UNIVERSITY OF WESTMINSTER

INFORMATICS INSTITUTE OF TECHNOLOGY

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5COSC020W DATABASE SYSTEMS COURSEWORK (2022/2023)

Module Leader	: Ragu Sivaraman
Assessment	: Individual Coursework
Date Released	: 27 September 2022
Date Due	**:** 31 OCTOBER 2022 at 13:00:00 – Part A. 28 NOVEMBER 2022 at 13:00:00 – Part A + Part B.
Submission Time	**:** 23:59 P.M.
Tutorial Group	: Group A
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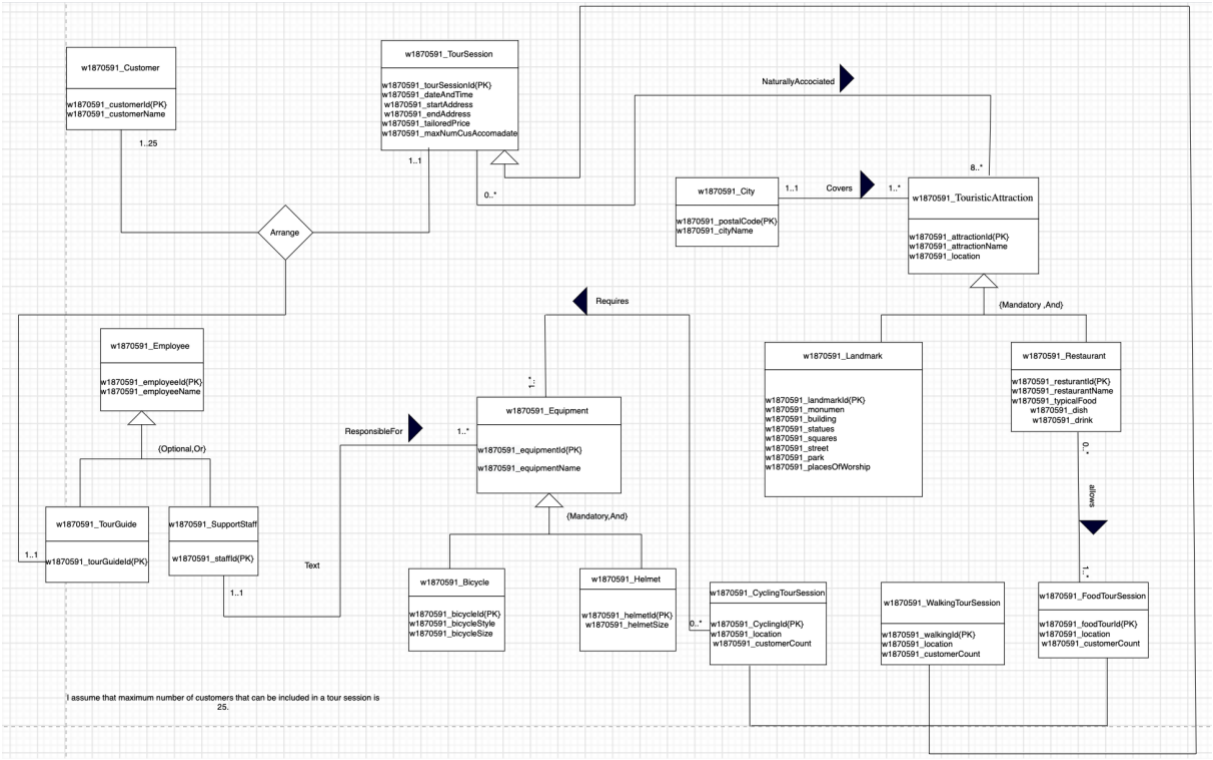
Part A

Question 01



*I assume that maximum number of customers that can be included in a tour session is 25.

QUESTION 02

Entity name	Brief Description
w1870591_Customer	People who get service from company
w1870591_TourSession	When a tour is actually scheduled on a particular day, it is referred to as a "tour session and it has specific start date and time, a start address, an end date and time and an end address.
w1870591_CyclingTourSession	A tour session that can be goes by bicycle
w1870591_WalkingTourSession	A tour session that can be goes by walking
w1870591_FoodTourSession	A tour session that can be taste some foods
w1870591_City	The cities which has selected by tourmato to visit toursessions and contains multiple touristic attractions considered worth visiting.
w1870591_TouristicAttraction	Touristic attractions in the city
w1870591_Landmark	simply relevant locations in the city that can be viewed such as streets, parks and so many more
w1870591_Restaurant	The restaurants that has selected by tourmato to visit food tour sessions and allow people to experience the local culinary delicacies.
w1870591_Equipment	Equipment's that will used in cycling tour sessions
w1870591_Bicycle	Bicycles that will used in cycling tour sessions
w1870591_Helmet	Helmets that will used in cycling tour sessions
w1870591_Employee	The peoples who are working in tourmato company
w1870591_TourGuide	They naturally to lead the tour sessions
w1870591_SupportStaff	play a key role by ensuring the strict maintenance of all equipment used by Tourmato

