UNIVERSITY OF WESTMINSTER

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INFORMATICS INSTITUTE OF TECHNOLOGY

5COSC020W

DATABASE SYSTEMS

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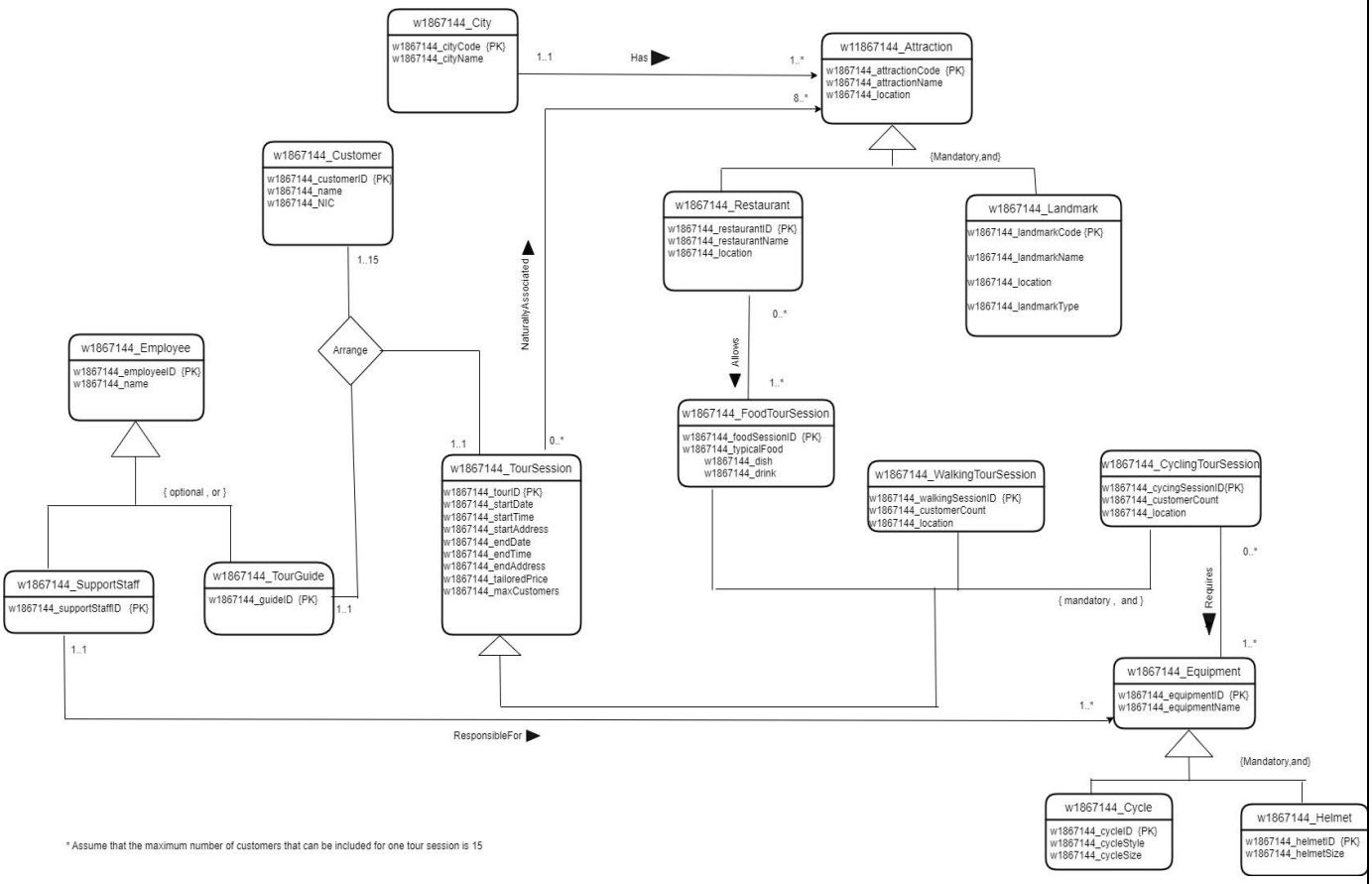
Tutorial Group : E

Assignment Type : Individual

Contents

QUESTION 1



* Assume that the maximum number of customers that can be included for one tour session is 15

QUESTION 2

Entity	Brief Description
w1867144_Customer	Customers that place bookings in tourmato
w1867144_City	The cities which has selected by tourmato to visit toursessions
w1867144_Attraction	The attractions that has identified by tourmato to visit toursessions
w1867144_Restaurant	The restaurants that has selected by tourmato to visit food tour sessions
w1867144_Landmark	Landmarks that has selected by tourmato as tourist attractions
w1867144_Employee	The employees who are working in tourmato
w1867144_SupportStaff	The employees who are specified as support staff in tourmato
w1867144_TourGuide	The employees who are specified as tour guides in tourmato
w1867144_TourSession	Customized visiting tour sessions offered by tourmato to their customers
w1867144_FoodTourSession	Special food sessions allows for the customers by the restaurants
w1867144_WalkingTourSession	Walking tour sessions arranged by tourmato according to the customers' choice
w1867144_CyclingTourSession	Cycling tour sessions arranged by tourmato according to the customers' choice
w1867144_Equipment	The equipments that provide by tourmato for their customers to be used during the cycling tour sessions
w1867144_Cycle	The cycles that provide by tourmato for their customers to be used during cycling tour sessions
w1867144_Helmet	The helmets that provide by tourmato for their customers to be used during cycling tour sessions

