



INFORMATICS
INSTITUTE OF
TECHNOLOGY

UNIVERSITY OF
WESTMINSTER 

DATABASE SYSTEMS

5COSC020C.1

Part A + Part B

Module Leader: Sivaraman Ragu

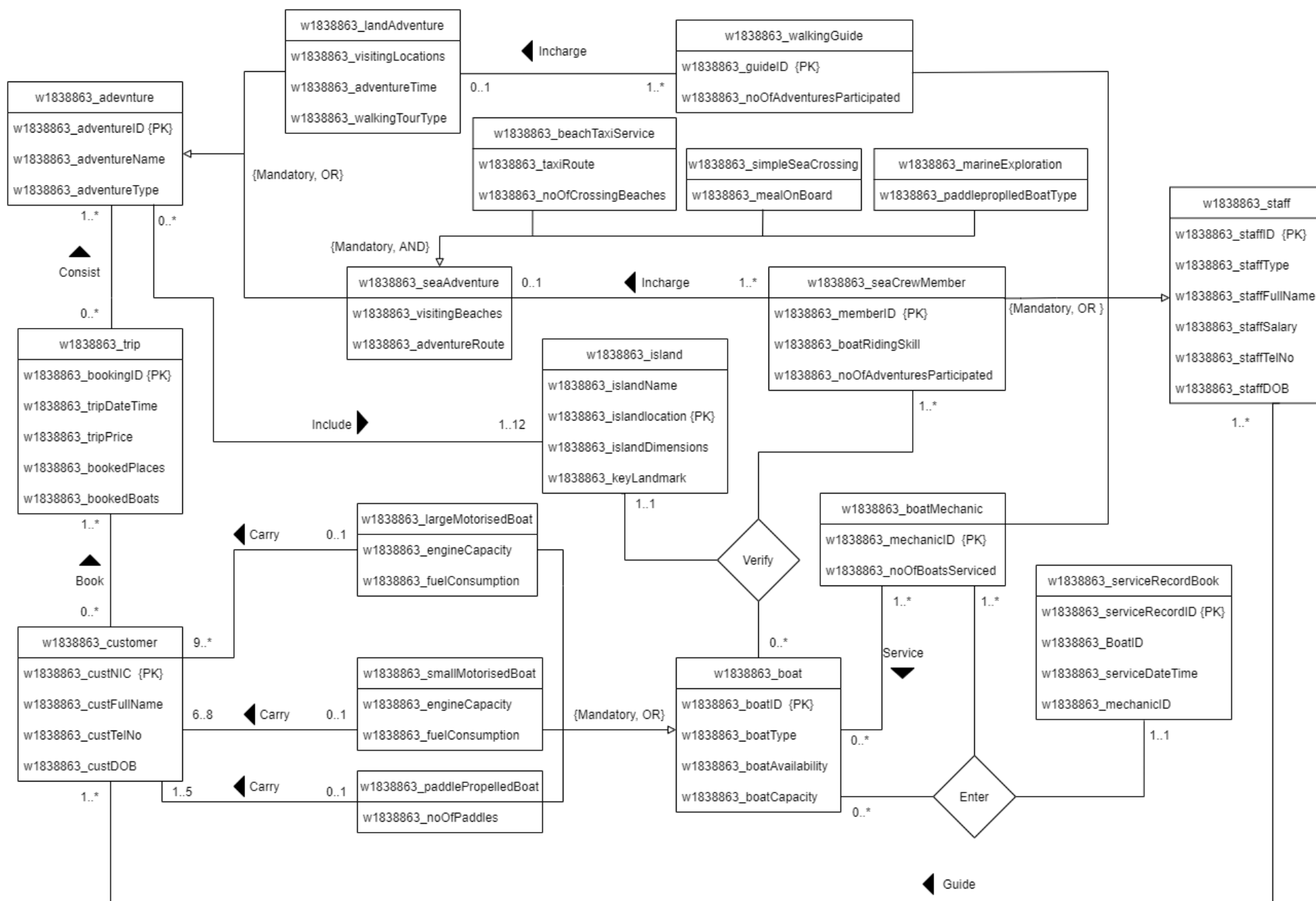
Tutorial Group M

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Student IIT ID: 20200929

Part A



Assumptions

The boats in an island is verified by sea crew members.

The smaller motorized boats and larger motorized boats should be at least loaded with the minimum customer count to start the boat ride.

Two main islands are not situated in the same location.

A service record book is kept to maintain service records.

One adventure should at least include one island (and a maximum of twelve islands).

Each walking guide, sea crew members, boat mechanics are provided with unique ID apart from the given staff ID number.

2)

Entity	Brief Description
w1838863_adventure	A journey to a particular place
w1838863_trip	Collection of adventures and other fun filled activities
w1838863_customer	Tourists who book trips in ArchipelagoCrazy
w1838863_boat	Used to transport tourists
w1838863_island	Places where tourists visit
w1838863_staff	Employees who work on ArchipelagoCrazy
w1838863_serviceRecordBook	Book to maintain service records of boats

