**INTRODUCTION TO DATABASES**

**Assignment 1 – Report Template and Guidelines**

**Outline Business Scenario**

A yacht charter company requires a web-based system to manage aspects of its holiday charter business.

*There are a number of customers, each of whom may book a number of holiday charters, with each charter booked by an individual customer. A holiday charter may involve one yacht only, but each yacht may be involved in many holiday charters. A holiday charter may visit several ports and each port will be visited by many holiday charters. Most ports have several yachts based in them (although a few smaller ports have no yachts based in them) with each yacht based in just a single home port.*

Information to be held and manipulated include:

* *the name, nationality, email address, phone number and id number of each customer.*
* *the name, type, model, home port, number of berths and cost of hire per day of each yacht.*
* *the name, phone number, email address and number of docking places at each port.*
* *the charter id, start date and duration of each charter, and the visit id, expected date of arrival and duration of stay at each port visited.*

Business processes to be supported include the ability to:

* *add details of a new customer together with the start date and duration of the charter they have booked, but without specifying the yacht to be used or the ports to be visited.*
* *list the total length of stay, between two given dates, of yachts in the fleet in each port.*
* *get a list of yachts (by name) visiting their home port between two given dates, together with the date of arrival and the length of the stay.*
* *list the ports visited by a given customer together with the date of arrival and length of stay, ordered by date.*
* *remove a yacht temporarily for a period of time (e.g., for servicing) and get a list of yachts that are not available,*

**Assignment Report**

**Design and Implementation of a Database  
to Support a Yacht Charter Company**

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1. **Entity Relationship Modelling**
   1. **ER Diagram**

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* 1. **Justification of Cardinality Ratios**
* Customer to charter (one to many relation)
* Charter to Yacht (many to one relation)
* Charter to port (many to many relation)
* Port to yacht (many to one relation)
  1. **Justification of Participation Constraints**
* A Customer can book many Charters, but each Charter is booked by one Customer.
* A Yacht may be involved in many Charters, but each Charter involves one Yacht.
* A Charter may visit several Ports, and each Port can be visited by many Charters.
* Most Ports have several Yachts based in them, but each Yacht is based in just one Home Port.
  1. **Entities and Attributes**
* customer (**id,**name,email\_address,nationality,phone\_number)
* port (**pname,**phone\_number,p\_email\_address,number\_of\_docking\_places)
* yacht (**y\_name**,type,model,cost\_of\_hire\_per\_day,number\_of\_berths,home\_port)
* charter (**charter\_id**,id,y\_name,start\_date,duration)
* visit(**visit\_id**,start\_date,expected\_date\_of\_arrival,duration\_of\_stay,pname,charter\_id)
  1. **Discussion of Limitations and Assumptions**

I was confused with the yacht table primary key, after discussion and research I took yacht name as an primary key.

1. **Relational Schema and Consideration of Normalisation**
   1. **Relational Schema**

* customer (**id,**name,email\_address,nationality,phone\_number,)
* port (**pname,**phone\_number,p\_email\_address,number\_of\_docking\_places)
* yacht(**y\_name**,type,model,cost\_of\_hire\_per\_day,number\_of\_berths,home\_port,)
* charter (**charter\_id**,id,y\_name,start\_date,duration,y\_name\*,charter\_id\*,id\*)
* visit(**visit\_id**,start\_date,expected\_date\_of\_arrival,duration\_of\_stay,pname\*,charter\_id\*,visit\_id\*)
  1. **Choice of Datatypes**

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* Varchar is used for words and phone numbers.
* Int is used for numbers, duration of stay, duration, number of berths, number of docking places.
* Decimal is used for cost of hire per day.
  1. **Normalisation**
* customer (**id,**name,email\_address,nationality,phone\_number)
* port (**pname,**phone\_number,p\_email\_address,number\_of\_docking\_places)
* yacht(**y\_name**,type,model,cost\_of\_hire\_per\_day,number\_of\_berths,home\_port)
* charter (**charter\_id**,start\_date,duration,y\_name\*,id\*)
* visit(**visit\_id**,start\_date,expected\_date\_of\_arrival,duration\_of\_stay,pname\*,charter\_id\*)

All of these entities are in Third normal form. Bold attributes are primary key and \* attributes are foreign keys.

