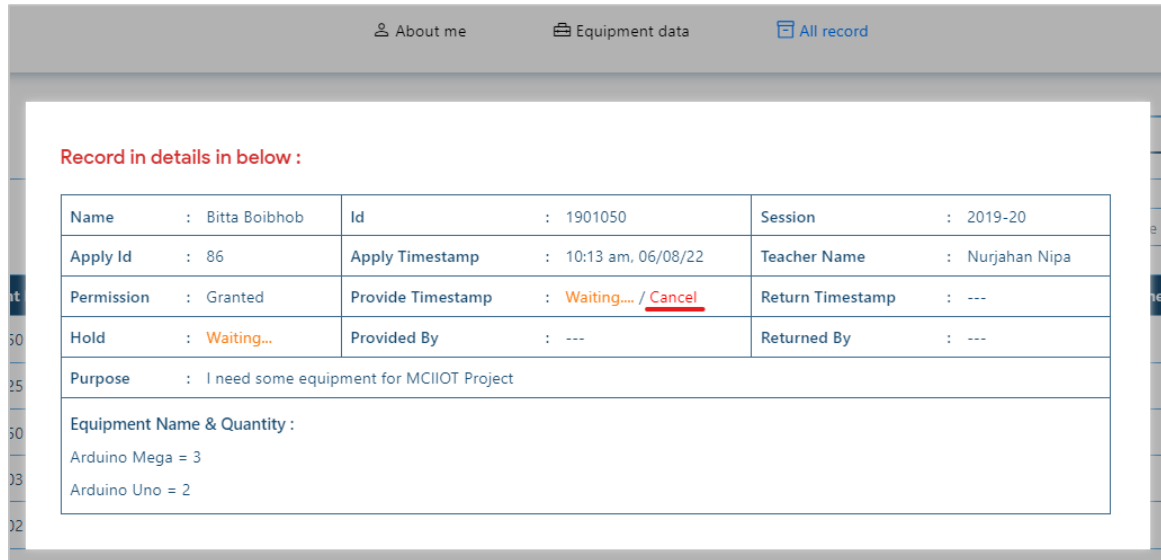
But the provide date-time isn't set until the particular student confirm this from his/her account.



Serial	Apply ID	Student ID	Name	Session	Apply Timestamp	Teacher Name	Permission	Provide Timestamp	Return Timestamp	Hold	Action
1	86	1901050	Bitta Boibhob	2019-20	10:13 am, 06/08/22	Nurjahan Nipa	Granted	Waiting...	---	---	Details
2	66	1901025	Mohaimenul Islam Mahin	2019-20	11:15 pm, 04/08/22	Md. Habibur Rahman	Granted	---	---	---	Details
3	65	1901050	Bitta Boibhob	2019-20	03:27 pm, 04/08/22	Md. Habibur Rahman	Granted	---	---	---	Details
4	63	2001003	Hafizur Rahman	2020-21	01:39 am, 04/08/22	Farzana Akter	Granted	---	---	---	Details

Figure 3.41: Waiting for students confirmation

Lab attendant also do a more thing, he/she can cancel the confirmation message.