General Entity	Specialized Entity	Brief Description
w1838863_adventure	w1838863_landAdventure	Adventure which is taken place on Land
	w1838863_seaAdventure	Adventure which is taken place on the sea
w1838863_seaAdventure	w1838863_beachTaxiService	Takes customers between beaches in an island using small motorized boats
	w1838863_simpleSeaCrossing	Takes customers between islands using large motorized boats
	w1838863_marineExploration	Explores the island locally and access more remote bays and creeks (Corral watching)
w1838863_boat	w1838863_largeMotorisedBoat	A large boat used to carry huge number of customers to an island or between islands
	w1838863_smallMotorisedBoat	Medium size boats used to hop between beaches or to travel to a particular beach
	w1838863_paddlePropelledBoat	Small boats used in marine explorations
w1838863_staff	w1838863_walkingGuide	Expertise staff member who guides the customers on land
	w1838863_seaCrewMember	Expertise staff member who guides the customers on sea and also drives boats
	w1838863_boatMechanic	Expertise staff member who services the boats

3)

Entity Name	Multiplicity	Relationship	Multiplicity	Entity Name	Brief Justification for Multiplicity (4 statements for each relationship)
w1838863_trip	0..*	consist	1..*	w1838863_adventure	One trip consists of at least one adventure
					One trip may consist of many adventures
					One adventure will not be consisted in any trip
					One adventure may be consisted in many trips
w1838863_customer	0..*	book	1..*	w1838863_trip	One customer will at least book one trip
					One customer may book many trips
					One trip may not be booked by any customer
					One trip may be booked by many customers
w1838863_staff	1..*	guide	1..*	w1838863_customer	One staff member will at least guide one customer
					One staff member may guide many customers
					One customer will be guided by at least one staff member
					One customer may be guided with many staff members
w1838863_walkingGuide	1..*	in charge	0..1	w1838863_landAdventure	One walking guide may not be in charge of any land adventure
					One walking guide will be in charge of only one land adventure
					One land adventure will be in charge of at least one walking guide
					One land adventure may be in charge of many walking guides

w1838863_seaCrewMember	1..*	in charge	0..1	w1838863_seaAdventure	One sea crew member will not be in charge of any sea adventures
					One sea crew member will be in charge of up to one sea adventure
					One sea adventure will be in charge of at least one sea crew member
					One sea adventure may be in charge of many sea crew members
w1838863_adventure	0..*	include	1..12	w1838863_island	One adventure will include at least one island
					One adventure may include up to twelve islands
					One island may not be included in any adventure
					One island may be included in many adventures
w1838863_boatMechanic	1..*	service	0..*	w1838863_boat	One boat mechanic will not service any boats
					One boat mechanic may service many boats
					One boat will be serviced by at least one boat mechanic
					One boat may be serviced by many boat mechanics

w1838863_largeMotorisedBoat	0..1	carry	9..*	w1838863_customer	One large motorized boat carries at least nine customers
					One large motorized boat may carry many customers
					One customer will not be carried by any large motorized boat
					One customer will only be carried by one large motorized boat
w1838863_smallMotorisedBoat	0..1	carry	6..8	w1838863_customer	One small motorized boat will carry at least six customers
					One small motorized boat can carry up to eight customers
					One customer will not be carried by any small motorized boat
					One customer will only be carried by one small motorized boat
w1838863_paddlePropelledBoat	0..1	carry	1..5	w1838863_customer	One paddle propelled boat carries at least one customer
					One paddle propelled boat carries up to five customers
					One customer will not be carried by any paddle propelled boat
					One customer will only be carried by one paddle propelled boat

w1838863_boat	0..*	verify	1..1	w1838863_island	One boat is verified by at least one sea crew member in one island
			1..*	w1838863_seaCrewMember	One boat is verified by many sea crew members in one island
w1838863_island	1.1	verify	0..*	w1838863_boat	One island is verified without any boats by one sea crew member
			1..*	w1838863_seaCrewMember	One island may be verified with many boats by many sea crew members
w1838863_seaCrewMember	1..*	verify	1..1	w1838863_island	One sea crew member verifies one island without any boats
			0..*	w1838863_boat	One sea crew member may verify one island with many boats
w1838863_boat	0..*	enter	1..*	w1838863_boatMechanic	One boat will be entered to one service record book at least by one mechanic
			1..1	w1838863_serviceRecordbook	One boat may be entered to one service record book by many boat mechanics
w1838863_serviceRecordbook	1..1	enter	1..*	w1838863_boatMechanic	One service record book will be entered with no any boats by one boat mechanic
			0..*	w1838863_boat	One service record book may be entered with many boats by many boat mechanics

w1838863_boatMechanic	1..*	enter	1..1	w1838863_serviceRecordbook	One boat mechanic will enter no any boat to one service record book
			0..*	w1838863_boat	One boat mechanic may enter many boats to one service record book

Entity Name	Attributes for this entity	Justification
w1838863_adventure	w1838863_adventureID {PK}	The unique ID number given to each adventure
	w1838863_adventureName	The name given to the particular adventure
	w1838863_adventureType	There are two types of adventures (Land and Sea)
w1838863_landAdventure	w1838863_visitingLocations	The locations which customers visit in a land adventure
	w1838863_adventureTime	The time when the adventure is scheduled to
	w1838863_walkingTourType	Walking tour or guided visit
w1838863_seaAdventure	w1838863_visitingBeaches	The beaches which are scheduled to visit in the sea adventure (many beaches in one island)
	w1838863_adventureRoute	Routes which the boat takes during the adventure
w1838863_trip	w1838863_bookingID {PK}	unique ID number which a customer gets after booking a particular trip
	w1838863_tripDateTime	The date and the time when the trip is scheduled to
	w1838863_tripPrice	Cost of the whole trip which the customer has to pay
	w1838863_bookedPlaces	Customer can book sea adventures and land adventures with necessary places to visit
	w1838863_bookedBoats	Customers can book several boats (kayaks, stand up paddleboards, canoes, etc.)
w1838863_island	w1838863_islandName	Name of the island
	w1838863_islandLocation {PK}	Each island has a unique location, two islands

