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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.

Acknowledgement

A study or a project of this volume can never be the outcome of a single person or just a mere group of dedicated students, so we express our profound sense of gratitude to those who extended their whole hearted help and support to us in completing our project because successful completion of any work requires guidance and help from a number of people. Firstly, it gives us immense pleasure to acknowledge our institute ‘Bangabandhu Sheikh Mujibur Rahman Digital University, Bangladesh’ for providing us an opportunity in developing a project on ‘IOT Lab Equipment Distribution System’. In addition, we wish to express our deep sense of gratitude to our honourable teacher ‘Nurjahan Nipa, Lecturer, Department of ICT, BDU’ for permitting us to carry out this project work and for his guidance and support. Last but not the least, we extend our whole-hearted gratitude for the invaluable contribution of our parents for their blessings and earnest affection and all those persons ‘behind the veil’ for their necessary support, which enabled us to complete this project.

Table of Content

1. Introduction 1
   1.1 Background 1
   1.2 Problem Statement 1
   1.3 Objectives of the work 2
   1.4 Significance of the study on this project 2

2. System Requirement and Design 3
   2.1 Hardware Specification 3
   2.2 Software Specification 3
      2.2.1 Requirement 3
      2.2.2 Software 3
      2.2.3 Frontend 3
      2.2.4 Backend 4
   2.3 Process flowchart 5
   2.4 Database Conceptual Design 6
      2.4.1 Entity Relationship Diagram 6
      2.4.2 Entities and Attributes 6
      2.4.3 Cardinalities 7
   2.5 Logic model design 7
   2.6 Physical design of the database 7

3. Implementation 10
   3.1 Database Overview with image 10
   3.2 Website Overview with image 12
      3.2.1 Login Page 12
      3.2.2 Student's Dashboard 13
      3.2.3 Teacher's Dashboard 17
      3.2.4 Lab Attendant's Dashboard 19
   3.3 Working Procedure 23
      3.3.1 Process Flowchart 23
      3.3.2 Process in website 24

4. Results & Discussion 32

5. Conclusion & Future scope 33
   5.1 Conclusion 33
   5.2 Future scope 33

References 34

List of figures

Figure 2.1: Systems business process 5
Figure 2.2: database diagram of our system 6
Figure 2.3: Datatype of student_information table 8
Figure 2.4: Datatype of teacher_information table 8
Figure 2.5: Datatype of apply_related_data table 9
Figure 2.6: Datatype of equipment_related_data table 9
Figure 2.7: Datatype of provide_confirm_Status table 9
Figure 3.1: List of table of database 10
Figure 3.2: student_information table with values 10
Figure 3.3: teacher_information table with values 10
Figure 3.4: apply_related_data table with values 11
Figure 3.5: equipment_related_data table with values 11
Figure 3.6: provide_confirm_Status table with values 11
Figure 3.7: Login page of website 12
Figure 3.8: Student dashboard's about me section 13
Figure 3.9: Student dashboard's edit information section 13
Figure 3.10: Student dashboard's Apply section 14
Figure 3.11: Search bar in apply section 15
Figure 3.12 Student dashboard's All record section 15
Figure 3.13: All record sections Search bar 16
Figure 3.14: Open a modal when Details button is clicked 16
Figure 3.15: Having Delete Operation into student dashboard 16
Figure 3.16 : Teacher dashboard's about me section 17
Figure 3.17: Teacher dashboard's edit information section 17
Figure 3.18: Teacher dashboard's All record section 18
Figure 3.19: All record sections Search bar 18
Figure 3.20 : Open a modal when Details button is clicked 18
Figure 3.21: Lab attendent dashboard's about me section 19
Figure 3.22: Equipment data is shown 19
Figure 3.23: Equipment data Searched 20
Figure 3.24: New equipment data Insertion 20
Figure 3.25: Edit equipment data 21
Figure 3.26: Delete equipment data 21
Figure 3.27: Lab attendent dashboard's All record section 22

Figure 3.28: Data searched in All record section 22
Figure 3.29: Open a modal when Details button is clicked 22
Figure 3.30: Process flowchart 23
Figure 3.31: Equipment quantity 24
Figure 3.32: Student select equipment quantity and apply 24
Figure 3.33 : Equipment quantity decreased 25
Figure 3.34: Pending Record show into table 25
Figure 3.35: Record show in details into modal 25
Figure 3.36: Pending record is shown 26
Figure 3.37: Teacher provide his/her permission 26
Figure 3.38: Granted Record is shown in table 26
Figure 3.39: Only granted record show into lab attendant's dashboard 27
Figure 3.40: Provide timestamp setup option 27
Figure 3.41: Waiting for students confirmation 27
Figure 3.42: Lab attendant can cancel the confirmation 28
Figure 3.43: Confirmation message is cancelled 28
Figure 3.44: Confirm now message shown into student's dashboard 28
Figure 3.45: Student confirm or cancel the confirmation from modal 29
Figure 3.46: Provide date-time properly setup 29
Figure 3.47: Details information into modal 29
Figure 3.48: Return datetime setup option 30
Figure 3.49: Confirmation for setup return datetime 30
Figure 3.50: Record that complete moved to tables second section 31
Figure 3.51: Details information into modal 31
Figure 3.52: Equipment quantity is decreased 31

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:

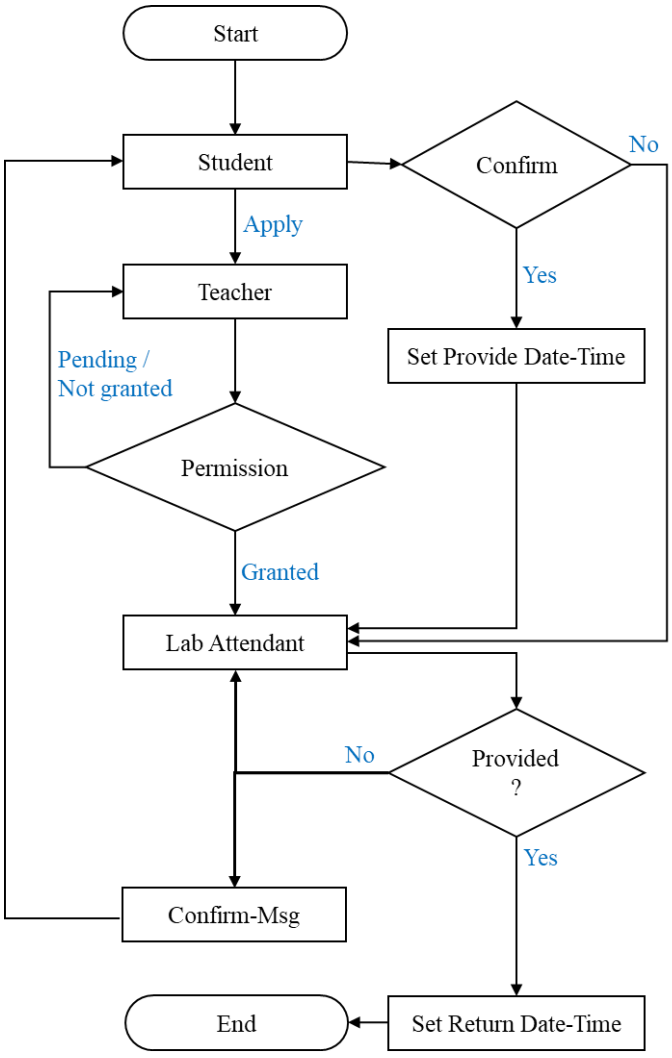


Figure 2.1: Process flowchart

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:

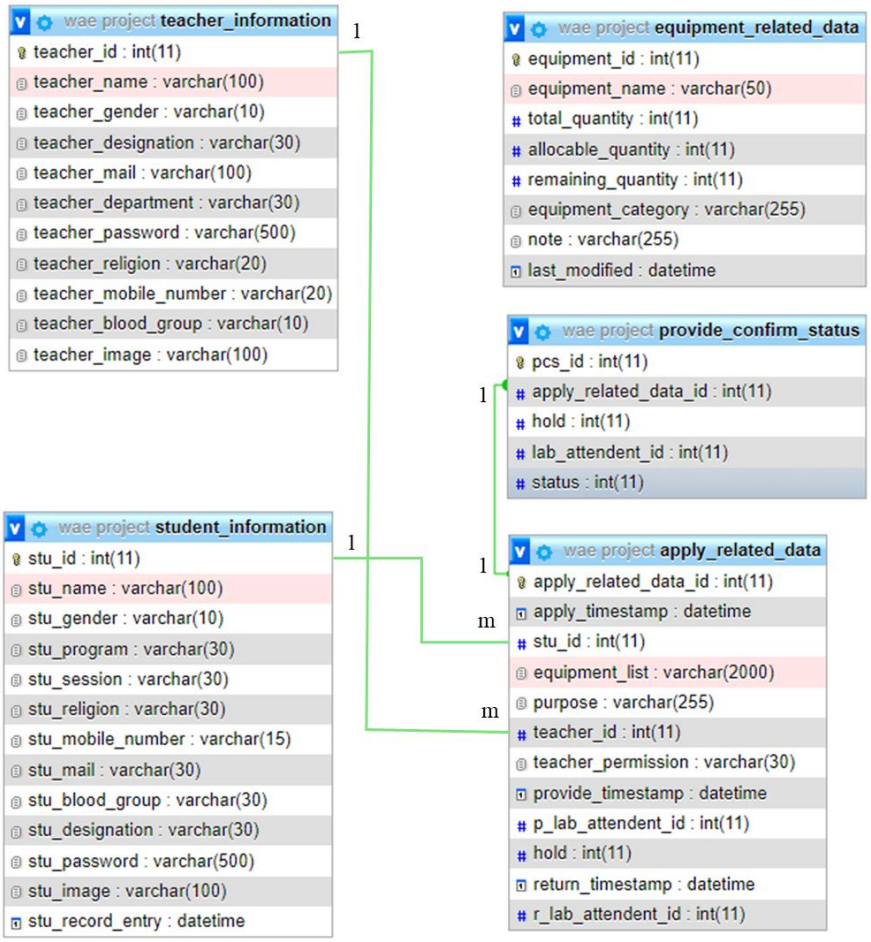


Figure 2.2: database diagram of our system

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
☐	1	stu_id 🔑	int(11)			No	*None*
☐	2	stu_name	varchar(100)	utf8mb4_general_ci		Yes	*NULL*
☐	3	stu_gender	varchar(10)	utf8mb4_general_ci		Yes	*NULL*
☐	4	stu_program	varchar(30)	utf8mb4_general_ci		Yes	*NULL*
☐	5	stu_session	varchar(30)	utf8mb4_general_ci		Yes	*NULL*
☐	6	stu_religion	varchar(30)	utf8mb4_general_ci		Yes	*NULL*
☐	7	stu_mobile_number	varchar(15)	utf8mb4_general_ci		Yes	*NULL*
☐	8	stu_mail	varchar(30)	utf8mb4_general_ci		Yes	*NULL*
☐	9	stu_blood_group	varchar(30)	utf8mb4_general_ci		Yes	*NULL*
☐	10	stu_designation	varchar(30)	utf8mb4_general_ci		No	Student
☐	11	stu_password	varchar(500)	utf8mb4_general_ci		No	*None*
☐	12	stu_image	varchar(100)	utf8mb4_general_ci		No	*None*
☐	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
☐	1	teacher_id 🔑	int(11)			No	*None*
☐	2	teacher_name	varchar(100)	utf8mb4_general_ci		Yes	*NULL*
☐	3	teacher_gender	varchar(10)	utf8mb4_general_ci		No	*None*
☐	4	teacher_designation	varchar(30)	utf8mb4_general_ci		Yes	*NULL*
☐	5	teacher_mail	varchar(100)	utf8mb4_general_ci		Yes	*NULL*
☐	6	teacher_department	varchar(30)	utf8mb4_general_ci		No	*None*
☐	7	teacher_password	varchar(500)	utf8mb4_general_ci		No	*None*
☐	8	teacher_religion	varchar(20)	utf8mb4_general_ci		No	*None*
☐	9	teacher_mobile_number	varchar(20)	utf8mb4_general_ci		No	*None*
☐	10	teacher_blood_group	varchar(10)	utf8mb4_general_ci		No	*None*
☐	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
1	apply_related_data_id	int(11)			No	None
2	apply_timestamp	datetime			Yes	NULL
3	stu_id	int(11)			Yes	NULL
4	equipment_list	varchar(2000)	utf8mb4_general_ci		Yes	NULL
5	purpose	varchar(255)	utf8mb4_general_ci		Yes	NULL
6	teacher_id	int(11)			Yes	NULL
7	teacher_permission	varchar(30)	utf8mb4_general_ci		Yes	Pending
8	provide_timestamp	datetime			Yes	NULL
9	p_lab_attendent_id	int(11)			Yes	NULL
10	hold	int(11)			No	0
11	return_timestamp	datetime			Yes	NULL
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
1	equipment_id	int(11)			No	None
2	equipment_name	varchar(50)	utf8mb4_general_ci		No	None
3	total_quantity	int(11)			No	0
4	allocable_quantity	int(11)			No	0
5	remaining_quantity	int(11)			No	None
6	equipment_category	varchar(255)	utf8mb4_general_ci		No	Sensor
7	note	varchar(255)	utf8mb4_general_ci		Yes	NULL
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
1	pcs_id	int(11)			No	None
2	apply_related_data_id	int(11)			Yes	NULL
3	hold	int(11)			No	0
4	lab_attendent_id	int(11)			Yes	NULL
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						
☐	apply_related_data	☆	Browse	Structure	Search	Insert	Empty	Drop
☐	equipment_related_data	☆	Browse	Structure	Search	Insert	Empty	Drop
☐	provide_confirm_status	☆	Browse	Structure	Search	Insert	Empty	Drop
☐	student_information	☆	Browse	Structure	Search	Insert	Empty	Drop
☐	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.