General entity	Specialised entity	Brief description
w1867144_Attraction	w1867144_Restaurant	The restaurants that has selected by tourmato to visit food tour sessions
	w1867144_Landmark	Landmarks that has selected by tourmato as tourist attractions
w1867144_TourSession	w1867144_WalkingTourSession	Walking tour sessions arranged by tourmato according to the customers' choice
	w1867144_CyclingTourSession	Cycling tour sessions arranged by tourmato according to the customers' choice
	w1867144_FoodTourSession	Special food sessions allows for the customers by the restaurants
w1867144_Employee	w1867144_TourGuide	The employees who are specified as tour guides in tourmato
	w1867144_SupportStaff	The employees who are specified as support staff in tourmato
w1867144_Equipment	w1867144_Cycle	The cycles that provide by tourmato for their customers to be used during cycling tour sessions
	w1867144_Helmet	The helmets that provide by tourmato for their customers to be used during cycling tour sessions

QUESTION 3

Entity name	Multiplicity	Relationship	Multiplicity	Entity name	Brief justifications for the multiplicity (4 statements for each relationship
w1867144_City	1..1	has	1..*	w1867144_Attraction	One city must have minimum one attraction
					One city can be have many attractions
					One attraction must have minimum one city
					One attraction must have maximum one city
w1867144_TourSession	0..*	NaturallyAssociated	8..*	w1867144_Attraction	One tour session must naturally associated with minimum 8 attractions
					One tour session can be naturally associated with many attractions
					One attraction may not naturally associated with any tour session
					One attraction can be naturally associated with many attractions
w1867144_Restaurant	0..*	Allows	1..*	w1867144_FoodTourSession	One restaurant must allow minimum one food tour session
					One restaurant can be allow many food tour sessions
					One food tour session may not be allow for any restaurant
					One food tour session can be allow for many restaurants
w1867144_CyclingTourSession	0..*	Requires	1..*	w1867144_Equipment	One cycling tour session must be requires minimum one equipment
					One cycling tour session can be require many equipments
					One equipment may not be require for any cycling tour session
					One equipment can be require for many cycling tour sessions
w1867144_Support Staff	1..1	ResponsibleFor	1..*	w1867144_Equipment	One support staff must be responsible for minimum one equipment
					One support staff can be responsible for many equipments

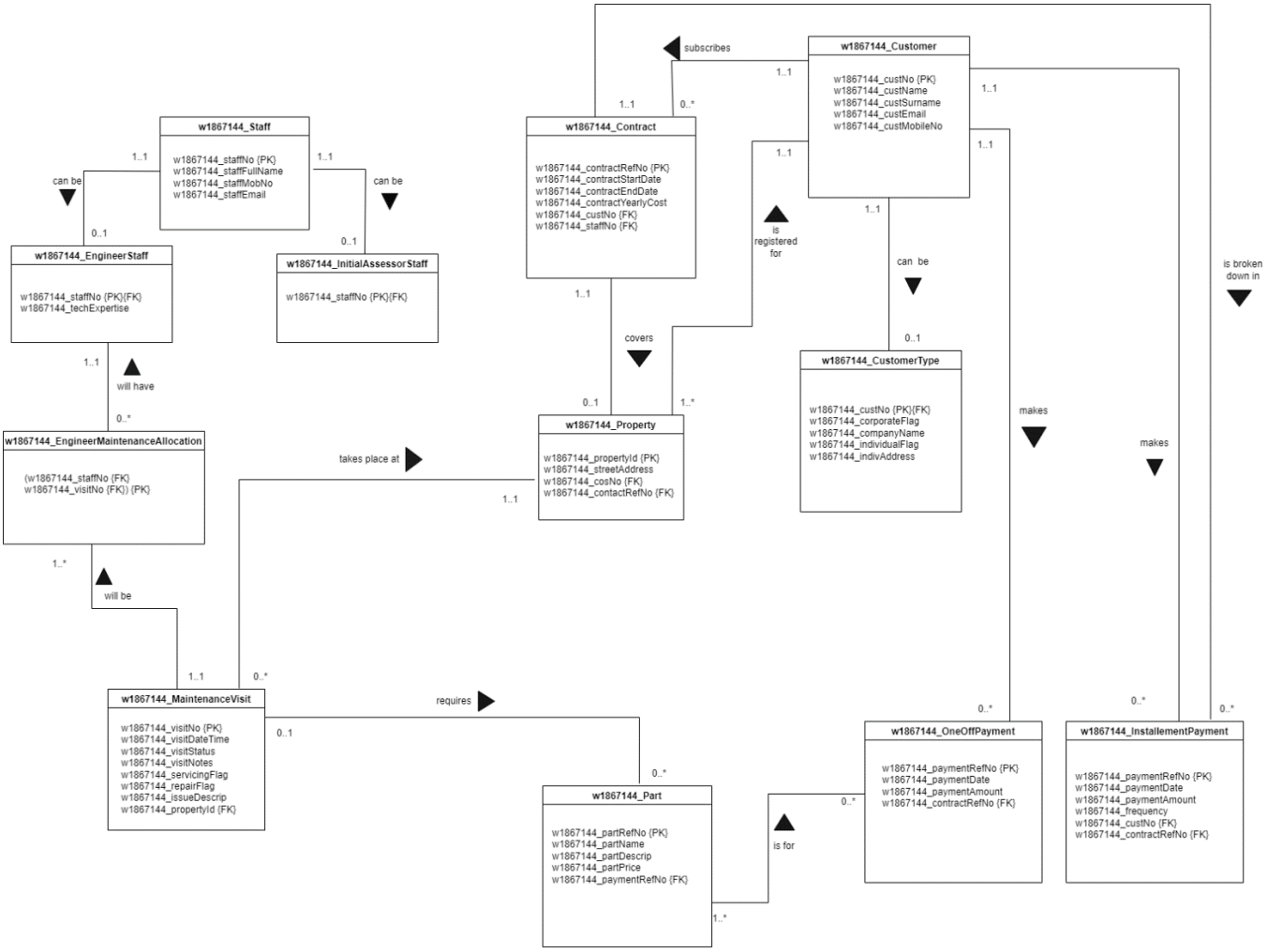
					One equipment must be responsible by minimum one staff
					One equipment must be responsible by maximum one staff
w1867144_Customer	1..15	Arrange	1..1	w1867144_TourGuide	One customer can be arrange minimum one tour session with minimum one tour guide
			1..1	w1867144_TourSession	One customer can be arrange maximum of one tour session with maximum of one tour guide
w1867144_TourGuide	1..1	Arrange	1..15	w1867144_Customer	One tour guide can arrange minimum of one tour session for minimum of one customer
			1..1	w1867144_TourSession	One tour guide can arrange maximum of one tour session for maximum of 15 customers
w1867144_TourSession	1..1	Arrange	1..1	w1867144_TourGuide	One tour session can be arrange by minimum one tour guide for minimum one customer
			1..15	w1867144_Customer	One tour session can be arrange by maximum of one tour guide for maximum of 15 customers