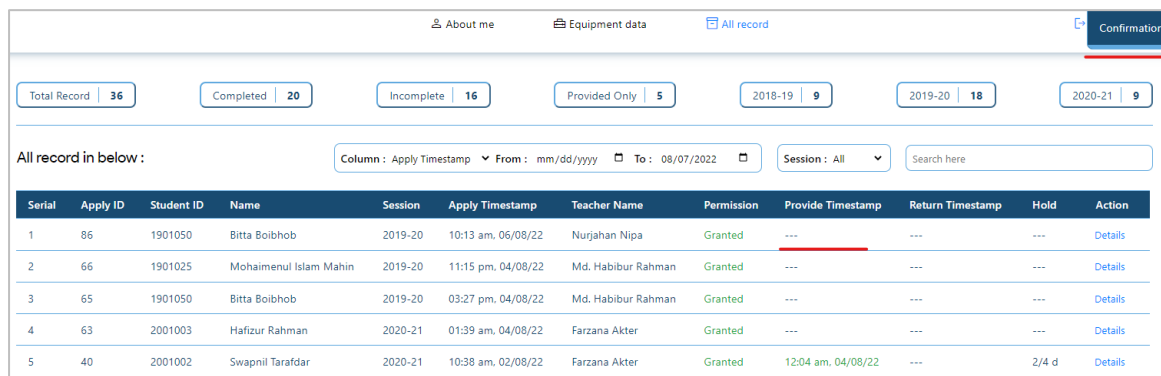


Record in details in below :

Name : Bitta Boibhob	Id : 1901050	Session : 2019-20
Apply Id : 86	Apply Timestamp : 10:13 am, 06/08/22	Teacher Name : Nurjahan Nipa
Permission : Granted	Provide Timestamp : Waiting.... / Cancel	Return Timestamp : ---
Hold : Waiting...	Provided By : ---	Returned By : ---
Purpose : I need some equipment for MCIIOT Project		
Equipment Name & Quantity :		
Arduino Mega = 3		
Arduino Uno = 2		

Figure 3.42: Lab attendant can cancel the confirmation

If the lab attendant cancel the confirmation then the record go its previous state.



Confirmation

Total Record | 36 | Completed | 20 | Incomplete | 16 | Provided Only | 5 | 2018-19 | 9 | 2019-20 | 18 | 2020-21 | 9

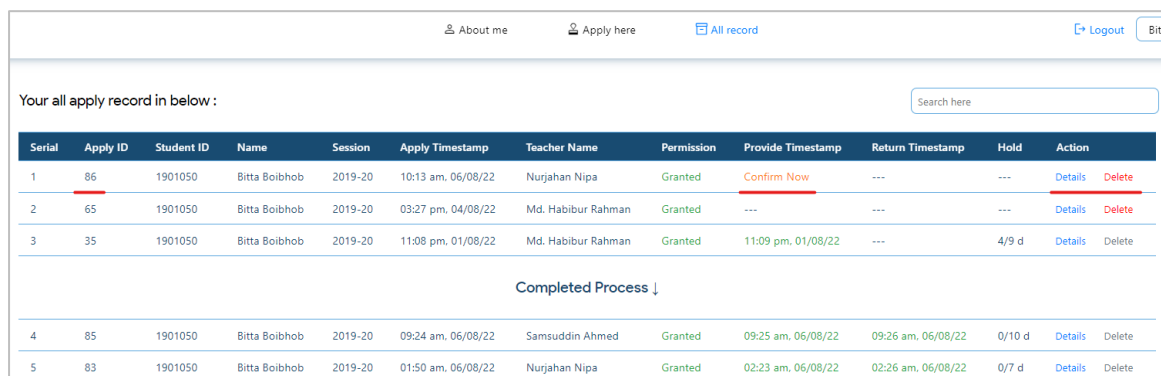
All record in below :

Column : Apply Timestamp From : mm/dd/yyyy To : 08/07/2022 Session : All Search here

Serial	Apply ID	Student ID	Name	Session	Apply Timestamp	Teacher Name	Permission	Provide Timestamp	Return Timestamp	Hold	Action
1	86	1901050	Bitta Boibhob	2019-20	10:13 am, 06/08/22	Nurjahan Nipa	Granted	---	---	---	Details
2	66	1901025	Mohaimenul Islam Mahin	2019-20	11:15 pm, 04/08/22	Md. Habibur Rahman	Granted	---	---	---	Details
3	65	1901050	Bitta Boibhob	2019-20	03:27 pm, 04/08/22	Md. Habibur Rahman	Granted	---	---	---	Details
4	63	2001003	Hafizur Rahman	2020-21	01:39 am, 04/08/22	Farzana Akter	Granted	---	---	---	Details
5	40	2001002	Swapnil Tarafdar	2020-21	10:38 am, 02/08/22	Farzana Akter	Granted	12:04 am, 04/08/22	---	2/4 d	Details

Figure 3.43: Confirmation message is cancelled

Step 4 (Student) : When lab attendant send confirmation, then the particular student can see this in its table.