General entity	Specialised entity	Brief Description
w1870591_TourSession	w1870591_CyclingTourSession	A tour session that can be goes by bicycle
	w1870591_WalkingTourSession	A tour session that can be goes by walking
	w1870591_FoodTourSession	A tour session that can be taste some foods
w1870591_TouristicAttraction	w1870591_Landmark	simply relevant locations in the city that can be viewed such as streets, parks and so many more
	w1870591_Restaurant	The restaurants that has selected by tourmato to visit food tour sessions and allow people to experience the local culinary delicacies.
w1870591_Equipment	w1870591_Bicycle	Bicycles that will used in cycling tour sessions
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w1870591_Employee	w1870591_TourGuide	They naturally to lead the tour sessions
	w1870591_SupportStaff	play a key role by ensuring the strict maintenance of all equipment used by Tourmato

QUESTION 03

Entity name	Multiplicity	Relationship	Multiplicity	Entity name	Brief justifications for the multiplicity (4 statements for each relationship
w1870591_City	1..1	Covers	1..*	w1870591_TouristicAttraction	One city must have minimum one touristic attraction
					One city can be have many touristic attractions
					One touristic attraction must have only one city
w1870591_TourSession	0..*	NaturallyAssociated	8..*	w1870591_TouristicAttraction	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
w1870591_Restaurant	0..*	Allows	1..*	w1870591_TourSession	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
w1870591_CyclingTourSession	0..*	Requires	1..*	w1870591_Equipment	One cycling tour session must be requires minimum one equipment
					One cycling tour session can be require many equipment's
					One equipment may not be require for any cycling tour session
					One equipment can be require for many cycling tour sessions

w1870591_SupportStaff	1..1	ResponsibleFor	1..*	w1870591_Equipment	One support staff must be responsible for minimum one equipment
					One support staff can be responsible for many equipment's
					One equipment must be responsible by only one staff
w1870591_Customer	1..25	Arrange	1..1	w1870591_TourGuide	One customer can be arrange minimum one tour session with minimum one tour guide
			1..1	w1870591_TourSession	One customer can be arrange maximum of one tour session with maximum of one tour guide
w1870591_TourGuide	1..1	Arrange	1..25	w1870591_Customer	One tour guide can arrange minimum of one tour session for minimum of one customer

QUESTION 04

Entity name	Attributes for this entity (include PK)	Brief explanation
w1870591_Customer	w1870591_customerId{PK} w1870591_customerName	Id of the customer Name of the customer
w1870591_TourSession	w1870591_tourSessionId{PK} w1870591_dateAndTime w1870591_startAddress w1870591_endAddress	Id of the tour session Date and time for tour session Start address for tour session End address for tour session

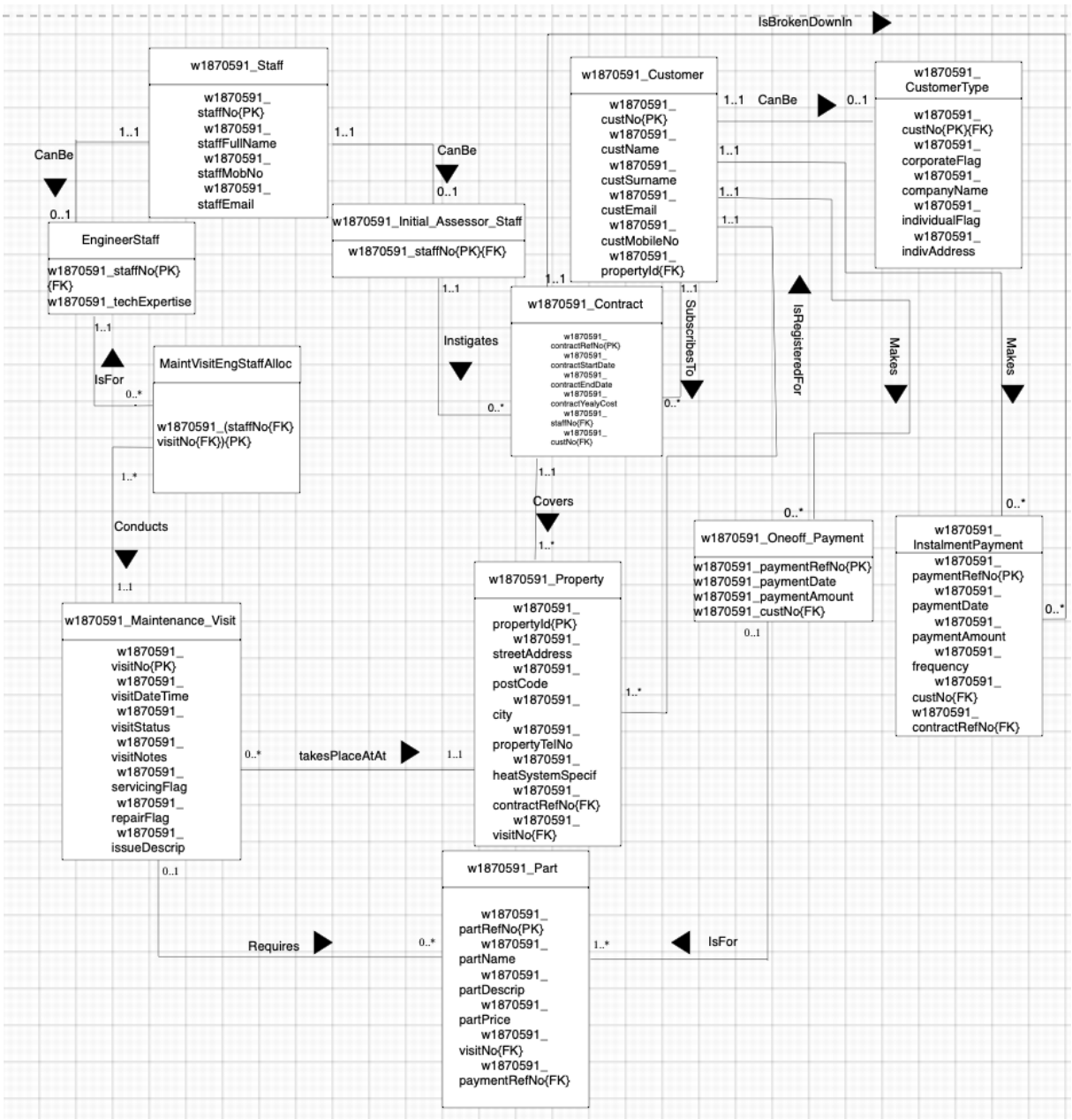
	w1870591_tailoredPrice w1870591_maxNumCusAccomadate	Tailored price for tour session Maximum number of customers that can accommodate for tour session
w1870591_CyclingTourSession	w1870591_CyclingId{PK} w1870591_location w1870591_customerCount	Id of the cycling session Places that cycle tour session located Customer count that in cycling tour session
w1870591_WalkingTourSession	w1870591_walkingId{PK} w1870591_location w1870591_customerCount	Id of the walking session Places that walking tour session located Customer count that in walking tour session
w1870591_FoodTourSession	w1870591_foodTourId{PK} w1870591_location w1870591_customerCount	Id of the food tour session Places that food tour session located Customer count that in food tour session
w1870591_City	w1870591_postalCode{PK} w1870591_cityName	Postal code of the city Name of the city
w1870591_TouristicAttraction	w1870591_attractionId{PK}	Id of the attraction