QUESTION 4

Entity name	Attributes for this entity (include PK)	Brief explanation
w1867144_Customer	w1867144_customerID {PK}	Code to identify the customer uniquely
	w1867144_name	Name of the customer
	w1867144_NIC	National identity card number of the customer
w1867144_City	w1867144_cityCode {PK}	Code to identify the city uniquely
	w1867144_cityName	Name of the city
w1867144_Attraction	w1867144_attractionCode {PK}	Code to identify the attraction uniquely
	w1867144_attractionName	Name of the place where attraction is situated
	w1867144_location	Location of the attraction place
w1867144_Restaurant	w1867144_restaurantID {PK}	Code to identify the restaurant uniquely
	w1867144_restaurantName	Name of the restaurant
	w1867144_location	Location of the restaurant
w1867144_Landmark	w1867144_landmarkCode {PK}	Code to identify the landmark uniquely
	w1867144_landmarkName	Name of the place where landmark has identified
	w1867144_landmarkType	Type of the landmark
	w1867144_locaton	Location of the landmark
w1867144_TourSession	w1867144_tourID {PK}	Code to identify the session uniquely
	w1867144_startDate	Starting date of the tour sesssion
	w1867144_startAddress	Place where the tour session is begining
	w1867144_startTime	Starting time of the tour sesssion
	w1867144_endDate	ending date of the tour sesssion
	w18671444_endTime	Ending time of the tour session
	w1867144_endAddress	Place where the tour session is ending
	w1867144_tailoredPrice	Total price to be paid per one person for the tour
	w1867144_maxCustomers	Maximum number of customers could participate for the session
w1867144_CyclingTourSession	w1867144_cyclingTourSessionID {PK}	Code to identify the session uniquely
	w1867144_customerCount	Number of customers participating

	w1867144_location	Map where the tour session is at in current situations during the session
w1867144_WalkingTourSession	w1867144_walkingTourSessionID {PK}	Code to identify the session uniquely
	w1867144_customerCount	Number of customers participating
	w1867144_location	Map where the tour session is at in current situations during the session
w1867144_FoodTourSession	w1867144_foodTourSessionID {PK}	Code to identify the session uniquely
	w1867144_typicalFood	Food that the restaurants are providing
	w1867144_dish	Dishes they have for the food tour session
	w1867144_drink	Drinks they have for the food tour session
w1867144_Employee	w1867144_employeeID {PK}	Code to identify the employees uniquely
	w1867144_name	Name of the employee
w1867144_TourGuide	w1867144_guideID {PK}	Code to identify the tour guide uniquely
w1867144_SupportStaff	w1867144_supportStaffID {PK}	Code to identify the support staff uniquely
w1867144_Equipment	w1867144_equipmentID {PK}	Code to identify the equipment uniquely
	w1867144_equipmentName	Name of the equipment
w1867144_Cycle	w1867144_cycleID {PK}	Code to identify the cycles uniquely
	w1867144_cycleStyle	Style of the cycle
	w1867144_cycleSize	Size of the cycle
w1867144_Helmet	w1867144_helmetID {PK}	Code to identify the helmets uniquely
	w1867144_helmetSize	Size of the helmet

QUESTION 5


w1867144_Staff
w1867144_staffNo {PK}
w1867144_staffFullName
w1867144_staffMobNo
w1867144_staffEmail
can be
can be
1..1
1..1
0..1
0..1
w1867144_EngineerStaff
w1867144_staffNo {PK}{FK}
w1867144_techExpertise
w1867144_InitialAssessorStaff
w1867144_staffNo {PK}{FK}
1..1
will have
0..*
w1867144_EngineerMaintenanceAllocation
(w1867144_staffNo {FK}
w1867144_visitNo {FK}) {PK}
1..*
will be
1..1
0..*
w1867144_MaintenanceVisit
w1867144_visitNo {PK}
w1867144_visitDateTime
w1867144_visitStatus
w1867144_visitNotes
w1867144_servicingFlag
w1867144_repairFlag
w1867144_issueDescrip
w1867144_propertyId {FK}
takes place at
1..1
w1867144_Property
w1867144_propertyId {PK}
w1867144_streetAddress
w1867144_cosNo {FK}
w1867144_contactRefNo {FK}
requires
0..1
0..*
w1867144_Part
w1867144_partRefNo {PK}
w1867144_partName
w1867144_partDescrip
w1867144_partPrice
w1867144_paymentRefNo {FK}
1..*
is for
0..*
w1867144_Contract
w1867144_contractRefNo {PK}
w1867144_contractStartDate
w1867144_contractEndDate
w1867144_contractYearlyCost
w1867144_custNo {FK}
w1867144_staffNo {FK}
1..1
covers
0..1
1..*
subscribes
1..1
0..*
w1867144_Customer
w1867144_custNo {PK}
w1867144_custName
w1867144_custSurname
w1867144_custEmail
w1867144_custMobileNo
1..1
is registered for
1..1
1..1
can be
0..1
w1867144_CustomerType
w1867144_custNo {PK}{FK}
w1867144_corporateFlag
w1867144_companyName
w1867144_individualFlag
w1867144_indivAddress
makes
makes
is broken down in
0..*
w1867144_OneOffPayment
w1867144_paymentRefNo {PK}
w1867144_paymentDate
w1867144_paymentAmount
w1867144_contractRefNo {FK}
0..*
w1867144_InstallementPayment
w1867144_paymentRefNo {PK}
w1867144_paymentDate
w1867144_paymentAmount
w1867144_frequency
w1867144_custNo {FK}
w1867144_contractRefNo {FK}
0..*