Logout Bitt

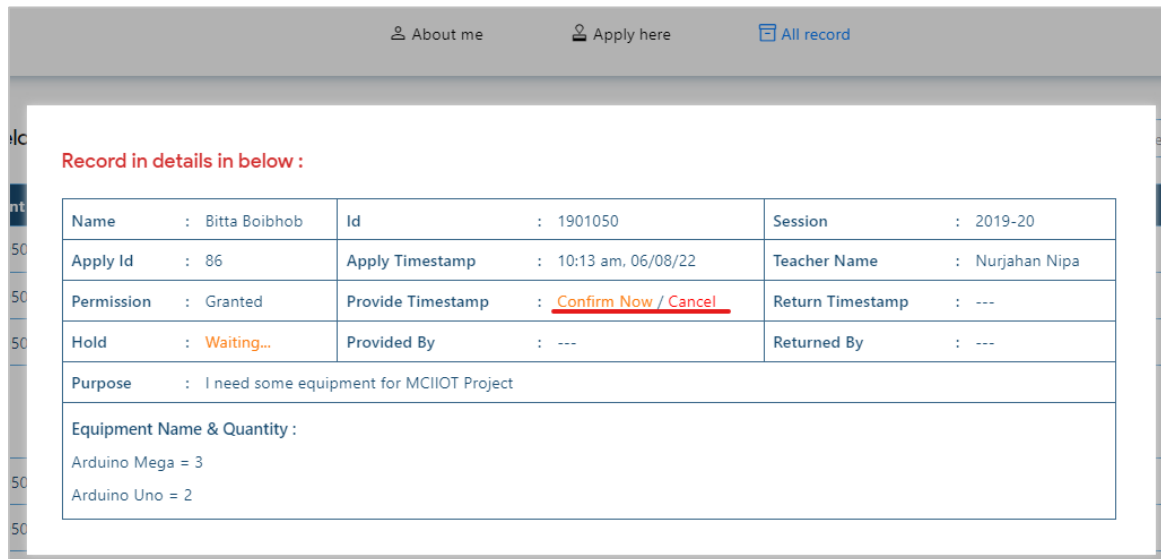
Your all apply record in below :

Search here

Serial	Apply ID	Student ID	Name	Session	Apply Timestamp	Teacher Name	Permission	Provide Timestamp	Return Timestamp	Hold	Action
1	86	1901050	Bitta Boibhob	2019-20	10:13 am, 06/08/22	Nurjahan Nipa	Granted	Confirm Now	---	---	Details Delete
2	65	1901050	Bitta Boibhob	2019-20	03:27 pm, 04/08/22	Md. Habibur Rahman	Granted	---	---	---	Details Delete
3	35	1901050	Bitta Boibhob	2019-20	11:08 pm, 01/08/22	Md. Habibur Rahman	Granted	11:09 pm, 01/08/22	---	4/9 d	Details Delete
Completed Process ↓											
4	85	1901050	Bitta Boibhob	2019-20	09:24 am, 06/08/22	Samsuddin Ahmed	Granted	09:25 am, 06/08/22	09:26 am, 06/08/22	0/10 d	Details Delete
5	83	1901050	Bitta Boibhob	2019-20	01:50 am, 06/08/22	Nurjahan Nipa	Granted	02:23 am, 06/08/22	02:26 am, 06/08/22	0/7 d	Details Delete

Figure 3.44: Confirm now message shown into student's dashboard

The student click on 'Details' and then click on 'Confirm Now' button. The student can also cancel the confirmation.