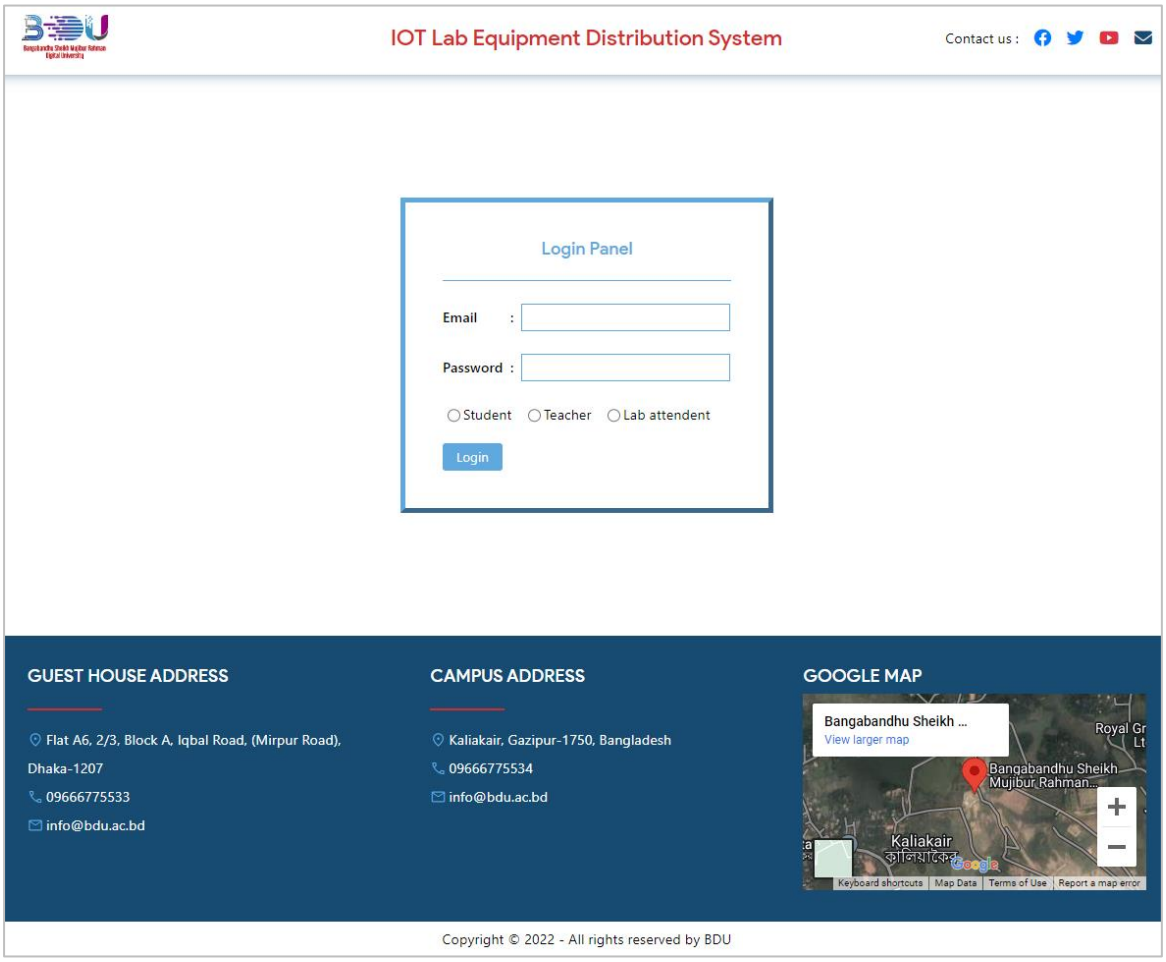


Figure 3.7: Login page of website

3.2.2 Student's Dashboard

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

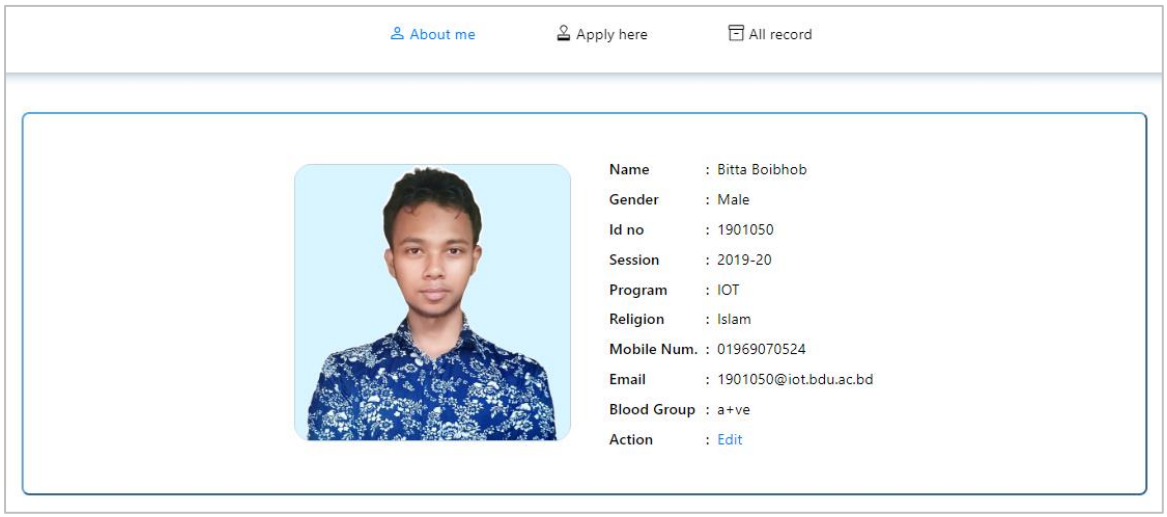


Figure 3.8: Student dashboard's about me section

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

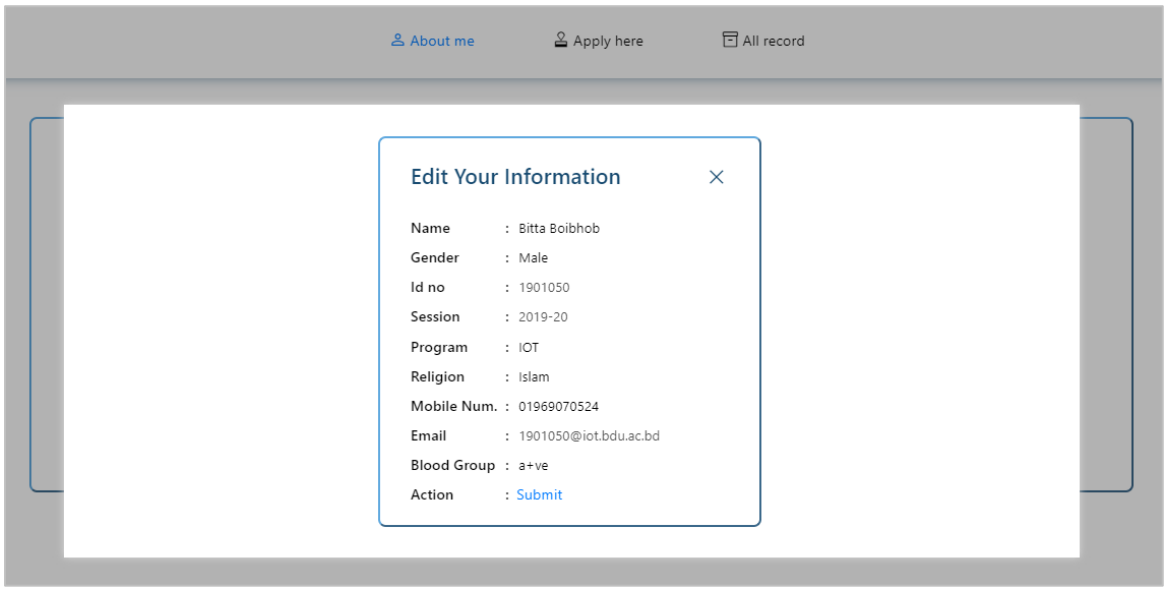


Figure 3.9: Student dashboard's edit information section

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.

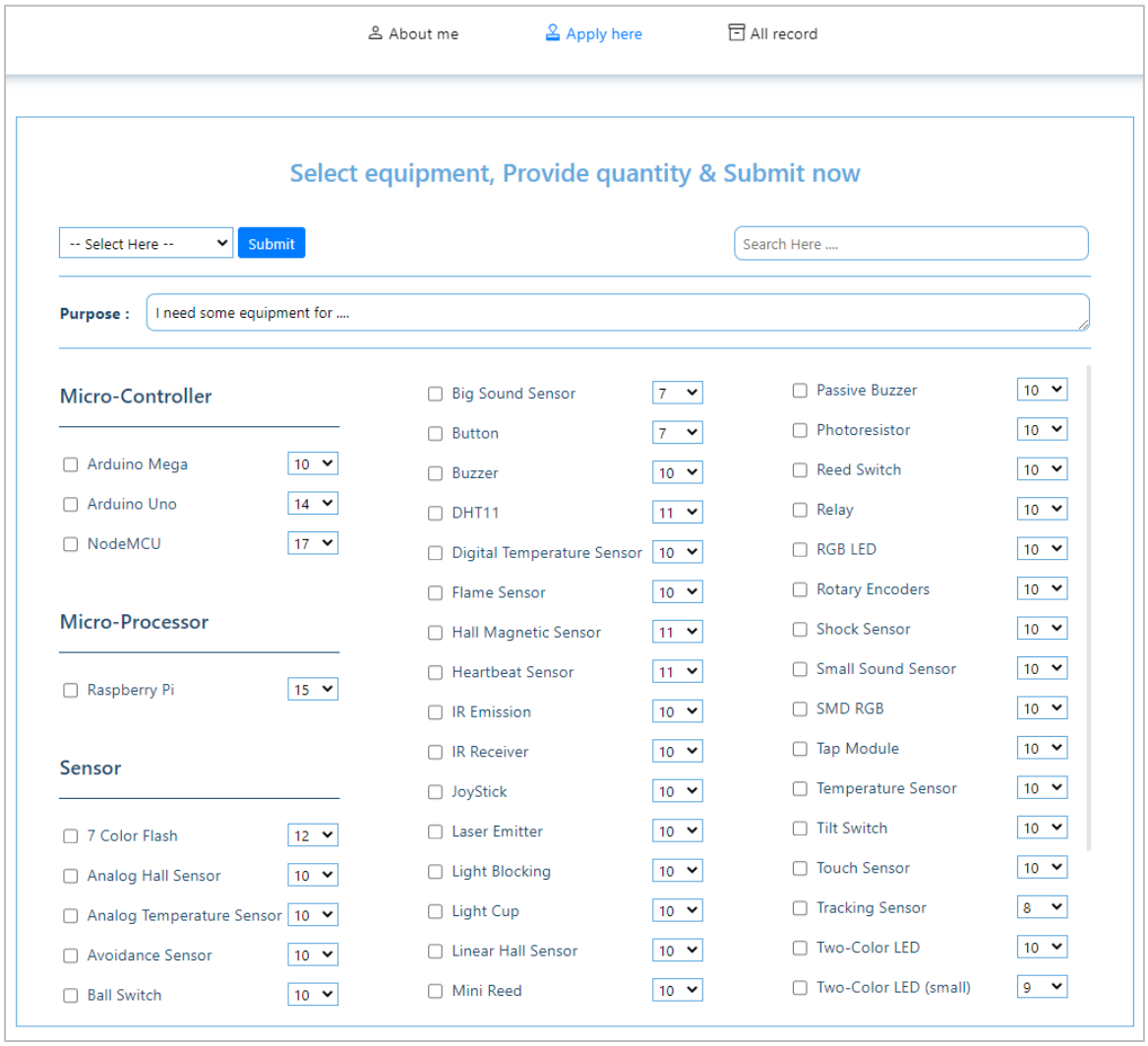


Figure 3.10: Student dashboard's Apply section

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.