QUESTION 6

Creation of customer table

CREATE TABLE w1867144_Customer

(

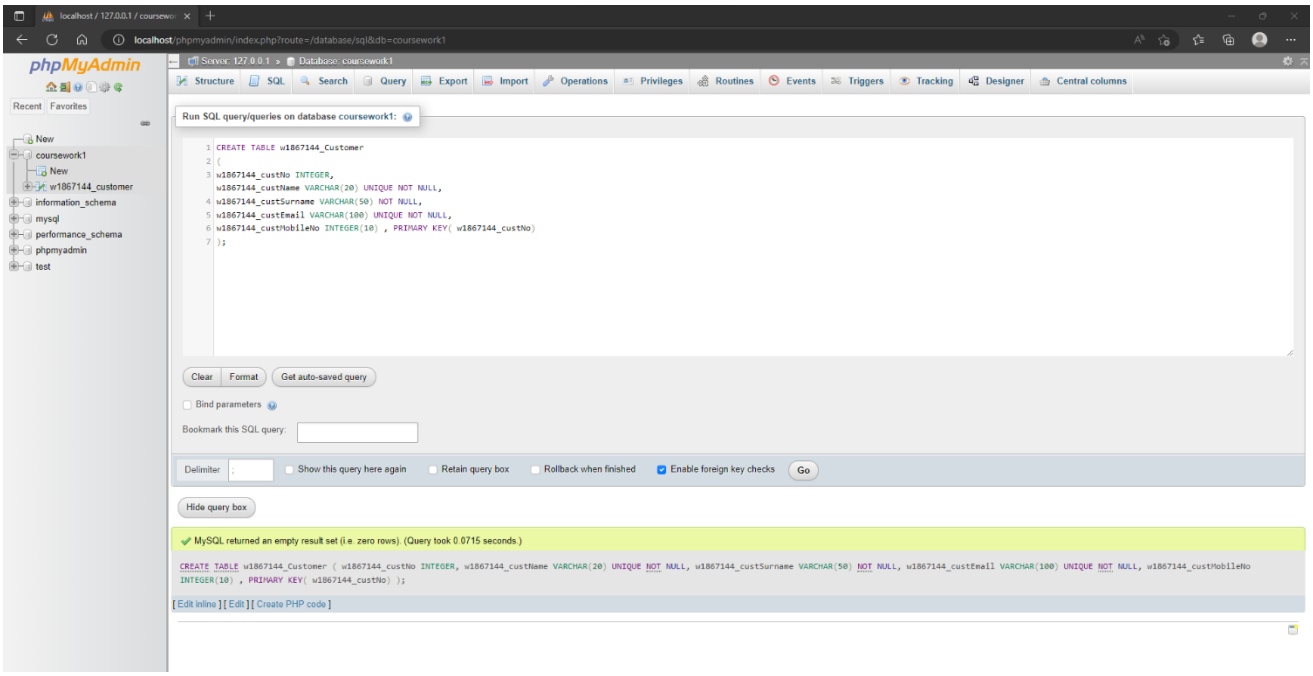
w1867144_custNo INTEGER,

w1867144_custName VARCHAR(20) UNIQUE NOT NULL,

w1867144_custSurname VARCHAR(50) NOT NULL, w1867144_custEmail VARCHAR(100) UNIQUE NOT NULL,

w1867144_custMobileNo INTEGER(10) , PRIMARY KEY(w1867144_custNo)

);



Populating customer table

w1867144_Customer (w1867144_custNo, w1867144_custName, w1867144_custSurname, w1867144_custEmail, w1867144_ custMobileNo)

