

Team RAD
MIS 533

Final Deliverable

Introduction:

As society grows, it is necessary for the construction industry to grow at the same rate. Basic infrastructure is essential for society, and not everyone has the same opportunity. It is found that 840 million people live more than 2 kilometers from all weather roads, according to WorldBank.org. Additionally, infrastructure can connect supply chains throughout cities. This enables better opportunities for all to have access to basic necessities like employment, healthcare and education. Energy can also be spread to urban and rural areas through new infrastructure. We believe that the standard of infrastructure should be raised globally.

Many construction companies have to use multiple software systems in order to keep track of everything. One system for work schedules, one for product ordering, one for a list of existing projects, etc.

The goal of our database project and our company, RAD Construction, is to streamline the construction industry and allow our company as well as others that want to use our database to make their project management easier. There are many issues that currently plague the industry and with the implementation of our database model we can secure more contracts and in turn boost productivity and profits. One of the biggest issues in the construction industry is competition for contracts/jobs. With a more proactive approach to data collection our company can get the edge over their competitors rather than missing out on countless opportunities by giving a more accurate estimate. This increased accuracy will come from having a better understanding of what parts are needed, what parts they have, where the parts are and who will be there to work. All of this is under one system. Including these database models can also allow construction companies to make predictions on how conditions will change in the future. This can help our company predict the useful life of parts and take more preparative steps to avoid unnecessary expenses down the line. There is also a benefit from the employee perspective. By implementing these databases, companies will better understand their current situation all in one app.

Solutions Review:

Construction Schedules can vary depending on the project, company policies, and client requirements. A typical construction work week consists of 40 hours, but these hours vary based on specific project demands. There are many situations where employees are required to work overtime, night shifts, and even weekends to get the job done in a timely manner. Caminiti Construction Inc., Rost Construction, LLC, and Kiefer - Randall Construction & Remodeling are all major companies with complex work schedules trying to ensure these people arrive on site and on time. With our model we can create a way for workers of RAD construction to know exactly where to be and where all from a single app. Along with this a clock in feature can be

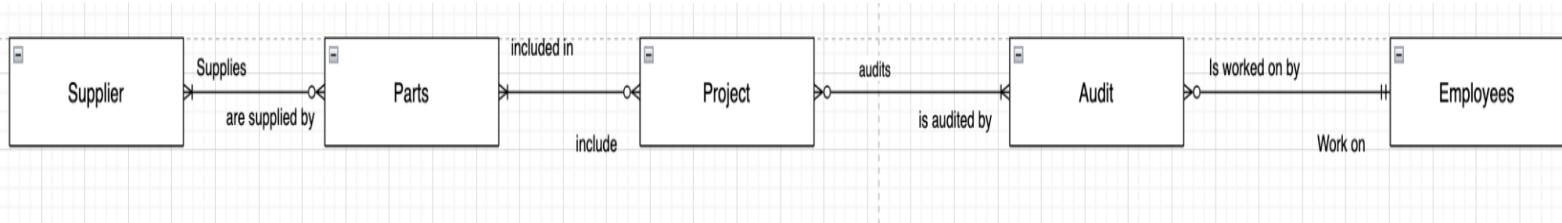
implemented when a worker is on site to ensure they receive full compensation for their work and also ensure they are there from the employers perspective.

The next solution we set to solve was ensuring the correct parts were delivered to the job site and in a timely manner. The basis of this comes to the idea of the supply chain and problems arising in our competitors. The main issues we found across Caminiti Construction Inc., Rost Construction, LLC, and Kiefer - Randall Construction & Remodeling were material shortages and logistical problems delaying the timelines for projects and quality issues. Rad Construction intends to mitigate these issues by using our database. With the project inventory feature, every part will be assigned to a specific site. This way when the parts are being loaded to go on site, no part will be forgotten as they all have been accounted for. Having this key function within our database will allow RAD Construction to complete all of our projects in a timely manner while eliminating material shortages.

The next major solution RAD Construction will be implementing in our database in our Audit Function. When researching the leftover parts of Caminiti Construction Inc., Rost Construction, LLC, and Kiefer - Randall Construction & Remodeling we found that many of their leftover parts were never reused or were returned for partial refund to suppliers. At RAD construction, we see this as an opportunity to put ourselves ahead of these competitors. With our Audit Function, we will be able to have employees inspect our leftover parts and judge the overall quality of these parts. Many times, these parts are left in good condition and can meet the needs of a new project we are starting. With our audit function, we can return these parts back to the project inventory and assign them to a new project. We also have implemented a redistribution function for when there is no specific project for the part at this time. In this case, the part will just be returned to the warehouse and accounted for until we can find use for it. This will allow RAD Construction to see unrealized profits that our competitors are missing out on by not implementing this.

Database Design:

3.1



3.2

Business rules:

- 1) One to many suppliers send parts to the parts inventory
- 2) The parts inventory receives zero to many parts from the suppliers
- 3) Suppliers do not need to ship a part if they are already in the database
- 4) Parts ordered to the supplier go first to parts inventory. Then from parts inventory, parts are distributed to different projects needed.
- 5) A project is worked on by one to many employees
- 6) An employee works on zero to many projects
- 7) An employee does not have to work on a project
- 8) A project has one to many parts in the project inventory
- 9) One to many parts are distributed to the project inventory from the parts inventory
- 10) A project inventory is audited by one auditor
- 11) Auditors audit one to many projects
- 12) An employee completes zero to many audits
- 13) Zero to many parts are redistributed to the parts inventory from zero to many audits

3.3

Supplier is defined as a company that provides our company with necessary parts. The first attribute is Supplier ID. This is a number in the system that identifies a supplier. This is an identifier attribute. The next attribute is supplier name. This is the name of the supplier's company. This is a required attribute. The next attribute is supplier address. This is the address of the supplier's headquarters. This is a required attribute. The next attribute is the supplier phone number. This is the supplier's phone number. This is a required attribute. The last attribute is the supplier email. This is the email address from the supplier. This is a required attribute.

Order is defined as sending parts from a supplier to a parts inventory. The first attribute is Order ID. This is defined as the number in the system that identifies the order. This is a composite identifier attribute. The next attribute is shipment type. This is the classification of priority shipment. This is a required attribute. The next attribute is order date. This is the date that the order is processed. This is a required attribute. The last attribute is cost. This is the total cost of the order. This is a required attribute.

Parts Inventory is defined as the storage of parts in our warehouse. The first attribute is Part ID. This is defined as the number in the system that identifies the part. This is an identifier attribute.

The next attribute is part name. This is defined as the name of each part. This is a required attribute. The next attribute is description. This describes each part. This is a required attribute. The next attribute is quantity. This defines the specific number of each different part. This is a required attribute. The next attribute is expiration date. This is the date in which the parts must be replaced. This is a required attribute. The next attribute is item cost. This is the cost for each specific part. This is a required attribute. The next attribute is date delivered. This is the date that the part is delivered into the warehouse. This is a required attribute. The last attribute is cost on hand. This is defined as the total number of parts multiplied by the price. This is a derived attribute.