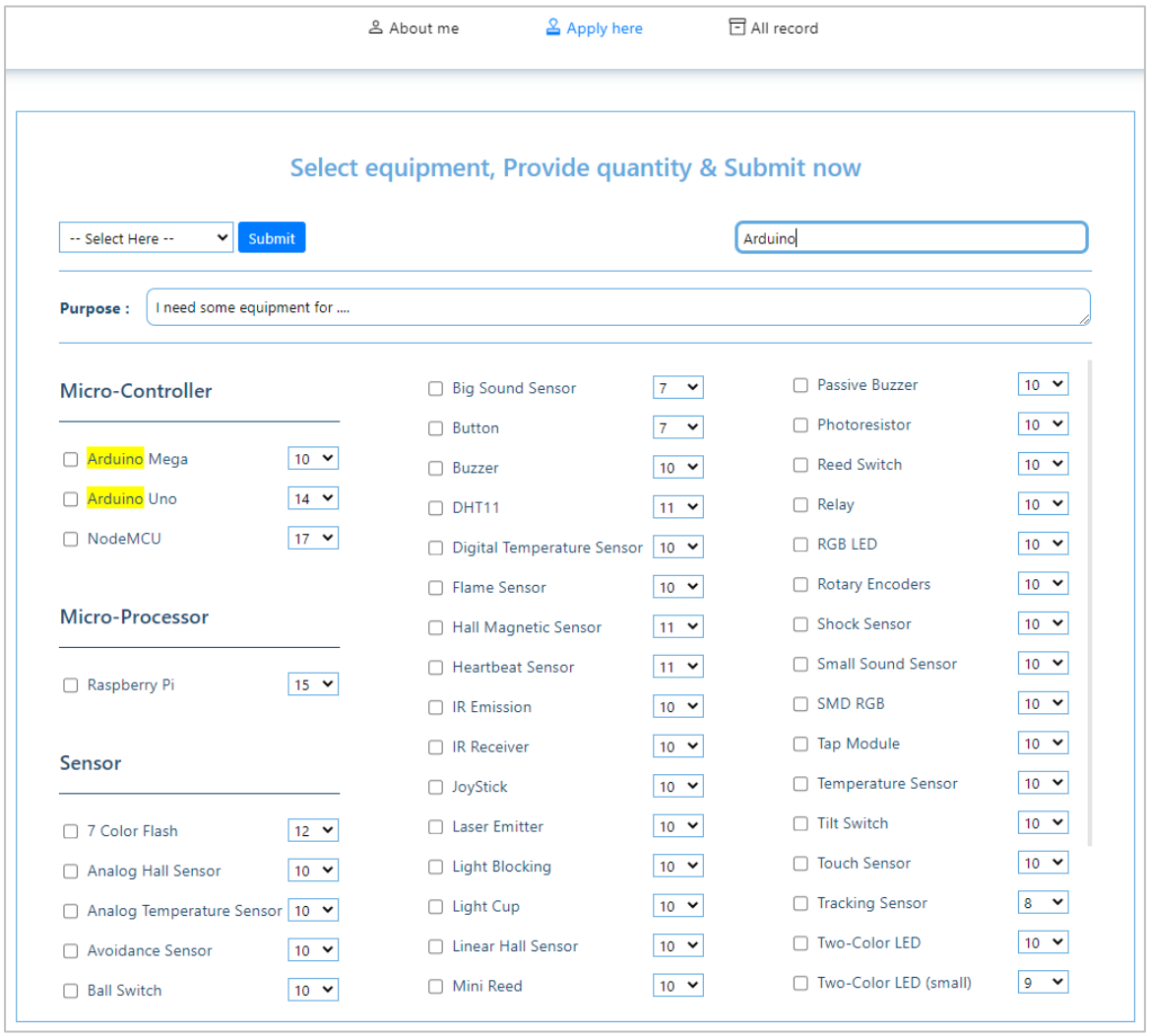
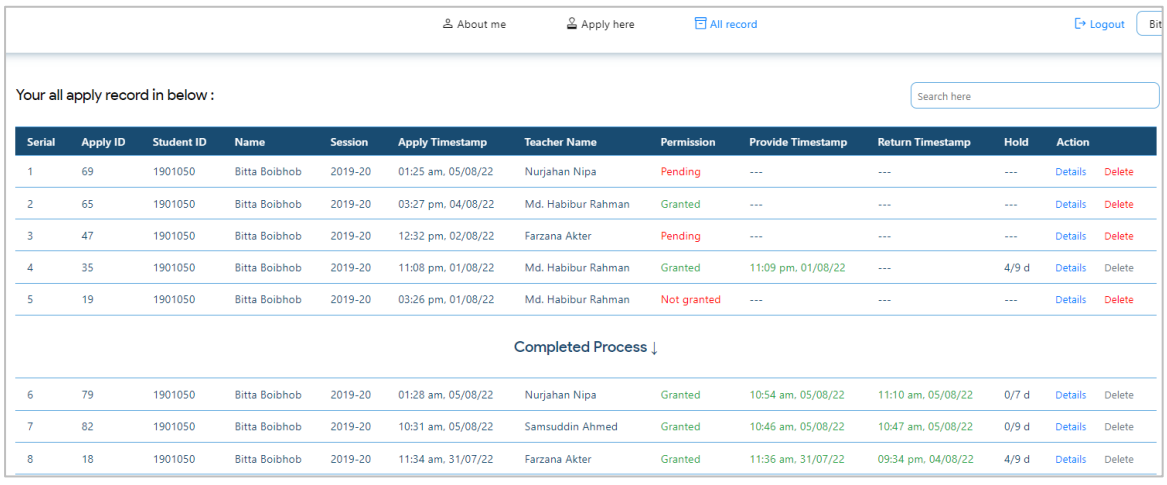


Figure 3.11: Search bar in apply section

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.



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
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.

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.

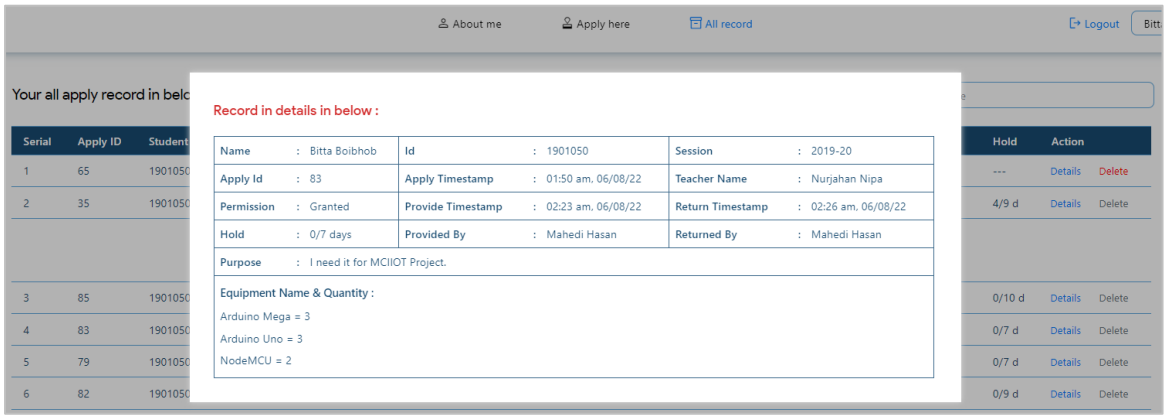


Figure 3.14: Open a modal when Details button is clicked

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.

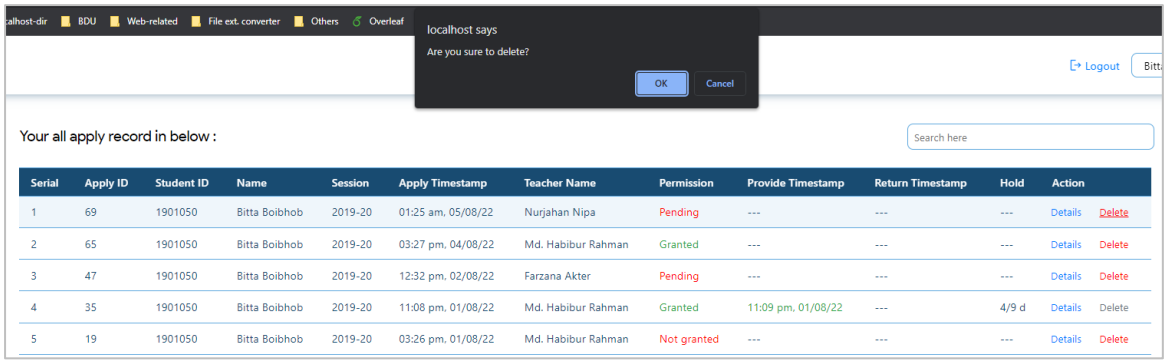


Figure 3.15: Having Delete Operation into student dashboard

3.2.3 Teacher's Dashboard

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

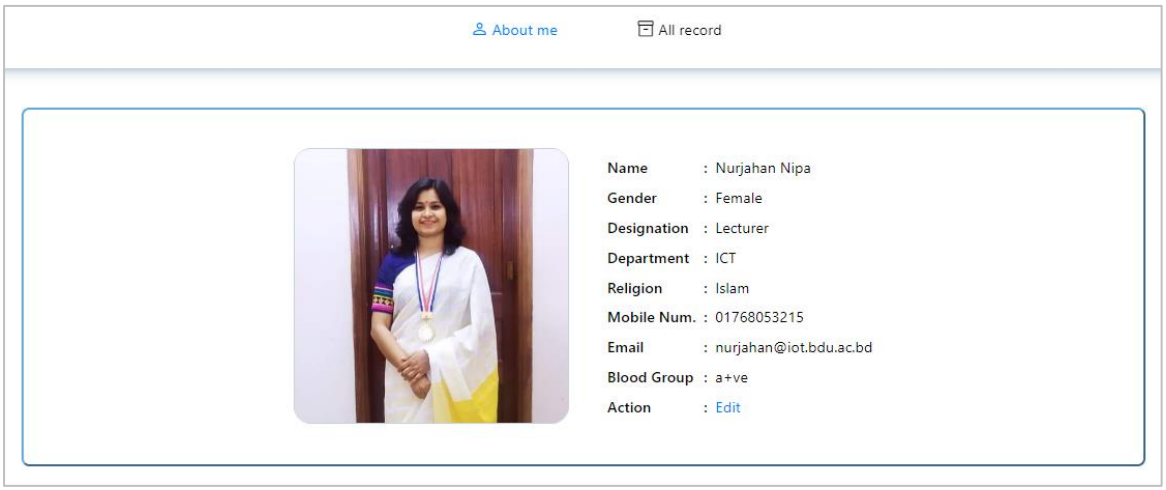


Figure 3.16 : Teacher dashboard's about me section

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

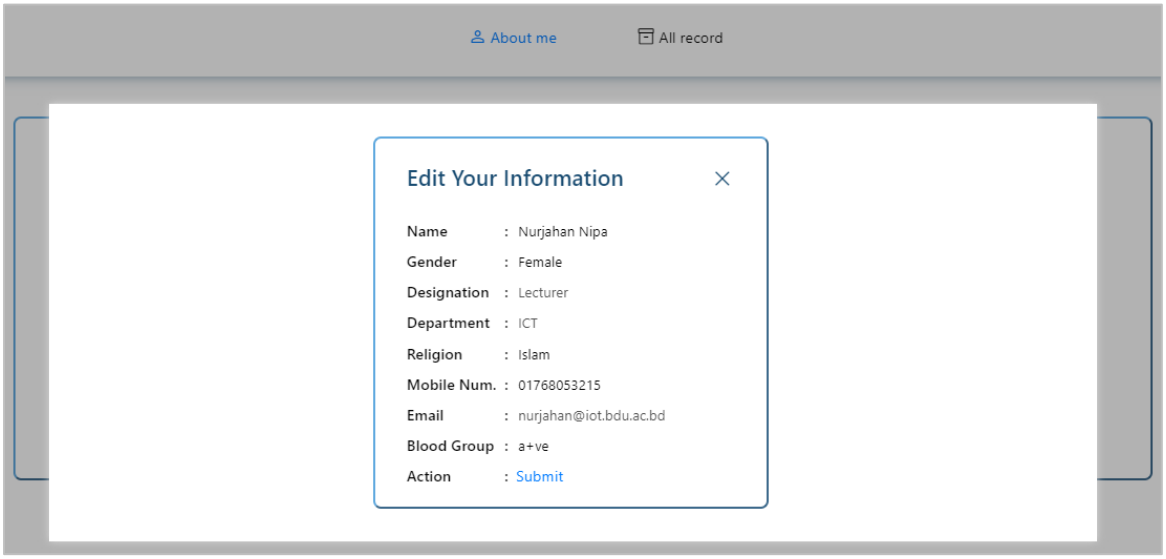


Figure 3.17: Teacher dashboard's edit information section

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.