VALUES

(01,'rishma','pathirana','rishma@gmail.com', 0764884890),

(02,'nethmi','fernando','nethmi@gmail.com', 0779656437),

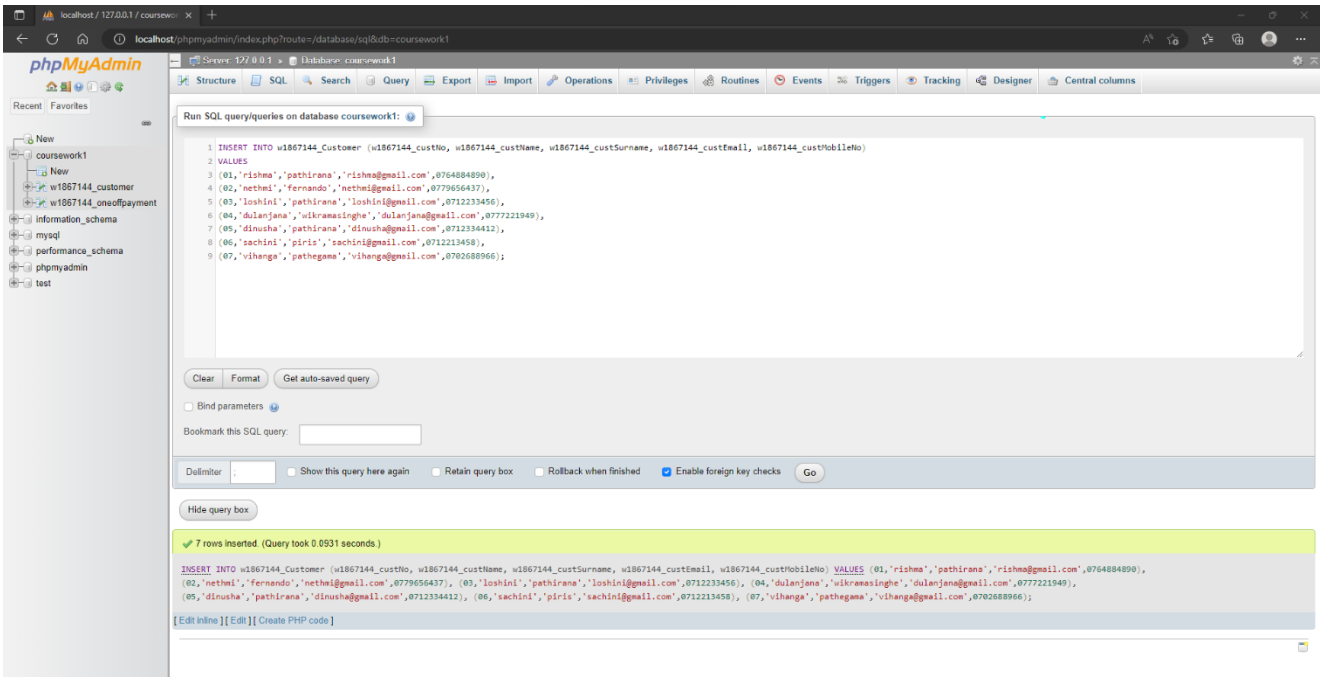
(03,'loshini','pathirana','los@gmail.com',0712233456),

(04,'dulanjana','wikramasinghe','dulanjana@gmail.com', 0777221949),

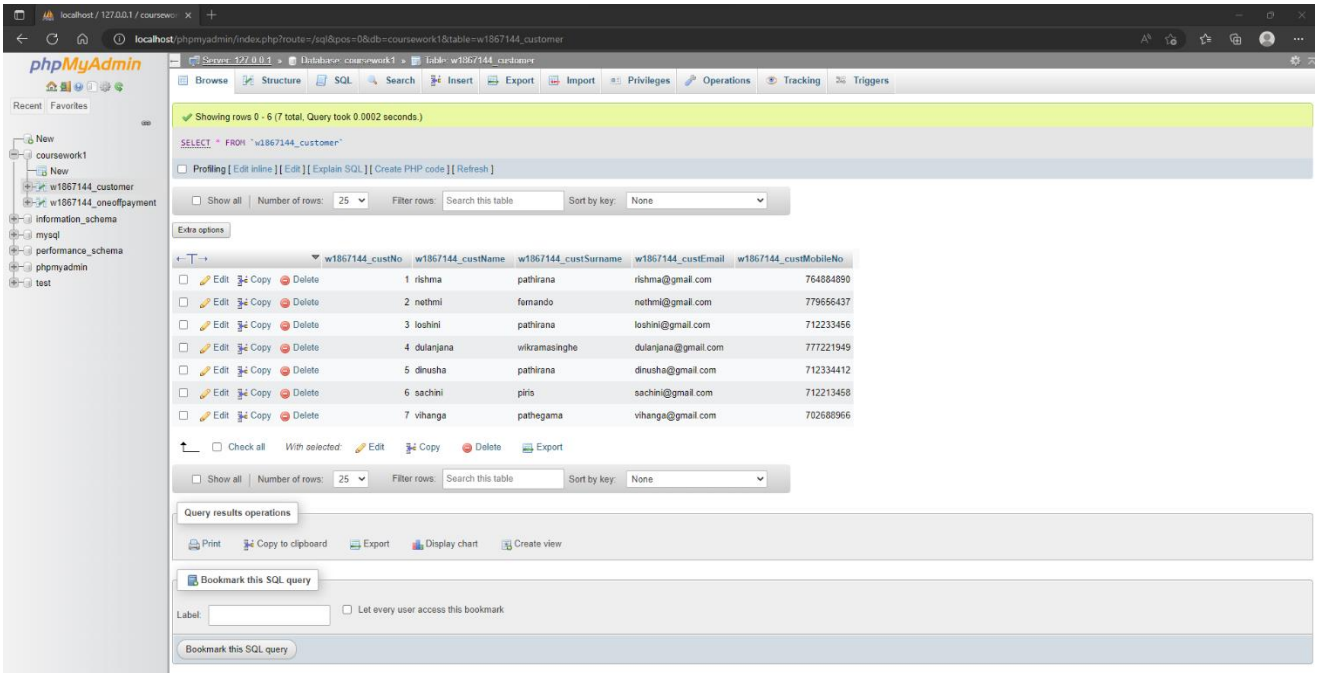
(05,'dinusha','pathirana','dinusha@gmail.com', 0712334412),

(06,'sachini','piris','sachini@gmail.com',0712213458),

(07,'vihanga','pathegama','vihanga@gmail.com', 0702688966);



