



**Faculty of Engineering**  
Cairo University



# Computerized Maintenance Management System

FINAL ASSESSMENT PROJECT

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## Description of Project.

We used web development as a software by making FRONT END by using HTML, CSS and JavaScript, DATABASE by using MYSQL and BACKEND by using NODEJS.

We created about 30 Pages that totally describe how our CMMS works. These pages include forms which are.

1. Add an equipment, employee and department.
2. Calibration or PPM or scrap or report for a certain equipment.
3. Make a daily pass form.
4. Search for equipment form.

These forms require different types of data which is stored in our database system so that they would display the data we inserted in a table. Each form of the mentioned forms has a table that displays the data we stored before and add the new data to this table.

In addition to forms and tables, we made a dashboard page that contains all the tables and the data we have.

The home page is a page that describes the hospital in general not the CMMS system.

## Database.

Each table in the database is to save a specific scope of data related to the clinical engineer job, so let's take a look at the sequence of our database:

## 1. EMPLOYEE

Server: 127.0.0.1 » Database: crims » Table: employee

Showing rows 0 - 1 (2 total, Query took 0.0013 seconds.)

SELECT \* FROM `employee`

Profiling [Edit inline] [Edit] [Explain SQL] [Create PHP code] [Refresh]

Show all | Number of rows: 25 | Filter rows: Search this table | Sort by key: None

+ Options

	name	national_id	email	mobile_no	role	position	department	depart_code	qualifications	salary
<input type="checkbox"/> Edit <input type="checkbox"/> Copy <input type="checkbox"/> Delete	mohamed ahmed	280040122104028	mohamedahmed@gmail.com	1133536373	Engineer	Junior	biomedical engineering	160	bachelor in biomedical engineering CUFE	5000
<input type="checkbox"/> Edit <input type="checkbox"/> Copy <input type="checkbox"/> Delete	maher mohamed	290050122104028	maher_mohamed@gmail.com	1037897879	technician	junior	biomedical engineering	160	institution of electronics	2000

Check all | With selected: Edit Copy Delete Export

Show all | Number of rows: 25 | Filter rows: Search this table | Sort by key: None

Figure 1 The Employee table structure which stores the information of Biomedical Engineers (Employee table).

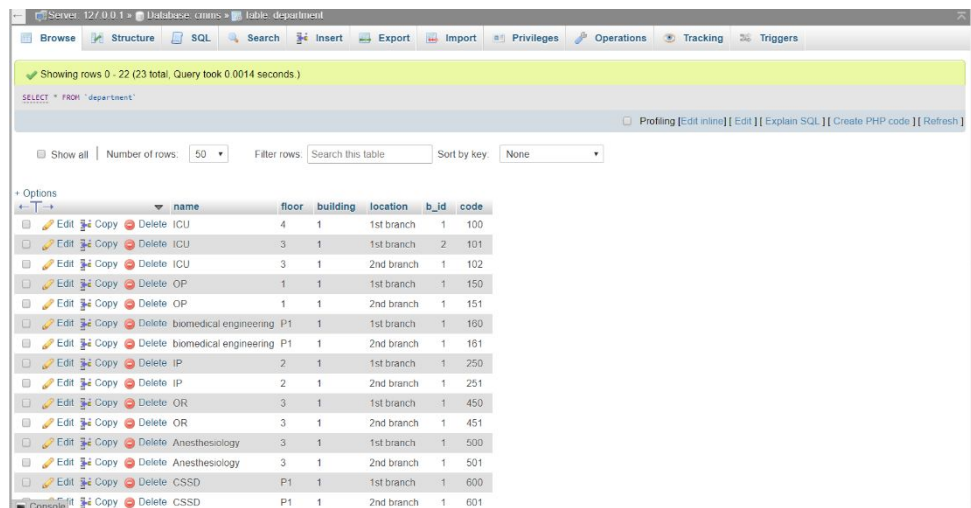
Table structure Relation view

#	Name	Type	Collation	Attributes	Null	Default	Comments	Extra	Action
1	name	varchar(200)	utf8_general_ci		No	None			Change Drop Primary Unique Index Spatia
2	national_id	bigint(200)			No	None			Change Drop Primary Unique Index Spatia
3	email	varchar(200)	utf8_general_ci		No	None			Change Drop Primary Unique Index Spatia
4	mobile_no	int(100)			No	None			Change Drop Primary Unique Index Spatia
5	role	varchar(200)	utf8_general_ci		No	None			Change Drop Primary Unique Index Spatia
6	position	varchar(200)	utf8_general_ci		No	None			Change Drop Primary Unique Index Spatia
7	department	varchar(200)	utf8_general_ci		No	None			Change Drop Primary Unique Index Spatia
8	depart_code	int(11)			No	None			Change Drop Primary Unique Index Spatia
9	qualifications	varchar(200)	utf8_general_ci		No	None			Change Drop Primary Unique Index Spatia
10	salary	int(100)			No	None			Change Drop Primary Unique Index Spatia

Figure 2 The data we store about every employee (Structure of employee table).

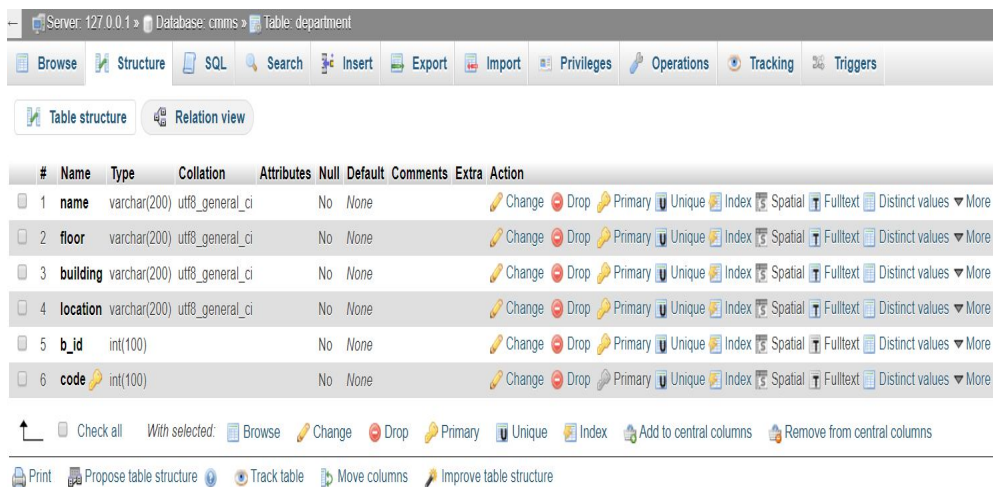
## 2. DEPARTMENT

This table we keep the information about each department including the biomedical engineering department , we have chosen OR,IP,ICU,OP,CSSD,LAB,ANESTHESIOLOGY ,OTOLARYNGOLOGY ,ORTHOPEDICS and UROLOGY departments to search and fill equipment data related to these department but mostly we will focus on the first three departments mentioned later on. We are assuming the hospital has 2 branches, each branch has only 1 building constructed of 4 floors



	name	floor	building	location	b_id	code
	ICU	4	1	1st branch	1	100
	ICU	3	1	1st branch	2	101
	ICU	3	1	2nd branch	1	102
	OP	1	1	1st branch	1	150
	OP	1	1	2nd branch	1	151
	biomedical engineering	P1	1	1st branch	1	160
	biomedical engineering	P1	1	2nd branch	1	161
	IP	2	1	1st branch	1	250
	IP	2	1	2nd branch	1	251
	OR	3	1	1st branch	1	450
	OR	3	1	2nd branch	1	451
	Anesthesiology	3	1	1st branch	1	500
	Anesthesiology	3	1	2nd branch	1	501
	CSSD	P1	1	1st branch	1	600
	CSSD	P1	1	2nd branch	1	601

Figure 3 Department table.