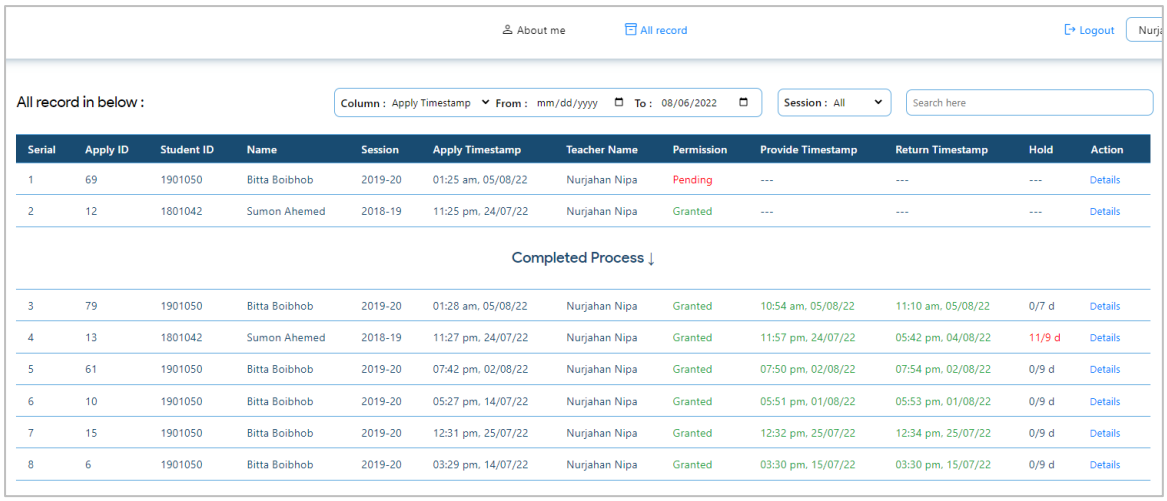


Figure 3.18: Teacher dashboard's All record section

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

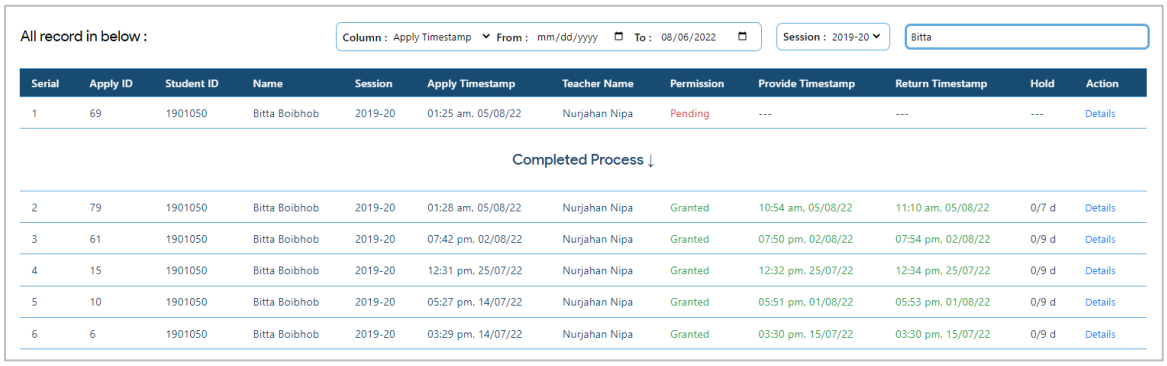


Figure 3.19: All record sections Search bar

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.

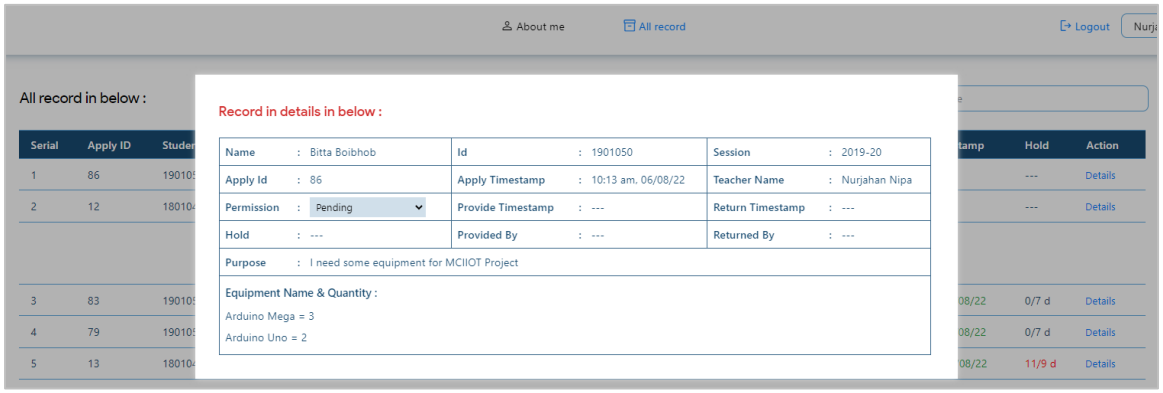


Figure 3.20 : Open a modal when Details button is clicked

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.

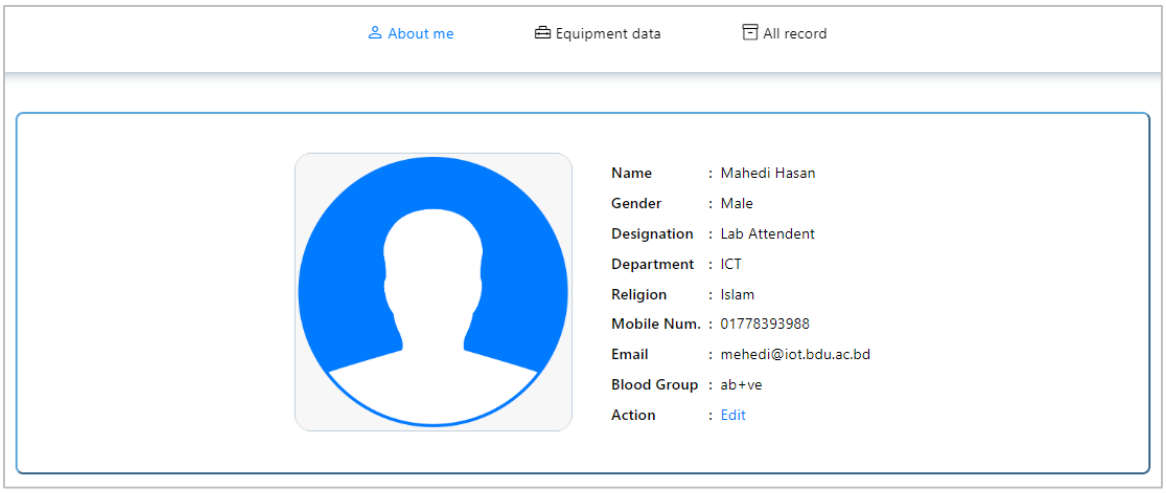


Figure 3.21: Lab attendent dashboard's about me section

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.

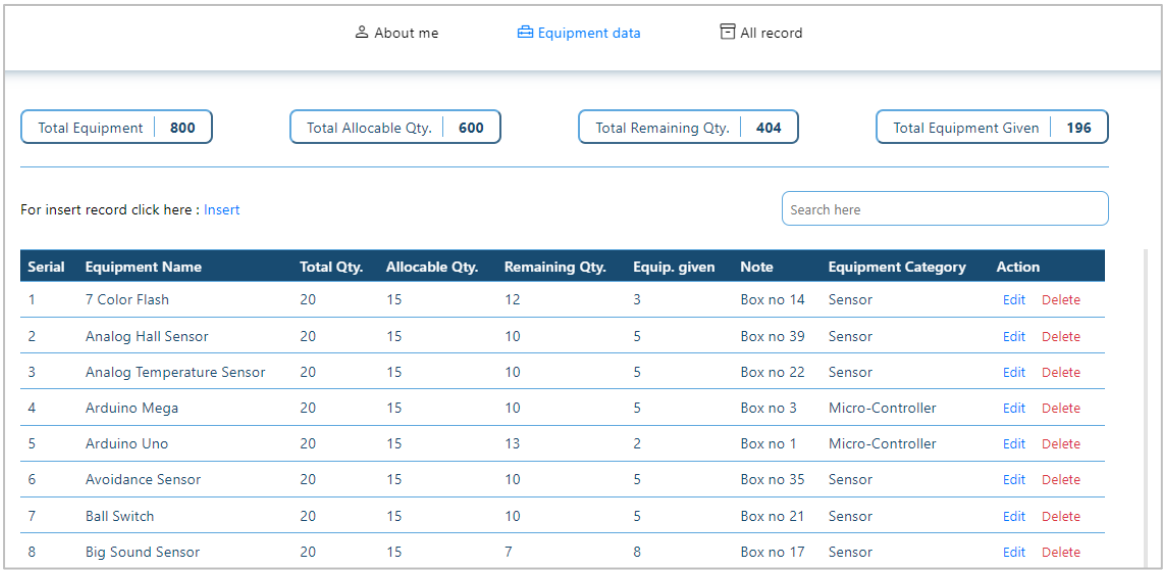


Figure 3.22: Equipment data is shown

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

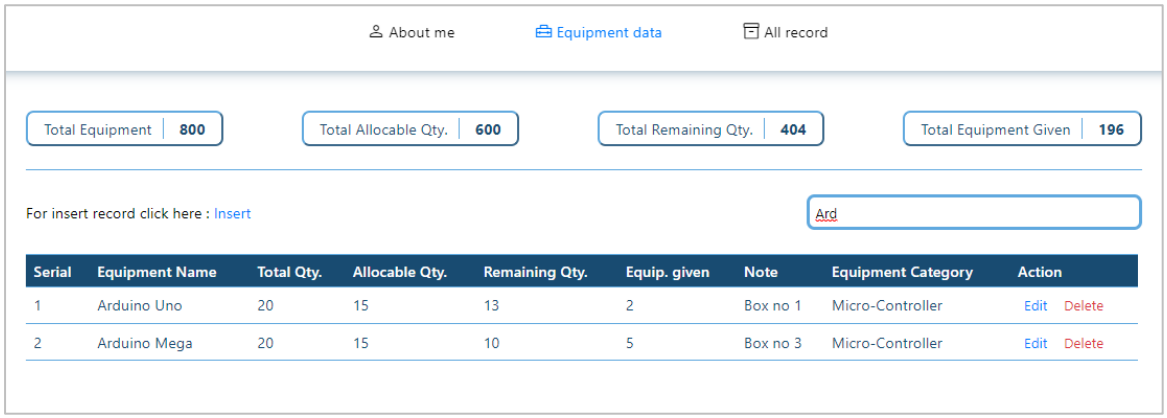


Figure 3.23: Equipment data Searched

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.

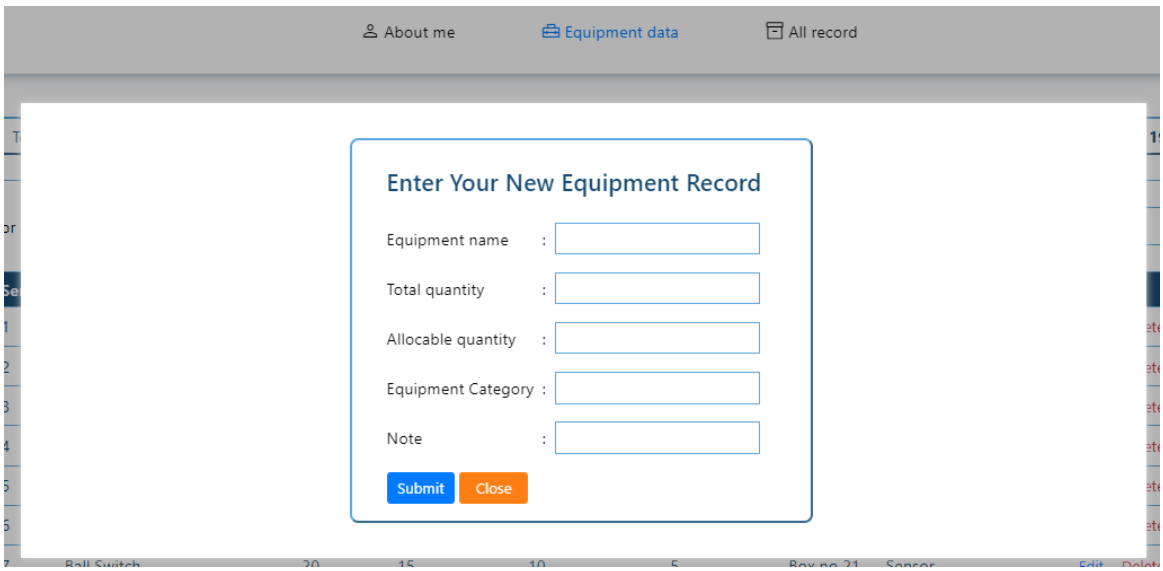


Figure 3.24: New equipment data Insertion

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.

