ITCS 6160
Database Systems

Truxxlt

Partners In New Direction

QueryBuilders

Aakash Pradeep Kulkarni
Akshay Arun Bankar
Saketh Kumar Kappala
Surya Pavan Malireddy
Vamsi Veginati

Guided By

- Dr. Pamela Thompson

Submitted On

- 05/01/2018

Summary

The project is based on a website TruxxIt which enables a person to book a truck to help him move things from a source to destination.

User can select any truck, on a range of varying sizes, based on the availability. User has to register on the portal before he has access to the system. A valid login id and password will be required for a user to sign in. User will enter his source and destination address and select the zip code from the drop down menu which shows up. The system queries the database to see which trucks are available and running the requested location, providing the user with a list of the same. Selecting a particular truck will automatically assign any random driver to the truck.

There is also an Admin Side of the system where the admin has log report of all the bookings done on the system. The admin can also add and delete trucks from the system.

Software and Technicalities:

The system front end was developed in Eclipse Enterprise Edition using JSP, Servlets and AJAX. The backend is preserved on the MySQL database with the server running all time to be queried as and when required. The system can be deployed on a Tomcat Server for execution.

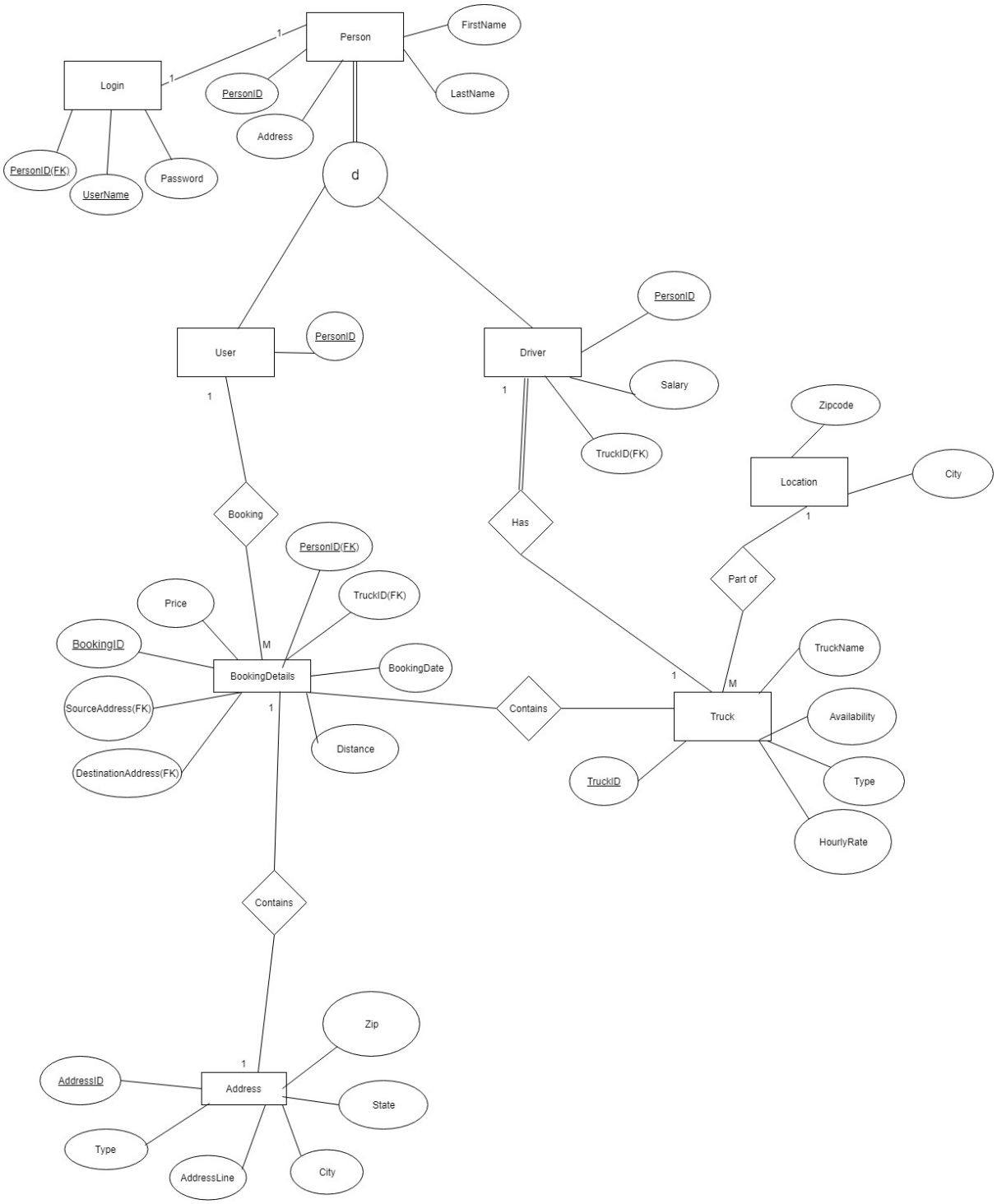
Business Rules

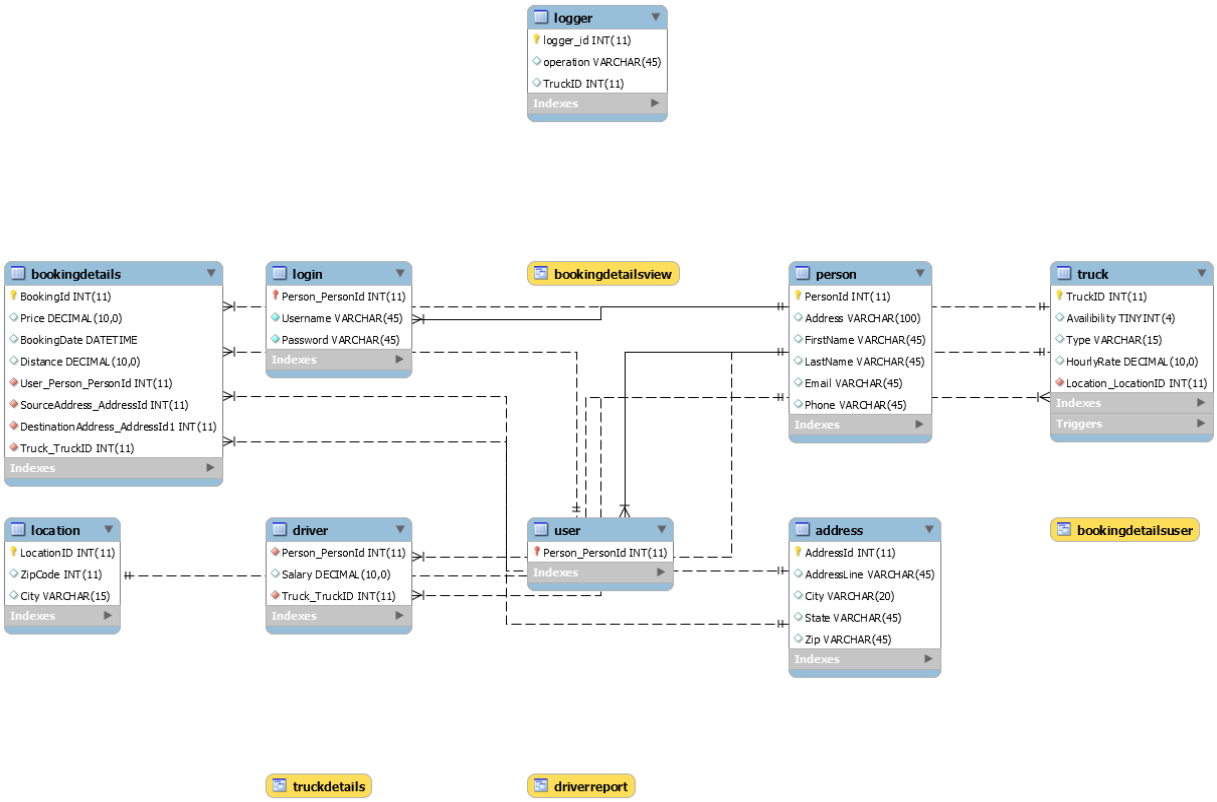
1. User should be able to check for the availability of the trucks in the particular locations.
2. User should be able to choose a size (Large, Medium, Regular) of the truck based on the load which he needs to carry.
3. User should be able to book a truck from current location to destination based on the availability.
4. User should be able to view a price based on the distance.
5. User should submit address details.
6. Administrator should be able maintain (CRUD operations) trucks information.
7. Administrator should be able to generate booking reports based on the date range filters.
8. Location has only one zip code.
9. User needs to specify while booking a truck whether he needs a drivers help for loading.
10. User can book destination and source address only from predefined set of addresses.
11. Each driver is associated to only one truck and is never associated to any other truck.