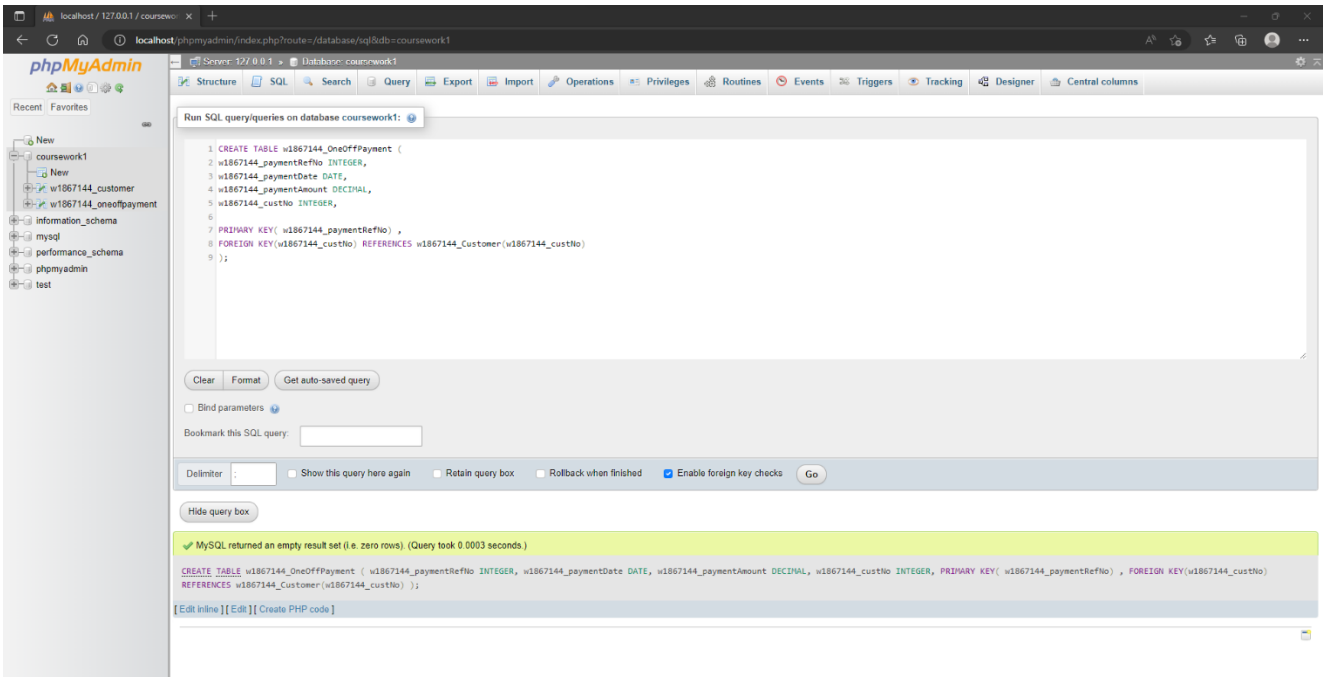
Customer table



Creation of one off payment table

```
CREATE TABLE w1867144_OneOffPayment (
w1867144_paymentRefNo INTEGER,
w1867144_paymentDate DATE,
w1867144_paymentAmount DECIMAL,
w1867144_custNo INTEGER,

PRIMARY KEY( w1867144_paymentRefNo) ,
FOREIGN KEY(w1867144_custNo) REFERENCES w1867144_Customer(w1867144_custNo)
);
```



Populating one off payment table

INSERT INTO

w1867144_OneOffPayment(w1867144_paymentRefNo, w1867144_paymentDate, w1867144_paymentAmount, w1867144_custNo)