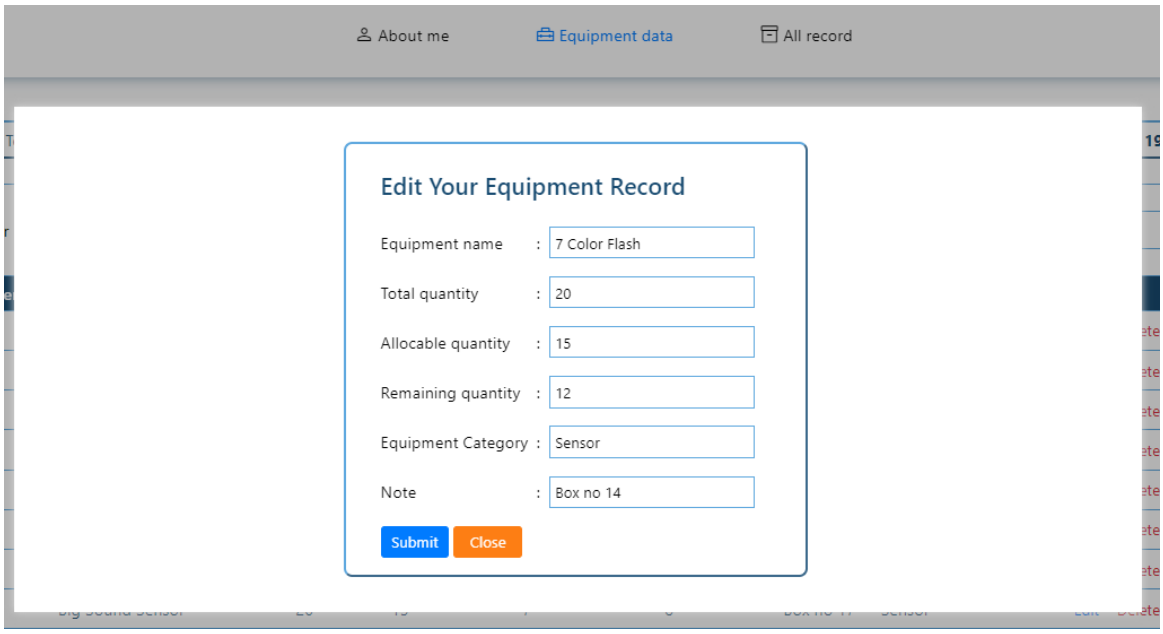


Figure 3.25: Edit equipment data

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

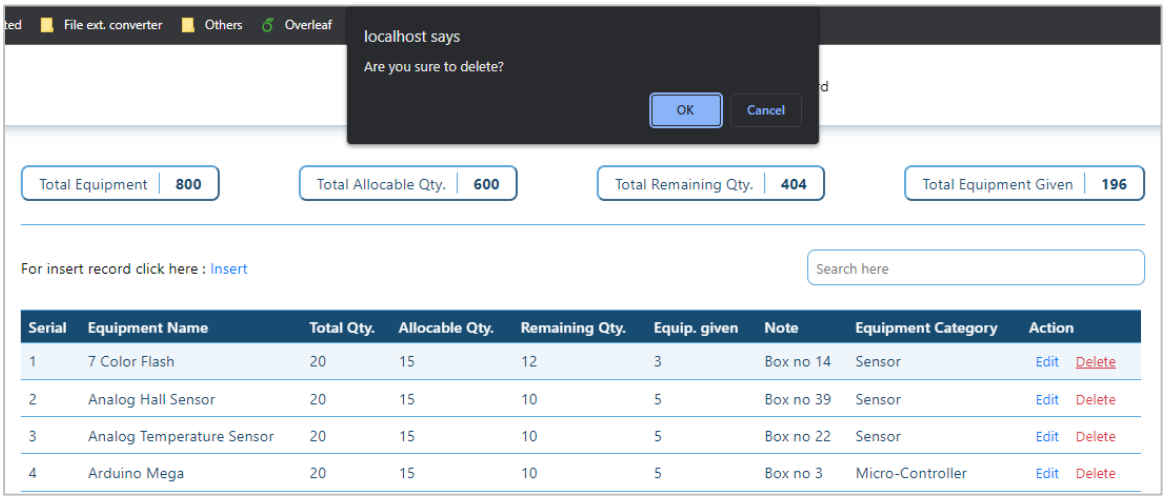


Figure 3.26: Delete equipment data

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 incompleted record and second section is for completed record.

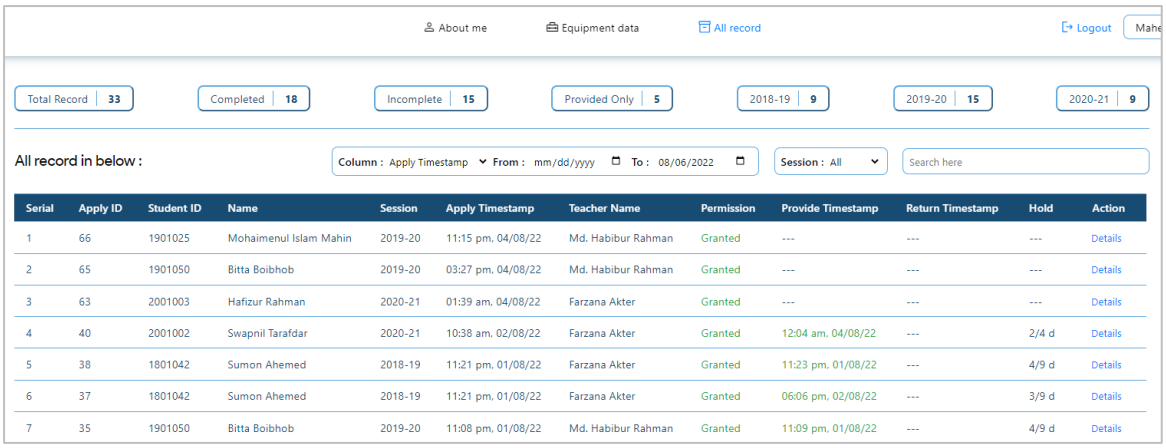


Figure 3.27: Lab attendent dashboard's All record section

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

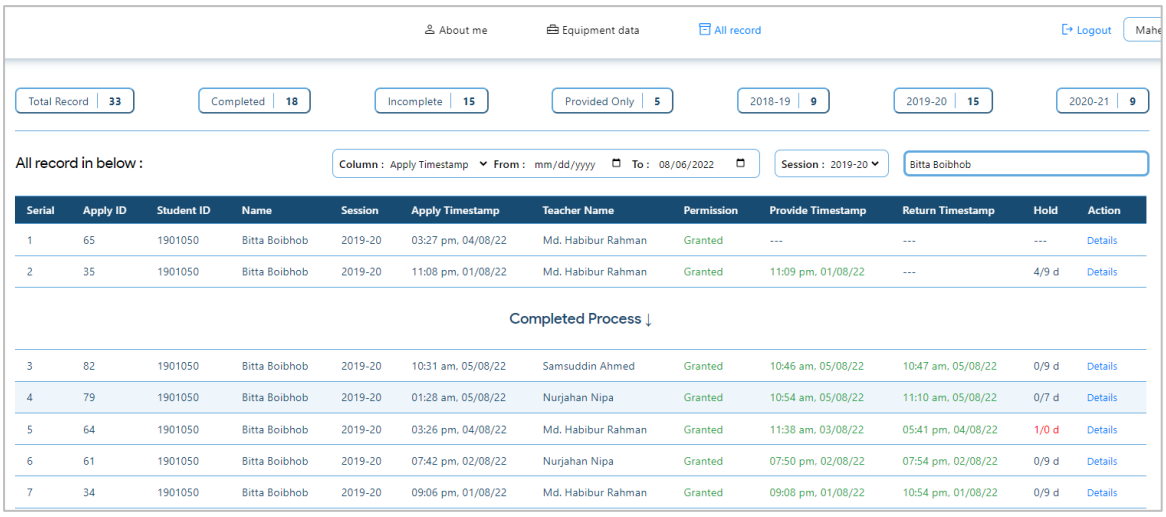


Figure 3.28: Data searched in All record section

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.

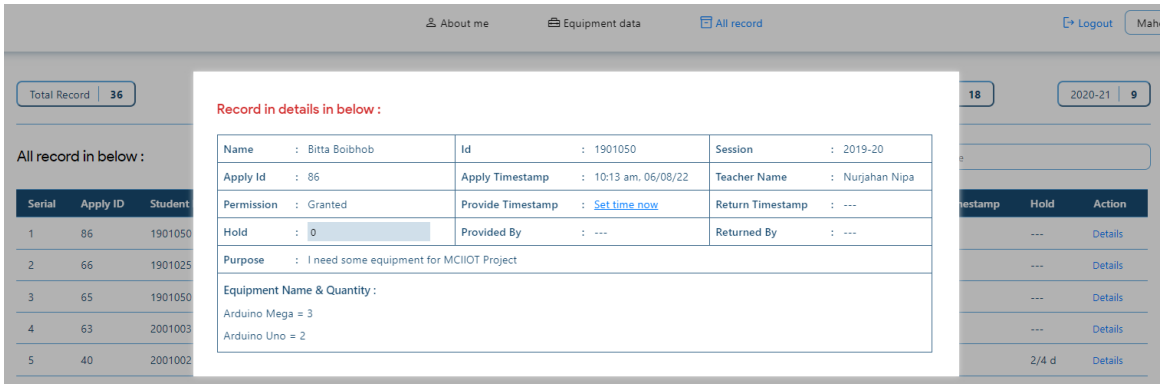


Figure 3.29: Open a modal when Details button is clicked

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.

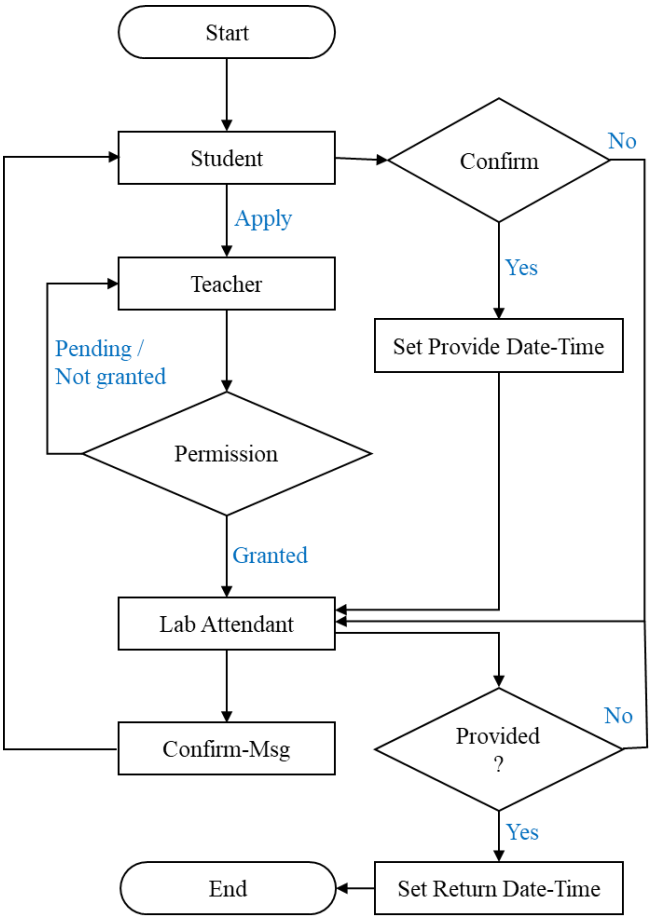


Figure 3.30: Process flowchart

3.3.2 Process in website

Note the previous quantity in below.

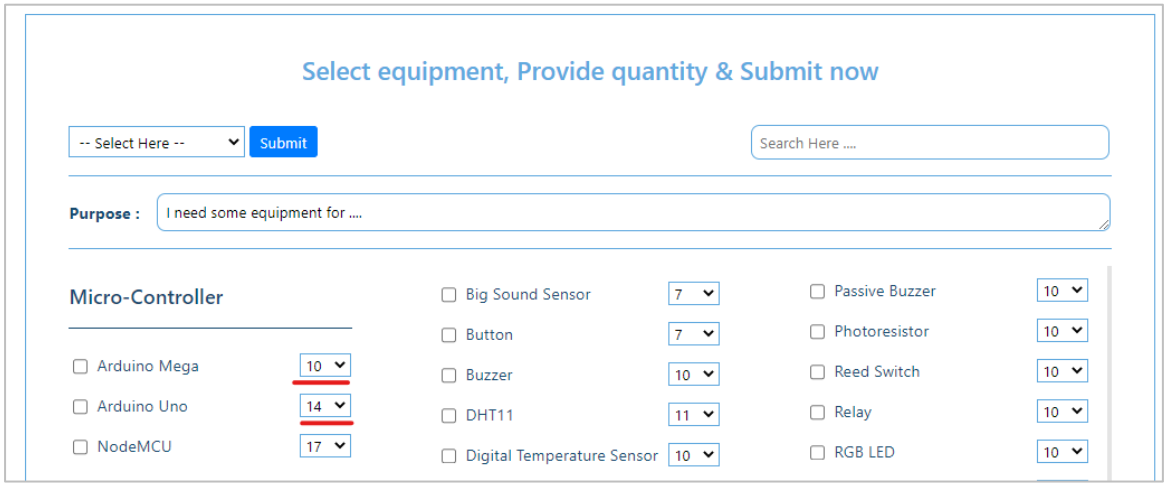


Figure 3.31: Equipment quantity

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.