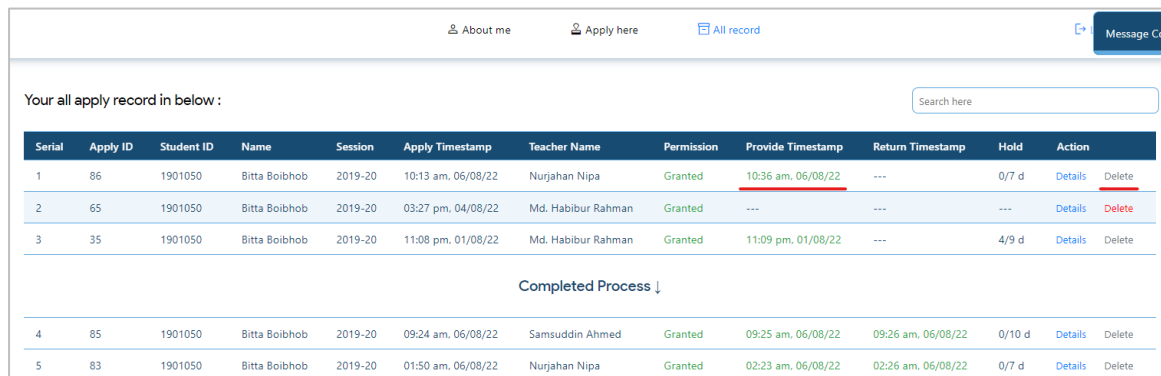


Record in details in below :

Name : Bitta Boibhob	Id : 1901050	Session : 2019-20
Apply Id : 86	Apply Timestamp : 10:13 am, 06/08/22	Teacher Name : Nurjahan Nipa
Permission : Granted	Provide Timestamp : Confirm Now / Cancel	Return Timestamp : ---
Hold : Waiting...	Provided By : ---	Returned By : ---
Purpose : I need some equipment for MCIIOT Project		
Equipment Name & Quantity :		
Arduino Mega = 3		
Arduino Uno = 2		

Figure 3.45: Student confirm or cancel the confirmation from modal

When student confirm the message, then the provide date-time is setup. After that those particular record can't delete by student.

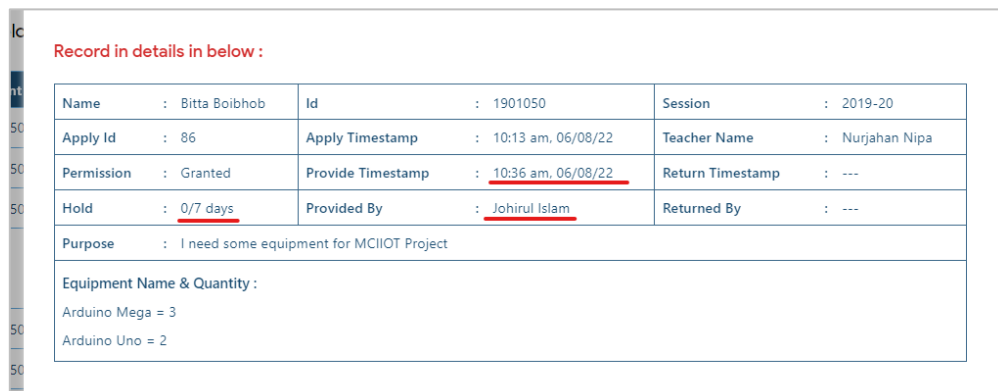


Your all apply record in below :

Serial	Apply ID	Student ID	Name	Session	Apply Timestamp	Teacher Name	Permission	Provide Timestamp	Return Timestamp	Hold	Action
1	86	1901050	Bitta Boibhob	2019-20	10:13 am, 06/08/22	Nurjahan Nipa	Granted	10:36 am, 06/08/22	---	0/7 d	Details Delete
2	65	1901050	Bitta Boibhob	2019-20	03:27 pm, 04/08/22	Md. Habibur Rahman	Granted	---	---	---	Details Delete
3	35	1901050	Bitta Boibhob	2019-20	11:08 pm, 01/08/22	Md. Habibur Rahman	Granted	11:09 pm, 01/08/22	---	4/9 d	Details Delete
Completed Process ↓											
4	85	1901050	Bitta Boibhob	2019-20	09:24 am, 06/08/22	Samsuddin Ahmed	Granted	09:25 am, 06/08/22	09:26 am, 06/08/22	0/10 d	Details Delete
5	83	1901050	Bitta Boibhob	2019-20	01:50 am, 06/08/22	Nurjahan Nipa	Granted	02:23 am, 06/08/22	02:26 am, 06/08/22	0/7 d	Details Delete

Figure 3.46: Provide date-time properly setup

By clicking 'Details' button, a student can know who provide the confirmation message.