	w1870591_attractionName w1870591_location	Name of the attraction Location of the attraction
w1870591_Landmark	w1870591_landmarkId{PK} w1870591_monumen w1870591_building w1870591_statues w1870591_squares w1870591_street w1870591_park w1870591_placesOfWorship	Id of the landmark There are lot of landmarks in the city these are some of the landmarks
w1870591_Restaurant	w1870591_resturantId{PK} w1870591_restaurantName w1870591_typicalFood w1870591_dish w1870591_drink	Id of the restaurant Name of the restaurant Food that the restaurants are providing Dishes they have for the food tour session Drinks they have for the food tour session
w1870591_Equipment	w1870591_equipmentId{PK} w1870591_equipmentName	Id of the equipment Name of the equipment
w1870591_Bicycle	w1870591_bicycleId{PK}	Id of the bicycle

	w1870591_bicycleStyle w1870591_bicycleSize	Style of the bicycle Size of the bicycle
w1870591_Helmet	w1870591_helmetId{PK} w1870591_helmetSize	Id of the helmet Size of the helmet
w1870591_Employee	w1870591_employeeId{PK} w1870591_employeeName	Id of the employee Name of the employee
w1870591_TourGuide	w1870591_tourGuideId{PK}	Id of the tour guide
w1870591_SupportStaff	w1870591_staffId{PK}	Id of the staff