#	Name	Type	Collation	Attributes	Null	Default	Comments	Extra	Action
1	name	varchar(200)	utf8_general_ci		No	None			Change Drop Primary Unique Index Spatial Fulltext Distinct values More
2	floor	varchar(200)	utf8_general_ci		No	None			Change Drop Primary Unique Index Spatial Fulltext Distinct values More
3	building	varchar(200)	utf8_general_ci		No	None			Change Drop Primary Unique Index Spatial Fulltext Distinct values More
4	location	varchar(200)	utf8_general_ci		No	None			Change Drop Primary Unique Index Spatial Fulltext Distinct values More
5	b_id	int(100)			No	None			Change Drop Primary Unique Index Spatial Fulltext Distinct values More
6	code	int(100)			No	None			Change Drop Primary Unique Index Spatial Fulltext Distinct values More

Figure 4 The data stored about each department in our departments (Structure of department table).

### 3. EQUIPMENT

Now let's dive deep into the largest table of our database which Has 360 row, each equipment has to be entered into a specific department using the department code. Since each equipment has a unique serial number so it is the primary key for the equipment ,but we mostly will use the equipment id which is also unique for the equipment but is easier to understand and the formula is given by the hospital and all the equipment must be entered on the same way .

department	dep_code	nomenclature	serial_no	id	model	manufacturer	contact_manufacturer	local_agent	contact_ag
PATIENT-BED	250	PATIENT-BED	01508B0	M01BED-IP	EUCLIDE45	ANTANTO	NULL	Alcan medical	NULL
PATIENT-BED	250	PATIENT-BED	01558B5	M02BED-IP	EUCLIDE45	ANTANTO	NULL	Alcan medical	NULL
PATIENT-BED	250	PATIENT-BED	01608B10	M03BED-IP	EUCLIDE45	ANTANTO	NULL	Alcan medical	NULL
PATIENT-BED	250	PATIENT-BED	01658B15	M04BED-IP	EUCLIDE45	ANTANTO	NULL	Alcan medical	NULL
PATIENT-BED	250	PATIENT-BED	01708B20	M05BED-IP	EUCLIDE45	ANTANTO	NULL	Alcan medical	NULL
PATIENT-BED	250	PATIENT-BED	01758B25	M06BED-IP	EUCLIDE45	ANTANTO	NULL	Alcan medical	NULL
PATIENT-BED	250	PATIENT-BED	01808B30	M07BED-IP	EUCLIDE45	ANTANTO	NULL	Alcan medical	NULL
PATIENT-BED	250	PATIENT-BED	01858B35	M08BED-IP	EUCLIDE45	ANTANTO	NULL	Alcan medical	NULL
PATIENT-BED	250	PATIENT-BED	01908B40	M09BED-IP	EUCLIDE45	ANTANTO	NULL	Alcan medical	NULL
PATIENT-BED	250	PATIENT-BED	01958B45	M10BED-IP	EUCLIDE45	ANTANTO	NULL	Alcan medical	NULL
ULTRASOUND-UNIT	100	ULTRASOUND-UNIT	050415VS1N	M01ULTRASOUND-ICU	EPIQ-5	PHILIPS	NULL	ELFATH	NULL
ULTRASOUND-UNIT	100	ULTRASOUND-UNIT	050415VS2N	M02ULTRASOUND-ICU	EPIQ-5	PHILIPS	NULL	ELFATH	NULL
ULTRASOUND-UNIT	101	ULTRASOUND-UNIT	050415VS3N	M03ULTRASOUND-ICU	EPIQ-5	PHILIPS	NULL	ELFATH	NULL
ULTRASOUND-UNIT	101	ULTRASOUND-UNIT	050415VS4N	M04ULTRASOUND-ICU	EPIQ-5	PHILIPS	NULL	ELFATH	NULL

Figure 5 All the equipment we have in each department (Equipment table).

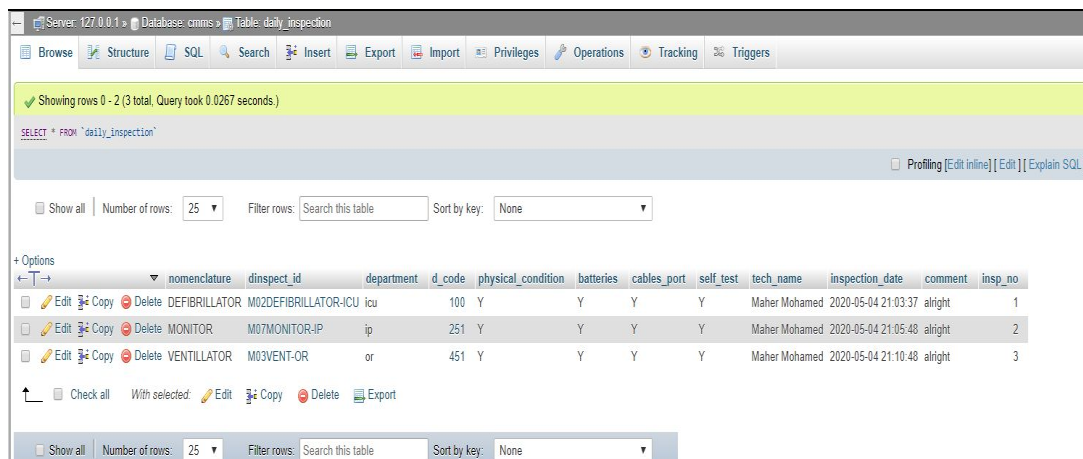
#	Name	Type	Collation	Attributes	Null	Default	Comments	Extra	Action
1	name	varchar(200)	utf8_general_ci		No	None			Change Drop Primary Unique Index Spatia
2	national_id	bigint(200)			No	None			Change Drop Primary Unique Index Spatia
3	email	varchar(200)	utf8_general_ci		No	None			Change Drop Primary Unique Index Spatia
4	mobile_no	int(100)			No	None			Change Drop Primary Unique Index Spatia
5	role	varchar(200)	utf8_general_ci		No	None			Change Drop Primary Unique Index Spatia
6	position	varchar(200)	utf8_general_ci		No	None			Change Drop Primary Unique Index Spatia
7	department	varchar(200)	utf8_general_ci		No	None			Change Drop Primary Unique Index Spatia
8	depart_code	int(11)			No	None			Change Drop Primary Unique Index Spatia
9	qualifications	varchar(200)	utf8_general_ci		No	None			Change Drop Primary Unique Index Spatia
10	salary	int(100)			No	None			Change Drop Primary Unique Index Spatia

Figure 6 The data we store about each equipment (Structure of equipment table).



## 4. DAILY INSPECTION

To maintain the safety of the equipment we have made a general daily pass for the equipment which checks on the physical condition, batteries, cables or ports or both and run a self-test. These procedures are very important to keep the equipment clean and safe and there's always an update of the condition to the user.



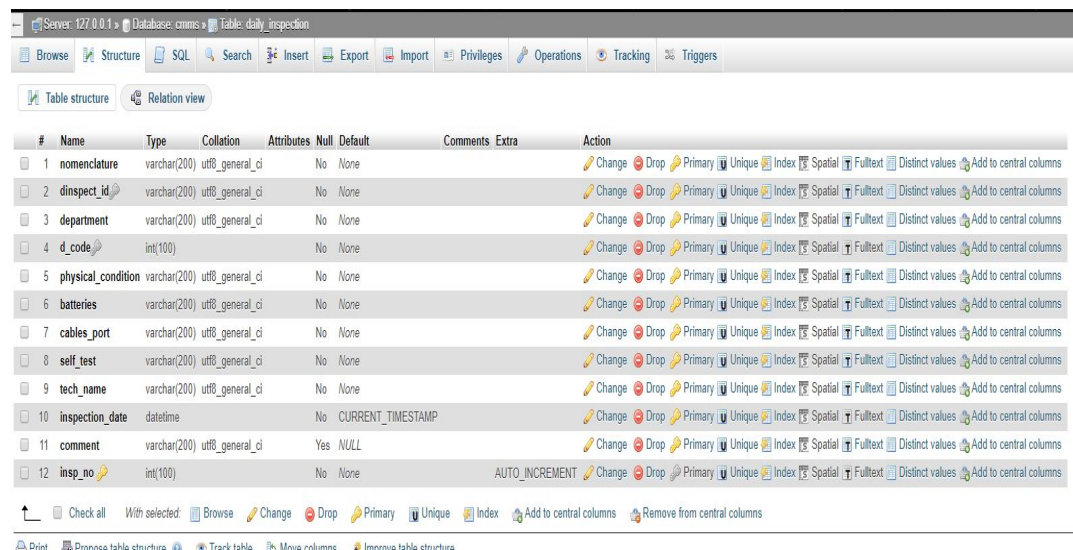
Showing rows 0 - 2 (3 total. Query took 0.0267 seconds)

```
SELECT * FROM 'daily_inspection'
```