1. **Database Construction**

Creating database as yacht\_charter\_company

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Creating tables for customer,port,yacht,charter,visit using different data types

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Adding foreign keys to different entities using Alter table

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Populating customer table with datas

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Populating port table with datas

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Populating yacht table with datas

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Populating charter table with datas

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Populating visit table with datas

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1. **Analysis and Interpretation**

The proposed method effectively creates and fills in the necessary database tables (customer, port, yacht, charter and visit). It can perform various queries and actions on these tables to meet different business needs.

However, there are some limitations to consider. Any changes made to the temporary table are only valid for the ongoing session and won't be saved for future sessions or after the current session is closed.

On the positive side, a temporary table (temp\_yacht) is utilized to mark yachts as "unavailable," ensuring that the original data in the YACHT table remains unaltered. This method provides a non-destructive way to indicate yacht availability.

The queries included in the solution are designed to extract pertinent information from the database, such as the total length of stay for each charter and the availability of yachts in homeports.

To maintain data integrity across related tables, the solution defines primary keys, foreign keys, and constraints. This helps ensure that the data in the database remains accurate and consistent.

**Appendix – SQL Code**

-- database

create database `yacht\_charter\_company` ;

use `yacht\_charter\_company`;

-- tables

create table `customer`(

id varchar (10) not null,

name varchar(30),

email\_address varchar (30),

nationality varchar (20),

phone\_number varchar (15),

constraint pk\_cus primary key(id)

);

create table `port`(

pname varchar (20) not null,

phone\_number varchar (18),

p\_email\_address varchar (40),

number\_of\_docking\_places int,

constraint pk\_port primary key(pname)

);

create table `yacht`(

y\_name varchar(15) not null,

type varchar (20),

model varchar (20),

cost\_of\_hire\_per\_day decimal(10,2),

number\_of\_berths int,

home\_port varchar (20),

constraint pk\_yacht primary key(y\_name)

);

create table `charter`(

charter\_id varchar (10) not null,

id char (10) not null,

y\_name varchar (15) not null,

start\_date varchar(10),

duration int,

constraint pk\_char primary key(charter\_id)

);

create table `visit`(

visit\_id varchar (7) not null,

start\_date varchar(10),

expected\_date\_of\_arrival varchar(10),

duration\_of\_stay int,

pname varchar (20) not null,

charter\_id varchar (10) not null,

constraint pk\_visit primary key(visit\_id)

);

-- foreign keys

alter table `charter`

add constraint fk\_1 foreign key (id) references `customer` (id);

alter table `charter`

add constraint fk\_2 foreign key (y\_name) references `yacht` (y\_name);

alter table `visit`

add constraint fk\_3 foreign key (pname) references `port` (pname);

alter table `visit`

add constraint fk\_4 foreign key (charter\_id) references `charter` (charter\_id);

-- Populating the database with the datas in the tables

insert into `customer` (id,name,email\_address,nationality,phone\_number)

values ('D13-101','Bette Davis','bette.davis@ulster.ac.uk','American','41728003'),

('D13-203','Cary Grant','bigcary@yahoo.com','British','+44417654321'),

('D13-306','William Holden','billyho66@yahoo.com','Irish','+38198322843'),

('D13-42','Humphrey Bogart','bogieh@gmail.com','American','07782751839'),

('D13-51','Ingrid Bergman','IngridB@hotmail.com','Swedish','02890123456'),

('D13-R20','Jean Harlow','jeanh99@gmail.com','German','005866419887654'),

('D13-R93','John Wayne','john.wayne@ulster.ac.uk','South African','02890112233'),