Assumptions:

1. User agrees to the quoted price.
2. Locations are predefined.
3. Drivers are assigned to trucks by default.

Enhanced Entity Relationship Diagram





EERD Description:

Login: Stores the login details of the user viz., Username and Password.

Person_PersonId	int(11)	NO	PRI	NULL
Username	varchar(45)	NO		NULL
Password	varchar(45)	NO		NULL

Person: It stores the details common to any person. There is a disjoint distribution of Person into User and Driver.

PersonId	int(11)	NO	PRI	NULL	auto_increment
Address	varchar(100)	YES		NULL	
FirstName	varchar(45)	YES		NULL	
LastName	varchar(45)	YES		NULL	
Email	varchar(45)	YES		NULL	
Phone	varchar(45)	YES		NULL	

User: It stores the details of the person, actually foreign keying the PersonID from the person table.

Field	Type	Null	Key	Default	Extra
Person_PersonId	int(11)	NO	PRI	NULL	

Driver: This table stores all the data specific to the driver, also foreign keying his personal details from the Person table.

Person PersonId	int(11)	NO	MUL	NULL
Salary	decimal(10,0)	YES		NULL
Truck TruckID	int(11)	NO	MUL	NULL

Location: It stores the list of all the different locations where the service is available alongside their corresponding zip codes.

LocationID	int(11)	NO	PRI	NULL	auto increment
ZipCode	int(11)	YES		NULL	
City	varchar(15)	YES		NULL	

Truck: Its stores the list of all the trucks available in the system with the model name, type (Small, Medium, Big), its availability and the hourly rate specific to the truck.

TruckID	int(11)	NO	PRI	NULL	auto increment
Availibility	tinyint(4)	YES		NULL	
Type	varchar(15)	YES		NULL	
HourlyRate	decimal(10,0)	YES		NULL	
Location LocationID	int(11)	NO	MUL	NULL	

Address: Its stores the address of the source and destination of the trip. The type keyword specifies whether it's a source address or a destination address.

AddressId	int(11)	NO	PRI	NULL	auto increment
AddressLine	varchar(45)	YES		NULL	
City	varchar(20)	YES		NULL	
State	varchar(45)	YES		NULL	
Zip	varchar(45)	YES		NULL	

Booking Details: It is the most important table in the system. It stores the details of the bookings done by the user viz., PersonID, Source Address, Destination Address, TruckId, Price, Distance, Booking Date.

BookingId	int(11)	NO	PRI	NULL	auto increment
Price	decimal(10,0)	YES		NULL	
BookingDate	datetime	YES		NULL	
Distance	decimal(10,0)	YES		NULL	
User Person PersonId	int(11)	NO	MUL	NULL	
SourceAddress AddressId	int(11)	NO	MUL	NULL	
DestinationAddress AddressId1	int(11)	NO	MUL	NULL	
Truck TruckID	int(11)	NO	MUL	NULL	

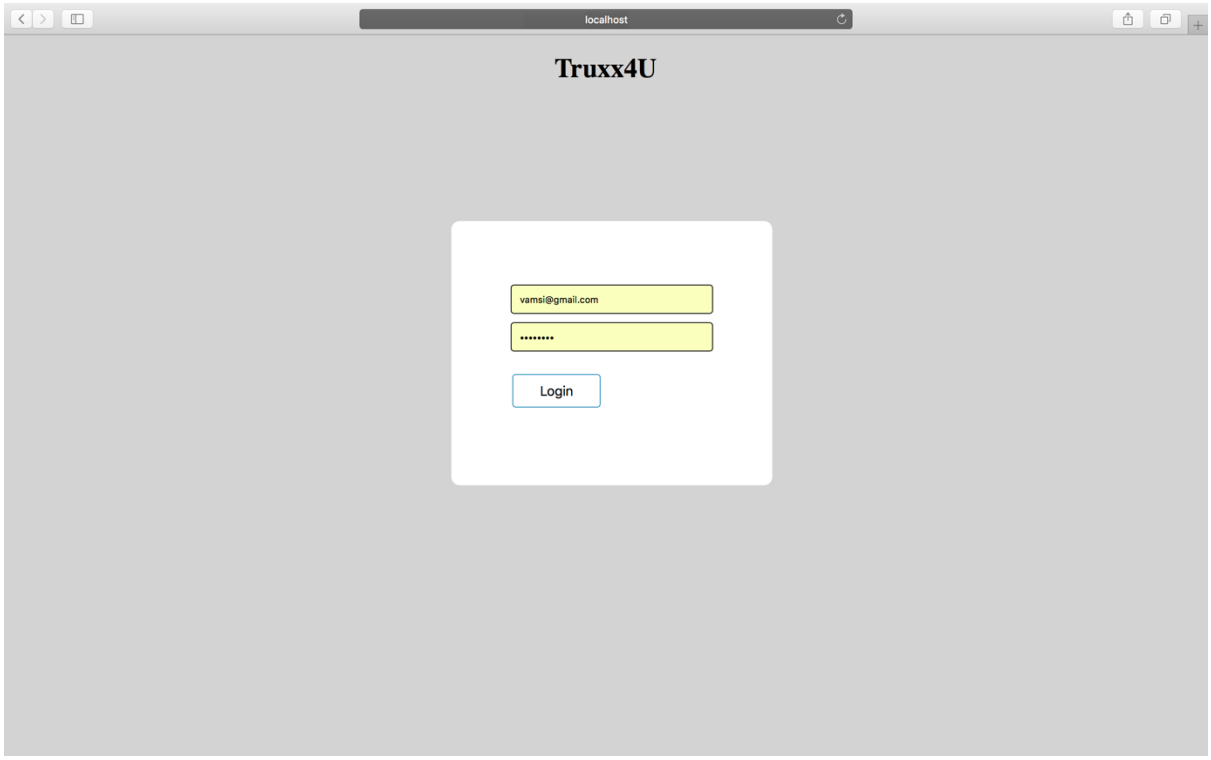
Logger: It is a part of the admin side of the system. It stores the TruckId of all the trucks that are deleted for the system for future reference.

	Field	Type	Null	Key	Default	Extra
	logger_id	int(11)	NO	PRI	NULL	auto_increment
	operation	varchar(45)	YES		NULL	
	TruckID	int(11)	YES		NULL	

WEB UI :

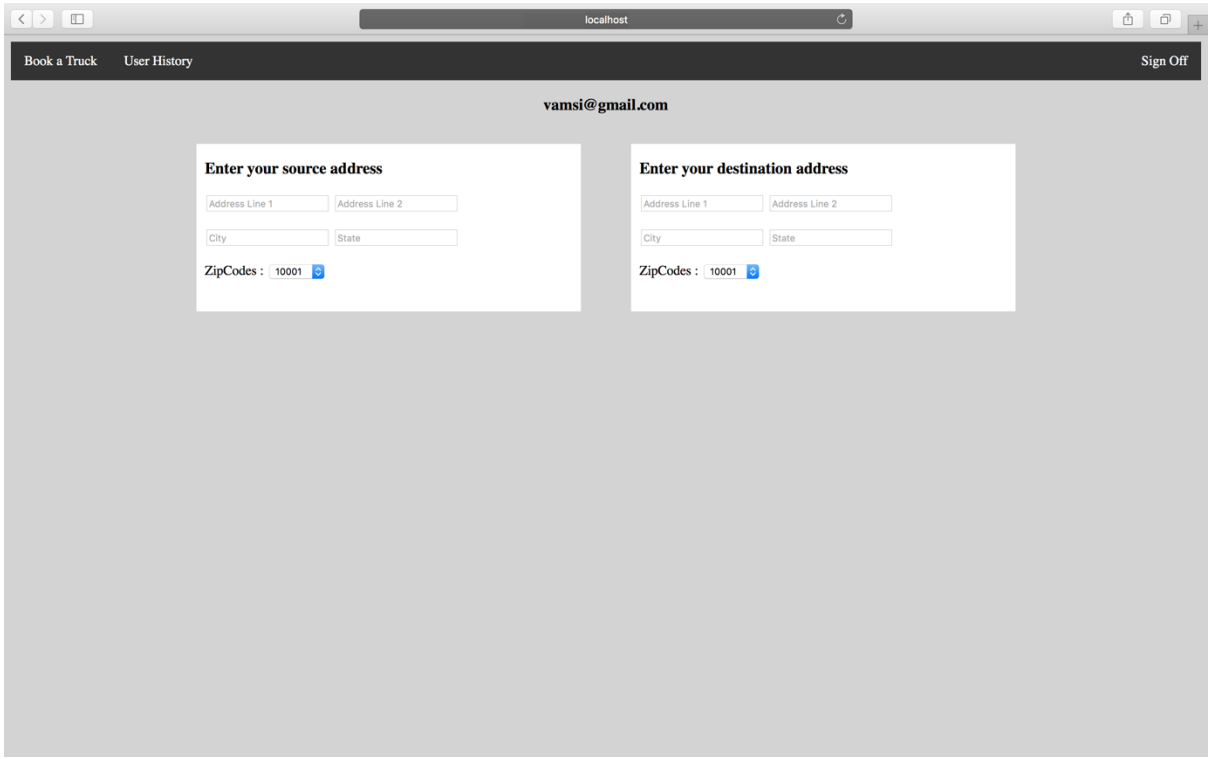
Login Screen:

Truxx4u website user login: Same login is used for both customers and admin.



Note: admin@test.org is considered as admin.

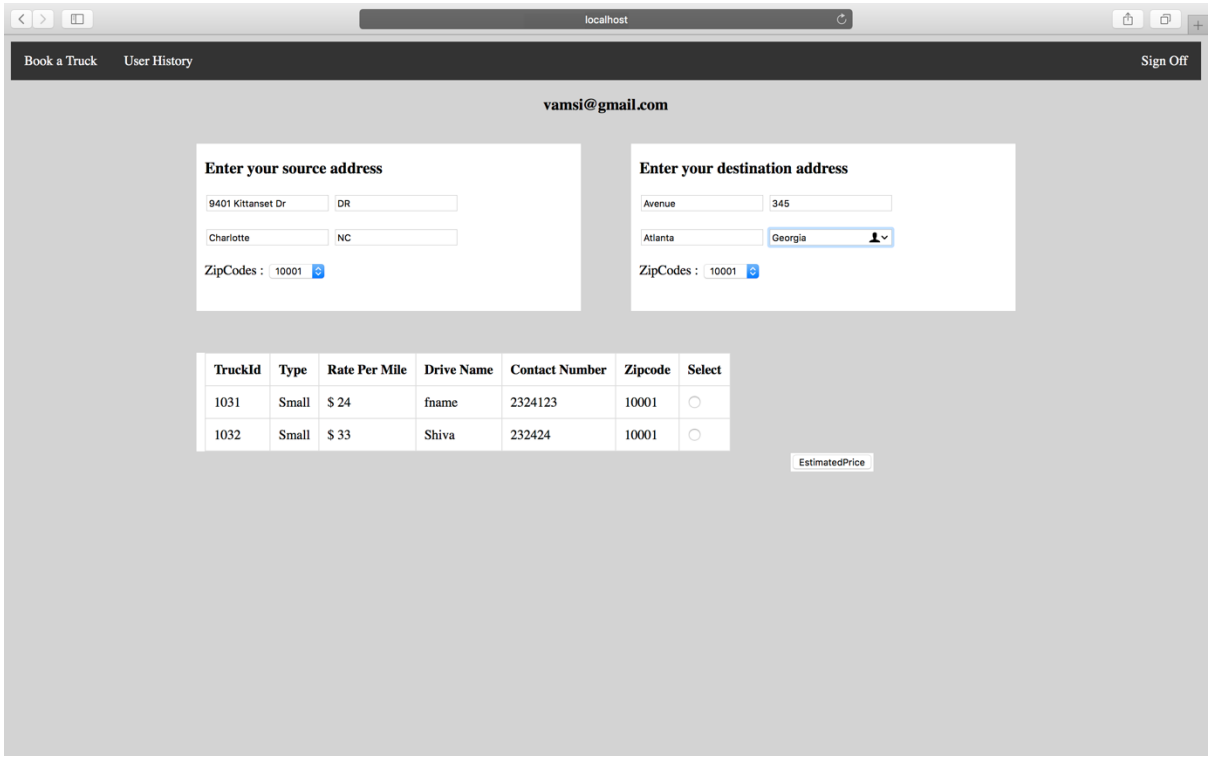
Enter Address with Zip-Code to book A Truck:



Note: Trucks list is displayed based on the source zipcode, this a get a trucks available in the truck table with availability status '1'. Admin has the authority to disable a truck by changing the availability from 1 to 0.

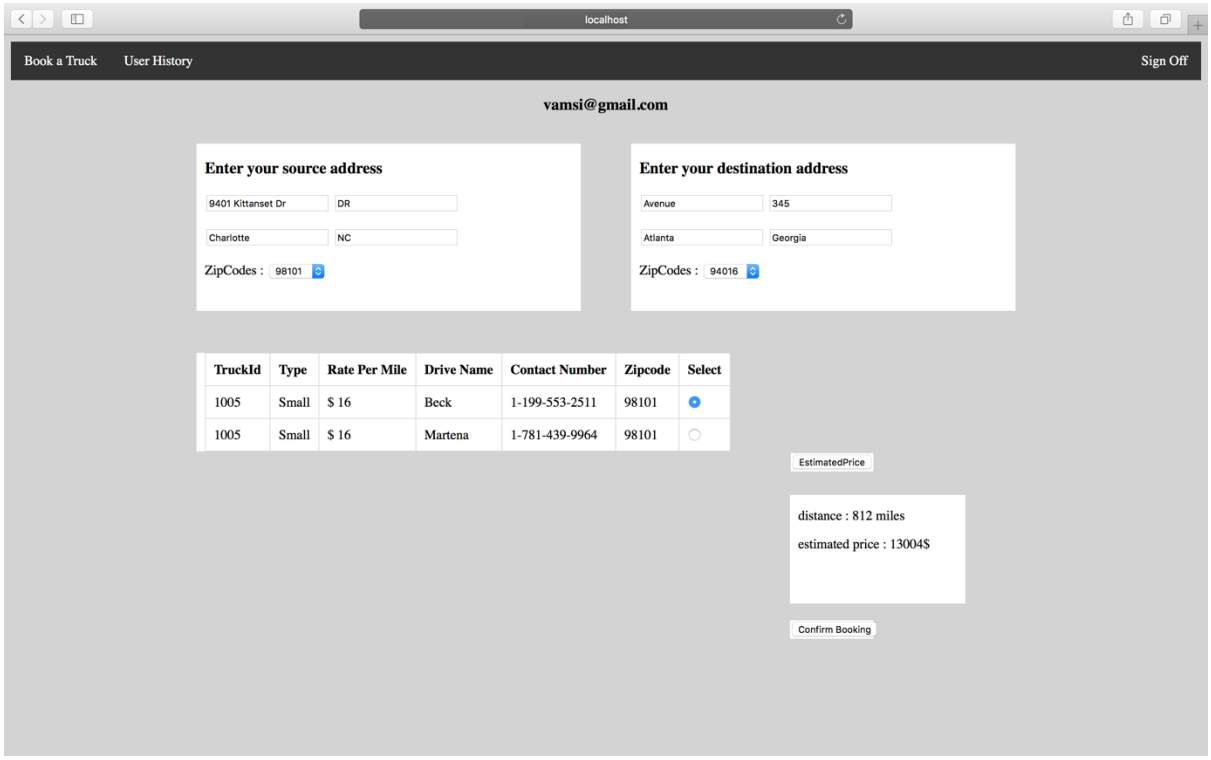
Select a truck based on availability:

As the availability of the trucks displayed, user should select one of the trucks and click on estimate price.