Number of rows: 25 Filter rows: Search this table Sort by key: None

	nomenclature	dinspect_id	department	d_code	physical_condition	batteries	cables_port	self_test	tech_name	inspection_date	comment	insp_no
1	DEFIBRILLATOR	M02DEFIBRILLATOR-ICU	icu	100	Y	Y	Y	Y	Maher Mohamed	2020-05-04 21:03:37	alright	1
2	MONITOR	M07MONITOR-IP	ip	251	Y	Y	Y	Y	Maher Mohamed	2020-05-04 21:05:48	alright	2
3	VENTILATOR	M03VENT-OR	or	451	Y	Y	Y	Y	Maher Mohamed	2020-05-04 21:10:48	alright	3

Figure 7 Daily Inspection Table



#	Name	Type	Collation	Attributes	Null	Default	Comments	Extra	Action
1	nomenclature	varchar(200)	utf8_general_ci		No	None			Change Drop Primary Unique Index Spatial Fulltext Distinct values Add to central columns
2	dinspect_id	varchar(200)	utf8_general_ci		No	None			Change Drop Primary Unique Index Spatial Fulltext Distinct values Add to central columns
3	department	varchar(200)	utf8_general_ci		No	None			Change Drop Primary Unique Index Spatial Fulltext Distinct values Add to central columns
4	d_code	int(100)			No	None			Change Drop Primary Unique Index Spatial Fulltext Distinct values Add to central columns
5	physical_condition	varchar(200)	utf8_general_ci		No	None			Change Drop Primary Unique Index Spatial Fulltext Distinct values Add to central columns
6	batteries	varchar(200)	utf8_general_ci		No	None			Change Drop Primary Unique Index Spatial Fulltext Distinct values Add to central columns
7	cables_port	varchar(200)	utf8_general_ci		No	None			Change Drop Primary Unique Index Spatial Fulltext Distinct values Add to central columns
8	self_test	varchar(200)	utf8_general_ci		No	None			Change Drop Primary Unique Index Spatial Fulltext Distinct values Add to central columns
9	tech_name	varchar(200)	utf8_general_ci		No	None			Change Drop Primary Unique Index Spatial Fulltext Distinct values Add to central columns
10	inspection_date	datetime			No	CURRENT_TIMESTAMP			Change Drop Primary Unique Index Spatial Fulltext Distinct values Add to central columns
11	comment	varchar(200)	utf8_general_ci		Yes	NULL			Change Drop Primary Unique Index Spatial Fulltext Distinct values Add to central columns
12	insp_no	int(100)			No			AUTO_INCREMENT	Change Drop Primary Unique Index Spatial Fulltext Distinct values Add to central columns

Figure 8 The structure of each daily inspection table.



## 5. REPORTS

This table is the heart of CMMS work, whenever a defect or a problem happens with the device one of the biomedical engineering staff must file a report and describe the problem and give an update if the problem is solved or not.

Showing rows 0 - 2 (3 total. Query took 0.0018 seconds)

SELECT \* FROM 'reports'

Number of rows: 25 Filter rows: Search this table Sort by key: None

	department	de_code	equip_name	manufacturer	model	fault_date	priority	fault_description	job_no	tech_name	action_taken	solved	end_date	report_id
		451	VENTILATOR	ACM	ACM812A	2020-05-06 00:39:10	4	leakage of oxygen	2036	mohamed ahmed	called company	no	NULL	M02VENT-OR
		250	MONITOR	TOPNTH	12 INCH	2020-05-06 00:42:35	3	screen damage	2037	mohamed ahmed	pushed the screen into place and it works fine	yes	2020-05-06 00:00:00	M02MONITOR-IP
		102	INFUSION-PUMP	UTTS-Healthcare	UT600II	2020-05-06 00:49:28	4	occlusion damage	2038	mohamed ahmed	changed tubes reconnected circuit still there was...	yes	2020-05-09 00:00:00	M07INFUSIONPUMP-ICU

Query results operations

Figure 9 Report table.

#	Name	Type	Collation	Attributes	Null	Default	Comments	Extra	Action
1	department	varchar(200)	utf8_general_ci		No	None			Change Drop Primary Unique Index Spatial Fulltext Distinct values Add to central columns
2	de_code	int(100)			No	None			Change Drop Primary Unique Index Spatial Fulltext Distinct values Add to central columns
3	equip_name	varchar(200)	utf8_general_ci		No	None			Change Drop Primary Unique Index Spatial Fulltext Distinct values Add to central columns
4	manufacturer	varchar(200)	utf8_general_ci		No	None			Change Drop Primary Unique Index Spatial Fulltext Distinct values Add to central columns
5	model	varchar(200)	utf8_general_ci		No	None			Change Drop Primary Unique Index Spatial Fulltext Distinct values Add to central columns
6	fault_date	datetime			No	CURRENT_TIMESTAMP			Change Drop Primary Unique Index Spatial Fulltext Distinct values Add to central columns
7	priority	int(100)			No	None			Change Drop Primary Unique Index Spatial Fulltext Distinct values Add to central columns
8	fault_description	varchar(200)	utf8_general_ci		No	None			Change Drop Primary Unique Index Spatial Fulltext Distinct values Add to central columns
9	job_no	int(100)			No	None	AUTO_INCREMENT		Change Drop Primary Unique Index Spatial Fulltext Distinct values Add to central columns
10	tech_name	varchar(200)	utf8_general_ci		No	None			Change Drop Primary Unique Index Spatial Fulltext Distinct values Add to central columns
11	action_taken	varchar(200)	utf8_general_ci		No	None			Change Drop Primary Unique Index Spatial Fulltext Distinct values Add to central columns
12	solved	varchar(200)	utf8_general_ci		No	None			Change Drop Primary Unique Index Spatial Fulltext Distinct values Add to central columns
13	end_date	datetime			Yes	NULL			Change Drop Primary Unique Index Spatial Fulltext Distinct values Add to central columns
14	report_id	varchar(200)	utf8_general_ci		No	None			Change Drop Primary Unique Index Spatial Fulltext Distinct values Add to central columns

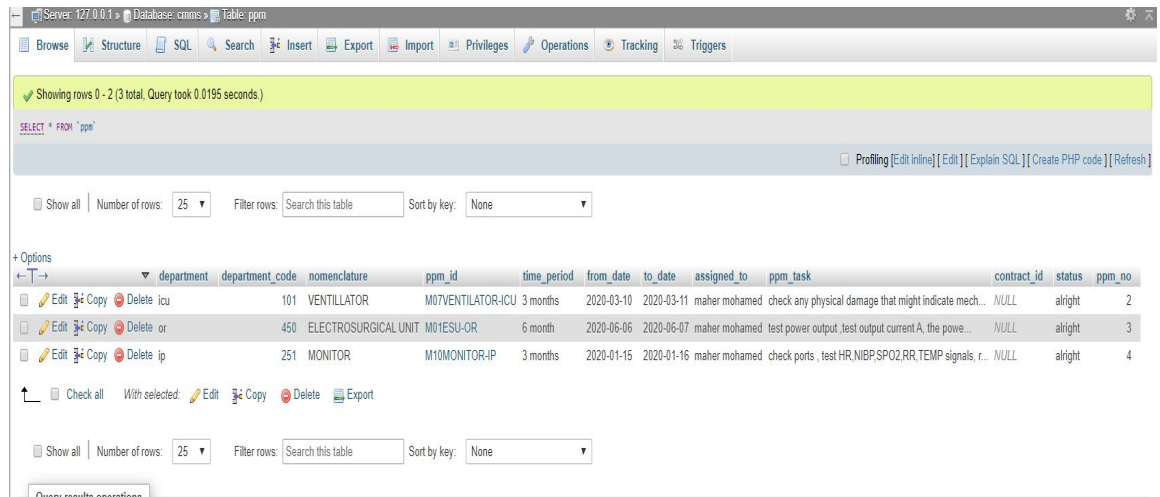
Check all With selected: Browse Change Drop Primary Unique Index Add to central columns Remove from central columns