('D14-38','Katharine Hepburn','kath\_hep29@hotmail.com','Irish','00447880708090'),

('D17-022','Marilyn Monroe','marilyn@hotmail.com','French','+88487618356732');

insert into `port` (pname,phone\_number,p\_email\_address,number\_of\_docking\_places)

values ('Genoa', '+3984774025', 'genoa667@genoaadmin.co.it', 160),

('Kusadasi', '+9045204295', 'Kusadasi\_harbour@hotmail.co.tr', 96),

('Barcelona', '+34(0)8892436767', 'harbourmaster@barcelona\_marina.com', 211),

('Marmaris', '+90(0)62228138', Null, 69),

('Perpignan', '+3373600125', Null, 88),

('Paphos', '+35788301000', 'paphosmariana@cyprusports.cy', 47),

('Monaco', '0037788356302', 'mariana@monacoport.mc', 104),

('Dénia', '+90229453883', 'denia\_port@denia\_port.com', 31),

('St Tropez', Null, 'master@sttropezmarina.fr', 239),

('Cartagena', '+34(0)62045005', Null, 21),

('Palma', '+3494955320', Null, 74),

('Marseiles', '+3330026016', 'marseiles\_port@france\_ports.fr', 92),

('Malaga', '+3430336117', 'harbour\_master@malagaport.com', 198),

('Heraklion', Null, 'herp@heraklioncity.co.gr', 85),

('Athens', '+3014936640', 'paays7@athensport.gr', 106),

('Valencia', '+3483884002', Null, 74),

('Izmir', '009062602105', Null, 93),

('Cagliari', '+3963660326', 'ettwu7@gmail.com', 40),

('Naples', '+3990583686', Null, 132),

('Palermo', '+3922746104', 'ggaft4@visitpalermo.co.it', 57),

('Bodrum', '+9099264831', Null, 89),

('Lisbon', '0035144700212', Null, 79),

('Magaluf', Null, 'maghar@maghar.com', 88),

('Cadiz', '+34(0)18128403', Null, 90),

('Montpelier', '+33(0)51411947', Null, 79),

('Cannes', '+3366295633', 'cannes.marina@yahoo.com', 148),

('Tangier', '+21245936724', 'tan778@tangierport.com', 63);

insert into `yacht` (y\_name,type,model,cost\_of\_hire\_per\_day,number\_of\_berths,home\_port)

values ('Serendipity', 'Monohull', 'Catalina 350', 2995.92, 9, 'Genoa'),

('Second Wind', 'Catamaran', 'MacGregor 26X', 1063.45, 8, 'Kusadasi'),

('Mad Hatter', 'Monohull', 'Jeanneau 42 DS', 869.45, 4, 'Barcelona'),

('Orion', 'Powered', 'Ranger 28', 2309.56, 9, 'Marmaris'),

('Serenity', 'Powered', 'Ranger 28', 2294, 11, 'Genoa'),

('Wind Dancer', 'Monohull', 'Jeanneau 42 DS', 892.4, 4, 'Barcelona'),

('Windsong', 'Catamaran', 'MacGregor 26X', 1352.9, 7, 'Dénia'),

('Escape', 'Monohull', 'Beneteau 373', 3016.34, 10, 'Kusadasi');

insert into `charter` (charter\_id,id,y\_name,start\_date,duration)