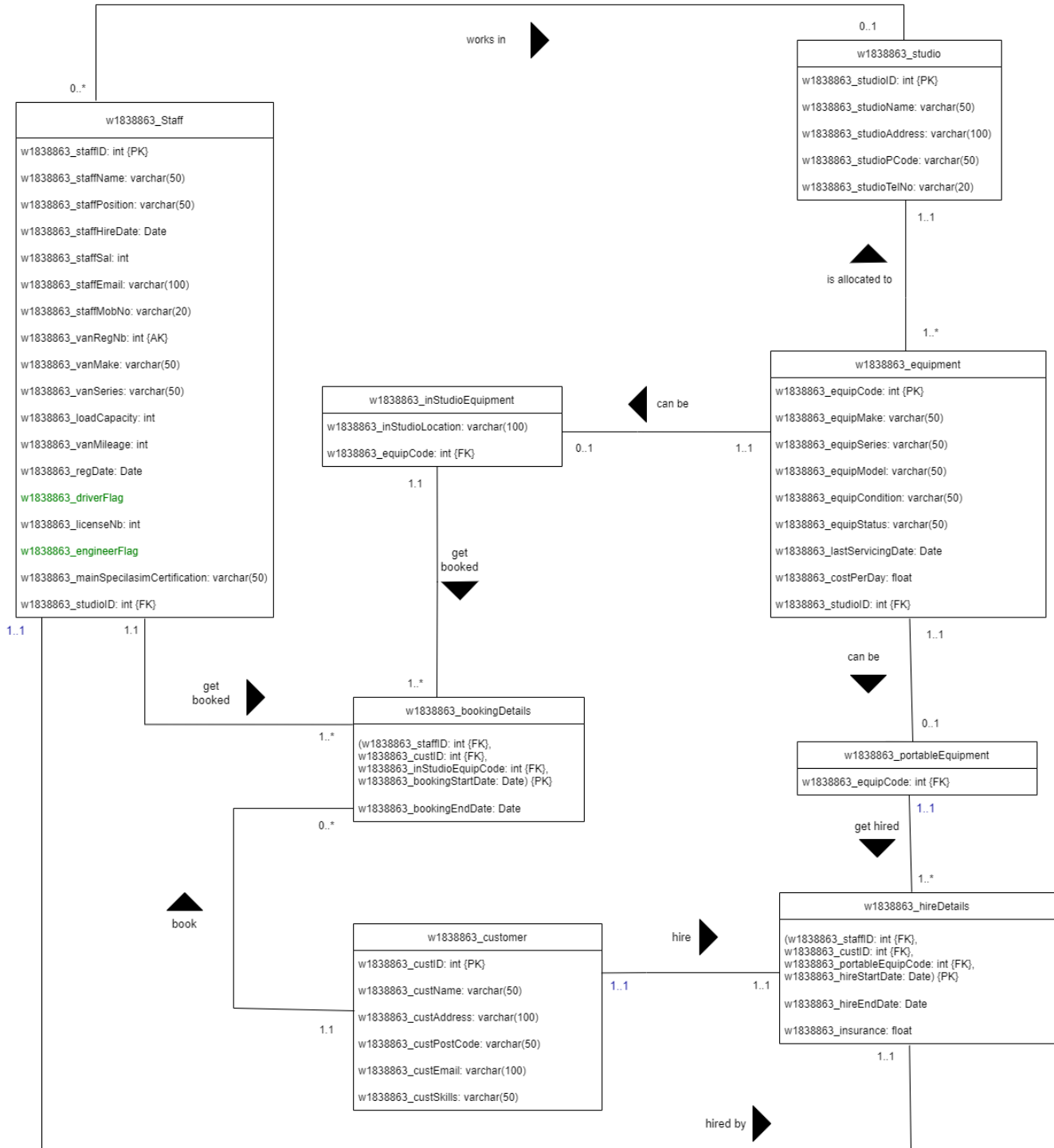
		can't be at the same coordinates
	w1838863_islandDimensions	The dimensions of the island (to declare the size of the island)
	w1838863_keyLandmark	The key Landmarks of the island (castles, fortresses, lighthouses, churches, monasteries, etc.)
w1838863_customer	w1838863_custNIC {PK}	The NIC number of customers which is a unique number
	w1838863_custFullName	The full name of the customer
	w1838863_custTelNo	The telephone number of the customer
	w1838863_custDOB	The date of birth of the customer (to declare the age of the customer)
w1838863_staff	w1838863_staffID {PK}	The ID number given to the staff members which is a unique number
	w1838863_staffType	There are three types of staff members (walking guides, sea crew, boat mechanic)
	w1838863_staffFullName	Full name of the staff member
	w1838863_staffSalary	Each and every staff member gets a salary
	w1838863_staffTelNo	Telephone number of the staff members
	w1838863_stafDOB	Date of birth of the staff members (to declare the age of the staff members)
w1838863_walkingGuide	w1838863_guideID {PK}	The unique ID number given only for guides
	w1838863_noOfAdventuresParticipated	Total Number of adventures the guide has participated(guided)