VALUES

(101,'2022-11-01',90.00,04),

(102,'2022-11-21',35.00,05),

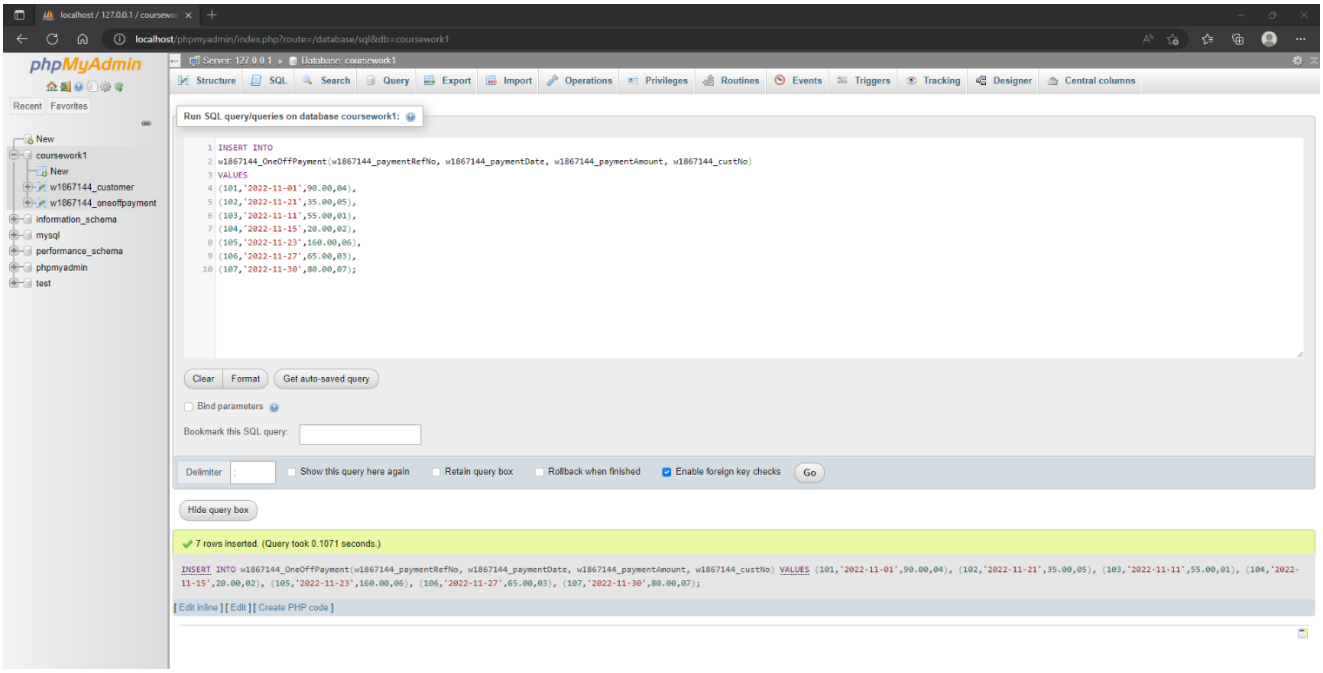
(103,'2022-11-11',55.00,01),

(104,'2022-11-15',20.00,02),

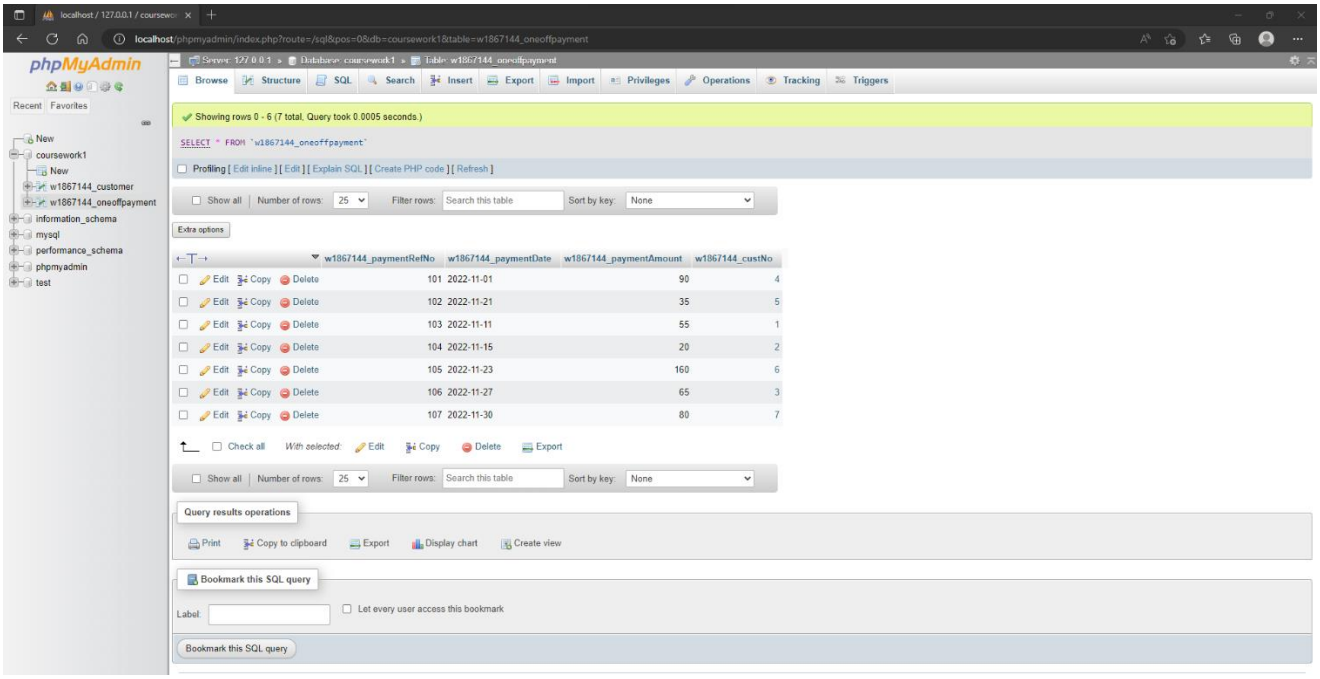
(105,'2022-11-23',160.00,06),

(106,'2022-11-27',65.00,03),

(107,'2022-11-30',80.00,07);



One off payment table



SQL QUERY

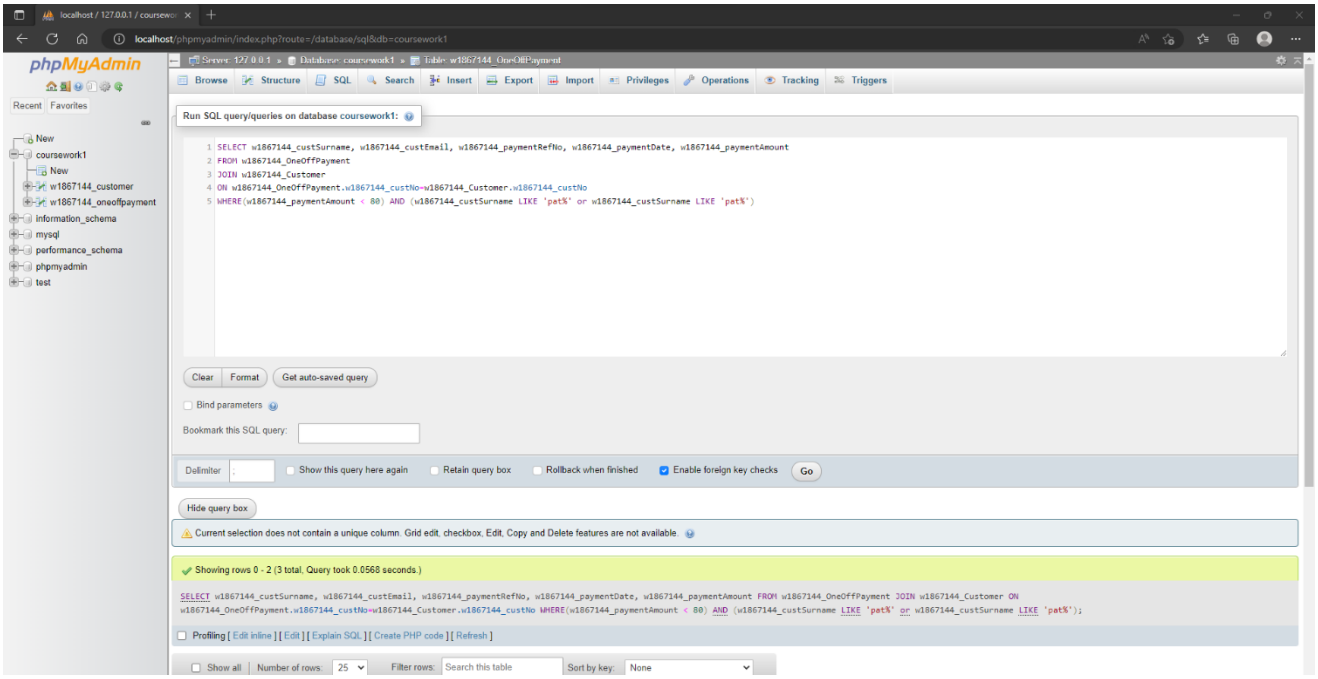
SELECT w1867144_custSurname, w1867144_custEmail, w1867144_paymentRefNo, w1867144_paymentDate, w1867144_paymentAmount