PART B

QUESTION 05

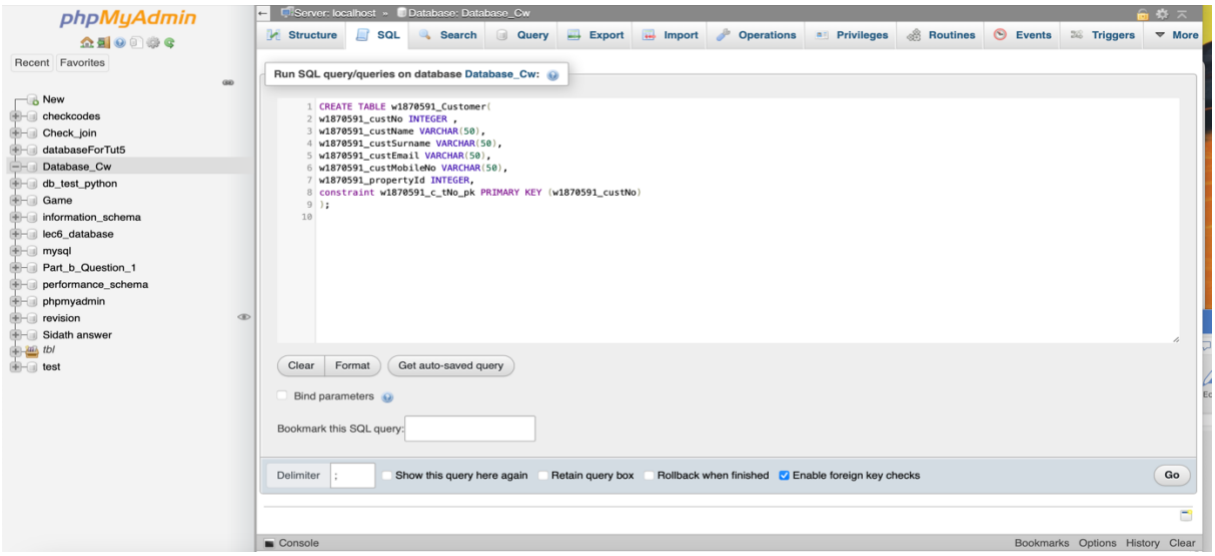


QUESTION 06

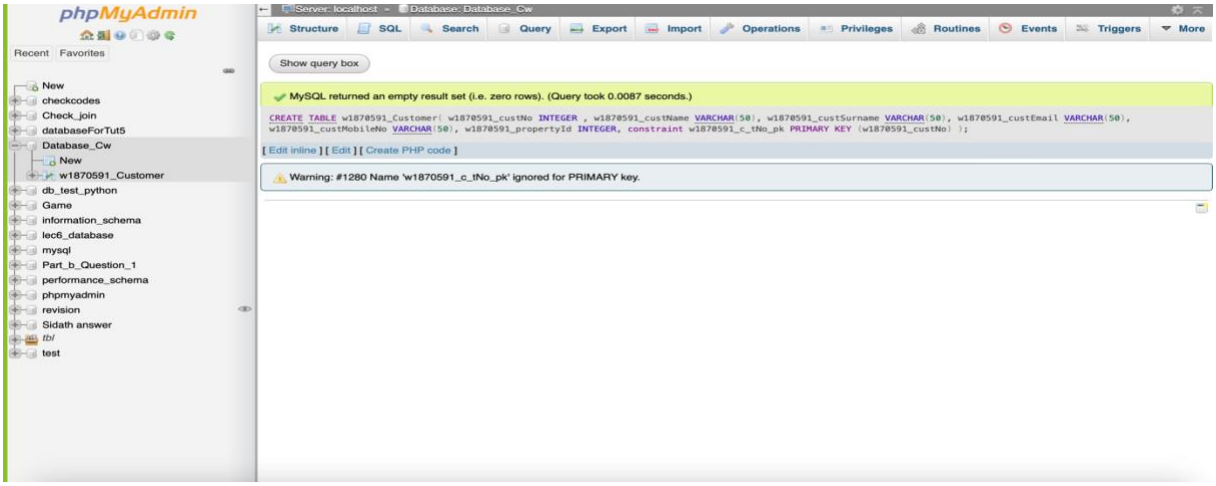
Code to create the customer table

```
CREATE TABLE w1870591_Customer(
w1870591_custNo INTEGER ,
w1870591_custName VARCHAR(50),
w1870591_custSurname VARCHAR(50),
w1870591_custEmail VARCHAR(50),
w1870591_custMobileNo VARCHAR(50),
w1870591_propertyId INTEGER,
constraint w1870591_c_tNo_pk PRIMARY KEY (w1870591_custNo)
);
```

Screenshot of customer table before execution



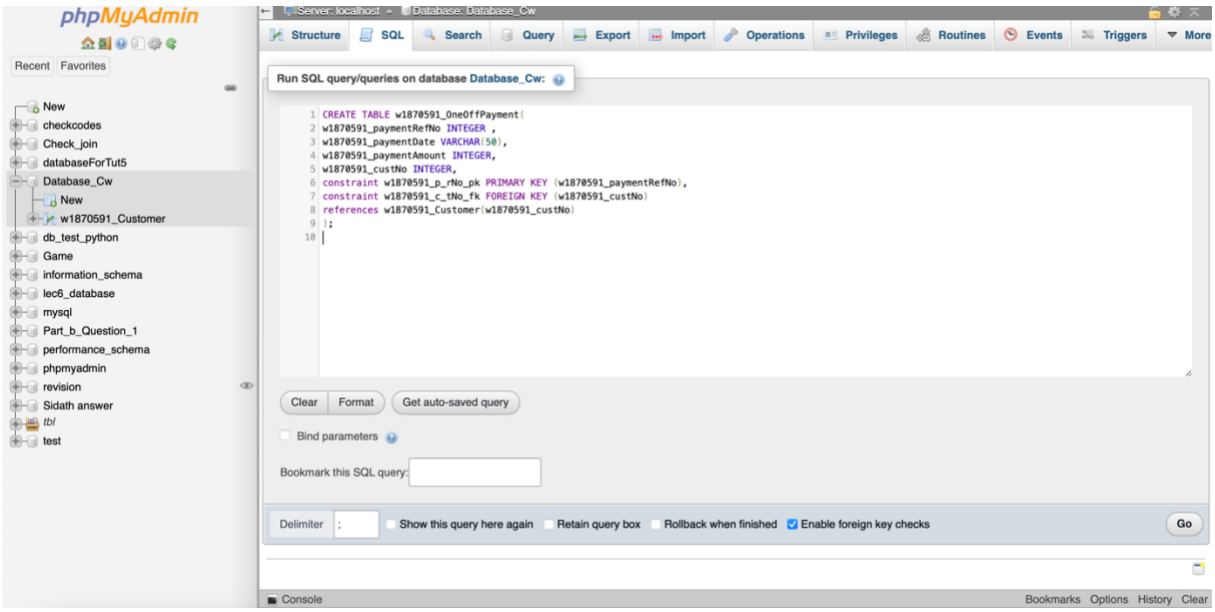
Screenshot of customer table after execution