w1838863_seaCrewMember	w1838863_memberID {PK}	The unique ID number given only for sea crew members
	w1838863_boatRidingSkill	The skills of the crew member in riding boats (Rating)
	w1838863_noOfAdventuresParticipated	Total number of sea adventures participated (Leaded).
w1838863_boatMechanic	w1838863_mechanicID {PK}	The unique ID number given only for boat mechanics
	w1838863_noOfBoatsServiced	Total number of boats serviced by the particular boat mechanic
w1838863_boat	w1838863_boatID {PK}	Unique ID number given to a boat to identify a particular boat
	w1838863_boatType	Type of the boat (large motorized boat, small motorized boat, paddle propelled boats)
	w1838863_boatAvailability	The availability of a boat (put on repair or provides service)
	w1838863_boatCapacity	Number of customers the boat can handle (number of seats)
w1838863_largeMotorisedBoat	w1838863_engineCapacity	Engine Capacity of the boat
	w1838863_fuelConsumption	Fuel Consumption of the boat (Gallon per Hour)
w1838863_smallMotorisedBoat	w1838863_engineCapacity	Engine Capacity of the boat
	w1838863_fuelConsumption	Fuel Consumption of the boat (Gallon per Hour)
w1838863_paddlePropelledBoat	w1838863_noOfPaddles	Total number of paddles the paddle propelled boat has

w1838863_beachTaxiService	w1838863_taxiRoute	The route which the taxi takes (different taxi has different routes).
	w1838863_noOfCrossingBeaches	Number of beaches the taxi stops, or passes by
w1838863_simpleSeaCrossing	w1838863_mealOnBoard	The customers can have a meal if they want (yes or no)
w1838863_marineExploration	w1838863_paddlePropelledBoatType	The type of the paddle Propelled boat (kayaks, stand up paddleboards, canoes, etc.)
w1838863_serviceRecordBook	w1838863_serviceRecordID {PK}	The unique ID number given to each service record to identify a particular record efficiently
	w1838863_boatID	The ID number of the boat which was serviced
	w1838863_mechanicID	The ID number of the boat mechanic who serviced the boat
	w1838863_serviceDateTime	The date and time of the service

Part B

5)



Assumptions

One customer may book same in studio equipment with same staff in different days. So, with the foreign keys w1838863_staffID, w1838863_custID and w1838863_inStudioEquipCode with the w1838863_bookingStartDate is also included in making the primary key which makes it a composite key.

One customer may hire same portable equipment with same staff in different days. So, with the foreign keys w1838863_staffID, w1838863_custID and w1838863_portableEquipCode with the w1838863_hireStartDate is also included in making the primary key which makes it a composite key.

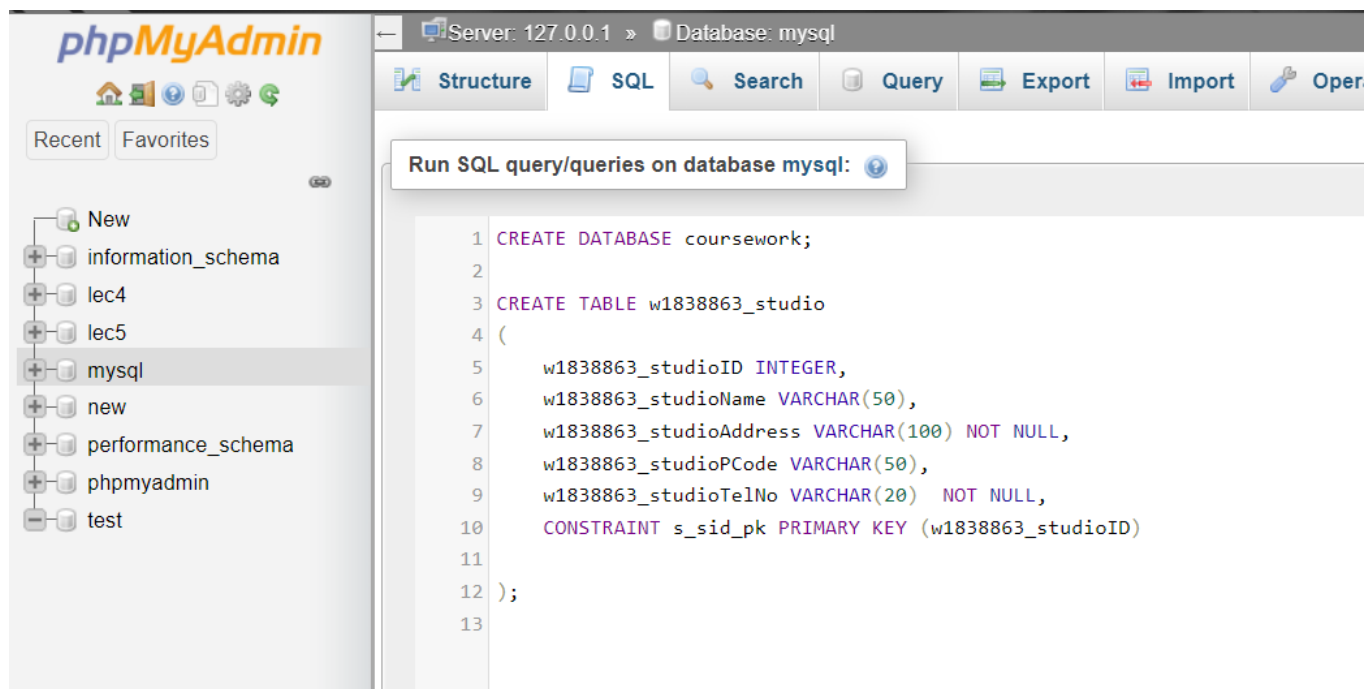
The booking cost can be calculated by calculating the difference between the booking start date and booking end date and with the cost per day of the instrument.