Print Propose table structure Track table Move columns Improve table structure

Figure 10 Structure of each report table

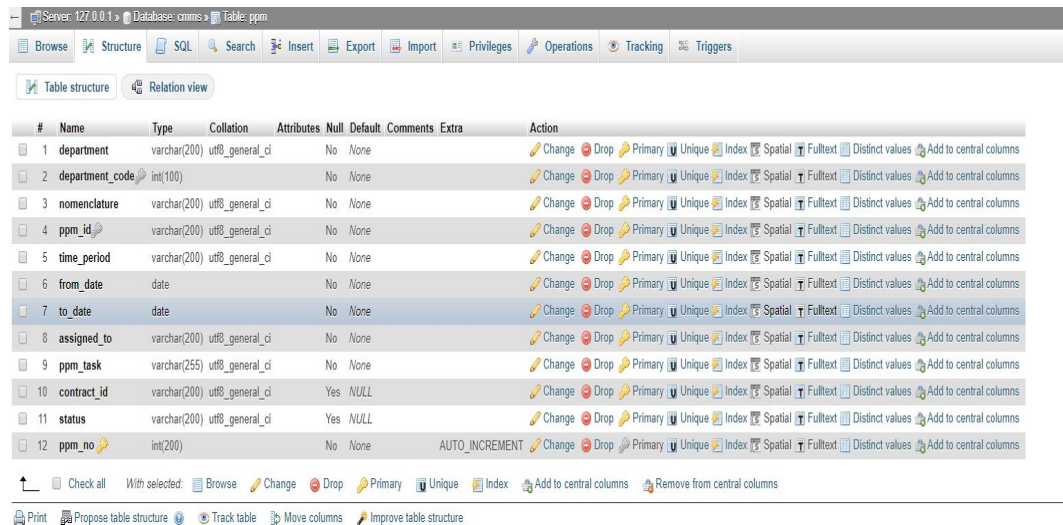
## 6. PPM

Planned preventive maintenance is very important for the equipment to keep a scheduled check and maintenance on the device. Some equipment have their ppm every 3 month and others each 6 month so it may vary from an equipment to another depending on the equipment, manufacturer recommendation and how vital and frequently used this equipment is.



department	department_code	nomenclature	ppm_id	time_period	from_date	to_date	assigned_to	ppm_task	contract_id	status	ppm_no
icu	101	VENTILATOR	M07VENTILATOR-ICU	3 months	2020-03-10	2020-03-11	maher mohamed	check any physical damage that might indicate mech...	NULL	alright	2
or	450	ELECTROSURGICAL UNIT M01ESU-OR		6 month	2020-06-06	2020-06-07	maher mohamed	test power output, test output current(A, the powe...	NULL	alright	3
ip	251	MONITOR	M10MONITOR-IP	3 months	2020-01-15	2020-01-16	maher mohamed	check ports, test HR,NIBP,SPO2,RR,TEMP signals, r...	NULL	alright	4

Figure 11 PPM table.

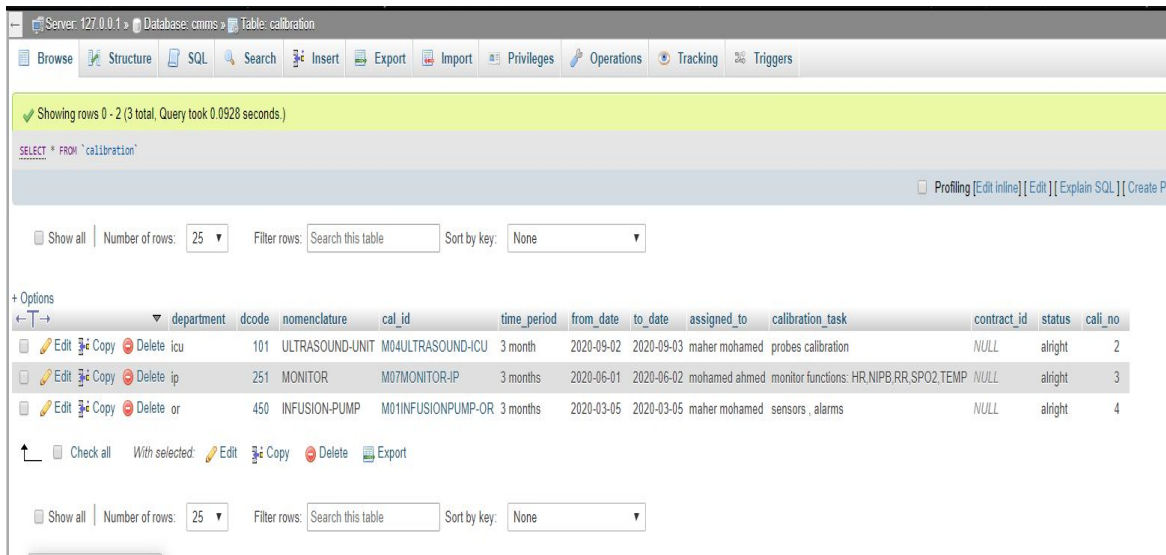


#	Name	Type	Collation	Attributes	Null	Default	Comments	Extra	Action
1	department	varchar(200)	utf8_general_ci		No	None			Change Drop Primary Unique Index Spatial Fulltext Distinct values Add to central columns
2	department_code	int(100)			No	None			Change Drop Primary Unique Index Spatial Fulltext Distinct values Add to central columns
3	nomenclature	varchar(200)	utf8_general_ci		No	None			Change Drop Primary Unique Index Spatial Fulltext Distinct values Add to central columns
4	ppm_id	varchar(200)	utf8_general_ci		No	None			Change Drop Primary Unique Index Spatial Fulltext Distinct values Add to central columns
5	time_period	varchar(200)	utf8_general_ci		No	None			Change Drop Primary Unique Index Spatial Fulltext Distinct values Add to central columns
6	from_date	date			No	None			Change Drop Primary Unique Index Spatial Fulltext Distinct values Add to central columns
7	to_date	date			No	None			Change Drop Primary Unique Index Spatial Fulltext Distinct values Add to central columns
8	assigned_to	varchar(200)	utf8_general_ci		No	None			Change Drop Primary Unique Index Spatial Fulltext Distinct values Add to central columns
9	ppm_task	varchar(255)	utf8_general_ci		No	None			Change Drop Primary Unique Index Spatial Fulltext Distinct values Add to central columns
10	contract_id	varchar(200)	utf8_general_ci		Yes	NULL			Change Drop Primary Unique Index Spatial Fulltext Distinct values Add to central columns
11	status	varchar(200)	utf8_general_ci		Yes	NULL			Change Drop Primary Unique Index Spatial Fulltext Distinct values Add to central columns
12	ppm_no	int(200)			No	None		AUTO_INCREMENT	Change Drop Primary Unique Index Spatial Fulltext Distinct values Add to central columns

Figure 12 Structure of each PPM table.

## 7. CALIBRATION

There's no device that won't need a calibration so this is also a very important table to maintain the safety and accuracy of the equipment. The calibration is also scheduled to maintain the lifetime of the equipment as long as we can.



Showing rows 0 - 2 (3 total. Query took 0.0928 seconds.)