Redistribution is defined as returning parts back to the warehouse after being leftover on a project. The first attribute is Redistribution ID. This is defined as the number in the system that identifies the redistribution of a part. This is a composite identifier attribute. The next attribute is number of parts returned. This is defined as the number of each specific part that is returned back to the warehouse.

Project Inventory is defined as the inventory on site necessary to complete the project. The first attribute is Inventory ID. This is defined as the number in the system that identifies the inventory on site. This is a composite identifier attribute. The next attribute is number of parts. This is defined as the number of parts required to complete the project. This is a required attribute. The last attribute is the project type. This is defined as the specific type of project that is being completed, which require different parts.

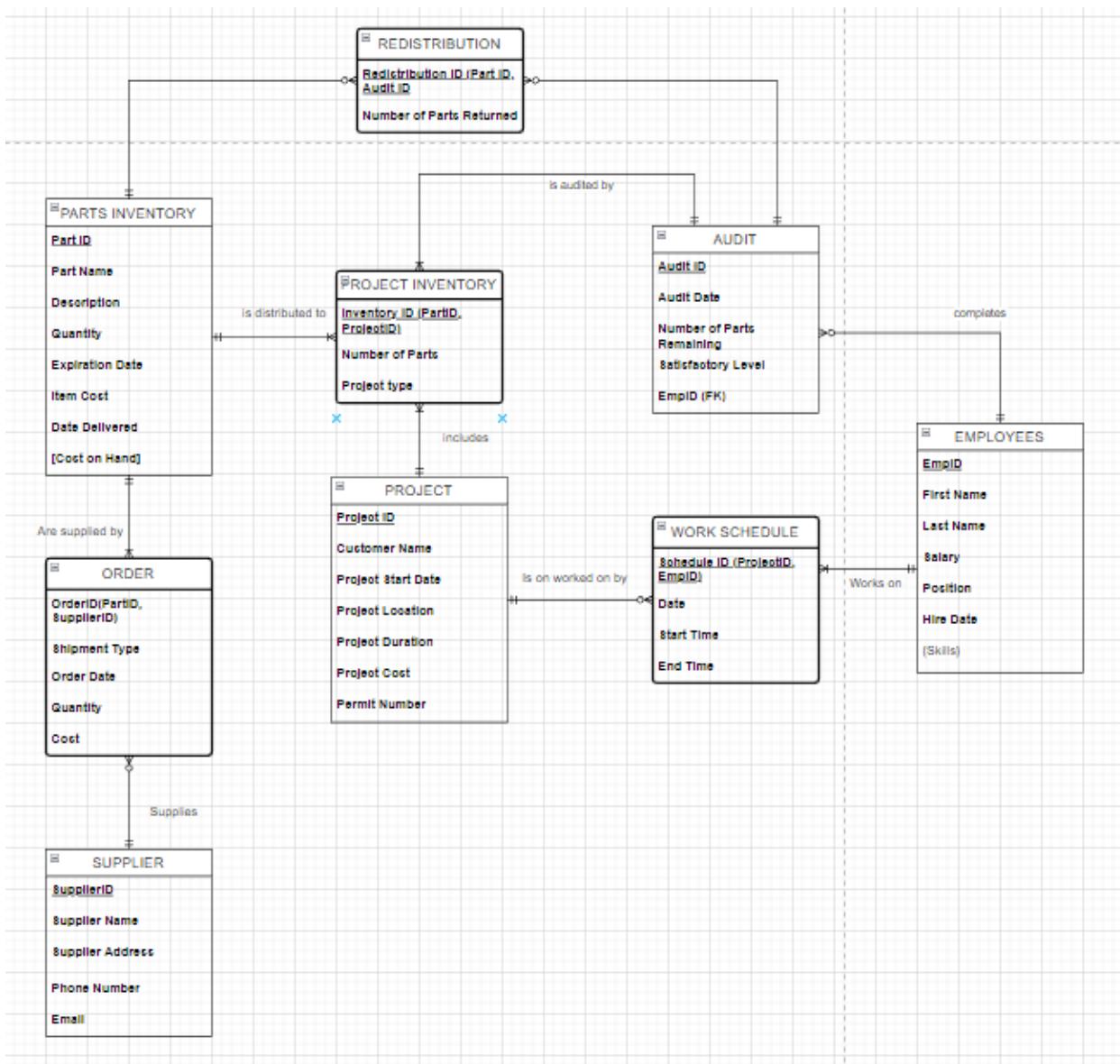
Project is defined as a job for the construction company to complete. This first attribute is Project ID. This is defined as the number in the system that identifies the specific project. This is an identifier attribute. The next attribute is customer name. This is the name of the customer in which the project is being completed. This is a required attribute. The next attribute is project start date. This is the date that the project is started. This is a required attribute. The next attribute is project location. This is the location of where the project is being completed. This is a required attribute. The next attribute is project duration. This is the length that the project takes to complete. This is a required attribute. The next attribute is project cost. This is the total cost that it will take for the project to be completed. This is a required attribute. The last attribute is permit number. This is the number associated with the permit received to work on the project. This is a required attribute.

Work schedule is defined as which employees are working on which project. The first attribute is Schedule ID. This is defined as the number in the system that identifies the specific schedule. This is a composite identifier attribute. The next attribute is date. This is the date that the employee is assigned to work. This is a required attribute. The next attribute is start time. This is the time that the employee is assigned to start. This is a required attribute. The last attribute is end time. This is the time that the employee is assigned to end. This is a required attribute.