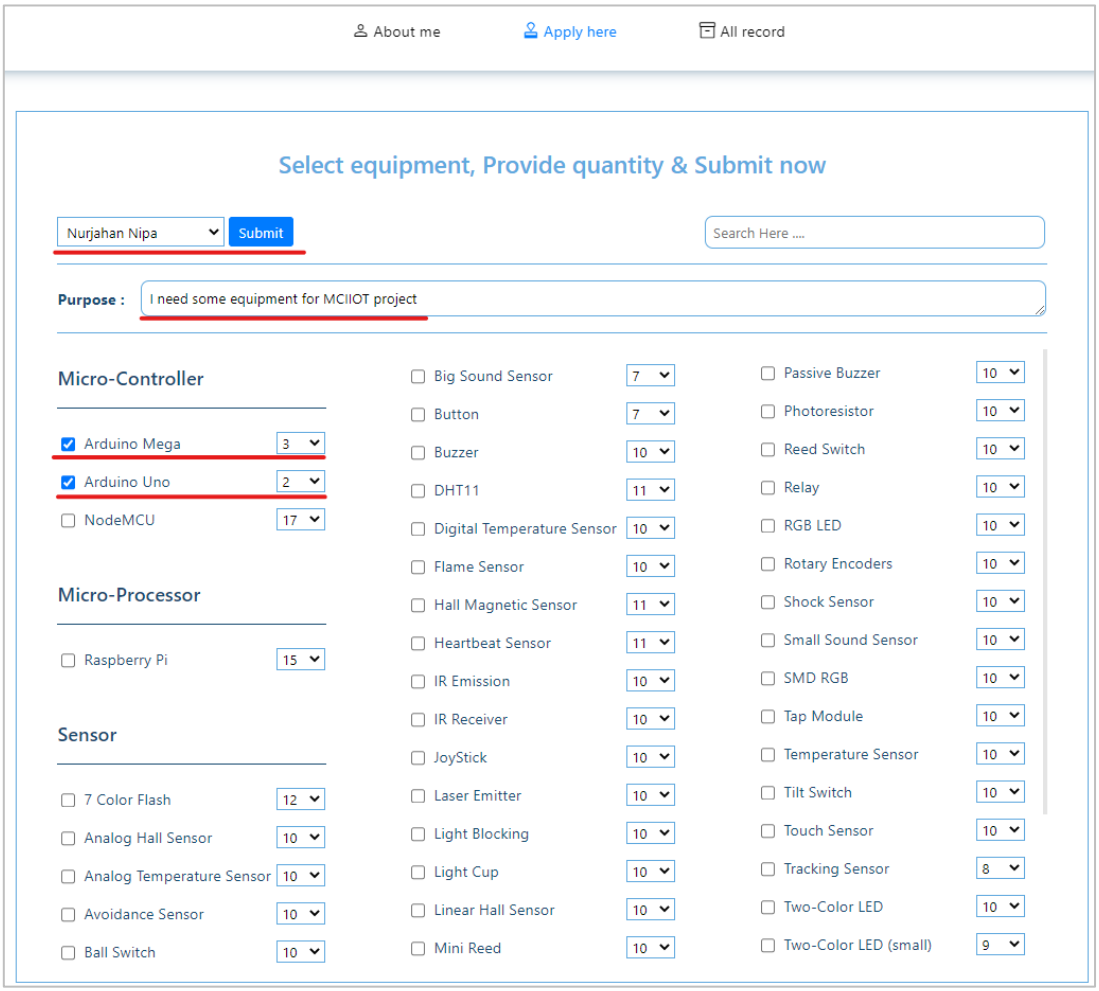


Figure 3.32: Student select equipment quantity and apply

We see that the quantity is decreased.

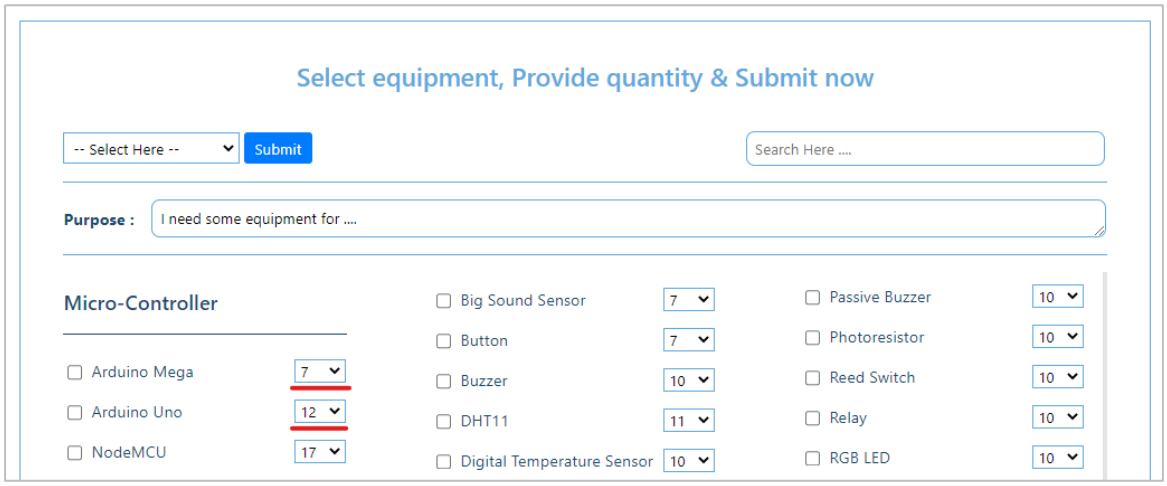


Figure 3.33 : Equipment quantity decreased

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

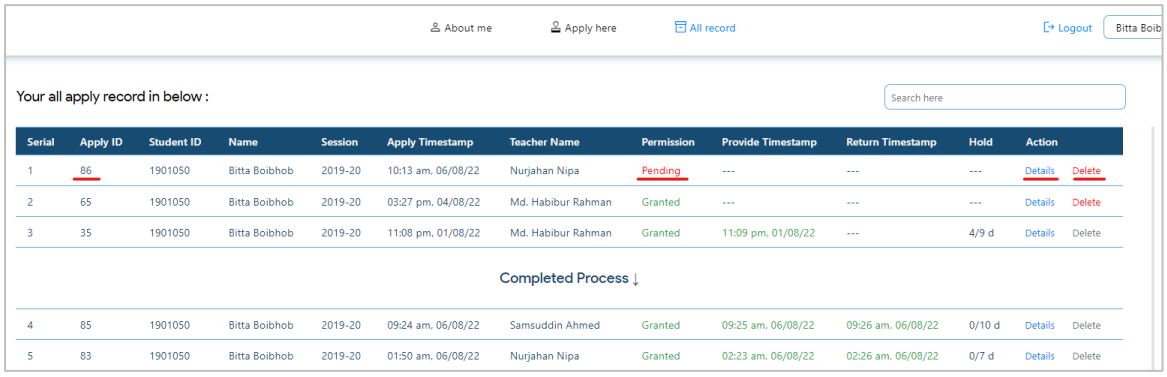


Figure 3.34: Pending Record show into table

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

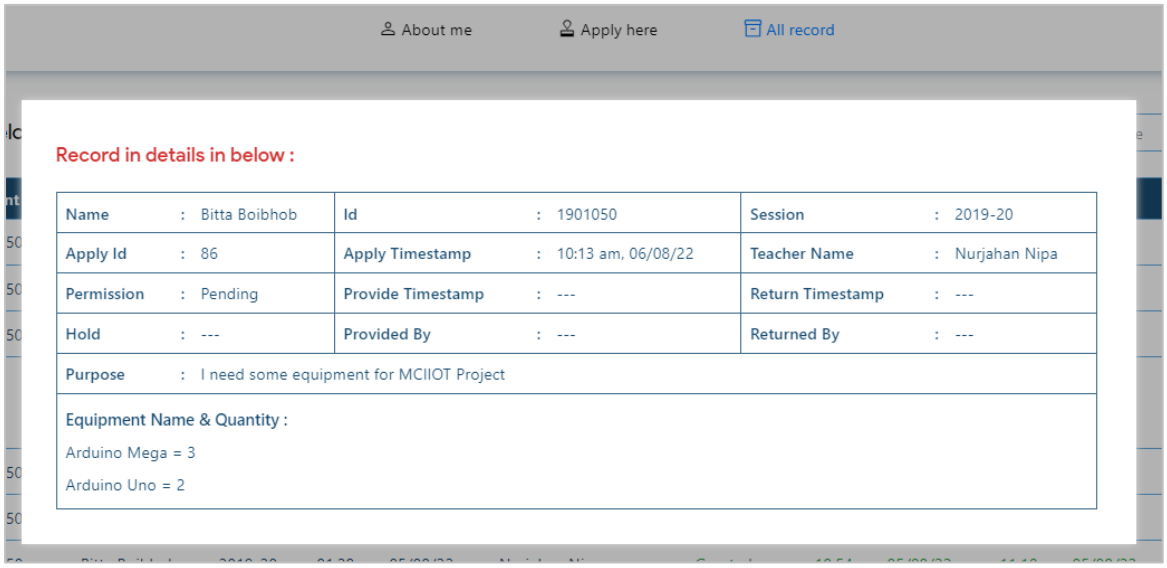


Figure 3.35: Record show in details into modal

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.

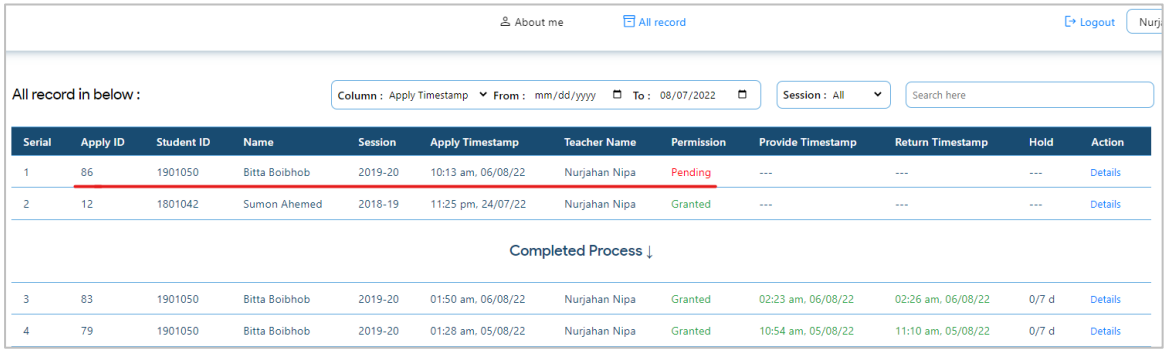


Figure 3.36: Pending record is shown

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

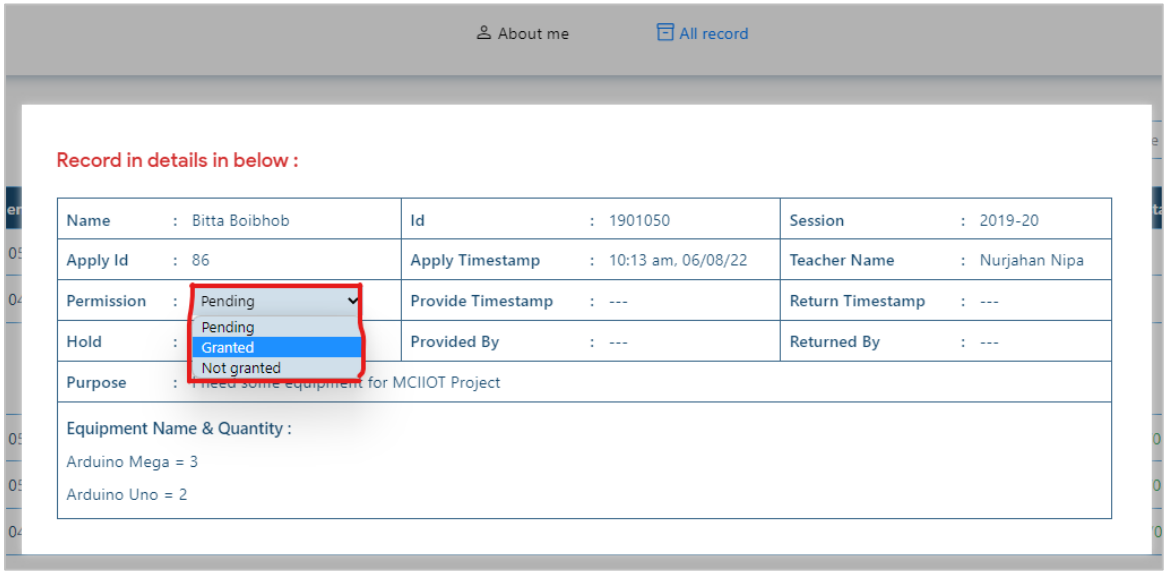


Figure 3.37: Teacher provide his/her permission

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

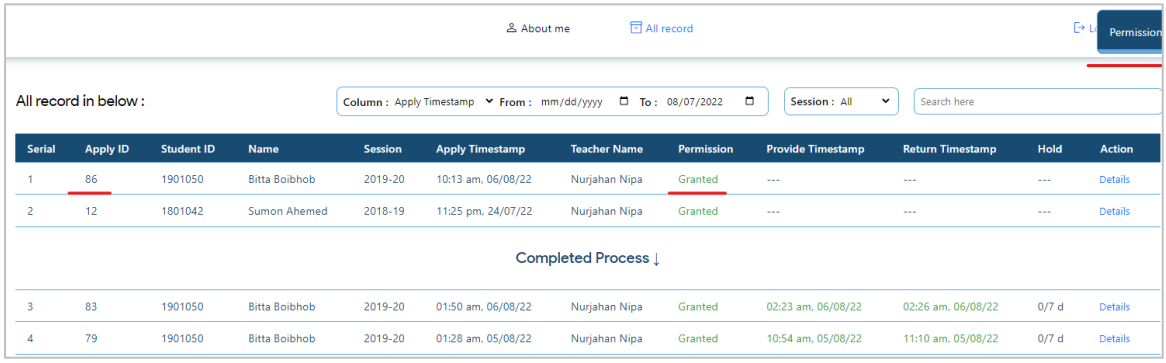


Figure 3.38: Granted Record is shown in table

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.