The hire cost can be calculated by calculating the difference between the hire start date and the hire end date and with the cost per day of the instrument.

6)

a) Creating Database “coursework”

b) Creating w1838863_studio table



The screenshot shows the phpMyAdmin web interface. The left sidebar displays a tree view of databases and schemas, with 'mysql' selected. The main panel is titled 'Run SQL query/queries on database mysql:' and contains the following SQL code:

```
1 CREATE DATABASE coursework;
2
3 CREATE TABLE w1838863_studio
4 (
5     w1838863_studioID INTEGER,
6     w1838863_studioName VARCHAR(50),
7     w1838863_studioAddress VARCHAR(100) NOT NULL,
8     w1838863_studioPCode VARCHAR(50),
9     w1838863_studioTelNo VARCHAR(20) NOT NULL,
10    CONSTRAINT s_sid_pk PRIMARY KEY (w1838863_studioID)
11 );
12
13
```

phpMyAdmin

Server: 127.0.0.1 » Database: mysql

Structure SQL Search Query Export Import Operations Privileges Routines Events Triggers Tracking Designer

Show query box

MySQL returned an empty result set (i.e. zero rows). (Query took 0.0024 seconds)

```
CREATE DATABASE coursework;
```

[Edit inline] [Edit] [Create PHP code]

MySQL returned an empty result set (i.e. zero rows). (Query took 0.0278 seconds)

```
CREATE TABLE w1838863_studio ( w1838863_studioID INTEGER, w1838863_studioName VARCHAR(50), w1838863_studioAddress VARCHAR(100) NOT NULL, w1838863_studioPCCode VARCHAR(50), w1838863_studioTelNo VARCHAR(20) NOT NULL, CONSTRAINT s_sid_pk PRIMARY KEY (w1838863_studioID) );
```

[Edit inline] [Edit] [Create PHP code]

Warning: #1280 Name 's_sid_pk' ignored for PRIMARY key.

c) Creating the w1838863_equipment table

phpMyAdmin

Server: 127.0.0.1 » Database: coursework

Structure SQL Search Query Export Import Operations Privileges Rout

Run SQL query/queries on database coursework:

```
1 CREATE TABLE w1838863_equipment
2 (
3     w1838863 equipCode INTEGER,
4     w1838863 equipMake VARCHAR(50) NOT NULL,
5     w1838863 equipSeries VARCHAR(50),
6     w1838863 equipModel VARCHAR(50),
7     w1838863 equipCondition VARCHAR(50),
8     w1838863 equipStatus VARCHAR(50) NOT NULL,
9     w1838863_lastServicingDate DATE NOT NULL,
10    w1838863_costPerDay FLOAT NOT NULL,
11    w1838863_studioId INTEGER NOT NULL,
12    CONSTRAINT se_eqc_pk PRIMARY KEY (w1838863 equipCode),
13    CONSTRAINT se_sid_fk FOREIGN KEY (w1838863_studioId) REFERENCES w1838863_studio(w1838863_studioId)
14 );
15
```

phpMyAdmin

Server: 127.0.0.1 » Database: coursework

Structure SQL Search Query Export Import Operations Privileges Routines Events Triggers Tracking Designer

Show query box

MySQL returned an empty result set (i.e. zero rows). (Query took 0.0208 seconds)

```
CREATE TABLE w1838863_equipment ( w1838863 equipCode INTEGER, w1838863 equipMake VARCHAR(50) NOT NULL, w1838863 equipSeries VARCHAR(50), w1838863 equipModel VARCHAR(50), w1838863 equipCondition VARCHAR(50), w1838863 equipStatus VARCHAR(50) NOT NULL, w1838863_lastServicingDate DATE NOT NULL, w1838863_costPerDay FLOAT NOT NULL, w1838863_studioId INTEGER NOT NULL, CONSTRAINT se_eqc_pk PRIMARY KEY (w1838863 equipCode), CONSTRAINT se_sid_fk FOREIGN KEY (w1838863_studioId) REFERENCES w1838863_studio(w1838863_studioId) );
```

[Edit inline] [Edit] [Create PHP code]

Warning: #1280 Name 'se_eqc_pk' ignored for PRIMARY key.

d) Populating the w1838863_studio table

phpMyAdmin

Recent Favorites

- New
- coursework
 - New
 - w1838863_equipment
 - w1838863_studio
- information_schema
- lec4
- lec5
- mysql
- new
- performance_schema
- phpmyadmin
- test

Server: 127.0.0.1 » Database: coursework » Table: w1838863_studio

Browse Structure SQL Search Insert Export Import Privileges Operations Tracking Triggers