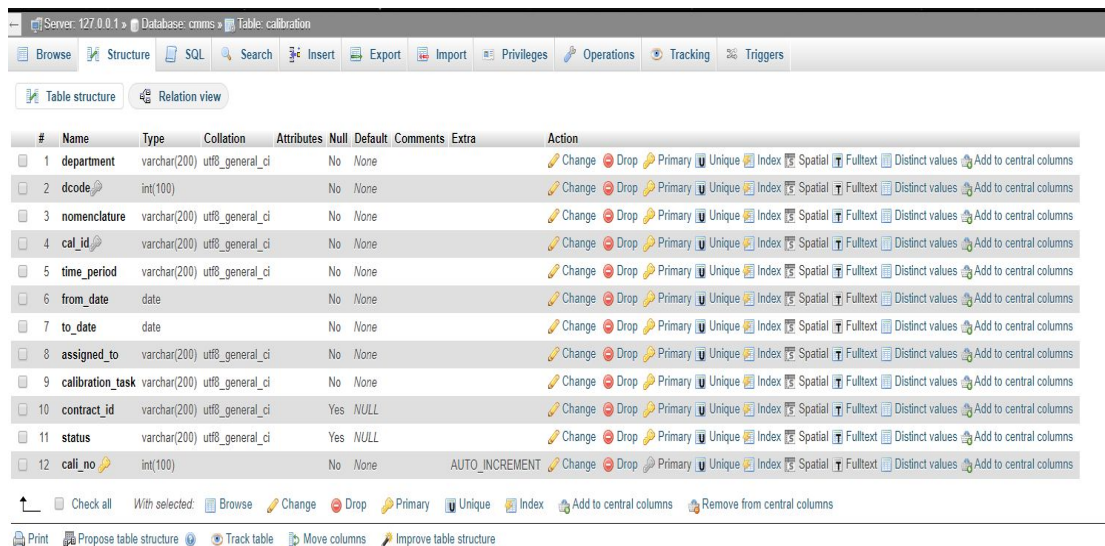
SELECT \* FROM "calibration"

Number of rows: 25 Filter rows: Search this table Sort by key: None

	department	dcode	nomenclature	cal_id	time_period	from_date	to_date	assigned_to	calibration_task	contract_id	status	cali_no
	icu	101	ULTRASOUND-UNIT	M04ULTRASOUND-ICU	3 month	2020-09-02	2020-09-03	maher mohamed	probes calibration	NULL	alright	2
	ip	251	MONITOR	M07MONITOR-IP	3 months	2020-06-01	2020-06-02	mohamed ahmed	monitor functions: HR,NIPB,RR,SPO2,TEMP	NULL	alright	3
	or	450	INFUSION-PUMP	M01INFUSIONPUMP-OR	3 months	2020-03-05	2020-03-05	maher mohamed	sensors , alarms	NULL	alright	4

Number of rows: 25 Filter rows: Search this table Sort by key: None

Figure 13 Calibration Table.



#	Name	Type	Collation	Attributes	Null	Default	Comments	Extra	Action
1	department	varchar(200)	utf8_general_ci		No	None			Change Drop Primary Unique Index Spatial Fulltext Distinct values Add to central columns
2	dcode	int(100)			No	None			Change Drop Primary Unique Index Spatial Fulltext Distinct values Add to central columns
3	nomenclature	varchar(200)	utf8_general_ci		No	None			Change Drop Primary Unique Index Spatial Fulltext Distinct values Add to central columns
4	cal_id	varchar(200)	utf8_general_ci		No	None			Change Drop Primary Unique Index Spatial Fulltext Distinct values Add to central columns
5	time_period	varchar(200)	utf8_general_ci		No	None			Change Drop Primary Unique Index Spatial Fulltext Distinct values Add to central columns
6	from_date	date			No	None			Change Drop Primary Unique Index Spatial Fulltext Distinct values Add to central columns
7	to_date	date			No	None			Change Drop Primary Unique Index Spatial Fulltext Distinct values Add to central columns
8	assigned_to	varchar(200)	utf8_general_ci		No	None			Change Drop Primary Unique Index Spatial Fulltext Distinct values Add to central columns
9	calibration_task	varchar(200)	utf8_general_ci		No	None			Change Drop Primary Unique Index Spatial Fulltext Distinct values Add to central columns
10	contract_id	varchar(200)	utf8_general_ci		Yes	NULL			Change Drop Primary Unique Index Spatial Fulltext Distinct values Add to central columns
11	status	varchar(200)	utf8_general_ci		Yes	NULL			Change Drop Primary Unique Index Spatial Fulltext Distinct values Add to central columns
12	cali_no	int(100)			No	None		AUTO_INCREMENT	Change Drop Primary Unique Index Spatial Fulltext Distinct values Add to central columns

Figure 14 Structure of each Calibration table.

## 8. SCRAP

At the end of the equipment journey it will be scrapped , so in this table we insert the device and delete all of its saved info on our database after the deletion date which is probably after years and the reason of this is that the device data might be very useful in many other concerns ,for example : buying a new device and comparing specifications and prices ,legal issues ,...etc.

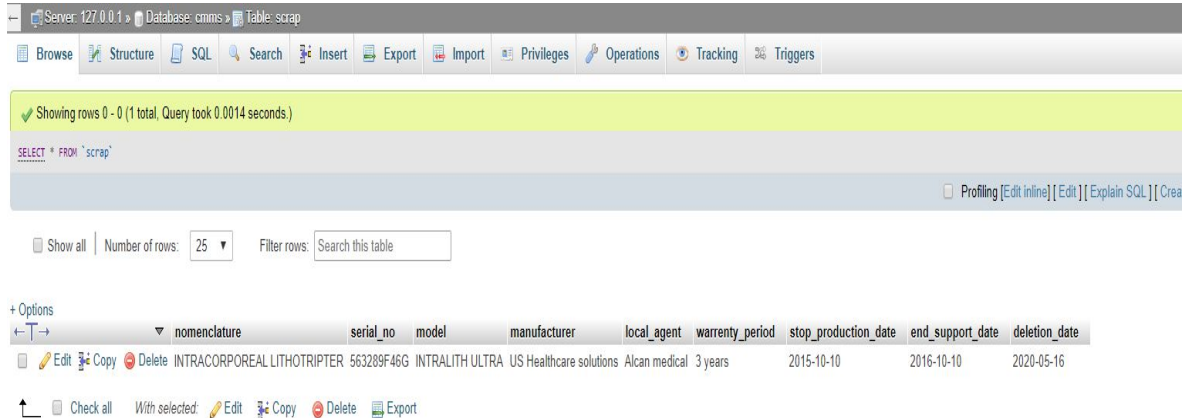


Figure 15 Scrap table.