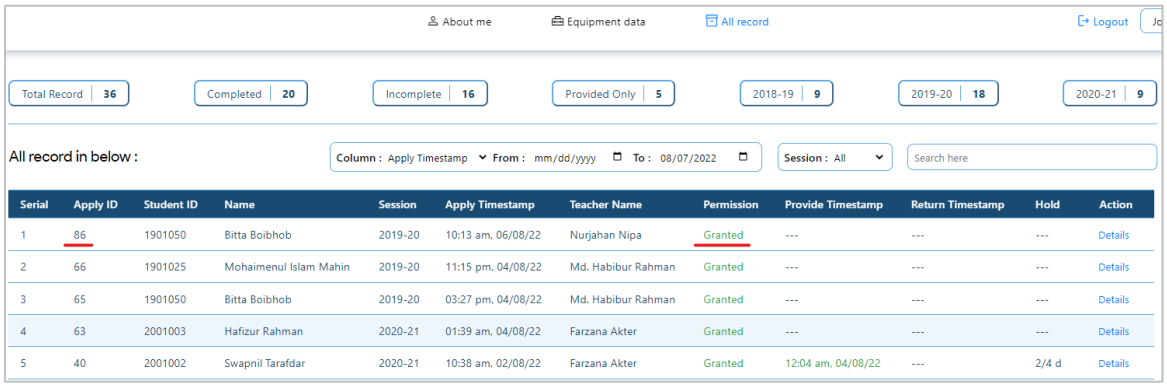


Figure 3.39: Only granted record show into lab attendant's dashboard

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

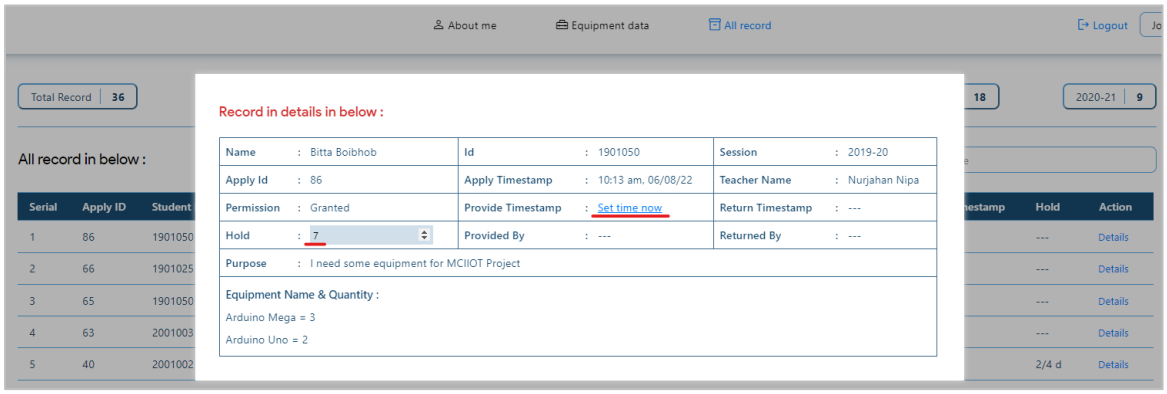


Figure 3.40: Provide timestamp setup option

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

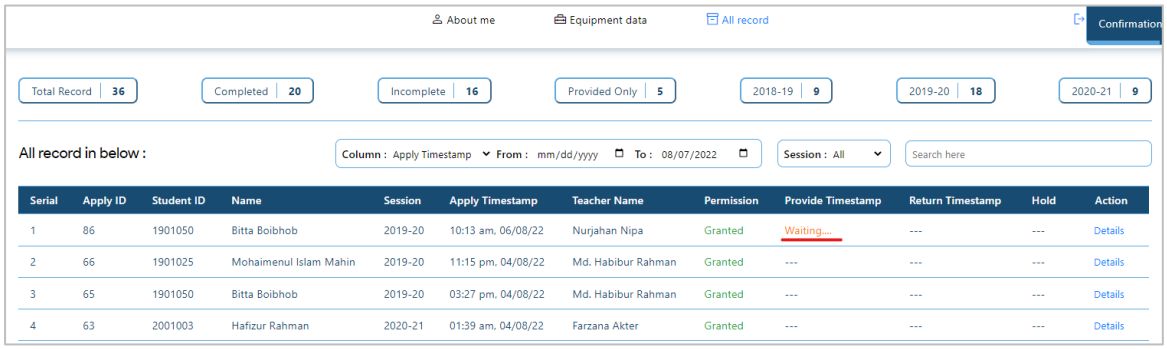


Figure 3.41: Waiting for students confirmation

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

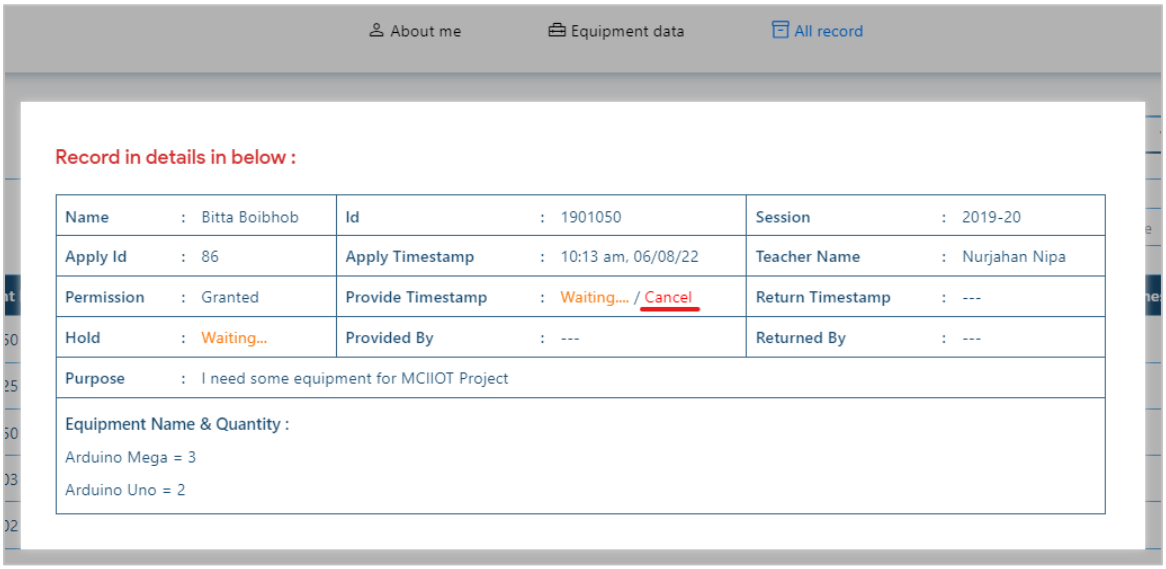


Figure 3.42: Lab attendant can cancel the confirmation

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

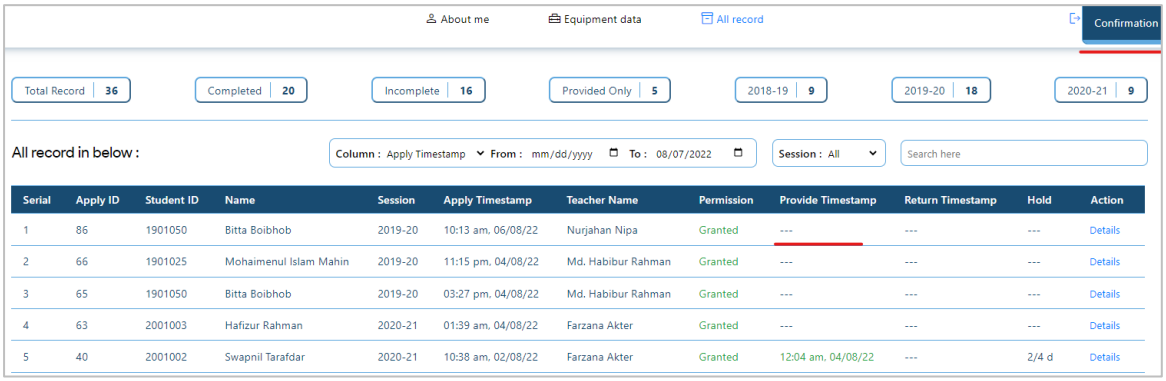


Figure 3.43: Confirmation message is cancelled

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

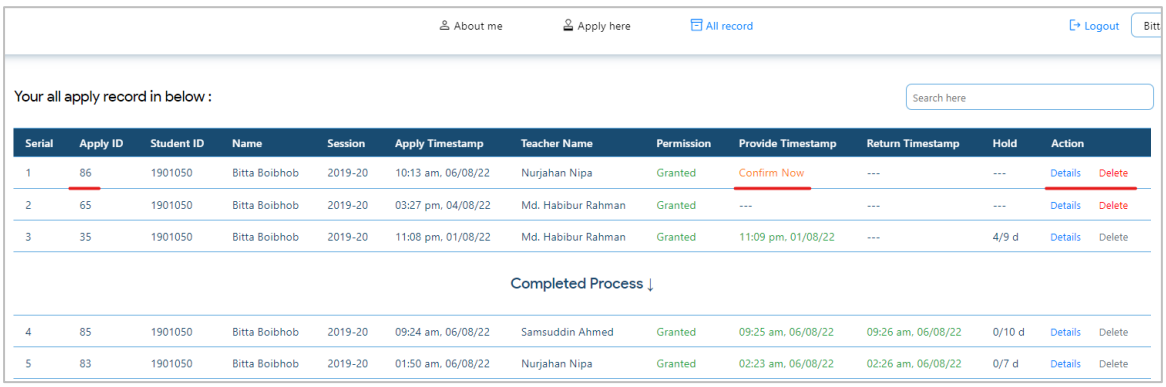


Figure 3.44: Confirm now message shown into student's dashboard

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

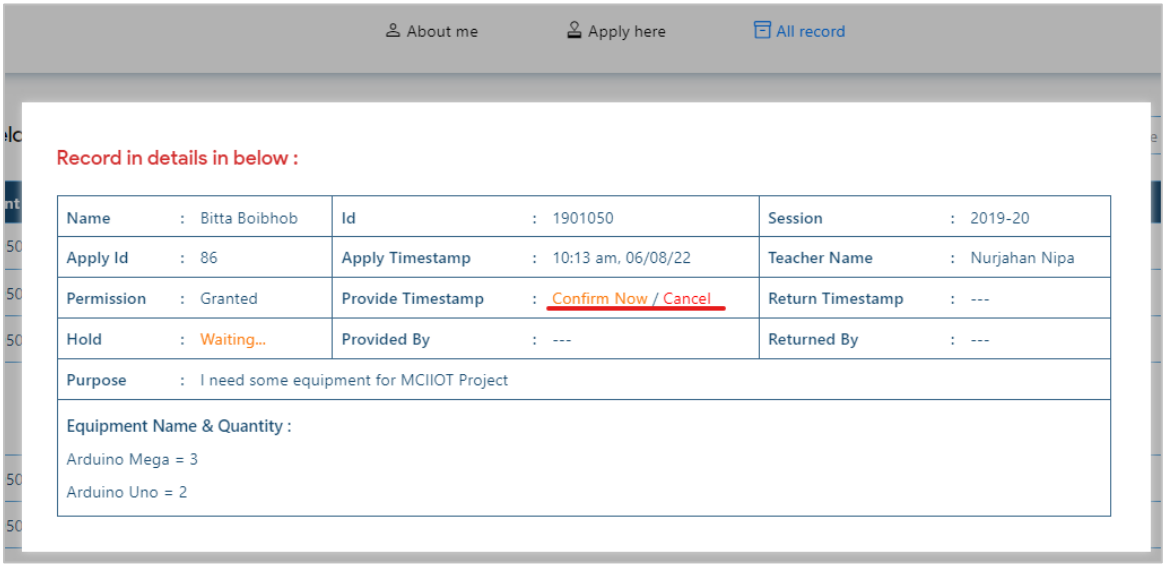


Figure 3.45: Student confirm or cancel the confirmation from modal