Run SQL query/queries on table coursework.w1838863_studio:

```

1 INSERT INTO
2 w1838863_studio(w1838863_studioID,w1838863_studioName,w1838863_studioAddress,w1838863_studioPCode,w1838863_studioTelNo)
3 VALUES
4 (101, 'Blogos', '159 Church Lane, London', '201489', '+44 2085 336666'),
5 (102, 'Narcoto', '201 Rawson Street, Halifax', '375019', '+44 3445 610302'),
6 (103, 'Calonas', '109 George Street, London', '202589', '+44 2072 540151'),
7 (104, 'Begamgo', '49 Victoria Street, Blackpool', '147213', '+44 1253 751159'),
8 (105, 'Dengo', 'Kingsland Centre, London', '301109', '+44 2075 435616'),
9 (106, 'Mariola', '14 Highfield Road, London', '305512', '+44 2052 561149'),
10 (107, 'Alfots', '34 Ancoats Street, Manchester', '121407', '+44 2435 517077'),
11 (108, 'Manchso', '04 Longridge Road, London', '138460', '+44 3445 610000');
12

```

SELECT * SELECT INSERT UPDATE DELETE Clear Format Get auto-saved query

w1838863_studioID
w1838863_studioName
w1838863_studioAddress
w1838863_studioPCode
w1838863_studioTelNo

phpMyAdmin

Recent Favorites

- New
- coursework
 - New
 - w1838863_equipment
 - w1838863_studio
- information_schema
- lec4
- lec5
- mysql
- new
- performance_schema
- phpmyadmin
- test

Server: 127.0.0.1 » Database: coursework » Table: w1838863_studio

Browse Structure SQL Search Insert Export Import Privileges Operations Tracking Triggers

Show query box

8 rows inserted. (Query took 0.0083 seconds.)

```

INSERT INTO w1838863_studio(w1838863_studioID,w1838863_studioName,w1838863_studioAddress,w1838863_studioPCode,w1838863_studioTelNo) VALUES (101, 'Blogos', '159 Church Lane, London', '201489', '+44 2085 336666'), (102, 'Narcoto', '201 Rawson Street, Halifax', '375019', '+44 3445 610302'), (103, 'Calonas', '109 George Street, London', '202589', '+44 2072 540151'), (104, 'Begamgo', '49 Victoria Street, Blackpool', '147213', '+44 1253 751159'), (105, 'Dengo', 'Kingsland Centre, London', '301109', '+44 2075 435616'), (106, 'Mariola', '14 Highfield Road, London', '305512', '+44 2052 561149'), (107, 'Alfots', '34 Ancoats Street, Manchester', '121407', '+44 2435 517077'), (108, 'Manchso', '04 Longridge Road, London', '138460', '+44 3445 610000');

```

[Edit inline] [Edit] [Create PHP code]

phpMyAdmin

Recent Favorites

- New
- coursework
 - New
 - w1838863_equipment
 - w1838863_studio
- information_schema
- lec4
- lec5
- mysql
- new
- performance_schema
- phpmyadmin
- test

Server: 127.0.0.1 » Database: coursework » Table: w1838863_studio

Browse Structure SQL Search Insert Export Import Privileges Operations Tracking Triggers

Showing rows 0 - 7 (8 total, Query took 0.0005 seconds.)

SELECT * FROM `w1838863_studio`

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

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

+ Options

	w1838863_studioID	w1838863_studioName	w1838863_studioAddress	w1838863_studioPCode	w1838863_studioTelNo
<input type="checkbox"/> Edit <input type="checkbox"/> Copy <input type="checkbox"/> Delete	101	Blogos	159 Church Lane, London	201489	+44 2085 336666
<input type="checkbox"/> Edit <input type="checkbox"/> Copy <input type="checkbox"/> Delete	102	Narcoto	201 Rawson Street, Halifax	375019	+44 3445 610302
<input type="checkbox"/> Edit <input type="checkbox"/> Copy <input type="checkbox"/> Delete	103	Calonas	109 George Street, London	202589	+44 2072 540151
<input type="checkbox"/> Edit <input type="checkbox"/> Copy <input type="checkbox"/> Delete	104	Begamgo	49 Victoria Street, Blackpool	147213	+44 1253 751159
<input type="checkbox"/> Edit <input type="checkbox"/> Copy <input type="checkbox"/> Delete	105	Dengo	Kingsland Centre, London	301109	+44 2075 435616
<input type="checkbox"/> Edit <input type="checkbox"/> Copy <input type="checkbox"/> Delete	106	Maniola	14 Highfield Road, London	305512	+44 2052 561149
<input type="checkbox"/> Edit <input type="checkbox"/> Copy <input type="checkbox"/> Delete	107	Alfots	34 Ancoats Street, Manchester	121407	+44 2435 517077
<input type="checkbox"/> Edit <input type="checkbox"/> Copy <input type="checkbox"/> Delete	108	Manchso	04 Longridge Road, London	138460	+44 3445 610000

☐ Check all | With selected: ☐ Edit ☐ Copy ☐ Delete ☐ Export

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

e) Populating w1838863_equipement table

phpMyAdmin Server: 127.0.0.1 » Database: coursework » Table: w1838863_equipement

Run SQL query/queries on table coursework.w1838863_equipement:

```

1 INSERT INTO
2 w1838863_equipement(w1838863_equipCode,w1838863_equipMake,w1838863_equipSeries,w1838863_equipModel,w1838863_equipCondition,
3 w1838863_equipStatus,w1838863_lastServicingDate,w1838863_costPerDay,w1838863_studioId)
4 VALUES
5 (901,'Casio','WK 7600','Portable Keyboard','Excellent','Available','2021-03-22',129,101),
6 (902,'SubZero','DR 30','Drum/Keyboard Amp','Excellent','Available','2021-04-20',109,102),
7 (903,'Schecter','C-8 Deluxe','Electric Guitar','Excellent','Available','2021-06-12',209,103),
8 (904,'SubZero','Fret 8-String','Electric Guitar','Good','Available','2021-02-19',119,104),
9 (905,'Mapex','Tornado III','18" Drum Kit','Excellent','Available','2021-05-12',239,105),
10 (906,'Elkhart','100CR','Cornet Package','Good','Available','2021-09-10',129,106),
11 (907,'Yamaha','MG10','Analog Mixer','Excellent','Available','2021-06-22',299,107),
12 (908,'Chandler','TG12345','Curve Bender','Good','Available','2021-08-07',99,108);
13