FROM w1867144_oneOffPayment

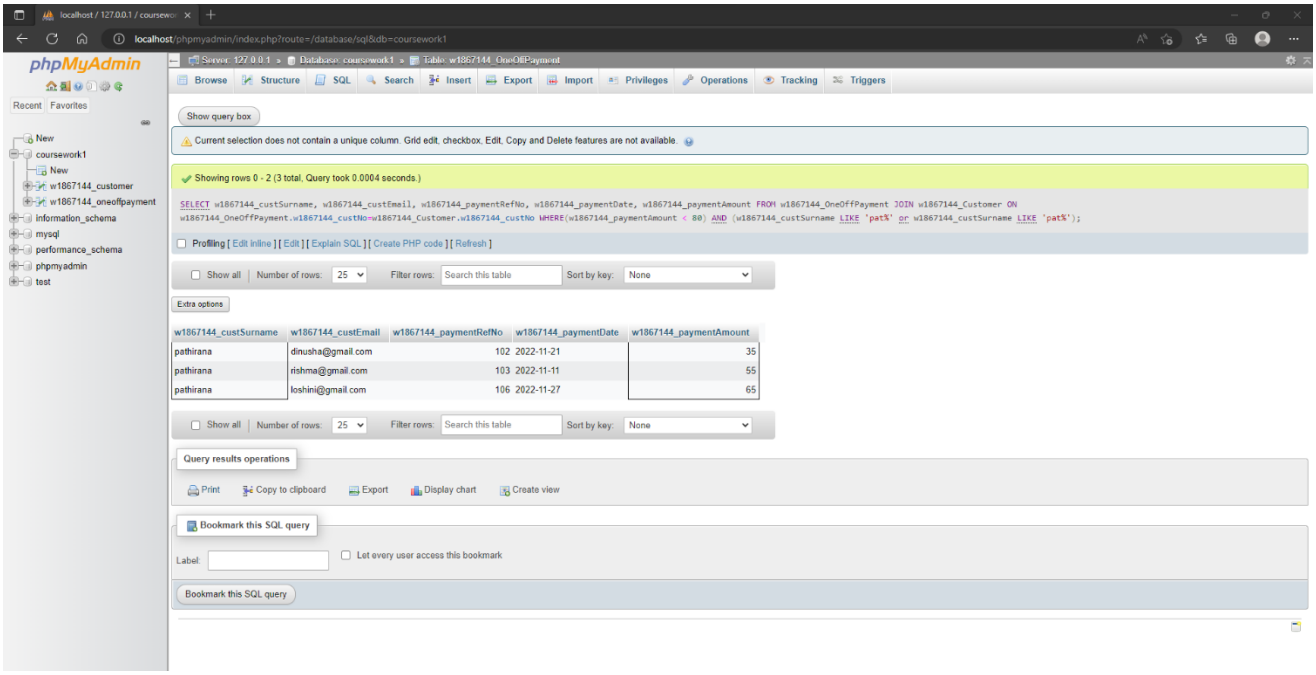
JOIN w1867144_Customer

ON w1867144_oneOffPayment.w1867144_custNo=w1867144_Customer.w1867144_custNo

WHERE(w1867144_paymentAmount < 80) AND (w1867144_custSurname LIKE 'pat%' or w1867144_custSurname LIKE 'pat%')



QUERY OUTPUT



QUESTION 7

Criteria	MySQL	MongoDB
Data Storage	• MySQL stores data in tables that are made up of rows and columns. (E.Meher,2020)	• MongoDB does not store data in a set schema. (E.Meher,2020)
Architecture	MySQL is based on a client-server architecture with storage optimized for multi-threading and high performance. (E.Meher,2020)	• The Nexus Architecture design idea of MongoDB combines Relational Database characteristics. (E.Meher,2020)
Performance	• MySQL is particularly strong at transaction processing. (E.Meher,2020)	• Because of its document-based data storage, MongoDB's performance on unstructured data is comparable to MySQL's. (E.Meher,2020)
Schema	• MySQL is wonderful if you have a specified and set schema. It allows you to maintain data consistency. (E.Meher,2020)	• MongoDB is ideal for current applications due to its flexible schema architecture, which allows you to meet the ever-changing requirements of Big Data applications. (E.Meher,2020)
Security	• MySQL offers normal encryption and normal security policies for the Standard Edition (E.Meher,2020)	• MongoDB provides security features like authentication, access control (user, role-based access control), and encryption(TLS/SSL) for sensitive data (E.Meher,2020)

REFERENCES

- Gyorodi, C. et al. (2015). A comparative study: MongoDB vs. MySQL. 2015 13th International Conference on Engineering of Modern Electric Systems (EMES). June 2015. Oradea, Romania: IEEE, 1–6. Available from https://doi.org/10.1109/EMES.2015.7158433 [Accessed 6 December 2022].

- MongoDB vs MySQL Performance: 7 Critical Differences. (2021). Available from https://hevodata.com/learn/mongodb-vs-mysql/ [Accessed 12 December 2022].