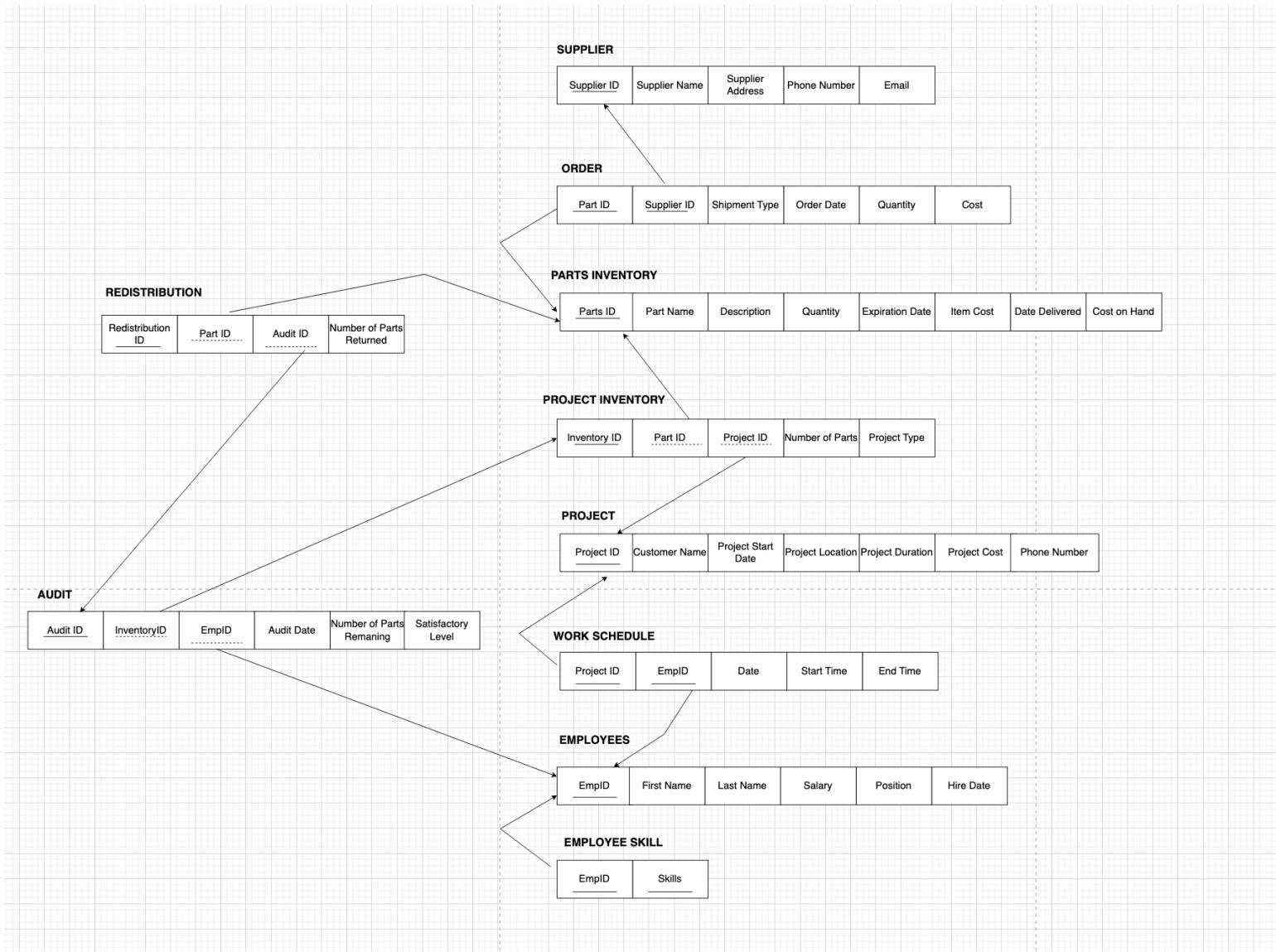
Employee is defined by a person who works in the company. The first attribute is Employee ID. This is defined as the number in the system that identifies the employee. This is an identifier attribute. The next attribute is first name. This is the first name of the employee. This is a required attribute. The next attribute is last name. This is the last name of the employee. This is a required attribute. The next attribute is salary. This is the salary of the employee. This is a required attribute. The next attribute is position. This is the employee's position at the company. This is a required attribute. The next attribute is hire date. This is the date when the employee is hired. This is a required attribute. The last attribute is skills. These are the skills that each employee possesses. This is a multivalued attribute.

Audit is defined as the process of verifying that the project was completed successfully. The first attribute is Audit ID. This is defined as the number in the system that identifies the audit. This is an identifier attribute. The next attribute is auditor name. This is the name of the person who completes the audit. This is a required attribute. The next attribute is satisfactory level. This is defined as the level of satisfaction that the audit reaches while inspecting. This is a required attribute. The next attribute is audit date. This is the date that the audit is completed. This is a required attribute. The last attribute is number of parts remaining. This identifies which parts are left over after a project is completed. This is a required attribute.

3.4



3.5



Functionality:

4.1

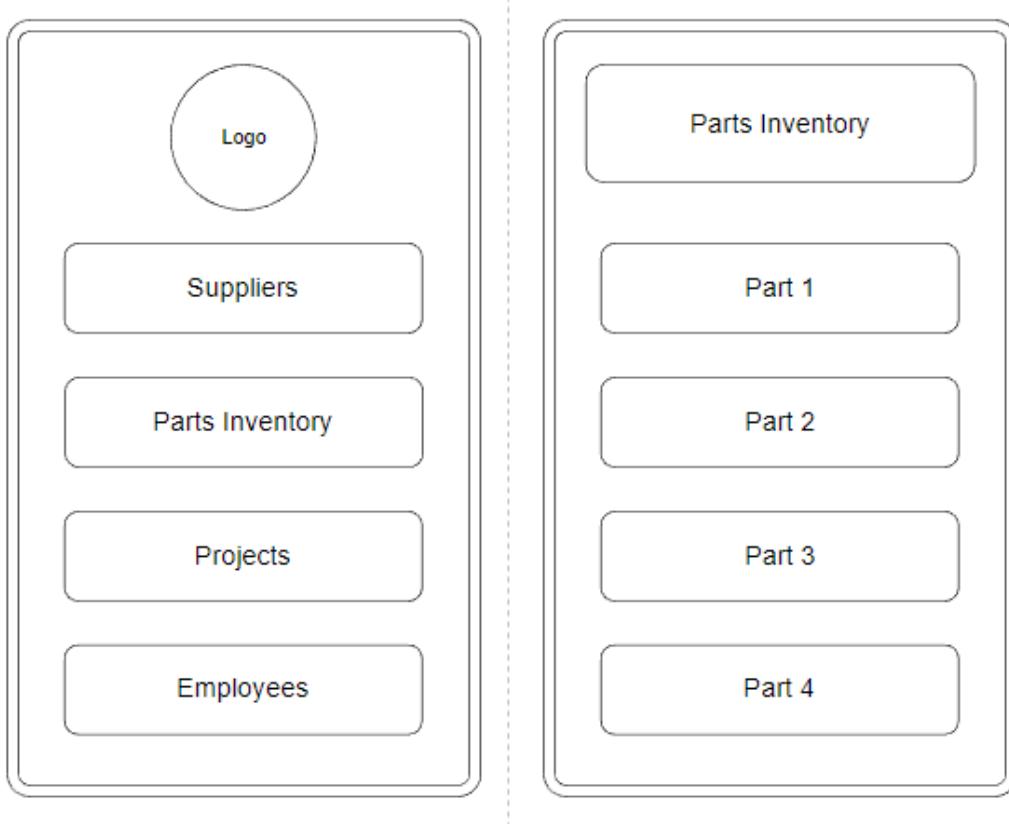
In order to implement this database we are going to use an app to allow the user to interact with it. When opening the app you will be met by a screen with your company's logo and 4 different buttons to click on. Those buttons would be Supplier, Parts Inventory, Project and Employees. When you click on the supplier button you will see a list of all the suppliers that you have ordered from. When you click on the name of the supplier you will see all of the information on that supplier such as their ID, address, and other contact information.

When clicking on the Parts inventory button you will see the part name. After clicking on the part name, you will be able to see all the part information included as attributes in the parts inventory. You will see the orderID that involved that part. If you click the orderID you will be brought to a page with all the order information.