```

SELECT * SELECT INSERT UPDATE DELETE Clear Format Get auto-saved query

Table structure: w1838863_equipCode, w1838863_equipMake, w1838863_equipSeries, w1838863_equipModel, w1838863_equipCondition, w1838863_equipStatus, w1838863_lastServicingDate, w1838863_costPerDay, w1838863_studioId

phpMyAdmin Server: 127.0.0.1 » Database: coursework » Table: w1838863_equipement

Show query box

8 rows inserted. (Query took 0.0169 seconds)

```

INSERT INTO w1838863_equipement(w1838863_equipCode,w1838863_equipMake,w1838863_equipSeries,w1838863_equipModel,w1838863_equipCondition,
w1838863_equipStatus,w1838863_lastServicingDate,w1838863_costPerDay,w1838863_studioId) VALUES (901,'Casio','WK 7600','Portable Keyboard','Excellent','Available','2021-03-22',129,101), (902,'SubZero','DR 30','Drum/Keyboard Amp','Excellent','Available','2021-04-20',109,102), (903,'Schecter','C-8 Deluxe','Electric Guitar','Excellent','Available','2021-06-12',209,103), (904,'SubZero','Fret 8-String','Electric Guitar','Good','Available','2021-02-19',119,104), (905,'Mapex','Tornado III','18" Drum Kit','Excellent','Available','2021-05-12',239,105), (906,'Elkhart','100CR','Cornet Package','Good','Available','2021-09-10',129,106), (907,'Yamaha','MG10','Analog Mixer','Excellent','Available','2021-06-22',299,107), (908,'Chandler','TG12345','Curve Bender','Good','Available','2021-08-07',99,108);

```

[Edit inline] [Edit] [Create PHP code]

phpMyAdmin Server: 127.0.0.1 » Database: coursework » Table: w1838863_equipement

8 total, Query took 0.0006 seconds.)

863_equipement

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

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

	w1838863_equipCode	w1838863_equipMake	w1838863_equipSeries	w1838863_equipModel	w1838863_equipCondition	w1838863_equipStatus	w1838863_lastServicingDate	w1838863_costPerDay	w1838863_studioId
Delete	901	Casio	WK 7600	Portable Keyboard	Excellent	Available	2021-03-22	129	101
Delete	902	SubZero	DR 30	Drum/Keyboard Amp	Excellent	Available	2021-04-20	109	102
Delete	903	Schecter	C-8 Deluxe	Electric Guitar	Excellent	Available	2021-06-12	209	103
Delete	904	SubZero	Fret 8-String	Electric Guitar	Good	Available	2021-02-19	119	104
Delete	905	Mapex	Tornado III	18" Drum Kit	Excellent	Available	2021-05-12	239	105
Delete	906	Elkhart	100CR	Cornet Package	Good	Available	2021-09-10	129	106
Delete	907	Yamaha	MG10	Analog Mixer	Excellent	Available	2021-06-22	299	107
Delete	908	Chandler	TG12345	Curve Bender	Good	Available	2021-08-07	99	108

With selected: Edit Copy Delete Export

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

f) Query

phpMyAdmin

Server: 127.0.0.1 > Database: coursework

Structure SQL Search Query Export Import Operations Privileges Routines Events Triggers Trac

Run SQL query/queries on database coursework:

```

1 SELECT s.w1838863_studioName,s.w1838863_studioAddress,e.w1838863_equipMake,e.w1838863_equipSeries,e.w1838863_equipModel,e.w1838863_costPerDay
2 FROM w1838863_studio s JOIN w1838863_equipm e
3 ON s.w1838863_studioID=e.w1838863_studioId
4 WHERE ( s.w1838863_studioAddress LIKE '%London%' AND e.w1838863_costPerDay>=125 );
5
6

```

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 - New
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 - w1838863_studio
- information_schema
- lec4
- lec5
- mysql
- new
- performance_schema
- phpmyadmin
- test

phpMyAdmin

Server: 127.0.0.1 > Database: coursework

Structure SQL Search Query Export Import Operations Privileges Routines Events Triggers Tracking Designer

Show query box

Showing rows 0 - 3 (4 total, Query took 0.0038 seconds.)

```

SELECT s.w1838863_studioName,s.w1838863_studioAddress,e.w1838863_equipMake,e.w1838863_equipSeries,e.w1838863_equipModel,e.w1838863_costPerDay FROM w1838863_studio s JOIN
w1838863_equipm e ON s.w1838863_studioID=e.w1838863_studioId WHERE ( s.w1838863_studioAddress LIKE '%London%' AND e.w1838863_costPerDay>=125 );