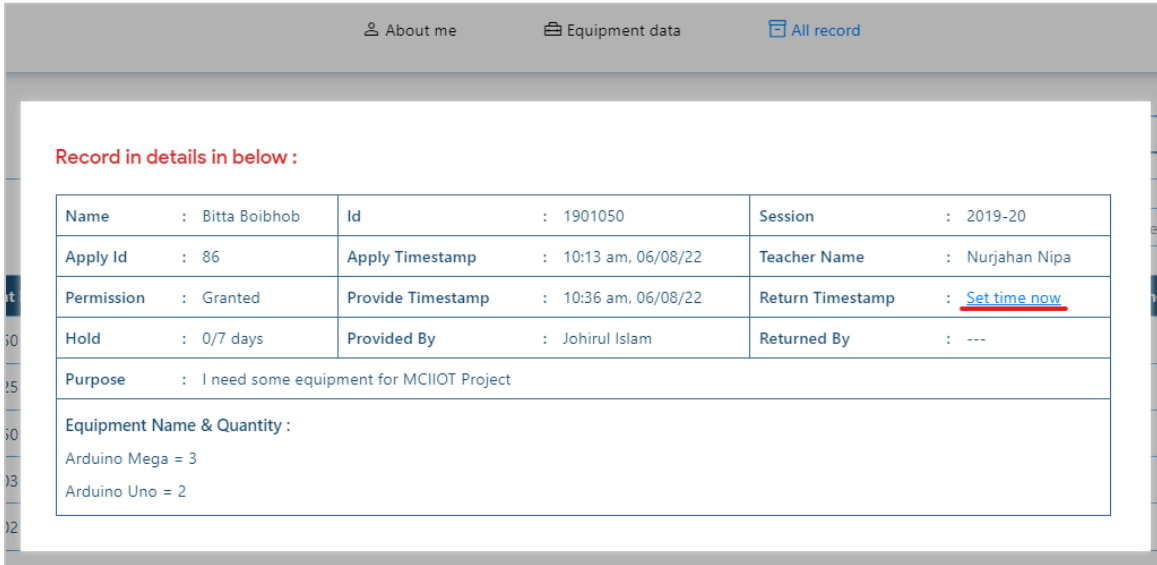


Record in details in below :

Name : Bitta Boibhob	Id : 1901050	Session : 2019-20
Apply Id : 86	Apply Timestamp : 10:13 am, 06/08/22	Teacher Name : Nurjahan Nipa
Permission : Granted	Provide Timestamp : 10:36 am, 06/08/22	Return Timestamp : ---
Hold : 0/7 days	Provided By : Johirul Islam	Returned By : ---
Purpose : I need some equipment for MCIIOT Project		
Equipment Name & Quantity :		
Arduino Mega = 3		
Arduino Uno = 2		