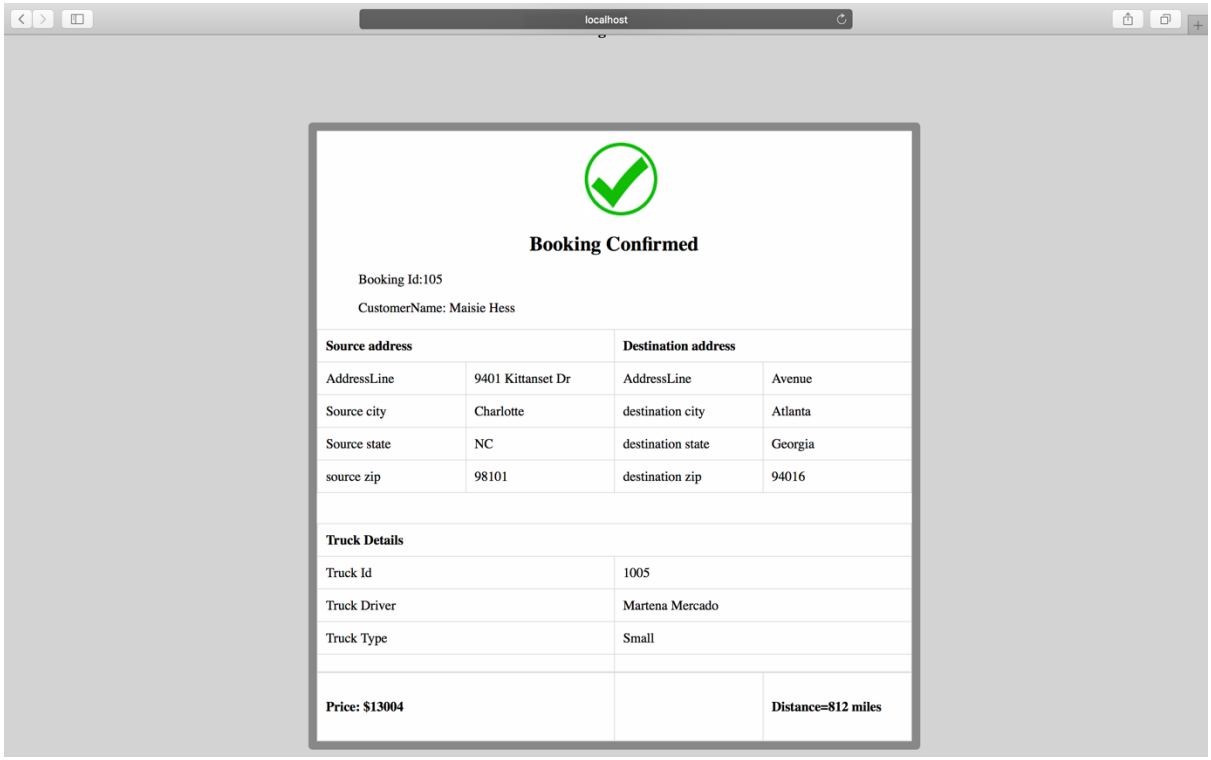
Check for estimated price:

Estimate price button displays the distance based on the zipcode and the price is calculated based on the Mile rate.



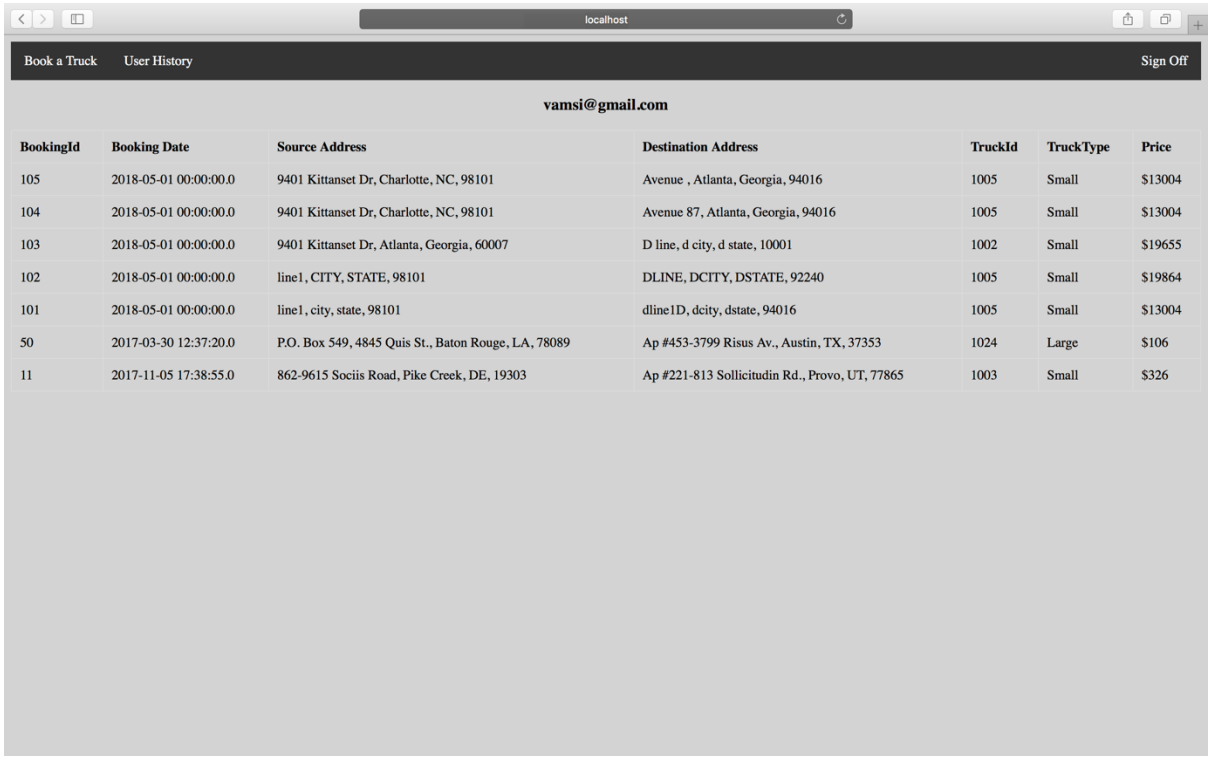
Confirm Booking:

This page gives a summary of the details which are given by the user while booking a truck.



User History:

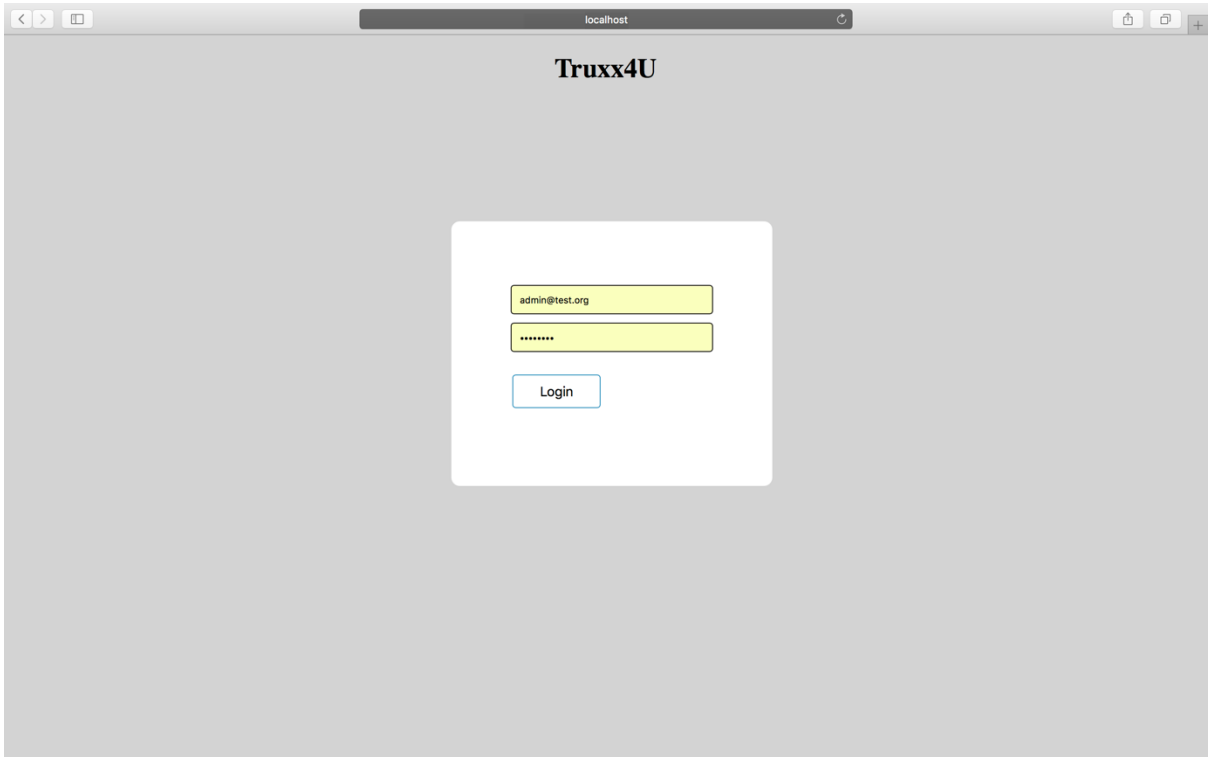
This page shows the list of trucks booked by a user over a period of time. Latest bookings comes on the top.