When clicking on the project button you will see a list of all the projectIDs. When you click on any of the projectIDs you will see all the attribute information for that project along with the InventoryID. If you click on the inventory ID you will see all the inventory information for that project as well as an Audit ID number if the project has been completed. When clicking on the AuditID you will see all the information that goes along with an audit as well as the Redistribution ID and the information that goes along with that.

The final button is the Employees button. Clicking on this button will allow you to see a list of the first and last names of the employees. When you click on their name you will see all their information along with a scheduleID. If you click on that you will see the date and times of all that employees scheduled shifts and the projectID to show the location they will be working at.

4.2



This is what the home page and then a sample of what clicking on one of the buttons would look like. Every other page you click through will be very similar to what the parts inventory one looks like just with the corresponding header and buttons.

Implementation:

5.1

Included in Appendix

5.2

Project:

432 • `select * from project;`

The screenshot shows the MySQL Workbench interface with a result grid for the 'project' table. The table has columns: project_id, customer_name, start_date, street, city, state, zip, duration, cost, and permit_num. The data includes rows for various projects like 'John Doe', 'Anthony Soprano', and 'Aaron Rodgers'. The 'cost' column contains values such as 5000.00, 25000.00, and 32000.00. The 'duration' column shows values like '2 weeks', '5 weeks', and '6 weeks'. The 'permit_num' column contains values like 12345, 12346, and 12347.

project_id	customer_name	start_date	street	city	state	zip	duration	cost	permit_num
001	John Doe	2023-01-01	Vestal Parkway	Binghamton	NY	13901	2 weeks	5000.00	12345
002	Anthony Soprano	2023-01-07	Birmingham Way	Binghamton	NY	13901	5 weeks	25000.00	12346
003	Zach Wilson	2023-01-05	Milpond Road	Binghamton	NY	13901	3 weeks	17000.00	12347
004	Harry Dnof	2023-02-05	Hflan Street	Binghamton	NY	13901	10 weeks	250000.00	12348
005	Nick Perry	2023-02-23	Nicky Way	Binghamton	NY	13901	2 weeks	4000.00	12349
006	Aaron Rodgers	2023-03-24	Jets Drive	Binghamton	NY	13901	6 weeks	32000.00	12350
007	Glenn Flan	2023-05-17	Holly Street	Binghamton	NY	13901	6 weeks	52000.00	12351
008	Patrick McGrin	2023-07-14	Brand Road	Binghamton	NY	13901	4 weeks	22000.00	12352
009	Aaron Judge	2023-08-19	Yankees Ave	Binghamton	NY	13901	10 weeks	300000.00	12353
010	Anikan Skywalker	2023-09-10	Republic Way	Binghamton	NY	13901	2 weeks	17000.00	1235
NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL

Supplier:

434 • `select * from supplier;`

The screenshot shows the MySQL Workbench interface with a result grid for the 'supplier' table. The table has columns: supplier_id, supplier_name, street, city, state, zip, phone_num, and email. The data includes rows for various suppliers like 'Henry Supply', 'SupplyCo', and 'Parts R Us'. The 'email' column contains email addresses such as henrysupply@gmail.com, supplyco@gmail.com, and partsrus@gmail.com.

supplier_id	supplier_name	street	city	state	zip	phone_num	email
100	Henry Supply	James St	Binghamton	NY	13901	6071111111	henrysupply@gmail.com
101	SupplyCo	Chesnut St	Binghamton	NY	13901	6072222222	supplyco@gmail.com
102	Parts R Us	Srikanth St	Binghamton	NY	13901	6073333333	partsrus@gmail.com
103	Hayley Supply	Kyle St	Binghamton	NY	13901	6074444444	hayleysupply@gmail.com
104	Sutter Parts	Murray St	Binghamton	NY	13901	6075555555	sutterparts@gmail.com
105	Parts by Cole	Chark St	Binghamton	NY	13901	6076666666	partsbycole@gmail.com
106	Sutt Bros Parts	Washington St	Binghamton	NY	13901	6077777777	suttbros@gmail.com
107	Kong Parts	82nd St	Brooklyn	NY	11209	9171111111	kongparts@gmail.com
108	Supplier Mart	18th St	Miami	FL	33135	3050001111	suppmart@gmail.com
109	Buff Parts	Swan St	Buffalo	NY	14203	7160001111	buffparts@gmail.com
NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL

Order List

Parts Inventory

432 • select * from order_list;

100% 23:430

Result Grid Filter Rows: Search Edit:

order_id	part_id	supplier_id	quantity	order_date	item_cost	shipment_ty...
200	300	100	5	2023-01-01	50.25	Firstclass
201	301	101	73	2023-01-02	300.99	Overnight
202	302	102	10	2023-01-10	60.00	Expedited
203	303	103	99	2023-01-11	100.00	Firstclass
204	304	104	16	2023-01-17	9.99	Expedited
205	305	105	29	2023-01-18	77.50	Overnight
206	306	106	30	2023-01-19	49.99	Firstclass
207	307	107	20	2023-01-20	79.99	Overnight
208	308	108	30	2023-01-23	400.75	Expedited
209	309	109	100	2023-01-23	75.00	Expedited
NULL	NULL	NULL	NULL	NULL	NULL	NULL

order_list 19

Action Output

Time	Action
145 19:20:00	select * from order_list LIMIT 0, 1000

434 • select * from parts_inventory;

100% 31:434

Result Grid Filter Rows: Search Edit: Export/Import:

part_id	part_name	part_description	quantity	expiration_da...	item_cost	date_delivered
300	Concrete	Mixture poured into molds	20	2023-12-29	50.25	2023-01-16
301	Steel Pipe	A pipe made from steel	50	2023-12-29	300.99	2023-01-03
302	Spray Foam	Insulation for roofing	100	2023-12-29	60.00	2023-01-13
303	Tiles	Used for laying floors	45	2023-12-29	100.00	2023-01-25
304	Brick	A block used for building	500	2023-12-29	9.99	2023-01-19
305	Aluminum	Steel used for building	300	2023-12-29	77.50	2023-01-19
306	Plywood	Wood used for building	500	2023-12-29	49.99	2023-02-05
307	PVC	Plastic pipe for building	100	2023-12-29	79.99	2023-01-21
308	CopperWire	Conductive metal	30	2023-12-29	400.75	2023-02-07
309	PC	Plastic used for building	300	2023-12-29	75.00	2023-02-07
NULL	NULL	NULL	NULL	NULL	NULL	NULL

parts_inventory 20

Action Output

Time	Action
146 19:24:34	select * from parts_inventory LIMIT 0, 1000

Redistribution

Project Inventory

```
434 • select * from redistribution;
```

100% 40:432

Result Grid Filter Rows: Search Edit

redis_id	part_id	num_parts_return...	audit_id
700	300	1	500
701	301	4	501
702	302	2	502
703	303	1	503
704	304	0	504
705	305	10	505
706	306	0	506
707	307	1	507
708	308	15	508
709	309	0	509
NULL	NULL	NULL	NULL

redistribution 21

Action Output

	Time	Action
147	19:25:22	select * from redistribution LIMIT 0, 1000

Employees

```
434 • select * from project_inventory;
```

100% 37:432

Result Grid Filter Rows: Search Edit

inventory_id	part_id	project_...	quantity	project_ty...
800	300	010	009	Roadwork
801	301	001	007	Building
802	302	002	004	House
803	303	003	013	Building
804	304	004	005	Building
805	305	005	023	Building
806	306	006	004	Roadwork
807	307	007	012	House
808	308	008	007	Building
809	309	009	016	Roadwork
NULL	NULL	NULL	NULL	NULL

project_inventory 23

Action Output

	Time	Action
159	19:26:25	select * from project_inventory LIMIT 0, 1000

Audit

434 • select * from employees;