Figure 3.47: Details information into modal

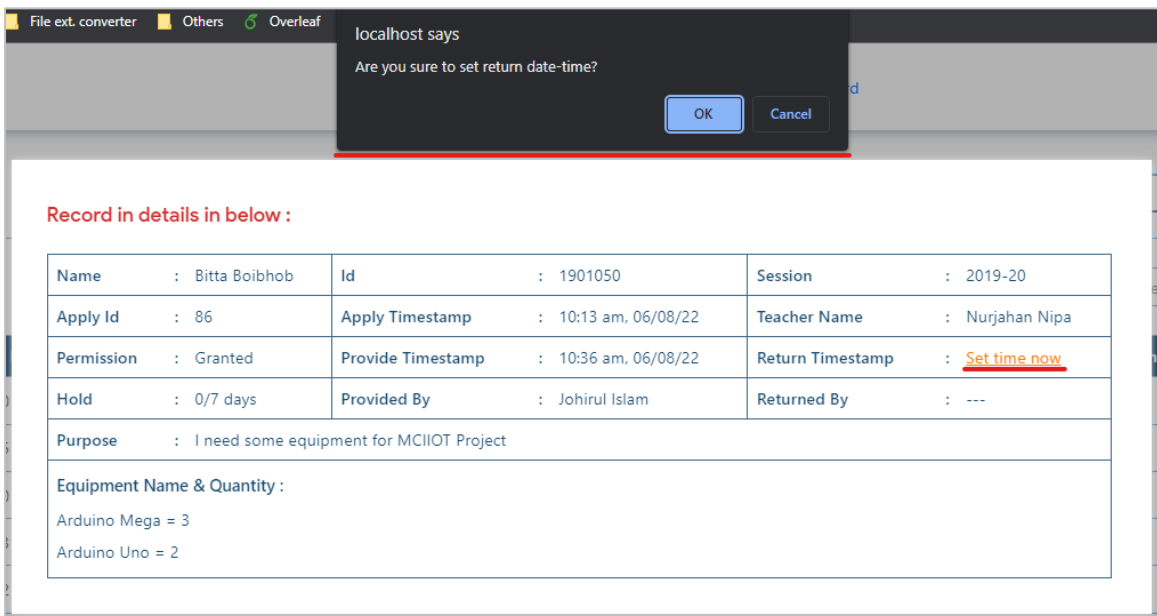
Step 5 (Lab attendant) : At last the student return to lab room to return back his/her equipment. The lab attendant receive the equipment and set the return time on a particular apply id.



Record in details in below :

Name : Bitta Boibhob	Id : 1901050	Session : 2019-20
Apply Id : 86	Apply Timestamp : 10:13 am, 06/08/22	Teacher Name : Nurjahan Nipa
Permission : Granted	Provide Timestamp : 10:36 am, 06/08/22	Return Timestamp : Set time now
Hold : 0/7 days	Provided By : Johirul Islam	Returned By : ---
Purpose : I need some equipment for MCIIOT Project		
Equipment Name & Quantity :		
Arduino Mega = 3		
Arduino Uno = 2		

Figure 3.48: Return datetime setup option



localhost says
Are you sure to set return date-time?

OK Cancel

Record in details in below :

Name : Bitta Boibhob	Id : 1901050	Session : 2019-20
Apply Id : 86	Apply Timestamp : 10:13 am, 06/08/22	Teacher Name : Nurjahan Nipa
Permission : Granted	Provide Timestamp : 10:36 am, 06/08/22	Return Timestamp : Set time now
Hold : 0/7 days	Provided By : Johirul Islam	Returned By : ---
Purpose : I need some equipment for MCIIOT Project		
Equipment Name & Quantity :		
Arduino Mega = 3		
Arduino Uno = 2		

Figure 3.49: Confirmation for setup return datetime

Then the record go to complete process section in the table.

<div> About me Equipment data All record Logout </div>											
<div> Total Record 36 Completed 21 Incomplete 15 Provided Only 5 2018-19 9 2019-20 18 2020-21 9 </div>											
All record in below : <div> Column : Apply Timestamp From : mm/dd/yyyy To : 08/07/2022 Session : All Search here </div>											
Serial	Apply ID	Student ID	Name	Session	Apply Timestamp	Teacher Name	Permission	Provide Timestamp	Return Timestamp	Hold	Action
13	22	1801034	Md. Abdus Sabur	2018-19	06:44 pm, 01/08/22	Md. Habibur Rahman	Granted	---	---	---	Details
14	21	1801034	Md. Abdus Sabur	2018-19	06:44 pm, 01/08/22	Md. Habibur Rahman	Granted	---	---	---	Details
15	12	1801042	Sumon Ahemed	2018-19	11:25 pm, 24/07/22	Nurjahan Nipa	Granted	---	---	---	Details
Completed Process ↓											
16	86	1901050	Bitta Boibhob	2019-20	10:13 am, 06/08/22	Nurjahan Nipa	Granted	10:36 am, 06/08/22	10:42 am, 06/08/22	0/7 d	Details
17	85	1901050	Bitta Boibhob	2019-20	09:24 am, 06/08/22	Samsuddin Ahmed	Granted	09:25 am, 06/08/22	09:26 am, 06/08/22	0/10 d	Details
18	83	1901050	Bitta Boibhob	2019-20	01:50 am, 06/08/22	Nurjahan Nipa	Granted	02:23 am, 06/08/22	02:26 am, 06/08/22	0/7 d	Details
19	51	2001003	Hafizur Rahman	2020-21	01:05 pm, 02/08/22	Farzana Akter	Granted	11:19 pm, 24/07/22	11:32 am, 05/08/22	12/20 d	Details