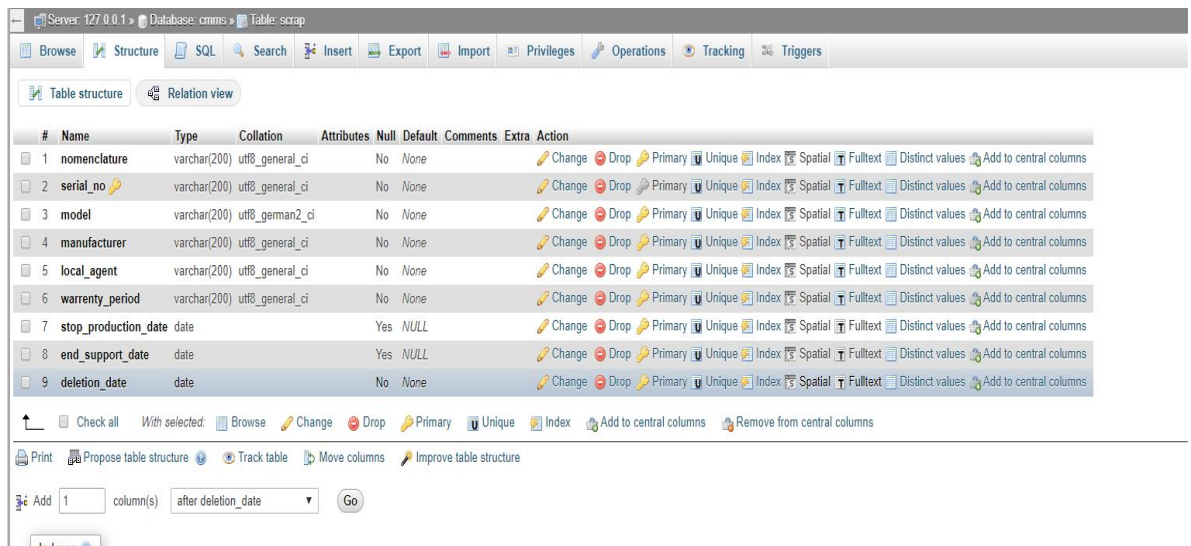


Figure 16 The structure of each scrap table



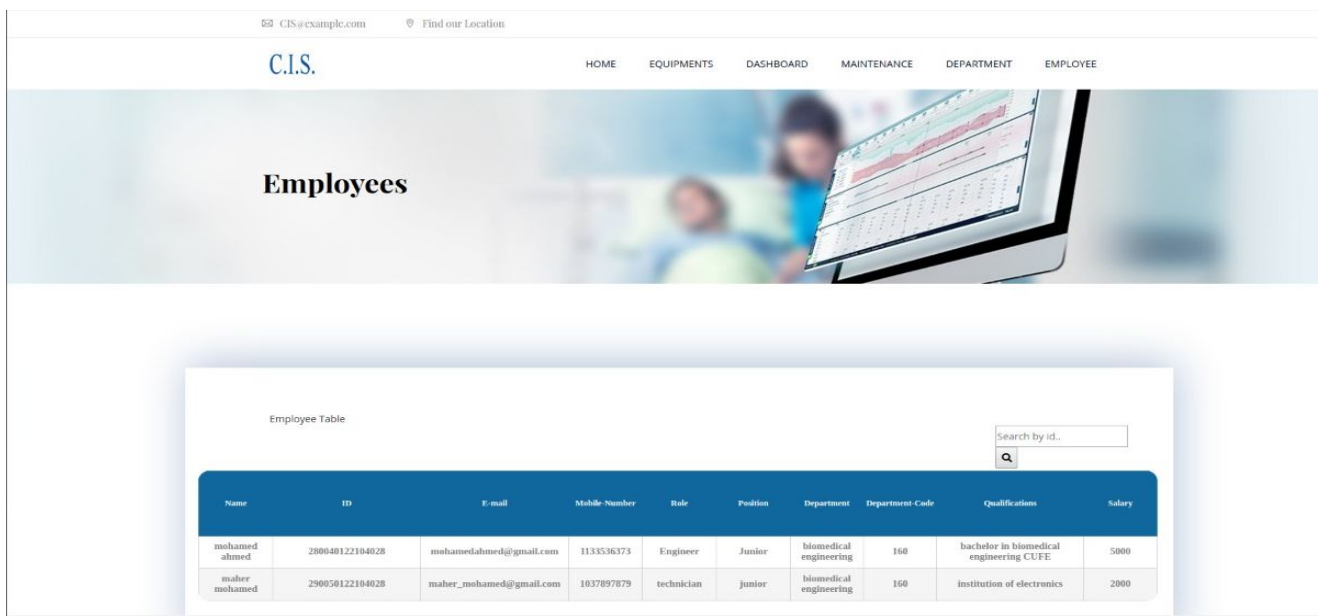
## Sequence to run the project.

1. By using WebStorm application, run the index file until a message in terminal “Listening on port 2000...” is shown and change the port if it is busy in the index file.
2. Go to google chrome or any browser and write “localhost:2000”.
3. The login page will be accessed, by using this username and password our system will be accessed.
  - username: YoussefMohamed
  - password: YouMo1998
4. The home page will be displayed, you can choose any of the features we have from the navbar.
5. By choosing add (to insert a new data for employee, equipment or department). You can choose this feature.
6. To display the data, you can choose to view the tables/reports we’ve.
7. To show the data for all the system, you can go to the dashboard page.

## Results.

We took many screenshots to the tables we’ve in our CMMS.

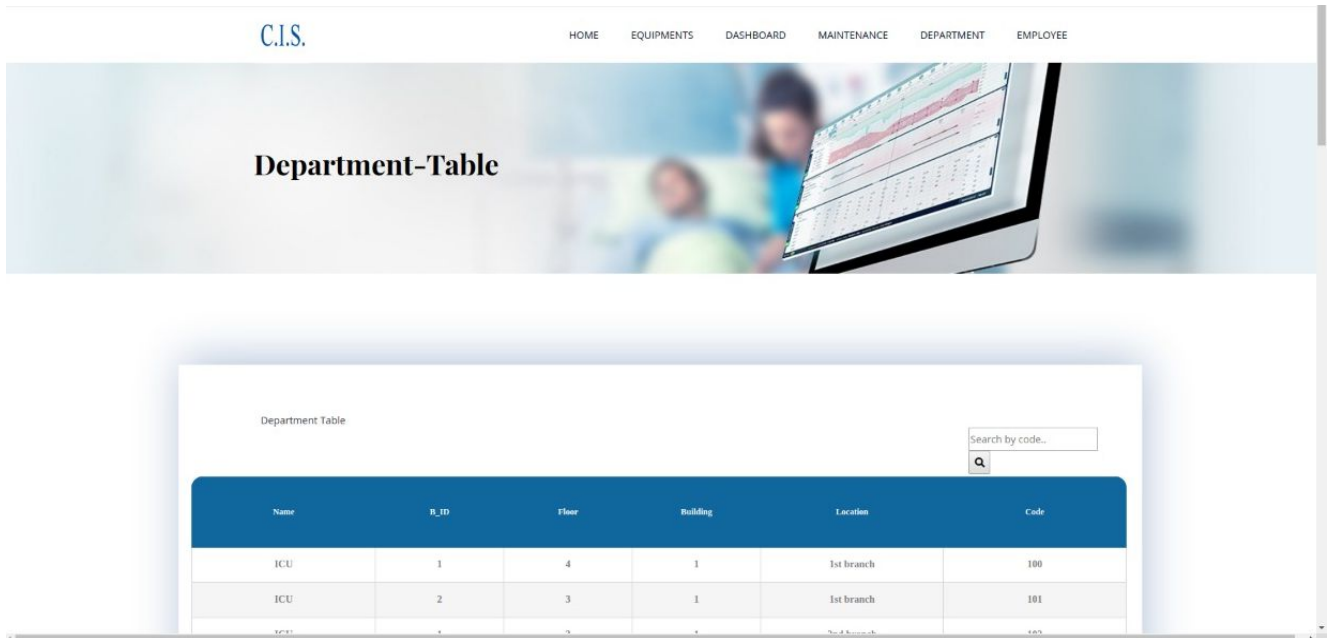
### 1. EMPLOYEE TABLE.



Name	ID	E-mail	Mobile Number	Role	Position	Department	Department Code	Qualifications	Salary
mohamed ahmed	280040122104028	mohamedahmed@gmail.com	1133536373	Engineer	Junior	biomedical engineering	160	bachelor in biomedical engineering CUFE	5000
maher mohamed	290050122104028	maher_mohamed@gmail.com	1037897879	technician	junior	biomedical engineering	160	institution of electronics	2000

Figure 17 The data of employees is shown here.