BookingId	Booking Date	Source Address	Destination Address	TruckId	TruckType	Price
105	2018-05-01 00:00:00.0	9401 Kittanset Dr, Charlotte, NC, 98101	Avenue , Atlanta, Georgia, 94016	1005	Small	$13004
104	2018-05-01 00:00:00.0	9401 Kittanset Dr, Charlotte, NC, 98101	Avenue 87, Atlanta, Georgia, 94016	1005	Small	$13004
103	2018-05-01 00:00:00.0	9401 Kittanset Dr, Atlanta, Georgia, 60007	D line, d city, d state, 10001	1002	Small	$19655
102	2018-05-01 00:00:00.0	line1, CITY, STATE, 98101	DLINE, DCITY, DSTATE, 92240	1005	Small	$19864
101	2018-05-01 00:00:00.0	line1, city, state, 98101	dline1D, dcity, dstate, 94016	1005	Small	$13004
50	2017-03-30 12:37:20.0	P.O. Box 549, 4845 Quis St., Baton Rouge, LA, 78089	Ap #453-3799 Risus Av., Austin, TX, 37353	1024	Large	$106
11	2017-11-05 17:38:55.0	862-9615 Sociis Road, Pike Creek, DE, 19303	Ap #221-813 Sollicitudin Rd., Provo, UT, 77865	1003	Small	$326

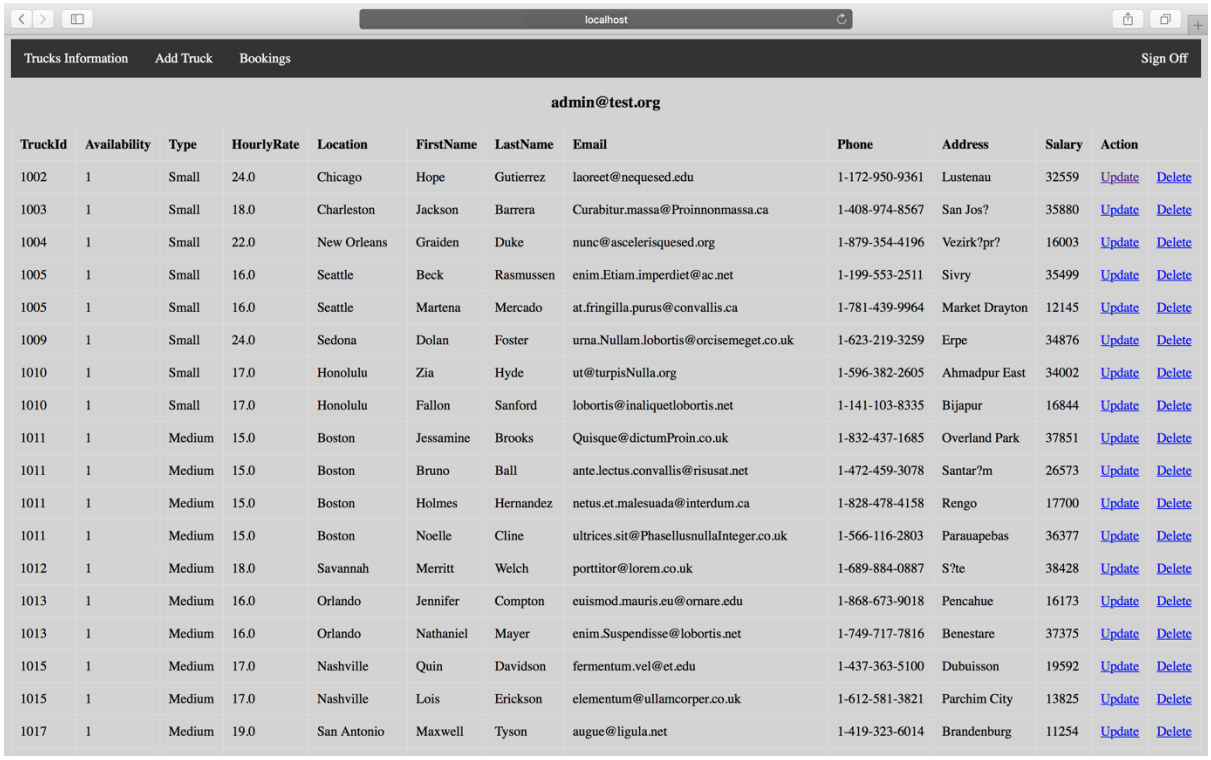
Admin Login:

Login page is same for both admin and enduser.



List of Available Trucks:

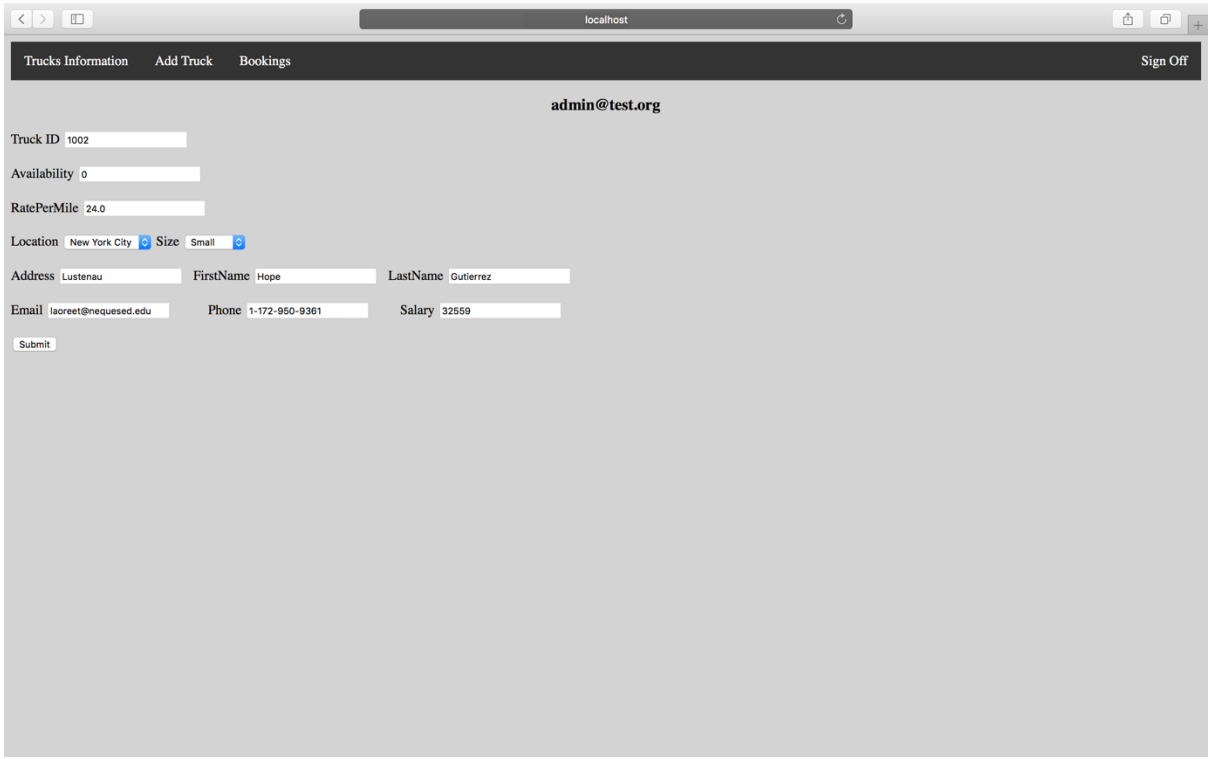
This is the landing page of the admin, this page displays the list of available trucks in the database. Admin can control the availability of the existing trucks by selecting update and changing the availability to zero.