Figure 3.50: Record that complete moved to tables second section

And who set the return date-time can be know by clicking ‘Details’ button.

[About me](#)
[Equipment data](#)
[All record](#)

Record in details in below :

Name : Bitta Boibhob	Id : 1901050	Session : 2019-20
Apply Id : 86	Apply Timestamp : 10:13 am, 06/08/22	Teacher Name : Nurjahan Nipa
Permission : Granted	Provide Timestamp : 10:36 am, 06/08/22	Return Timestamp : 10:42 am, 06/08/22
Hold : 0/7 days	Provided By : Johirul Islam	Returned By : Mahedi Hasan
Purpose : I need some equipment for MCIIOT Project		
Equipment Name & Quantity : Arduino Mega = 3 Arduino Uno = 2		

Figure 3.51: Details information into modal

We see that the equipment quantity is increased.

Select equipment, Provide quantity & Submit now

-- Select Here -- Submit Search Here

Purpose : I need some equipment for

Micro-Controller <input type="checkbox"/> Arduino Mega 10 <input type="checkbox"/> Arduino Uno 14 <input type="checkbox"/> NodeMCU 17	<input type="checkbox"/> Big Sound Sensor 7 <input type="checkbox"/> Button 7 <input type="checkbox"/> Buzzer 10 <input type="checkbox"/> DHT11 11 <input type="checkbox"/> Digital Temperature Sensor 10	<input type="checkbox"/> Passive Buzzer 10 <input type="checkbox"/> Photoresistor 10 <input type="checkbox"/> Reed Switch 10 <input type="checkbox"/> Relay 10 <input type="checkbox"/> RGB LED 10
---	---	--

Figure 3.52: Equipment quantity is decreased

Chapter 4

Results & Discussion

By implementing this project, we have gotten a website by which BDU's IOT Lab equipment distribution can be held properly. All the record that is important to note is stored in the database and show into website. All procedure from apply to return equipment are performed securely. All the important data is saved permanently into database that can't edit from the website. This website also have data filtering, searching facility. Having insertion, deletion, update opatation. All the operation and data exchange with database performed with the help php, mysql, jquery and ajax. So that a user experience a no reload able system in all the sector of the webpage.

Chapter 5

Conclusion & Future scope

5.1 Conclusion

In this paper, we design and achieve a ‘IOT Lab Equipment Distribution System’ for BDU’s authorized student, teacher and members. The system is structured into the data access layer, logical function layer, login form, users about section, update section, insertion section, delete section, data read section and also a proper login panel for student, teacher and lab attendant. All the steps that is need for BDU’s IOT Lab equipment distribution action and database design is the focus of this system which are clearly and effectively designed by the process flowchart, database and other languages.

5.2 Future scope

If anyone wants to extend this project then he/she can make an additional database. He/She can added mail system that make communication easier between student, teacher and lab attendant. In our system, a user can’t update his/her image. So this update operation can be added here for images. All the essential record isn’t show into users about section like age, birth date and so more. This kind of information can be added here. Day by day it can be upgraded, but we are trying our best to do this unique project in a short time.

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