## 2. DEPARTMENT TABLE.



C.I.S. HOME EQUIPMENTS DASHBOARD MAINTENANCE DEPARTMENT EMPLOYEE

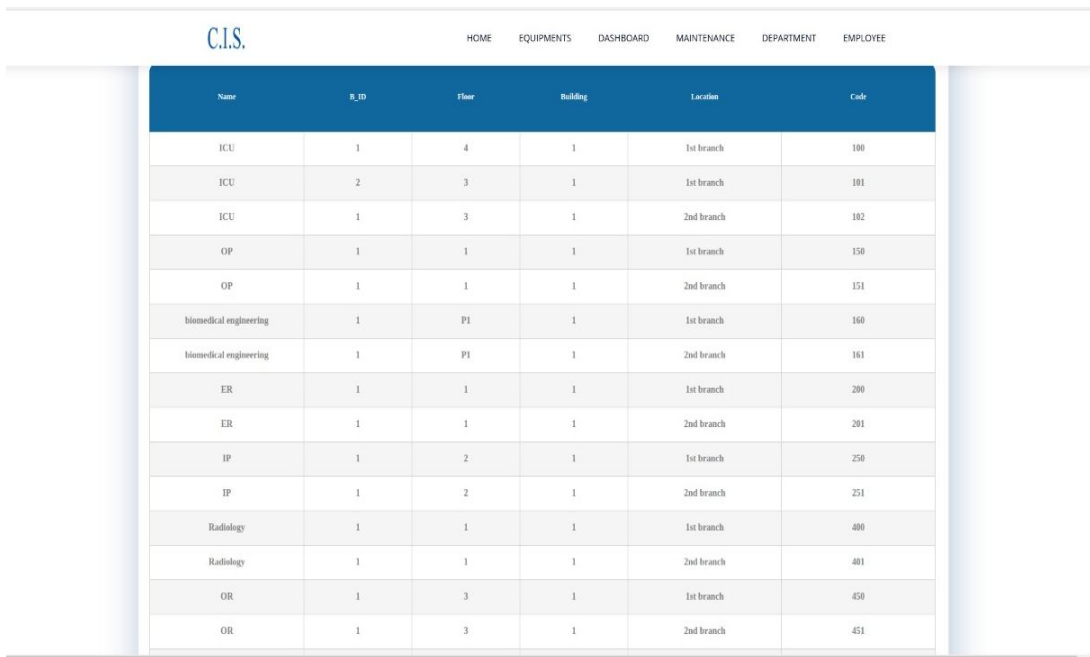
### Department-Table

Department Table

Search by code...

Name	B_ID	Floor	Building	Location	Code
ICU	1	4	1	1st branch	100
ICU	2	3	1	1st branch	101
ICU	1	3	1	2nd branch	102

Figure 18 A. The data of each department.



C.I.S. HOME EQUIPMENTS DASHBOARD MAINTENANCE DEPARTMENT EMPLOYEE

Name	B_ID	Floor	Building	Location	Code
ICU	1	4	1	1st branch	100
ICU	2	3	1	1st branch	101
ICU	1	3	1	2nd branch	102
OP	1	1	1	1st branch	150
OP	1	1	1	2nd branch	151
biomedical engineering	1	P1	1	1st branch	160
biomedical engineering	1	P1	1	2nd branch	161
ER	1	1	1	1st branch	200
ER	1	1	1	2nd branch	201
IP	1	2	1	1st branch	250
IP	1	2	1	2nd branch	251
Radiology	1	1	1	1st branch	400
Radiology	1	1	1	2nd branch	401
OR	1	3	1	1st branch	450
OR	1	3	1	2nd branch	451

Figure 19 B. The data of each department

### 3. EQUIPMENT TABLE.

Equipment Table 1 2 3 4

Name/Structure	ID	Department	Department Code	Serial Number	Model	Manufacture	Manufacturer Contact	Local Agent	Agent Contact	Condition Code	Price	Installation Data	Warranty Period	Maintenance Agreement
PATIENT-BED	M01BED-IP	IP	250	0150BB0	EUCLIDE45	ANTANTO	NULL	Alcan Medical	NULL	A	12000	Sat Apr 15 2017 00:00:00 GMT+0200 (Eastern European Standard Time)	Wed Apr 15 2020 00:00:00 GMT+0200 (Eastern European Standard Time)	N
PATIENT-BED	M02BED-IP	IP	250	0155BB5	EUCLIDE45	ANTANTO	NULL	Alcan Medical	NULL	A	12000	Sat Apr 15 2017 00:00:00 GMT+0200 (Eastern European Standard Time)	Wed Apr 15 2020 00:00:00 GMT+0200 (Eastern European Standard Time)	N

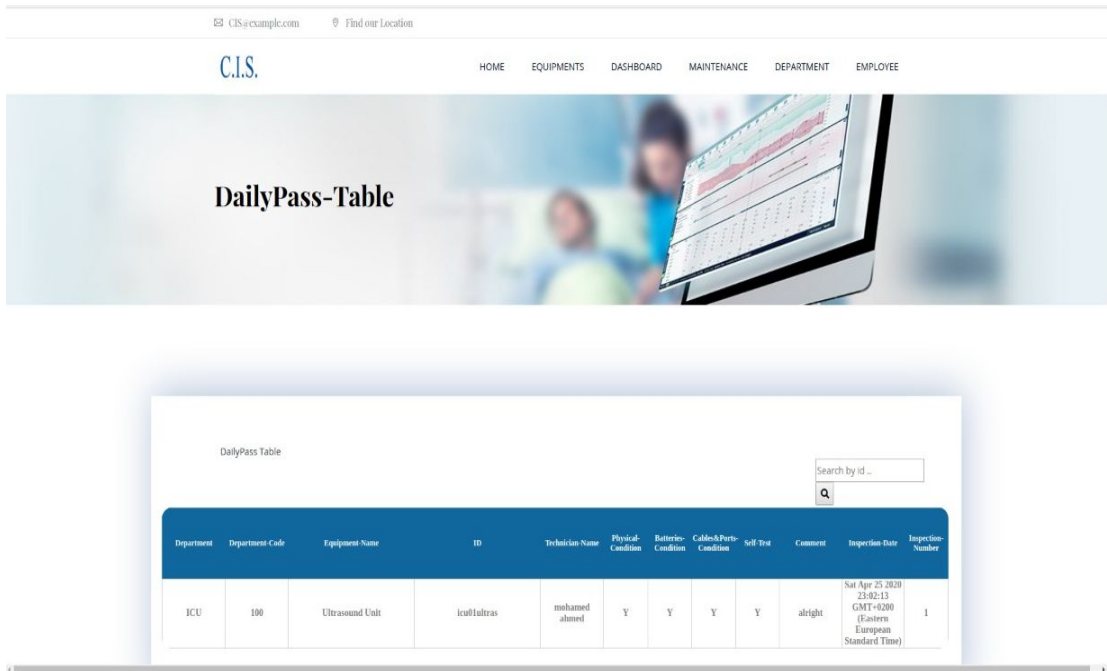
Figure 20 A. The data for each equipment.

Name/Structure	ID	Department	Department Code	Serial Number	Model	Manufacture	Manufacturer Contact	Local Agent	Agent Contact	Condition Code	Price	Installation Data	Warranty Period	Maintenance Agreement
PATIENT-BED	M04BED-IP	IP	250	0165BB15	EUCLIDE45	ANTANTO	NULL	Alcan Medical	NULL	A	12000	Sat Apr 15 2017 00:00:00 GMT+0200 (Eastern European Standard Time)	Wed Apr 15 2020 00:00:00 GMT+0200 (Eastern European Standard Time)	N
Patient-BED	M05BED-IP	IP	250	0170BB20	EUCLIDE45	ANTANTO	NULL	Alcan Medical	NULL	A	12000	Sat Apr 15 2017 00:00:00 GMT+0200 (Eastern European Standard Time)	Wed Apr 15 2020 00:00:00 GMT+0200 (Eastern European Standard Time)	N
PATIENT-BED	M06BED-IP	IP	250	0175BB25	EUCLIDE45	ANTANTO	NULL	Alcan Medical	NULL	A	12000	Sat Apr 15 2017 00:00:00 GMT+0200 (Eastern European Standard Time)	Wed Apr 15 2020 00:00:00 GMT+0200 (Eastern European Standard Time)	N
PATIENT-BED	M07BED-IP	IP	250	0180BB30	EUCLIDE45	ANTANTO	NULL	Alcan Medical	NULL	A	12000	Sat Apr 15 2017 00:00:00 GMT+0200 (Eastern European Standard Time)	Wed Apr 15 2020 00:00:00 GMT+0200 (Eastern European Standard Time)	N
PATIENT-BED	M08BED-IP	IP	250	0185BB35	EUCLIDE45	ANTANTO	NULL	Alcan Medical	NULL	A	12000	Sat Apr 15 2017 00:00:00 GMT+0200 (Eastern European Standard Time)	Wed Apr 15 2020 00:00:00 GMT+0200 (Eastern European Standard Time)	N
PATIENT-BED	M09BED-IP	IP	250	0190BB40	EUCLIDE45	ANTANTO	NULL	Alcan Medical	NULL	A	12000	Sat Apr 15 2017 00:00:00 GMT+0200 (Eastern European Standard Time)	Wed Apr 15 2020 00:00:00 GMT+0200 (Eastern European Standard Time)	N
PATIENT-BED	M10BED-IP	IP	250	0195BB45	EUCLIDE45	ANTANTO	NULL	Alcan Medical	NULL	A	12000	Sat Apr 15 2017 00:00:00 GMT+0200 (Eastern European Standard Time)	Wed Apr 15 2020 00:00:00 GMT+0200 (Eastern European Standard Time)	N
ULTRASOUND-UNIT	M01ULTRASOUND-ICU	ICU	100	050415VS1N	EPIQ-5	PHILIPS		ELFATH		A	250000	Sun Jul 14 2019 00:00:00 GMT+0200 (Eastern European Standard Time)		Y
ULTRASOUND-UNIT	M02ULTRASOUND-ICU	ICU	100	050415VS2N	EPIQ-5	PHILIPS		ELFATH		A	250000	Sun Jul 14 2019 00:00:00 GMT+0200 (Eastern European Standard Time)		Y