TruckId	Availability	Type	HourlyRate	Location	FirstName	LastName	Email	Phone	Address	Salary	Action	
1002	1	Small	24.0	Chicago	Hope	Gutierrez	laoreet@nequesed.edu	1-172-950-9361	Lustenau	32559	Update	Delete
1003	1	Small	18.0	Charleston	Jackson	Barrera	Curabitur.massa@Proinnonmassa.ca	1-408-974-8567	San Jos?	35880	Update	Delete
1004	1	Small	22.0	New Orleans	Graiden	Duke	nunc@ascelerisquesed.org	1-879-354-4196	Vezirk?pr?	16003	Update	Delete
1005	1	Small	16.0	Seattle	Beck	Rasmussen	enim.Etiam.imperdiet@ac.net	1-199-553-2511	Sivry	35499	Update	Delete
1005	1	Small	16.0	Seattle	Martena	Mercado	at.fringilla.purus@convallis.ca	1-781-439-9964	Market Drayton	12145	Update	Delete
1009	1	Small	24.0	Sedona	Dolan	Foster	urna.Nullam.lobortis@orcisemeget.co.uk	1-623-219-3259	Erpe	34876	Update	Delete
1010	1	Small	17.0	Honolulu	Zia	Hyde	ut@turpisNulla.org	1-596-382-2605	Ahmadpur East	34002	Update	Delete
1010	1	Small	17.0	Honolulu	Fallon	Sanford	lobortis@inaliquetlobortis.net	1-141-103-8335	Bijapur	16844	Update	Delete
1011	1	Medium	15.0	Boston	Jessamine	Brooks	Quisque@dictumProin.co.uk	1-832-437-1685	Overland Park	37851	Update	Delete
1011	1	Medium	15.0	Boston	Bruno	Ball	ante.lectus.convallis@risusat.net	1-472-459-3078	Santar?m	26573	Update	Delete
1011	1	Medium	15.0	Boston	Holmes	Hernandez	netus.et.malesuada@interdum.ca	1-828-478-4158	Rengo	17700	Update	Delete
1011	1	Medium	15.0	Boston	Noelle	Cline	ultrices.sit@PhasellusnullaInteger.co.uk	1-566-116-2803	Parauapebas	36377	Update	Delete
1012	1	Medium	18.0	Savannah	Merritt	Welch	porttitor@lorem.co.uk	1-689-884-0887	S?te	38428	Update	Delete
1013	1	Medium	16.0	Orlando	Jennifer	Compton	euismod.mauris.eu@ornare.edu	1-868-673-9018	Pencahue	16173	Update	Delete
1013	1	Medium	16.0	Orlando	Nathaniel	Mayer	enim.Suspendisse@lobortis.net	1-749-717-7816	Benestare	37375	Update	Delete
1015	1	Medium	17.0	Nashville	Quin	Davidson	fermentum.vel@et.edu	1-437-363-5100	Dubuisson	19592	Update	Delete
1015	1	Medium	17.0	Nashville	Lois	Erickson	elementum@ullamcorper.co.uk	1-612-581-3821	Parchim City	13825	Update	Delete
1017	1	Medium	19.0	San Antonio	Maxwell	Tyson	augue@ligula.net	1-419-323-6014	Brandenburg	11254	Update	Delete

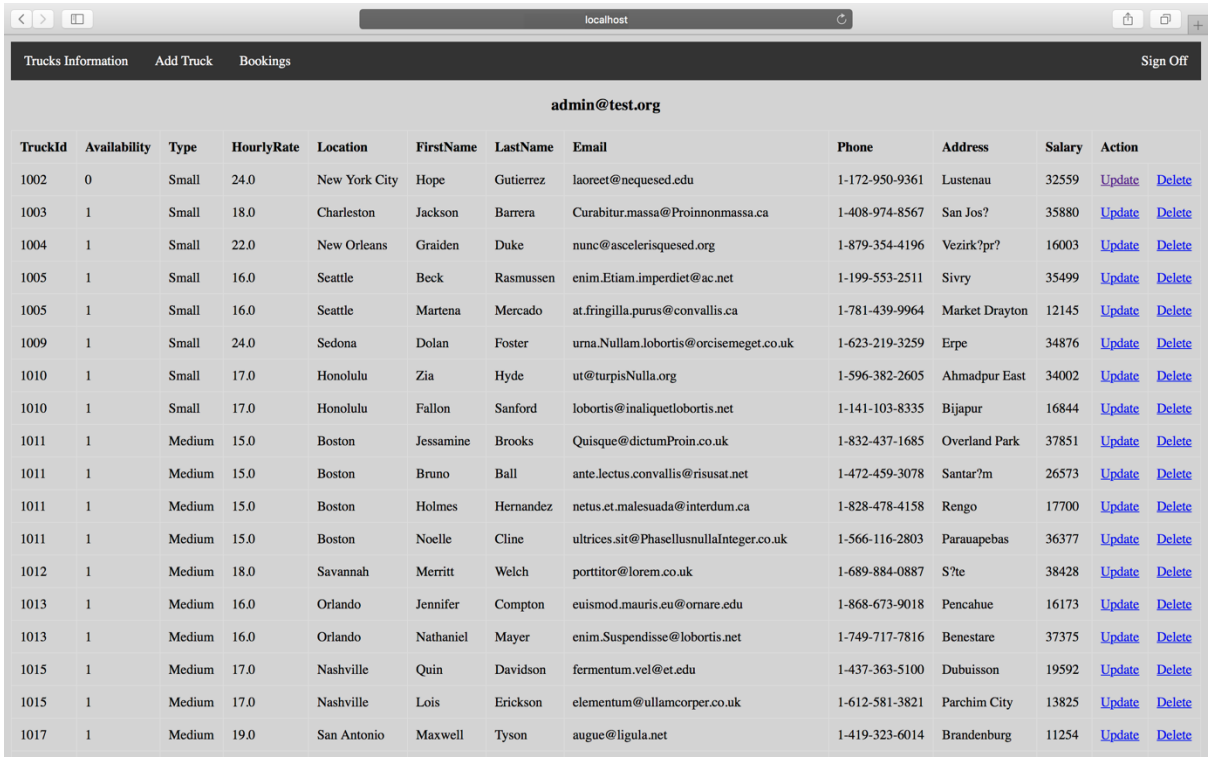
Update an existing truck:

Click on update in the truck list and the previous details will be populated, truckId cannot be updated because it is auto generated.



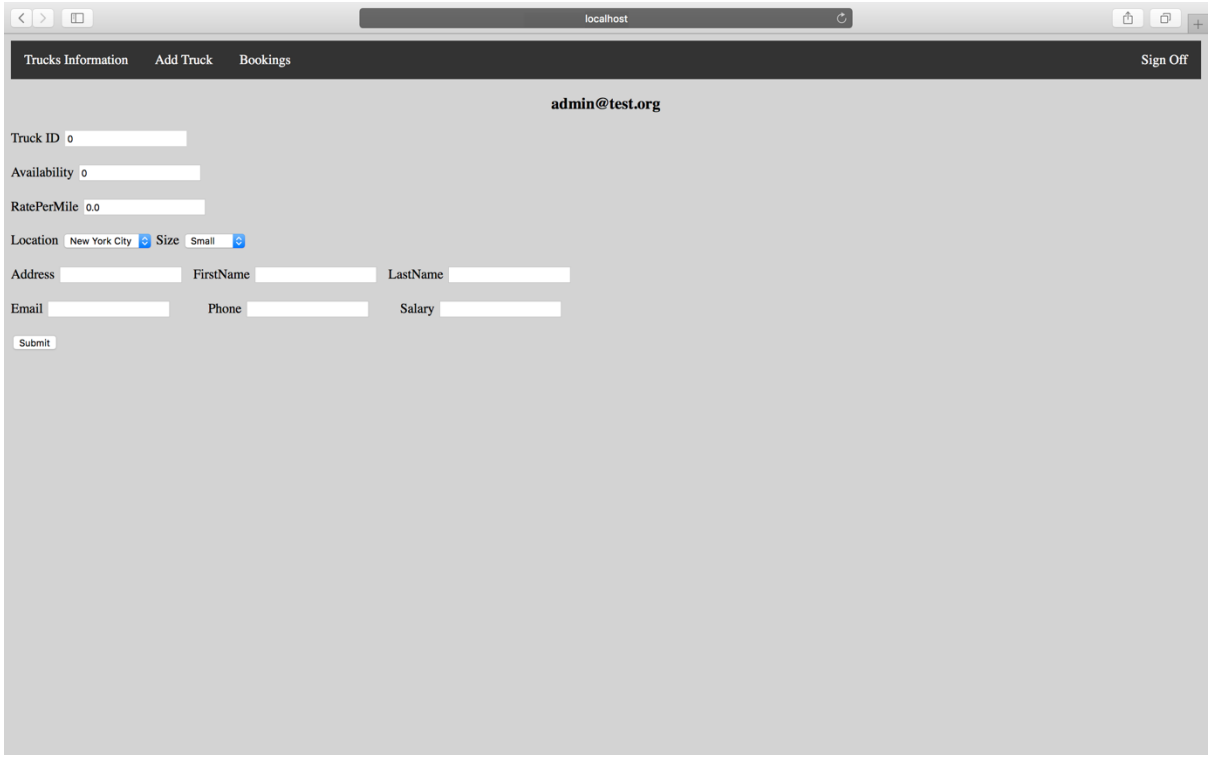
Updated trucks information:

Trucks list will be dynamically updated and displayed.