100% 24:429

Result Grid Filter Rows: Search Edit:

	emp_id	first_name	last_name	salary	position	hire_date
▶	400	Hayley	Flanagan	92000.00	Foreman	2019-01-05
401	Andy	Bernard	96000.00	Foreman	2019-03-14	
402	Jim	Halpart	76000.00	Laborer	2020-04-24	
403	Michael	Scottt	72000.00	Laborer	2020-06-17	
404	Anthony	Volpe	72000.00	Laborer	2020-09-12	
405	Nick	Lodolo	70000.00	Laborer	2020-12-17	
406	Curtis	Granderson	70000.00	Laborer	2021-02-24	
407	Paul	Goldy	64000.00	Laborer	2021-03-14	
408	Mike	Trout	64000.00	Laborer	2021-03-30	
409	Joe	Morgan	62000.00	Laborer	2021-06-19	
	HULL	HULL	HULL	HULL	HULL	HULL

employees 24

Action Output

Time	Action
160 19:27:16	select * from employees LIMIT 0, 1000

434 • select * from audit;

100% 1:431

Result Grid Filter Rows: Search Edit:

	audit_id	audit_date	num_parts_remainin...	stat_level	emp_id
▶	500	2023-01-01	004	10	401
501	2023-01-07	002	08	401	
502	2023-01-05	001	10	401	
503	2023-02-05	002	09	401	
504	2023-02-23	004	10	401	
505	2023-03-24	001	09	402	
506	2023-05-17	002	10	402	
507	2023-07-14	009	07	402	
508	2023-08-19	006	09	402	
509	2023-09-10	007	10	402	
	HULL	HULL	HULL	HULL	HULL

audit 26

Action Output

Time	Action
172 19:27:49	select * from audit LIMIT 0, 1000

Work Schedule

434 • select * from work_schedule;

100% 29:434

Result Grid Filter Rows: Export

	schedule_id	project...	emp_id	work_date	start_time	end_time
▶	600	001	400	2023-01-01	09:00	17:00
601	001	402	2023-01-01	09:00	17:00	
602	001	403	2023-01-01	09:00	17:00	
603	001	404	2023-01-01	09:00	17:00	
604	001	405	2023-01-01	09:00	17:00	
605	002	402	2023-01-07	23:00	08:00	
606	002	406	2023-01-07	23:00	08:00	
607	002	407	2023-01-07	23:00	08:00	
608	002	408	2023-01-07	23:00	08:00	
609	002	409	2023-01-07	23:00	08:00	

work_schedule 27

Action Output

Time	Action
186 19:29:34	select * from work_schedule LIMIT 0, 1000

5.3

Report 1:

```
430 • select * from employees
431   order by salary desc;
```

100% 32:428

Result Grid Filter Rows: Search Edit:

emp_id	first_name	last_name	salary	position	hire_date
► 401	Andy	Bernard	96000.00	Foreman	2019-03-14
400	Hayley	Flanagan	92000.00	Foreman	2019-01-05
402	Jim	Hafpart	76000.00	Laborer	2020-04-24
403	Michael	Scottd	72000.00	Laborer	2020-06-17
404	Anthony	Volpe	72000.00	Laborer	2020-09-12
405	Nick	Lodolo	70000.00	Laborer	2020-12-17
406	Curtis	Granderson	70000.00	Laborer	2021-02-24
407	Paul	Goldy	64000.00	Laborer	2021-03-14
408	Mike	Trott	64000.00	Laborer	2021-03-30
409	Joe	Morgan	62000.00	Laborer	2021-06-19
HULL	HULL	HULL	HULL	HULL	HULL

employees 30

Action Output

Time	Action
202 19:57:08	select * from employees order by salary desc LIMIT 0, 1000

We used the Order by function. This is helpful to the organization as it will allow us to figure out which employees make the most money in order of how much they make.

Report 2:

433 • update parts_inventory set item_cost = '100' where part_id = '305';
434 • select * from parts_inventory;
435

100% 24:430

Result Grid Filter Rows: Search Edit: Export/Import:

part_id	part_name	part_description	quantity	expiration_date	item_cost	date_delivered
► 300	Concrete	Mixture poured into molds	20	2023-12-29	50.25	2023-01-16
301	Steel Pipe	A pipe made from steel	50	2023-12-29	300.99	2023-01-03
302	Spray Foam	Insulation for roofing	100	2023-12-29	60.00	2023-01-13
303	Tiles	Used for laying floors	45	2023-12-29	100.00	2023-01-25
304	Brick	A block used for building	500	2023-12-29	9.99	2023-01-19
305	Aluminum	Steel used for building	300	2023-12-29	100.00	2023-01-19
306	Plywood	Wood used for building	500	2023-12-29	49.99	2023-02-05
307	PVC	Plastic pipe for building	100	2023-12-29	79.99	2023-01-21
308	CopperWire	Conductive metal	30	2023-12-29	400.75	2023-02-07
309	PC	Plastic used for building	300	2023-12-29	75.00	2023-02-07
HULL	HULL	HULL	HULL	HULL	HULL	HULL

parts_inventory 31

Action Output

Time	Action
204 19:59:12	select * from parts_inventory LIMIT 0, 1000

We used the Update function. This is important to the business because it allows us to update our parts' cost if it increases in price.

Report 3.

436 • Select * from project
437 where cost=(select max(cost) from project);
438

100% 40:433

Result Grid Filter Rows: Search Edit: Export/Import:

project_...	customer_name	start_date	street	city	state	zip	duration	cost
► 009	Aaron Judge	2023-08-19	Yankees Ave	Binghamton	NY	13901	10 weeks	300000.0
HULL	HULL	HULL	HULL	HULL	HULL	HULL	HULL	HULL

project 32

Action Output

Time	Action
205 19:59:48	Select * from project where cost=(select max(cost) from project) LIMIT 0, 1000

We used the max subquery function. The purpose of using this function is to find out which project costs the most money.

```
439 • select audit_id from audit where num_parts_remaining >= 005 and stat_level >=8;
440
100% 45:437
```

Result Grid Filter Rows: Search Edit: Export/Import:

audit_id
508
509
NULL

audit 33

Action Output

Time	Action
206 20:01:05	select audit_id from audit where num_parts_remaining >= 005 and stat_level >=8 LIMIT 0, 1000

Report 4:

We used a compound function. This function will allow us to figure out which audits returned more than 5 parts with a satisfaction level of 8 or higher. These would likely be cases where there will be a number of useful parts for another project.

```
441 • select emp_id from work_schedule where end_time-start_time >= '9:00';
100% 34:439
```

Result Grid Filter Rows: Search Export:

emp_id
402
406
407
408
409

work_schedule 34

Action Output

Time	Action
207 20:02:38	select emp_id from work_schedule where end_time-start_time >= '9:00' LIMIT 0, 1000

Report 5:

We used a compound function. This function will allow us to figure out which employees worked overtime. This is important as the pay structure for overtime is time and a half so we must be able to know which employees have worked overtime.

```
445 • UPDATE Employees SET position = 'Foreman' WHERE emp_id = '404';
446 • select * from employees;
100% 1:442
```

Result Grid Filter Rows: Search Edit: Export/Import:

emp_id	first_name	last_name	salary	position	hire_date
402	Jim	Halpart	76000.00	Laborer	2020-04-24
403	Michael	Scottt	72000.00	Laborer	2020-06-17
404	Anthony	Volpe	72000.00	Foreman	2020-09-12
405	Nick	Lodolo	70000.00	Laborer	2020-12-17
406	Curtis	Granderson	70000.00	Laborer	2021-02-24
407	Paul	Goldy	64000.00	Laborer	2021-03-14
408	Mike	Trout	64000.00	Laborer	2021-03-30
409	Joe	Morgan	62000.00	Laborer	2021-06-19
NULL	NULL	NULL	NULL	NULL	NULL

employees 35

Action Output

Time	Action
209 20:14:52	select * from employees LIMIT 0, 1000

Report 6:

This uses the update function. This function will be useful when an employee receives a promotion. In this case employee 404 was promoted from laborer to foreman.

```
448 • select employees.emp_id, employees.salary, employees.position, work_schedule.schedule_id, work_schedule.start_time, work_schedule.end_time
449   from employees, work_schedule
450   where employees.emp_id = work_schedule.emp_id;
```

Result Grid | Filter Rows: Search Export:

emp_id	salary	position	schedule_id	start_time	end_time
400	92000.00	Foreman	600	09:00	17:00
402	76000.00	Laborer	601	09:00	17:00
403	72000.00	Laborer	602	09:00	17:00
404	72000.00	Foreman	603	09:00	17:00
405	70000.00	Laborer	604	09:00	17:00
402	76000.00	Laborer	605	09:00	19:00
406	70000.00	Laborer	606	09:00	19:00
407	64000.00	Laborer	607	09:00	19:00
408	64000.00	Laborer	608	09:00	19:00
409	62000.00	Laborer	609	09:00	19:00

Result 38

Action Output

Time	Action	Response	Dura
213 20:36:58	select employees.emp_id, employees.salary, employees.position, work_schedule.schedule_id, work_schedule.start_time, work...	10 row(s) returned	0.00

```
452 • select part_id, num_parts_returned from redistribution
453   where num_parts_returned <10 and num_parts_returned >0;
```

Result Grid | Filter Rows: Search Export:

part_id	num_parts_returned
300	1
301	4
302	2
303	1
307	1

redistribution 43

Action Output

Time	Action
219 21:08:19	select part_id, num_parts_returned from redistribution where num_parts_re

Result Grid | Filter Rows: Search Export:

full_name	salary
Joe Morgan	62000.00

Result 53

Action Output

Time	Action	Response
243 21:53:11	select CONCAT(first_name,...	1 row(s) returned

Report 7:

This uses a join function. This function will be useful when sending out routes for employees to see where each employee will be working and at what time.

Report 8:

This uses a compound function. This function will be useful because it will find out which parts were almost exactly estimated for the job. This can be used when considering the next order.

Report 9:

This is a string function. This function will be useful because it will help streamline the database and help the user find employees faster.

```

458 • select distinct project.project_id, project_type, duration, cost from project
459     inner join project_inventory on project.project_id = project_inventory.project_id
460
100% ◇ 50:456
Result Grid Filter Rows: Search Export:
project_id project_ty... duration cost
010 Roadwork 2 weeks 17000.00
001 Building 2 weeks 5000.00
002 House 5 weeks 25000.00
003 Building 3 weeks 17000.00
004 Building 10 weeks 250000.00
005 Building 2 weeks 4000.00
006 Roadwork 6 weeks 32000.00
007 House 6 weeks 52000.00
008 Building 4 weeks 22000.00
009 Roadwork 10 weeks 300000.00
Result 57
Action Output
Time Action Response
252 22:15:14 select distinct project.proje... 10 row(s) returned

```

Report 10:

This is a join function. It will be useful because it will create a more specific view of the project on hand for upper management. This will allow them to decide when to take on other jobs

Future Work:

In the future, this database could be useful for many construction companies to keep organized and have it all in one place, instead of having multiple systems to keep track of everything. Nick's family owns a construction company and our goal would be to pitch this idea to them and see if they have any thoughts of implementing it. If it goes well with them and they like the way the database functions we could then move on and pitch this to many other companies.

If a company does implement this database we could ask for feedback as they use it. We can use that feedback to see if there is anything that we could improve, add or remove from the database in order to offer the best user experience possible.

References:

```
create database final_project;
```

```
use final_project;
```

```
create table PROJECT
    (project_id char(3) primary key,
    customer_name char(20) not null,
    start_date date,
    street char(15),
    city char(10),
    state char(2),
```

```
zip char(5),
duration char(10),
cost decimal(10,2),
permit_num char(15)
);
```

```
create table SUPPLIER
(supplier_id char(3) primary key,
supplier_name char(15) not null,
street char(15),
city char(10),
state char(2),
zip char(5),
phone_num char(10),
email char(25)
);
```

```
create table ORDER_LIST
(order_id char(3) primary key,
part_id char(3) not null,
supplier_id char(3) not null,
quantity char(3) not null,
order_date date,
item_cost decimal(10,2),
shipment_type char(10)
);
```

```
create table PARTS_INVENTORY
(part_id char(3) primary key,
part_name char(10) not null,
part_description char(30),
quantity char(3),
expiration_date date,
item_cost decimal(10,2),
date_delivered date
);
```

```
create table REDISTRIBUTION
(redis_id char(3) primary key,
part_id char(3) not null,
```

```
num_parts_returned char(3),
audit_id char(3)
);

create table PROJECT_INVENTORY
    (inventory_id char(3) primary key,
part_id char(3) not null,
project_id char(3) not null,
quantity char(3),
project_type char(10)
);

create table EMPLOYEES
    (emp_id char(3) primary key,
first_name char(15) not null,
last_name char(15) not null,
salary decimal (7,2),
position char(10),
hire_date date
);

create table AUDIT
    (audit_id char(3) primary key,
audit_date date,
num_parts_remaining char(3),
stat_level char(2),
emp_id char(3),
constraint fk_emp_id foreign key (emp_id) references EMPLOYEES(emp_id)
);

create table WORK_SCHEDULE
    (schedule_id char(3),
project_id char(3),
emp_id char(3),
work_date date,
start_time char(6),
end_time char(6)
);
```