values ('CH-033', 'D13-R20', 'Serendipity', '6.17.2018', 7),

('CH-032', 'D17-022', 'Second Wind', '6.24.2018', 36),

('CH-027', 'D13-101', 'Mad Hatter', '6.25.2018', 7),

('CH-034', 'D13-203', 'Serendipity', '6.30.2018', 18),

('CH-036', 'D13-42', 'Serenity', '7.2.2018', 14),

('CH-028', 'D13-42', 'Mad Hatter', '7.5.2018', 21),

('CH-043', 'D13-306', 'Windsong', '7.6.2018', 10),

('CH-030', 'D13-R20', 'Orion', '7.11.2018', 14),

('CH-039', 'D13-101', 'Wind Dancer', '7.12.2018', 7),

('CH-035', 'D13-R20', 'Serendipity', '7.22.2018', 10),

('CH-037', 'D14-38', 'Serenity', '7.23.2018', 21),

('CH-044', 'D13-306', 'Windsong', '7.29.2018', 35),

('CH-031', 'D13-101', 'Orion', '7.30.2018', 10),

('CH-029', 'D13-R93', 'Mad Hatter', '8.5.2018', 14),

('CH-040', 'D17-022', 'Wind Dancer', '8.10.2018', 10),

('CH-038', 'D13-203', 'Serendipity', '8.18.2018', 7),

('CH-041', 'D13-51', 'Wind Dancer', '8.23.2018', 7),

('CH-026', 'D13-51', 'Escape', '8.25.2018', 14),

('CH-042', 'D14-38', 'Wind Dancer', '9.6.2018', 15),

('CH-045', 'D13-203', 'Windsong', '9.6.2018', 21);

insert into `visit` (visit\_id,start\_date,expected\_date\_of\_arrival,duration\_of\_stay,pname,charter\_id)

values ('V101', '6.17.2018', '6.17.2018', 0, 'Genoa', 'CH-033'),

('V102', '6.24.2018', '6.24.2018', 0, 'Kusadasi', 'CH-032'),

('V103', '6.25.2018', '6.25.2018', 0, 'Barcelona', 'CH-027'),

('V106', '6.17.2018', '6.30.2018', 1, 'Genoa', 'CH-033'),

('V107', '7.2.2018', '7.2.2018', 1, 'Genoa', 'CH-036'),

('V110', '7.5.2018', '7.5.2018', 1, 'Barcelona', 'CH-027'),

('V111', '7.6.2018', '7.6.2018', 0, 'Dénia', 'CH-043'),

('V116', '7.11.2018', '7.11.2018', 0, 'Marmaris', 'CH-030'),

('V118', '7.12.2018', '7.12.2018', 1, 'Barcelona', 'CH-039'),

('V127', '7.22.2018', '7.22.2018', 1, 'Genoa', 'CH-035'),

('V129', '7.23.2018', '7.23.2018', 0, 'Genoa', 'CH-037'),

('V132', '7.29.2018', '7.29.2018', 0, 'Dénia', 'CH-044'),

('V133', '7.30.2018', '7.30.2018', 0, 'Marmaris', 'CH-031'),

('V138', '8.5.2018', '8.5.2018', 0, 'Barcelona', 'CH-029'),

('V144', '8.10.2018', '8.10.2018', 0, 'Barcelona', 'CH-040'),

('V149', '8.18.2018', '8.18.2018', 0, 'Genoa', 'CH-038'),

('V152', '8.23.2018', '8.23.2018', 0, 'Barcelona', 'CH-041'),

('V153', '8.25.2018', '8.25.2018', 0, 'Kusadasi', 'CH-032'),

('V158', '9.6.2018', '9.6.2018', 0, 'Barcelona', 'CH-042');

1. %%sql

insert into customer

values ('D18-223','sayeed','sayeed-@ulster.ac.uk','bangladeshi','0787556321');

1. %%sql

select charter.charter\_id, SUM(visit.duration\_of\_stay) as "Total duration of Stay"

from charter inner join visit

on charter.charter\_id = visit.charter\_id

group by charter.charter\_id;

1. %%sql

select yacht.y\_name

from yacht inner join port

on yacht.home\_port = port.pname

where port.pname is not null;

1. %%sql

select distinct pname

from port

where pname in (

select pname

from visit

where charter\_id in (

select charter\_id

from charter

where id is not null

)

);

1. %%sql

create temporary table temp\_yacht as

select \*, 'available' as status

from yacht;

%%sql

update temp\_yacht

set status = 'unknown'

where y\_name = 'Escape';

%%sql

select \*

from temp\_yacht;