```

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

☐ Show all | Number of rows: 25 | Filter rows: Search this table

+ Options

w1838863_studioName	w1838863_studioAddress	w1838863_equipMake	w1838863_equipSeries	w1838863_equipModel	w1838863_costPerDay
Blogos	159 Church Lane, London	Casio	WK 7600	Portable Keyboard	129
Calonas	109 George Street, London	Schecter	C-8 Deluxe	Electric Guitar	209
Dengo	Kingsland Centre, London	Mapex	Tornado III	18" Drum Kit	239
Mariola	14 Highfield Road, London	Elkhart	100CR	Cornet Package	129

☐ Show all | Number of rows: 25 | Filter rows: Search this table

Query results operations

☐ Print ☐ Copy to clipboard ☐ Export ☐ Display chart ☐ Create view

Bookmark this SQL query

Label: ☐ Let every user access this bookmark

Console > this SQL query

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7)

	Relational Databases	NoSQL Databases
Schema and query language	Use a standard structured query language (SQL) which is more convenient for users to use and has a pre-define schema (Nayak, Poriya and Poojary, 2013). In order to enter data, it should comply with the schema and should be structured data which fit into tables, so this makes it less flexible.	This lacks a standard query language therefore it holdups behind relational databases in terms of users. NoSQL uses dynamic schema for unstructured data (Nayak, Poriya and Poojary, 2013). As there is no schema, data can be entered any time so it's more flexible than relational databases.
Data Consistency	Relational databases fully support ACID (Atomicity, Consistency, Isolation, Durability) where consistency is a main feature. And also, data duplication is not allowed which protects data integrity. Thus, very high data consistency can be guaranteed (Mohamed, Altrafi and Ismail, 2014).	NoSQL databases are defined in between the BASE (Basically available, Soft state, Eventual consistency) and ACID so data consistency cannot be guaranteed and also it threatens the data integrity as data duplication is allowed which may be a serious concern. (Mohamed, Altrafi and Ismail, 2014).
Storage	Data is structured and stored in tables, it contains a schema so data should be structured and contains as tuples. And also, as relational databases follow vertical scale and as scale up is limited the storage gets limited. So, the servers should be powered up, because adding more data leads to have increased downtime. When volume of data increases the performance decreases and data handling becomes slower and harder (Birgen, 2014).	Data is semi structured and does not contain a schema which makes it easier and faster for data handling. NoSQL follows horizontal scale and as scale out is unlimited the data storage become unlimited. It gives the user the possibility of adding nodes dynamically to a cluster without any downtime. Even a large volume of data would not affect the performance (Birgen, 2014).
Scalability	Vertically scalable (increasing server power by adding more hardware like RAM, CPU). To scale relational databases users will have to distribute the database across multiple powerful servers (adding more power to server) which will be very expensive. Thus handling the data across multiple servers will be challenging because maintaining the schema and keeping the data consistent will be difficult (Raut, 2017).	Horizontally scalable (distributing data over a wider range of servers). When scaling a NoSQL database, the user will have to distribute the database across multiple servers (no need to be powerful) which will be less expensive. And maintaining the data across multiple servers will be relatively easy because it does not have a schema and NoSQL databases have been designed to facilitate horizontal scaling (Raut, 2017).
Performance	As the volume of data increases the performance degrades because it follows vertical scaling method and it needs more powerful servers. Thus, makes it less efficient and compared to NoSQL it is slower and less flexible (Nayak, Poriya and Poojary, 2013).	The performance will not degrade even for a higher volume of data because it uses horizontal scaling method which distribute data over wider range of servers making it more efficient, faster and more flexible than Relational databases (Nayak, Poriya and Poojary, 2013).
Workload	Supports SQL and NoSQL type workloads but horizontal scalability in SQL databases is challenging. When the volume of data increases the servers should be powered up to increase	NoSQL databases can handle greater amounts of workloads related to unstructured data. Flexible searches can be done across a large collection of

	the workloads otherwise it will lead to greater downtimes (Birgen, 2014).	unstructured data which has no single point of failure (Birgen, 2014).
Infrastructure	Relational databases can be classified as open sourced and closed sourced. This database follows ACID properties and is vertically scalable. When adding large amount of data, the performance decreases so it requires to upgrade the infrastructure by adding more Ram, CPU, etc. which is quite expensive. The infrastructure should be powerful enough to handle large workloads otherwise it will lead to downtime errors (Birgen, 2014).	NoSQL databases can be classified on the method of data storage; graph databases, key-value store databases, document store databases etc. This database follows BASE properties and is horizontally scalable. When adding large amount of data, it requires to add few more servers to the database infrastructure to control the large traffic created (Birgen, 2014).
Security	In relational databases it uses an encryption method when storing data. With the use of this encryption it increases the level of security so that the data is kept confidential (Mohamed, Altrafi and Ismail, 2014).	But in NoSQL it does not use any encryption method. The data is stored clean which in result makes the level of security to degrade (Mohamed, Altrafi and Ismail, 2014).

References

- Raut, D.A.B. (2017). NOSQL Database and Its Comparison with RDBMS. 8. Available from [ijcirv13n7 08.pdf \(ripublishation.com\)](#). [Accessed 1 December 2021].
- Mohamed, M., Altrafi, O. and Ismail, M. (2014). Relational Vs. NoSQL databases: A survey. *International Journal of Computer and Information Technology (IJCIT)*, 03, 598. Available from [Relational-Vs-NoSQL-databases-A-survey.pdf \(researchgate.net\)](#). [Accessed 3 December 2021].
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