Insert into PROJECT

Values

('001', 'John Doe', '2023/01/01', 'Vestal Parkway', 'Binghamton', 'NY', '13901', '2 weeks',
'5000.00', '12345');

Insert into PROJECT

Values

('002', 'Anthony Soprano', '2023/01/07', 'Birmingham Way', 'Binghamton', 'NY', '13901', '5
weeks', '25000.00', '12346');

Insert into PROJECT

Values

('003', 'Zach Wilson', '2023/01/05', 'Milpond Road', 'Binghamton', 'NY', '13901', '3 weeks',
'17000.00', '12347');

Insert into PROJECT

Values

('004', 'Harry Dnof', '2023/02/05', 'Hflan Street', 'Binghamton', 'NY', '13901', '10 weeks',
'250000.00', '12348');

Insert into PROJECT

Values

('005', 'Nick Perry', '2023/02/23', 'Nicky Way', 'Binghamton', 'NY', '13901', '2 weeks', '4000.00',
'12349');

Insert into PROJECT

Values

('006', 'Aaron Rodgers', '2023/03/24', 'Jets Drive', 'Binghamton', 'NY', '13901', '6 weeks',
'32000.00', '12350');

Insert into PROJECT

Values

('007', 'Glenn Flan', '2023/05/17', 'Holly Street', 'Binghamton', 'NY', '13901', '6 weeks',
'52000.00', '12351');

Insert into PROJECT

Values

('008', 'Patrick McGrin', '2023/07/14', 'Brand Road', 'Binghamton', 'NY', '13901', '4 weeks',
'22000.00', '12352');

Insert into PROJECT

Values

('009', 'Aaron Judge', '2023/08/19', 'Yankees Ave', 'Binghamton', 'NY', '13901', '10 weeks',
'300000.00', '12353');

Insert into PROJECT

Values

('010', 'Anikan Skywalker', '2023/09/10', 'Republic Way', 'Binghamton', 'NY', '13901', '2 weeks',
'17000.00', '1235');

Select * FROM PROJECT;

```
insert into SUPPLIER
values
('100', 'Henry Supply', 'James St', 'Binghamton', 'NY', '13901', '6071111111',
'henrysupply@gmail.com');
```

```
insert into SUPPLIER
values
('101', 'SupplyCo', 'Chesnut St', 'Binghamton', 'NY', '13901', '6072222222',
'supplyco@gmail.com');
```

```
insert into SUPPLIER
values
('102', 'Parts R Us', 'Srikanth St', 'Binghamton', 'NY', '13901', '6073333333',
'partsrus@gmail.com');
```

```
insert into SUPPLIER
values
('103', 'Hayley Supply', 'Kyle St', 'Binghamton', 'NY', '13901', '6074444444',
'hayleysupply@gmail.com');
```

```
insert into SUPPLIER
values
('104', 'Sutter Parts', 'Murray St', 'Binghamton', 'NY', '13901', '6075555555',
'sutterparts@gmail.com');
```

```
insert into SUPPLIER
values
('105', 'Parts by Cole', 'Chark St', 'Binghamton', 'NY', '13901', '6076666666',
'partsbycole@gmail.com');
```

```
insert into SUPPLIER
values
('106', 'Sutt Bros Parts', 'Washington St', 'Binghamton', 'NY', '13901', '6077777777',
'suttbros@gmail.com');
```

```
insert into SUPPLIER
values
('107', 'Kong Parts', '82nd St', 'Brooklyn', 'NY', '11209', '9171111111', 'kongparts@gmail.com');
```

```
insert into SUPPLIER  
values  
('108', 'Supplier Mart', '18th St', 'Miami', 'FL', '33135', '3050001111', 'suppmart@gmail.com');
```

```
insert into SUPPLIER  
values  
('109', 'Buff Parts', 'Swan St', 'Buffalo', 'NY', '14203', '7160001111', 'buffparts@gmail.com');
```

```
select * from SUPPLIER;
```

```
insert into ORDER_LIST  
values  
('200', '300', '100', '5', '2023/01/01', '50.25', 'Firstclass');
```

```
insert into ORDER_LIST  
values  
('201', '301', '101', '73', '2023/01/02', '300.99', 'Overnight');
```

```
insert into ORDER_LIST  
values  
('202', '302', '102', '10', '2023/01/10', '60', 'Expedited');
```

```
insert into ORDER_LIST  
values  
('203', '303', '103', '99', '2023/01/11', '100', 'Firstclass');
```

```
insert into ORDER_LIST  
values  
('204', '304', '104', '16', '2023/01/17', '9.99', 'Expedited');
```

```
insert into ORDER_LIST  
values  
('205', '305', '105', '29', '2023/01/18', '77.50', 'Overnight');
```

```
insert into ORDER_LIST  
values  
('206', '306', '106', '30', '2023/01/19', '49.99', 'Firstclass');
```

```
insert into ORDER_LIST
```

```
values
('207', '307', '107', '20', '2023/01/20', '79.99', 'Overnight');

insert into ORDER_LIST
values
('208', '308', '108', '30', '2023/01/23', '400.75', 'Expedited');

insert into ORDER_LIST
values
('209', '309', '109', '100', '2023/01/23', '75', 'Expedited');

select * from ORDER_LIST;

insert into PARTS_INVENTORY
values
('300', 'Concrete', 'Mixture poured into molds', '20', '2023/12/29', '50.25', '2023/01/16');

insert into PARTS_INVENTORY
values
('301', 'Steel Pipe', 'A pipe made from steel ', '50', '2023/12/29', '300.99', '2023/01/03');

insert into PARTS_INVENTORY
values
('302', 'Spray Foam', 'Insulation for roofing', '100', '2023/12/29', '60', '2023/01/13');

insert into PARTS_INVENTORY
values
('303', 'Tiles', 'Used for laying floors', '45', '2023/12/29', '100', '2023/01/25');

insert into PARTS_INVENTORY
values
('304', 'Brick', 'A block used for building', '500', '2023/12/29', '9.99', '2023/01/19');

insert into PARTS_INVENTORY
values
('305', 'Aluminum', 'Steel used for building', '300', '2023/12/29', '77.50', '2023/01/19');

insert into PARTS_INVENTORY
values
('306', 'Plywood', 'Wood used for building', '500', '2023/12/29', '49.99', '2023/02/05');
```

```
insert into PARTS_INVENTORY  
values  
('307', 'PVC', 'Plastic pipe for building', '100', '2023/12/29', '79.99', '2023/01/21');
```

```
insert into PARTS_INVENTORY  
values  
('308', 'CopperWire', 'Conductive metal', '30', '2023/12/29', '400.75', '2023/02/07');
```

```
insert into PARTS_INVENTORY  
values  
('309', 'PC', 'Plastic used for building', '300', '2023/12/29', '75', '2023/02/07');
```

```
select * from PARTS_INVENTORY;
```

```
insert into redistribution  
values  
('700', '300', '1', '500');
```

```
insert into redistribution  
values  
('701', '301', '4', '501');
```

```
insert into redistribution  
values  
('702', '302', '2', '502');
```

```
insert into redistribution  
values  
('703', '303', '1', '503');
```

```
insert into redistribution  
values  
('704', '304', '0', '504');
```

```
insert into redistribution  
values  
('705', '305', '10', '505');
```

```
insert into redistribution  
values  
('706', '306', '0', '506');
```

```
insert into redistribution  
values  
('707', '307', '1', '507');
```

```
insert into redistribution  
values  
('708', '308', '15', '508');
```

```
insert into redistribution  
values  
('709', '309', '0', '509');
```

```
select * from redistribution;
```

```
Insert into PROJECT_INVENTORY  
Values  
('800', '300', '010', '009', 'Roadwork');  
Insert into PROJECT_INVENTORY  
Values  
('801', '301', '001', '007', 'Building');  
Insert into PROJECT_INVENTORY  
Values  
('802', '302', '002', '004', 'House');  
Insert into PROJECT_INVENTORY  
Values  
('803', '303', '003', '013', 'Building');  
Insert into PROJECT_INVENTORY  
Values  
('804', '304', '004', '005', 'Building');  
Insert into PROJECT_INVENTORY  
Values  
('805', '305', '005', '023', 'Building');  
Insert into PROJECT_INVENTORY  
Values  
('806', '306', '006', '004', 'Roadwork');  
Insert into PROJECT_INVENTORY
```