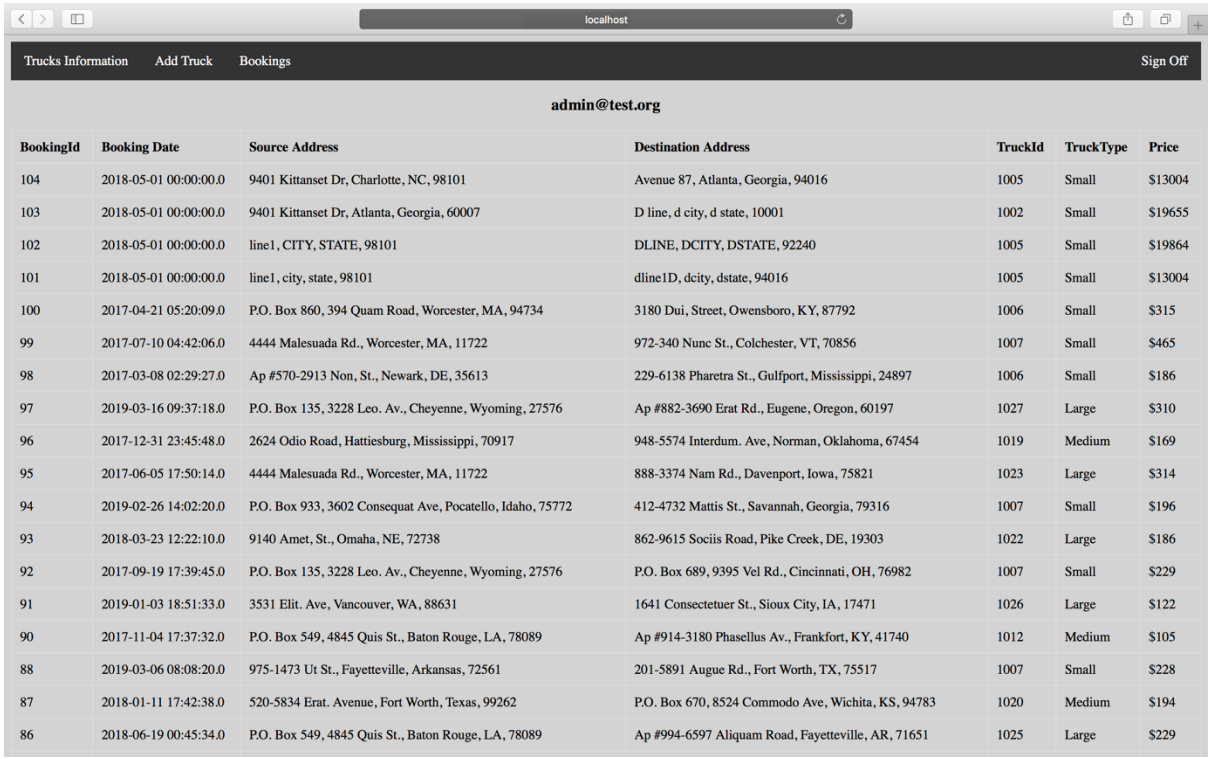
TruckId	Availability	Type	HourlyRate	Location	FirstName	LastName	Email	Phone	Address	Salary	Action	
1002	0	Small	24.0	New York City	Hope	Gutierrez	laoreet@nequesed.edu	1-172-950-9361	Lustenau	32559	Update	Delete
1003	1	Small	18.0	Charleston	Jackson	Barrera	Curabitur.massa@Proinnonmassa.ca	1-408-974-8567	San Jos?	35880	Update	Delete
1004	1	Small	22.0	New Orleans	Graiden	Duke	nunc@ascelerisquesed.org	1-879-354-4196	Vezirk?pr?	16003	Update	Delete
1005	1	Small	16.0	Seattle	Beck	Rasmussen	enim.Etiam.imperdiet@ac.net	1-199-553-2511	Sivry	35499	Update	Delete
1005	1	Small	16.0	Seattle	Martena	Mercado	at.fringilla.purus@convallis.ca	1-781-439-9964	Market Drayton	12145	Update	Delete
1009	1	Small	24.0	Sedona	Dolan	Foster	urna.Nullam.lobortis@orcisemeget.co.uk	1-623-219-3259	Erpe	34876	Update	Delete
1010	1	Small	17.0	Honolulu	Zia	Hyde	ut@turpisNulla.org	1-596-382-2605	Ahmadpur East	34002	Update	Delete
1010	1	Small	17.0	Honolulu	Fallon	Sanford	lobortis@inaliquetlobortis.net	1-141-103-8335	Bijapur	16844	Update	Delete
1011	1	Medium	15.0	Boston	Jessamine	Brooks	Quisque@dictumProin.co.uk	1-832-437-1685	Overland Park	37851	Update	Delete
1011	1	Medium	15.0	Boston	Bruno	Ball	ante.lectus.convallis@risusat.net	1-472-459-3078	Santar?m	26573	Update	Delete
1011	1	Medium	15.0	Boston	Holmes	Hernandez	netus.et.malesuada@interdum.ca	1-828-478-4158	Rengo	17700	Update	Delete
1011	1	Medium	15.0	Boston	Noelle	Cline	ultrices.sit@PhasellusnullaInteger.co.uk	1-566-116-2803	Parauapebas	36377	Update	Delete
1012	1	Medium	18.0	Savannah	Merritt	Welch	porttitor@lorem.co.uk	1-689-884-0887	S?te	38428	Update	Delete
1013	1	Medium	16.0	Orlando	Jennifer	Compton	euismod.mauris.eu@ornare.edu	1-868-673-9018	Pencahue	16173	Update	Delete
1013	1	Medium	16.0	Orlando	Nathaniel	Mayer	enim.Suspendisse@lobortis.net	1-749-717-7816	Benestare	37375	Update	Delete
1015	1	Medium	17.0	Nashville	Quin	Davidson	fermentum.vel@et.edu	1-437-363-5100	Dubuisson	19592	Update	Delete
1015	1	Medium	17.0	Nashville	Lois	Erickson	elementum@ullamcorper.co.uk	1-612-581-3821	Parchim City	13825	Update	Delete
1017	1	Medium	19.0	San Antonio	Maxwell	Tyson	augue@ligula.net	1-419-323-6014	Brandenburg	11254	Update	Delete

Add A truck: This screen is used to add truck to the new location or add a new truck.



Booking History:

This page displays the list of end user bookings.