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

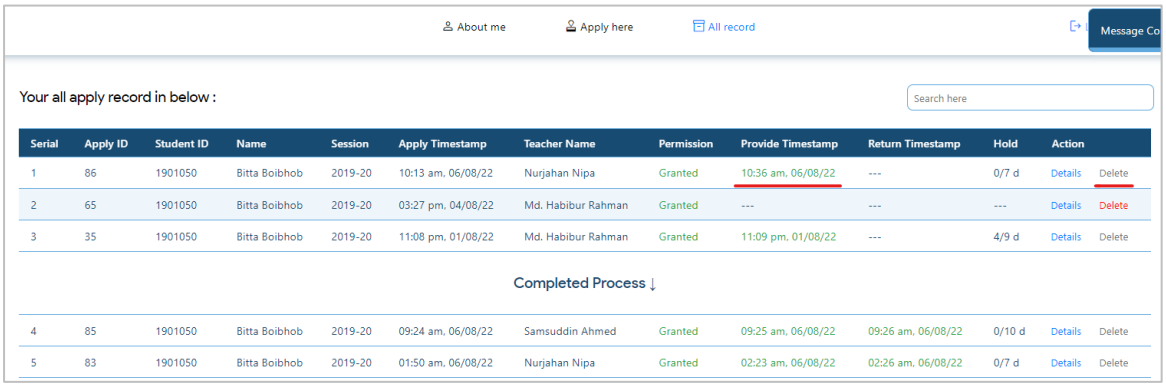


Figure 3.46: Provide date-time properly setup

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

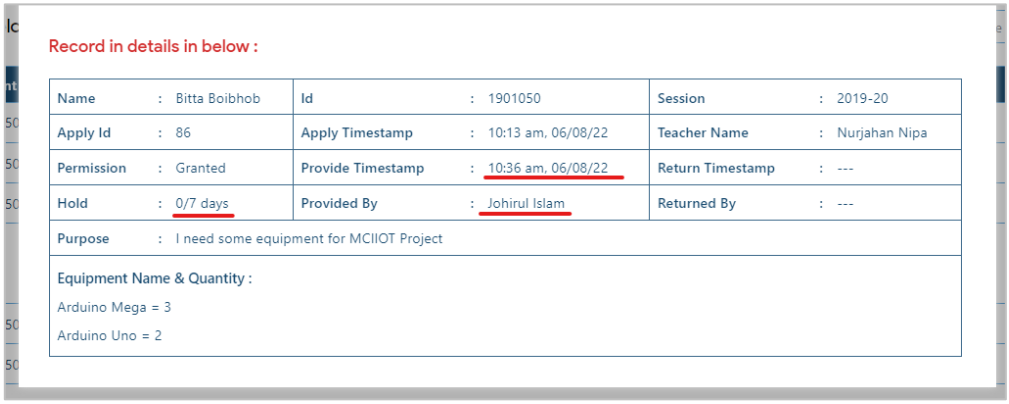


Figure 3.47: Details information into modal

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.

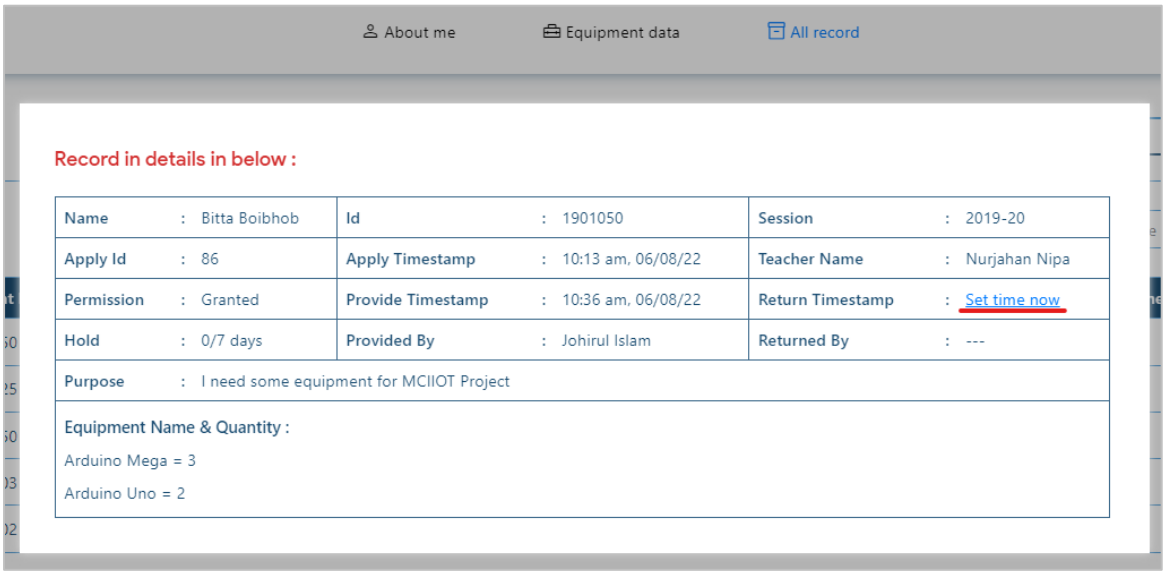


Figure 3.48: Return datetime setup option

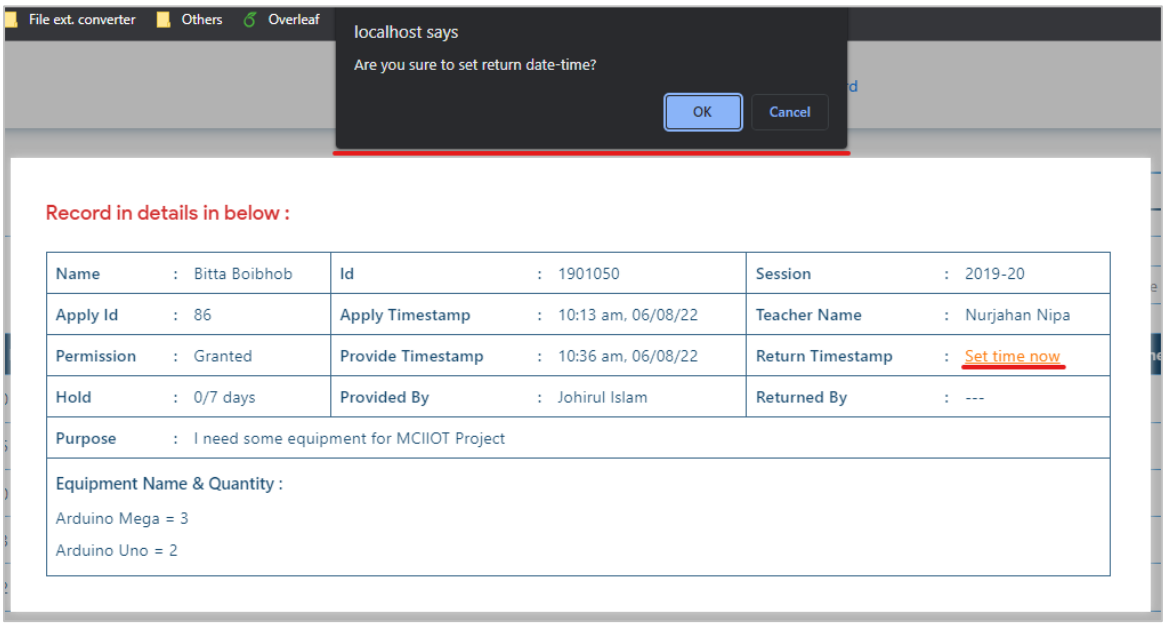


Figure 3.49: Confirmation for setup return datetime

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

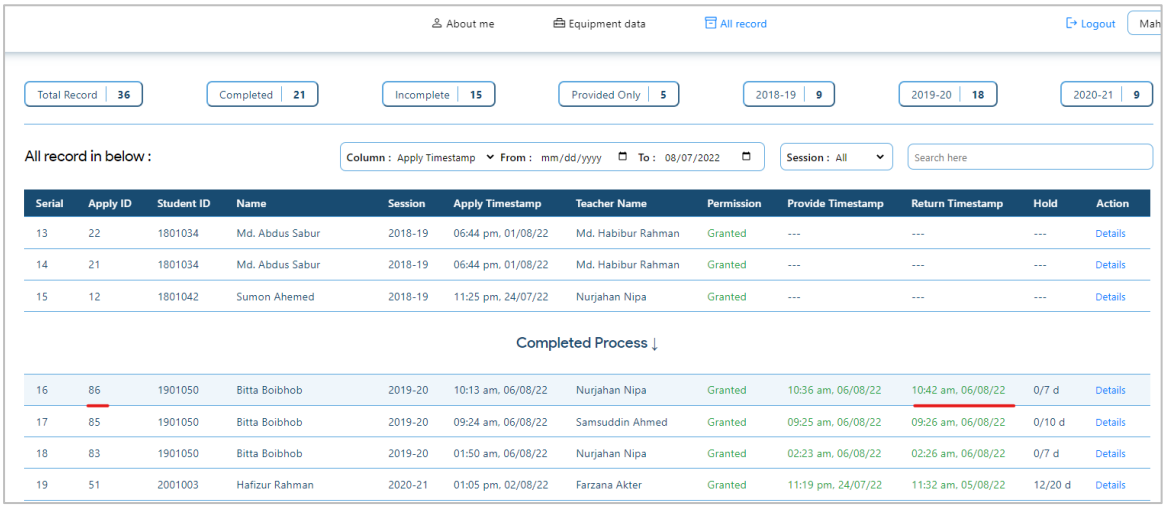


Figure 3.50: Record that complete moved to tables second section

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

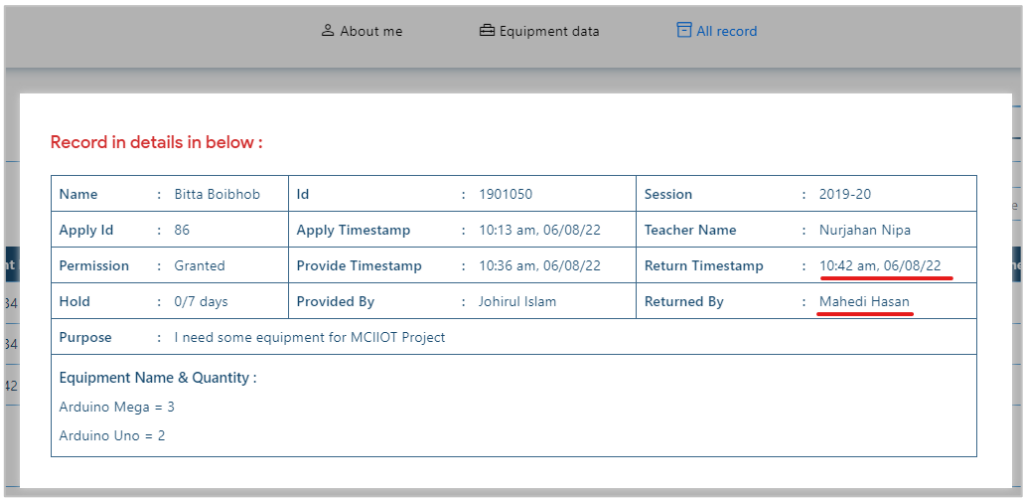


Figure 3.51: Details information into modal

We see that the equipment quantity is increased.

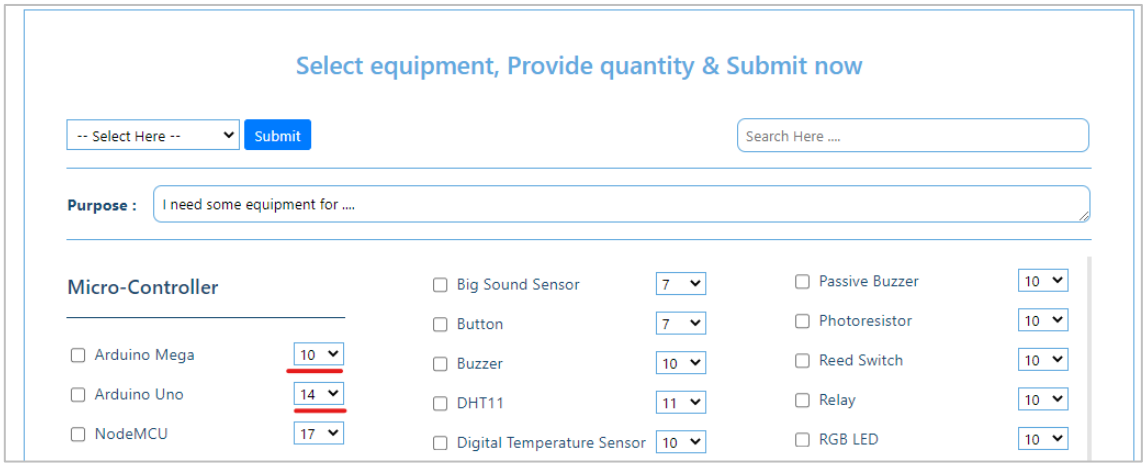


Figure 3.52: Equipment quantity is decreased

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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