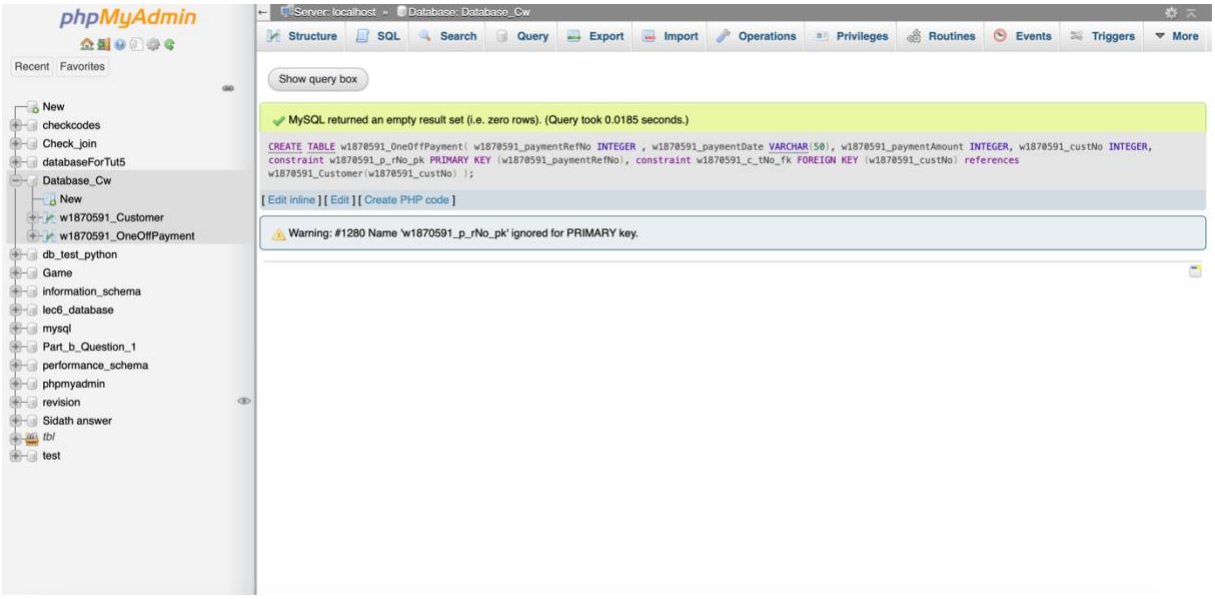
Code to create the one-off payment table

```
CREATE TABLE w1870591_OneOffPayment(
w1870591_paymentRefNo INTEGER ,
w1870591_paymentDate VARCHAR(50),
w1870591_paymentAmount INTEGER,
w1870591_custNo INTEGER,
constraint w1870591_p_rNo_pk PRIMARY KEY (w1870591_paymentRefNo),
constraint w1870591_c_tNo_fk FOREIGN KEY (w1870591_custNo)
references w1870591_Customer(w1870591_custNo)
);
```

Screenshot of one-off payment table before execution



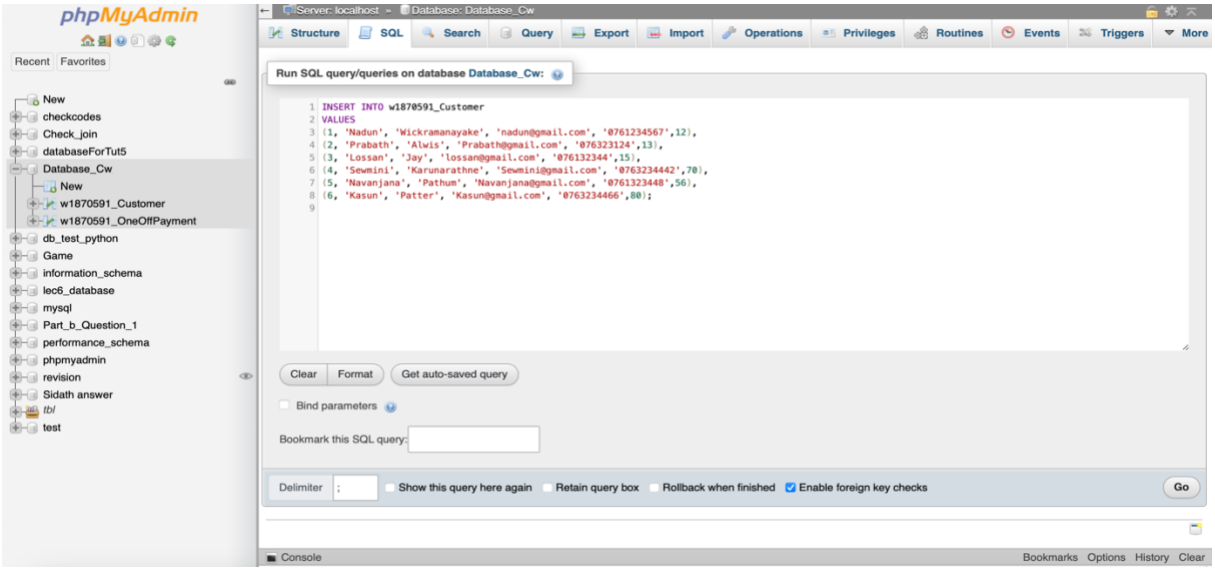
Screenshot of one-off payment table after execution