Values
('807', '307', '007', '012', 'House');
Insert into PROJECT_INVENTORY
Values
('808', '308', '008', '007', 'Building');
Insert into PROJECT_INVENTORY
Values
('809', '309', '009', '016', 'Roadwork');

select* from PROJECT_INVENTORY;

Insert into EMPLOYEES
Values
('400', 'Hayley', 'Flanagan', '92000.00', 'Foreman', '2019/01/05');
Insert into EMPLOYEES
Values
('401', 'Andy', 'Bernard', '96000.00', 'Foreman', '2019/03/14');
Insert into EMPLOYEES
Values
('402', 'Jim', 'Halpart', '76000.00', 'Laborer', '2020/04/24');
Insert into EMPLOYEES
Values
('403', 'Michael', 'Scottd', '72000.00', 'Laborer', '2020/06/17');
Insert into EMPLOYEES
Values
('404', 'Anthony', 'Volpe', '72000.00', 'Laborer', '2020/09/12');
Insert into EMPLOYEES
Values
('405', 'Nick', 'Lodolo', '70000.00', 'Laborer', '2020/12/17');
Insert into EMPLOYEES
Values
('406', 'Curtis', 'Granderson', '70000.00', 'Laborer', '2021/02/24');
Insert into EMPLOYEES
Values
('407', 'Paul', 'Goldy', '64000.00', 'Laborer', '2021/03/14');
Insert into EMPLOYEES
Values
('408', 'Mike', 'Trout', '64000.00', 'Laborer', '2021/03/30');

Insert into EMPLOYEES

Values
('409', 'Joe', 'Morgan', '62000.00', 'Laborer', '2021/06/19');

select * from employees;

Insert into AUDIT
VALUES
(‘500’, ‘2023/01/01’, ‘004’, ‘10’, ‘401’);
Insert into AUDIT
VALUES
(‘501’, ‘2023/01/07’, ‘002’, ‘08’, ‘401’);
Insert into AUDIT
VALUES
(‘502’, ‘2023/01/05’, ‘001’, ‘10’, ‘401’);
Insert into AUDIT
VALUES
(‘503’, ‘2023/02/05’, ‘002’, ‘09’, ‘401’);
Insert into AUDIT
VALUES
(‘504’, ‘2023/02/23’, ‘004’, ‘10’, ‘401’);
Insert into AUDIT
VALUES
(‘505’, ‘2023/03/24’, ‘001’, ‘09’, ‘402’);
Insert into AUDIT
VALUES
(‘506’, ‘2023/05/17’, ‘002’, ‘10’, ‘402’);
Insert into AUDIT
VALUES
(‘507’, ‘2023/07/14’, ‘009’, ‘07’, ‘402’);
Insert into AUDIT
VALUES
(‘508’, ‘2023/08/19’, ‘006’, ‘09’, ‘402’);
Insert into AUDIT
VALUES
(‘509’, ‘2023/09/10’, ‘007’, ‘10’, ‘402’);

Insert into WORK_SCHEDULE
Values
(‘600’, ‘001’, ‘400’, ‘2023/01/01’, ‘09:00’, ‘17:00’);
Insert into WORK_SCHEDULE

Values
('601', '001', '402', '2023/01/01', '09:00', '17:00');
Insert into WORK_SCHEDULE
Values
('602', '001', '403', '2023/01/01', '09:00', '17:00');
Insert into WORK_SCHEDULE
Values
('603', '001', '404', '2023/01/01', '09:00', '17:00');
Insert into WORK_SCHEDULE
Values
('604', '001', '405', '2023/01/01', '09:00', '17:00');
Insert into WORK_SCHEDULE
Values
('605', '002', '402', '2023/01/07', '09:00', '19:00');

Insert into WORK_SCHEDULE
Values
('606', '002', '406', '2023/01/07', '09:00', '19:00');
Insert into WORK_SCHEDULE
Values
('607', '002', '407', '2023/01/07', '09:00', '19:00');
Insert into WORK_SCHEDULE
Values
('608', '002', '408', '2023/01/07', '09:00', '19:00');
Insert into WORK_SCHEDULE
Values
('609', '002', '409', '2023/01/07', '09:00', '19:00');
select*from WORK_SCHEDULE;

Select * from project;

Select * from supplier;

Select * from order_list;

Select * from parts_inventory;

Select * from redistribution;

Select * from project_inventory;

Select * from employees;

Select * from audit;

Select * from work_schedule;

```
select * from employees  
order by salary desc;
```

```
update parts_inventory set item_cost =      '100' where part_id = '305';  
select * from parts_inventory;
```

```
Select * from project  
where cost=(select max(cost) from project);
```

```
select audit_id from audit where num_parts_remaining >= 005 and stat_level >=8;
```

```
select emp_id from work_schedule where end_time-start_time >= '9:00';
```

```
UPDATE Employees SET position = 'Foreman' WHERE emp_id = '404' ;  
select * from employees;
```

```
select employees.emp_id, employees.salary, employees.position, work_schedule.schedule_id,  
work_schedule.start_time, work_schedule.end_time  
from employees, work_schedule  
where employees.emp_id = work_schedule.emp_id;
```

```
select part_id, num_parts_returned from redistribution  
where num_parts_returned <10 and num_parts_returned >0;
```

```
select CONCAT(first_name, ' ', last_name) as full_name, salary from employees  
where salary=(select min(salary) from employees);
```

```
select distinct project.project_id, project_type, duration, cost from project  
inner join project_inventory on project.project_id = project_inventory.project_id
```