Figure 21 B. The data for each equipment.



#### 4. DAILY INSPECTION TABLE.



The screenshot shows a web application interface for 'C.I.S.' with a navigation bar containing links: HOME, EQUIPMENTS, DASHBOARD, MAINTENANCE, DEPARTMENT, and EMPLOYEE. The main heading is 'DailyPass-Table'. Below it, a table titled 'Daily Table' is displayed with a search bar 'Search by id...' and a magnifying glass icon. The table has the following columns: Department, Department Code, Equipment Name, ID, Technician Name, Physical Condition, Battery Condition, Cable/Port Condition, Self Test, Comment, Inspection Date, and Inspection Number. A single data row is shown for an Ultrasound Unit inspected by Mohamed Ahmed on Saturday, April 25, 2020.

Department	Department Code	Equipment Name	ID	Technician Name	Physical Condition	Battery Condition	Cable/Port Condition	Self Test	Comment	Inspection Date	Inspection Number
ICU	100	Ultrasound Unit	icufuturas	mohamed ahmed	Y	Y	Y	Y	abright	Sat Apr 25 2020 23:02:13 GMT+0200 (Eastern European Standard Time)	1

Figure 22 Data stored for each daily inspection.

#### 5. REPORT TABLE.



The screenshot shows the same web application interface as Figure 22, but the main heading is 'Report-Table'. The table titled 'Report Table' has a search bar 'Search by id...' and a magnifying glass icon. The table has the following columns: Department, Department Code, Equipment Name, ID, Manufacturer, Model, Fault Date, Job Number, Priority, Technician Name, Fault Description, Action Taken, Solution, and End Date. A single data row is shown for a Maylayhaga-ICU with a fault reported on Sunday, May 03, 2020.

Department	Department Code	Equipment Name	ID	Manufacturer	Model	Fault Date	Job Number	Priority	Technician Name	Fault Description	Action Taken	Solution	End Date
ICU	100	aylhaga	M01ayhaga-ICU	sdf	erwe	Sun May 03 2020 21:57:05 GMT+0200 (Eastern European Standard Time)	2035	2	sds	dffa	daff	no	Wed May 20 2020 21:55:35 GMT+0200 (Eastern European Standard Time)

Figure 23 Report data displayed in this table.

## 6. PPM TABLE.

Department	Department Code	Nomenclature	ID	Time Period	From-date	To-date	Assigned-To	PPM-Task	PPM-Number	Contract ID	Status
ICU	100	Ultrasound Unit	icu01ultras	0000-00-00	Fri May 10 2019 00:00:00 (Eastern European Standard Time)	Sat May 11 2019 00:00:00 (Eastern European Standard Time)	mohamed ahmed	check prepes , modes cables, port	1		

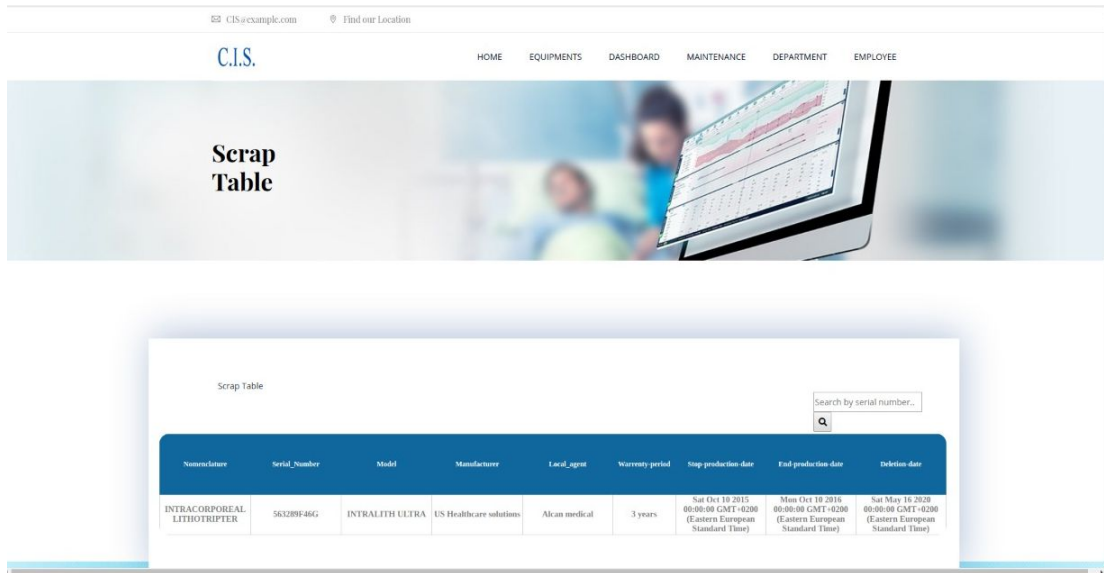
Figure 24 PPM table that displays the data stored.

## 7. CALIBRATION TABLE.

Department	Department Code	Nomenclature	ID	Time Period	From-date	To-date	Assigned-To	Calibration task	Contract ID	Calibration-Number	Status
ICU	100	Ultrasound Unit	icu01ultras	2 days	Thu Apr 02 2020 00:00:00 GMT+0200 (Eastern European Standard Time)	Sat Apr 04 2020 00:00:00 GMT+0200 (Eastern European Standard Time)	mohamed ahmed	prepes defect	389031	1	

Figure 25 Calibration table that displays the data stored.

## 8. SCRAP TABLE.



The screenshot shows a web application interface. At the top, there is a header with the C.I.S. logo and navigation links: HOME, EQUIPMENTS, DASHBOARD, MAINTENANCE, DEPARTMENT, and EMPLOYEE. Below the header is a banner image with the text 'Scrap Table'. The main content area displays a 'Scrap Table' with a search bar labeled 'Search by serial number...' and a magnifying glass icon. The table has the following columns: Nomenclature, Serial\_Number, Model, Manufacture, Local\_agent, Warranty period, Stop production date, End production date, and Deletion date. The table contains one row of data.

Nomenclature	Serial_Number	Model	Manufacture	Local_agent	Warranty period	Stop production date	End production date	Deletion date
INTRACORPOREAL LITHOTRIPTER	56328WF-66G	INTRALITH ULTRA	US Healthcare solutions	Altan medical	3 years	Sat Oct 10 2015 00:00:00 GMT+0200 (Eastern European Standard Time)	Mon Oct 10 2016 00:00:00 GMT+0200 (Eastern European Standard Time)	Sat May 16 2020 00:00:00 GMT+0200 (Eastern European Standard Time)

Figure 26 Scrap table that displays the data stored.