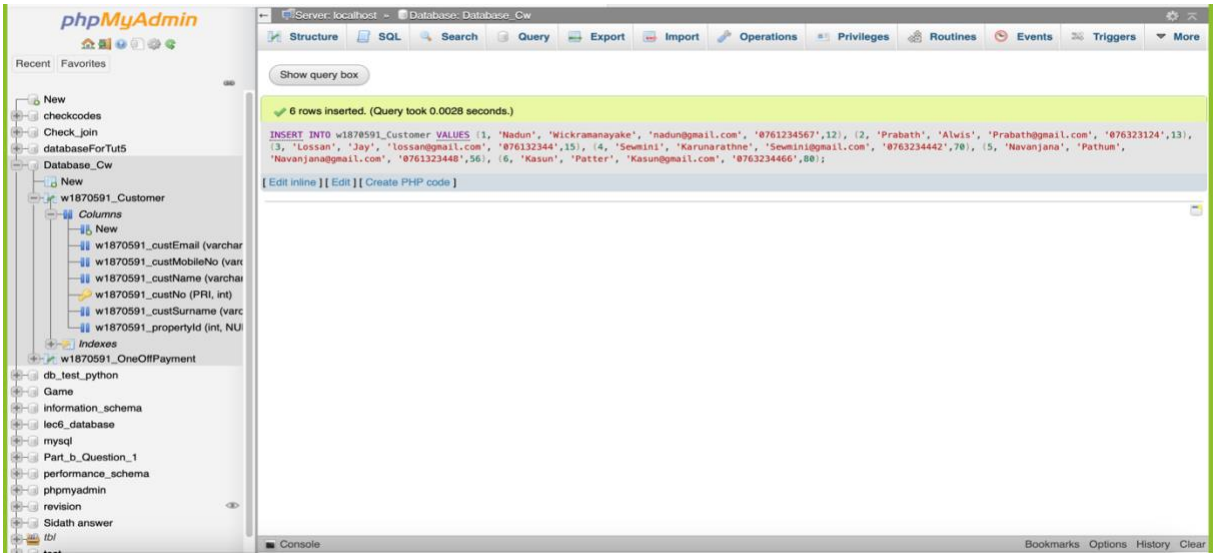
Inserting values into customer table

```
INSERT INTO w1870591_Customer
VALUES
(1, 'Nadun', 'Wickramanayake', 'nadun@gmail.com', '0761234567',12),
(2, 'Prabath', 'Alwis', 'Prabath@gmail.com', '076323124',13),
(3, 'Lossan', 'Jay', 'lossan@gmail.com', '076132344',15),
(4, 'Sewmini', 'Karunarathne', 'Sewmini@gmail.com', '0763234442',70),
(5, 'Navanjana', 'Pathum', 'Navanjana@gmail.com', '0761323448',56),
(6, 'Kasun', 'Patter', 'Kasun@gmail.com', '0763234466',80);
```

Screenshot of values entered customer table before execution



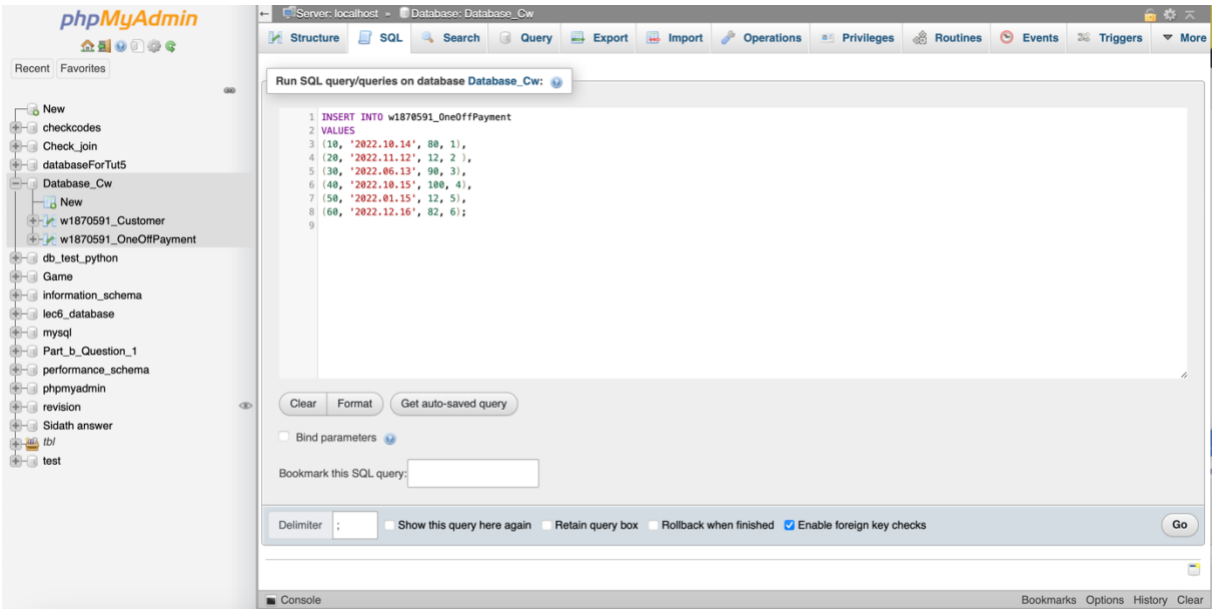
Screenshot of values entered customer table after execution