BookingId	Booking Date	Source Address	Destination Address	TruckId	TruckType	Price
104	2018-05-01 00:00:00.0	9401 Kittanset Dr, Charlotte, NC, 98101	Avenue 87, Atlanta, Georgia, 94016	1005	Small	$13004
103	2018-05-01 00:00:00.0	9401 Kittanset Dr, Atlanta, Georgia, 60007	D line, d city, d state, 10001	1002	Small	$19655
102	2018-05-01 00:00:00.0	line1, CITY, STATE, 98101	DLINE, DCITY, DSTATE, 92240	1005	Small	$19864
101	2018-05-01 00:00:00.0	line1, city, state, 98101	dline1D, dcity, dstate, 94016	1005	Small	$13004
100	2017-04-21 05:20:09.0	P.O. Box 860, 394 Quam Road, Worcester, MA, 94734	3180 Dui, Street, Owensboro, KY, 87792	1006	Small	$315
99	2017-07-10 04:42:06.0	4444 Malesuada Rd., Worcester, MA, 11722	972-340 Nunc St., Colchester, VT, 70856	1007	Small	$465
98	2017-03-08 02:29:27.0	Ap #570-2913 Non, St., Newark, DE, 35613	229-6138 Pharetra St., Gulfport, Mississippi, 24897	1006	Small	$186
97	2019-03-16 09:37:18.0	P.O. Box 135, 3228 Leo. Av., Cheyenne, Wyoming, 27576	Ap #882-3690 Erat Rd., Eugene, Oregon, 60197	1027	Large	$310
96	2017-12-31 23:45:48.0	2624 Odio Road, Hattiesburg, Mississippi, 70917	948-5574 Interdum. Ave, Norman, Oklahoma, 67454	1019	Medium	$169
95	2017-06-05 17:50:14.0	4444 Malesuada Rd., Worcester, MA, 11722	888-3374 Nam Rd., Davenport, Iowa, 75821	1023	Large	$314
94	2019-02-26 14:02:20.0	P.O. Box 933, 3602 Consequat Ave, Pocatello, Idaho, 75772	412-4732 Mattis St., Savannah, Georgia, 79316	1007	Small	$196
93	2018-03-23 12:22:10.0	9140 Amet, St., Omaha, NE, 72738	862-9615 Sociis Road, Pike Creek, DE, 19303	1022	Large	$186
92	2017-09-19 17:39:45.0	P.O. Box 135, 3228 Leo. Av., Cheyenne, Wyoming, 27576	P.O. Box 689, 9395 Vel Rd., Cincinnati, OH, 76982	1007	Small	$229
91	2019-01-03 18:51:33.0	3531 Elit. Ave, Vancouver, WA, 88631	1641 Consectetuer St., Sioux City, IA, 17471	1026	Large	$122
90	2017-11-04 17:37:32.0	P.O. Box 549, 4845 Quis St., Baton Rouge, LA, 78089	Ap #914-3180 Phasellus Av., Frankfort, KY, 41740	1012	Medium	$105
88	2019-03-06 08:08:20.0	975-1473 Ut St., Fayetteville, Arkansas, 72561	201-5891 Augue Rd., Fort Worth, TX, 75517	1007	Small	$228
87	2018-01-11 17:42:38.0	520-5834 Erat. Avenue, Fort Worth, Texas, 99262	P.O. Box 670, 8524 Commodo Ave, Wichita, KS, 94783	1020	Medium	$194
86	2018-06-19 00:45:34.0	P.O. Box 549, 4845 Quis St., Baton Rouge, LA, 78089	Ap #994-6597 Aliquam Road, Fayetteville, AR, 71651	1025	Large	$229

Advanced SQL Statements

1. Stored Procedure
    - *addTruckAndDriver:* As 1 truck is associated with 1 driver, whenever admin adds 1 truck, 1 driver needs to be entered into database.
        - this procedure is called when we perform insert operation on truck and it accepts parameters as *address, firstName, lastName, email, phone, salary and truckID* of last entered
    - *adminReport:* This procedure calls view *'BookingDetailsView'* and displays data required for adminstration purposes
    - *updateTruckandDriver:* This procedure is called when admin wants to update some records related to Truck or its associated driver
        - It takes parameters as follows:
          truckID, availability, ratePerMile, type, cityname, address, firstName, lastName, email, phone, salary,
        - It updates the truck and respective driver and person table records by updating these parameters.

2. Trigger
    - *truck_BEFORE_DELETE*: Whenever we delete a truck, its corresponding driver need to be deleted from database first as *truckID* is foreign key in driver's table. Hence this trigger will first delete the corresponding driver and then delete query for truck will be executed.
    - *truck_AFTER_DELETE*: After delete operation is successful, we add one entry into logger table specifying operation and the *truckID* of deleted truck. This operation is performed using the mentioned trigger.

3. Views
    - *bookingdetailsuser*: This view displays sum spent by user and his first and last name. It can be queried for total amount spent

by user by passing his *userID*. It can also be used on admin side to see user wise total spending.

- *bookingdetailsview*: It is the view which gives booking details and also its corresponding addresses in detail which are mapped from the address table.
- *driverreport*: This view gives details of driver with his or her details, its associated *truckID* and total distance travelled
- *truckdetails*: This view will give details of truck and its associated driver with its details such as name, phone, address, etc.

4. Transaction

- In the procedure `*addTruckAndDriver*`, we are implementing all the inserts in one transaction and commit is called before procedure ends. Hence logically, it executes serially and atomicity is also maintained.

Data Dictionary

Data dictionary is a file or set of files that contains database metadata. It usually describes about the objects present in the database i.e. ownership, tables, relationships, etc.

a. Login

Column	Type	Default Value	Nullable	Character Set	Collation	Privileges
Person_PersonId	int(11)		NO			select,insert,update,references
Username	varchar(45)		NO	utf8	utf8_general_ci	select,insert,update,references
Password	varchar(45)		NO	utf8	utf8_general_ci	select,insert,update,references

b. Person

Column	Type	Default Value	Nullable	Character Set	Collation	Privileges
PersonId	int(11)		NO			select,insert,update,references
Address	varchar(100)		YES	utf8	utf8_general_ci	select,insert,update,references
FirstName	varchar(45)		YES	utf8	utf8_general_ci	select,insert,update,references
LastName	varchar(45)		YES	utf8	utf8_general_ci	select,insert,update,references
Email	varchar(45)		YES	utf8	utf8_general_ci	select,insert,update,references
Phone	varchar(45)		YES	utf8	utf8_general_ci	select,insert,update,references

c. User

Column	Type	Default Value	Nullable	Character Set	Collation	Privileges
Person_PersonId	int(11)		NO			select,insert,update,references

d. Driver

Column	Type	Default Value	Nullable	Character Set	Collation	Privileges
Person_PersonId	int(11)		NO			select,insert,update,references
Salary	decimal(10,0)		YES			select,insert,update,references
Truck_TruckID	int(11)		NO			select,insert,update,references

e. Location

Column	Type	Default Value	Nullable	Character Set	Collation	Privileges
LocationID	int(11)		NO			select,insert,update,references
ZipCode	int(11)		YES			select,insert,update,references
City	varchar(15)		YES	utf8	utf8_general_ci	select,insert,update,references

f. Truck

Column	Type	Default Value	Nullable	Character Set	Collation	Privileges
TruckID	int(11)		NO			select,insert,update,references
Availibility	tinyint(4)		YES			select,insert,update,references
Type	varchar(15)		YES	utf8	utf8_general_ci	select,insert,update,references
HourlyRate	decimal(10,0)		YES			select,insert,update,references
Location_LocationID	int(11)		NO			select,insert,update,references

g. Address

Column	Type	Default Value	Nullable	Character Set	Collation	Privileges
AddressId	int(11)		NO			select,insert,update,references
AddressLine	varchar(45)		YES	utf8	utf8_general_ci	select,insert,update,references
City	varchar(20)		YES	utf8	utf8_general_ci	select,insert,update,references
State	varchar(45)		YES	utf8	utf8_general_ci	select,insert,update,references
Zip	varchar(45)		YES	utf8	utf8_general_ci	select,insert,update,references

h. BookingDetails

Column	Type	Default Value	Nullable	Character Set	Collation	Privileges
BookingId	int(11)		NO			select,insert,update,references
Price	decimal(10,0)		YES			select,insert,update,references
BookingDate	datetime		YES			select,insert,update,references
Distance	decimal(10,0)		YES			select,insert,update,references
User_Person_PersonId	int(11)		NO			select,insert,update,references
SourceAddress_Addr...	int(11)		NO			select,insert,update,references
DestinationAddress_...	int(11)		NO			select,insert,update,references
Truck_TruckID	int(11)		NO			select,insert,update,references

i. Logger

Column	Type	Default Value	Nullable	Character Set	Collation	Privileges
logger_id	int(11)		NO			select,insert,update,references
operation	varchar(45)		YES	utf8	utf8_general_ci	select,insert,update,references
TruckID	int(11)		YES			select,insert,update,references

References

i. https:// .w3schools.com/sql/
ii. https:// .javatpoint.com/jsp-tutorial
iii. https:// .guru99.com/introduction-to-mysql-workbench.html