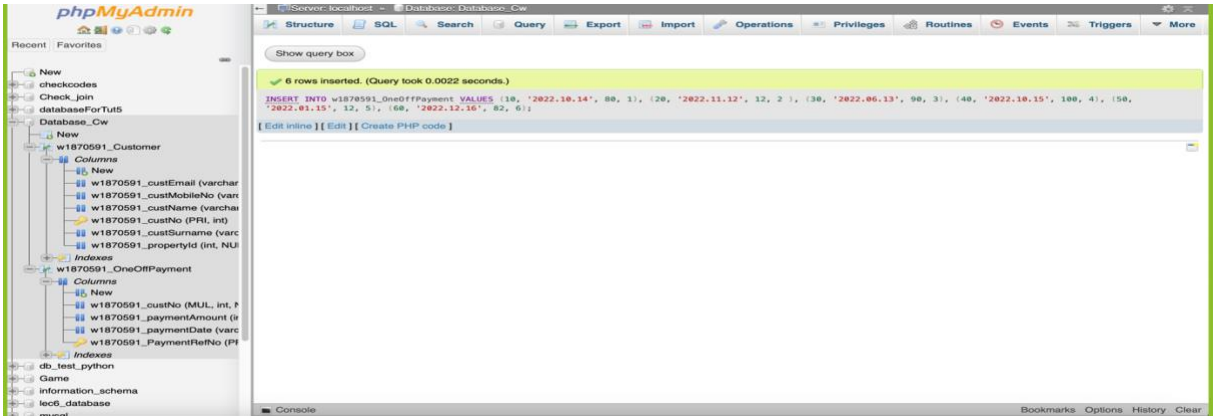
Inserting values into one-off payment table

```
INSERT INTO w1870591_OneOffPayment
VALUES
(10, '2022.10.14', 80, 1),
(20, '2022.11.12', 12, 2 ),
(30, '2022.06.13', 90, 3),
(40, '2022.10.15', 100, 4),
(50, '2022.01.15', 12, 5),
(60, '2022.12.16', 82, 6);
```

Screenshot of values entered one-off payment table before execution



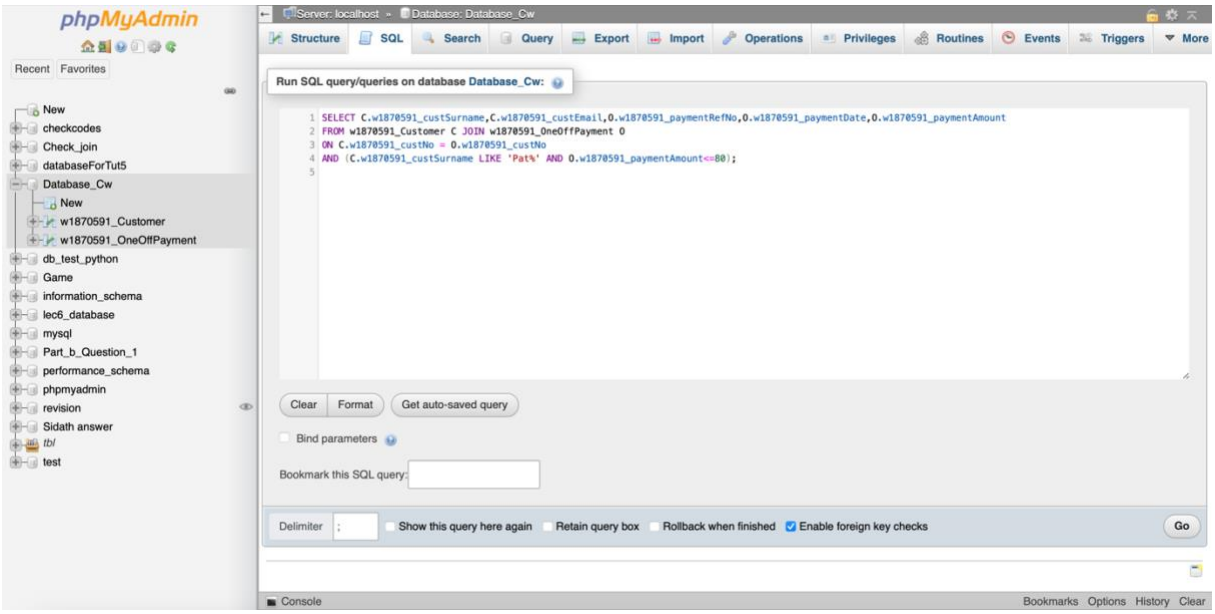
Screenshot of values entered one-off payment table after execution



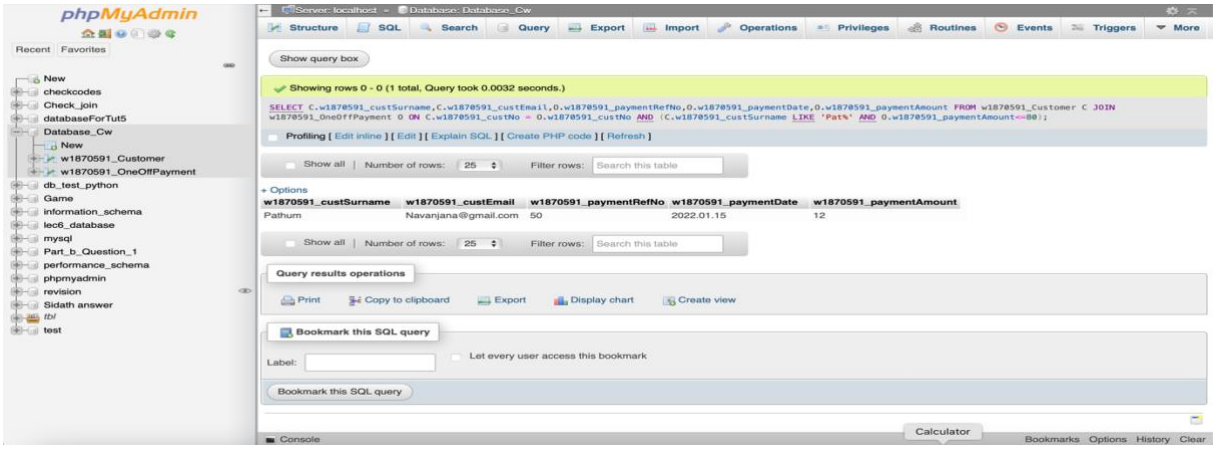
Code to create the query

```
SELECT
C.w1870591_custSurname,C.w1870591_custEmail,O.w1870591_paymentRefNo,O.w1870591_paym
entDate,O.w1870591_paymentAmount
FROM w1870591_Customer C JOIN w1870591_OneOffPayment O
ON C.w1870591_custNo = O.w1870591_custNo
AND (C.w1870591_custSurname LIKE 'Pat%' AND O.w1870591_paymentAmount<=80);
```

Screenshot of query before the execution



Screenshot of query after the execution with the results



QUESTION 07

	MySQL	MongoDB
schemas	"The tables in the databases must have a schema definition according to MySQL. The schema cannot be changed as a result. The only permitted inputs are those that follow the provided schema."(InterviewBit, 2021)	"Data is stored in collections in MongoDB without a rigid schema. To put it another way, incoming data can adhere to a pre-defined structure, but distinct documents within the same collection may have varied structures as needed." (InterviewBit, 2021)
data consistency	"Without repeatedly modifying the design or wasting effort on it, it will provide improved data consistency."(InterviewBit, 2021)	"But once more, if your needs change, MongoDB might be a better choice for you." (InterviewBit, 2021)
storage	In a MySQL database, each individual entry is recorded as a "row." (InterviewBit, 2021)	MongoDB stores each record as a distinct "document." (InterviewBit, 2021)
performance	"In a MySQL database, each individual entry is recorded as a row." (InterviewBit, 2021)	"MongoDB is designed with write performance in mind (means writing speed performance of MongoDB database is far greater than MySQL database). "(InterviewBit, 2021)
User Friendliness	"In comparison to MongoDB, MySQL is a little more complicated because to the table schema, foreign keys, normalization, etc. "(InterviewBit, 2021)	"Because it is simple to use and has a clear understanding of the idea behind data storage, MongoDB is a popular choice among developers. "(InterviewBit, 2021)
Scalability	MySQL Database supports vertical scaling (Scaling vertically means adding more power to your existing machine for example upgrading CPU and RAM). (InterviewBit, 2021)	"MongoDB databases provide both vertical and horizontal scaling (Vertical scaling involves giving your present computer greater power, such as increasing CPU and RAM, whereas horizontal scaling, also known as scaling out, refers to adding more nodes or machines to your infrastructure to satisfy new demands.)." (InterviewBit, 2021)

security	“The encryption capabilities supported by MySQL are identical to those of MongoDB, as is the authentication scheme. Users may be given roles as well as privileges, granting them access to specific database actions and datasets.”(MongoDB,2019)	“The well-known role-based access control paradigm is made use of by MongoDB along with a configurable set of permissions. Users are given one or more roles, and each role confers a set of restrictions on the use of databases and datasets. All communication is secured using TLS, and data at rest encryption is accomplished by writing encrypted documents to MongoDB data collections using a master key that is never made available to MongoDB.” (MongoDB,2019)
Flexibility	“Since MySQL uses a different schema than MongoDB, it is less adaptable. .”(MongoDB,2019)	“The schema-less nature of MongoDB documents makes it easy to construct and upgrade applications over time without the requirement for challenging and expensive schema migration operations as you would with a relational database. .”(MongoDB,2019)

REFERENCES

MongoDB (2019). *MongoDB and MySQL Compared*. [online] MongoDB. Available from: https://www.mongodb.com/compare/mongodb-mysql [Accessed 10 Dec 2022].

InterviewBit. (2021). *MongoDB vs MySQL: Know The Difference*. [online] Available at: https://www.interviewbit.com/blog/mongodb-vs-mysql/ [Accessed 10 Dec 2022].