CW1 Database Design and Implementation

Group 9

Jamie, Matthew, James, Lucca, CJ

Task contributions:

As a group we all worked together on all the tasks, however the final design/implementation of the tasks were done as follows:

Matthew: Task 1

CJ: Task 1

Lucca: Task 2

Jamie: Task 3/Task 4

James: Task 3/Task 4

Course code and name:	F28DM – Database Management Systems
Type of assessment:	**Group**
Coursework Title:	CW1
Student Name:	Jamie Mcintosh
Student ID Number:	H00371025

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Student Signature *(type your name):* *Jamie Mcintosh*

Date: *16/02/2023*

Course code and name:	F28Dm Database Management Systems
Type of assessment:	**Group**
Coursework Title:	CW1
Student Name:	Lucca Anthony Marcondes Browning
Student ID Number:	H00369673

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Student Signature *(type your name):* *Lucca Anthony Marcondes Browning*

Date: *16/02/2023*

Course code and name:	F28DM – Database Management Systems
Type of assessment:	**Group**
Coursework Title:	Coursework 1
Student Name:	Matthew Forsyth
Student ID Number:	H00372975

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Student Signature *(type your name):* *Matthew Forsyth*

Date: *16/02/2023*

Course code and name:	F28Dm Database Management Systems
Type of assessment:	**Group**
Coursework Title:	CW1
Student Name:	James Stewart
Student ID Number:	H00371382

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Student Signature *(type your name):* *James Stewart*

Date: *16/02/2023*

Course code and name:	F28Dm Database Management Systems
Type of assessment:	**Group**
Coursework Title:	CW1
Student Name:	CJ
Student ID Number:	H00373745

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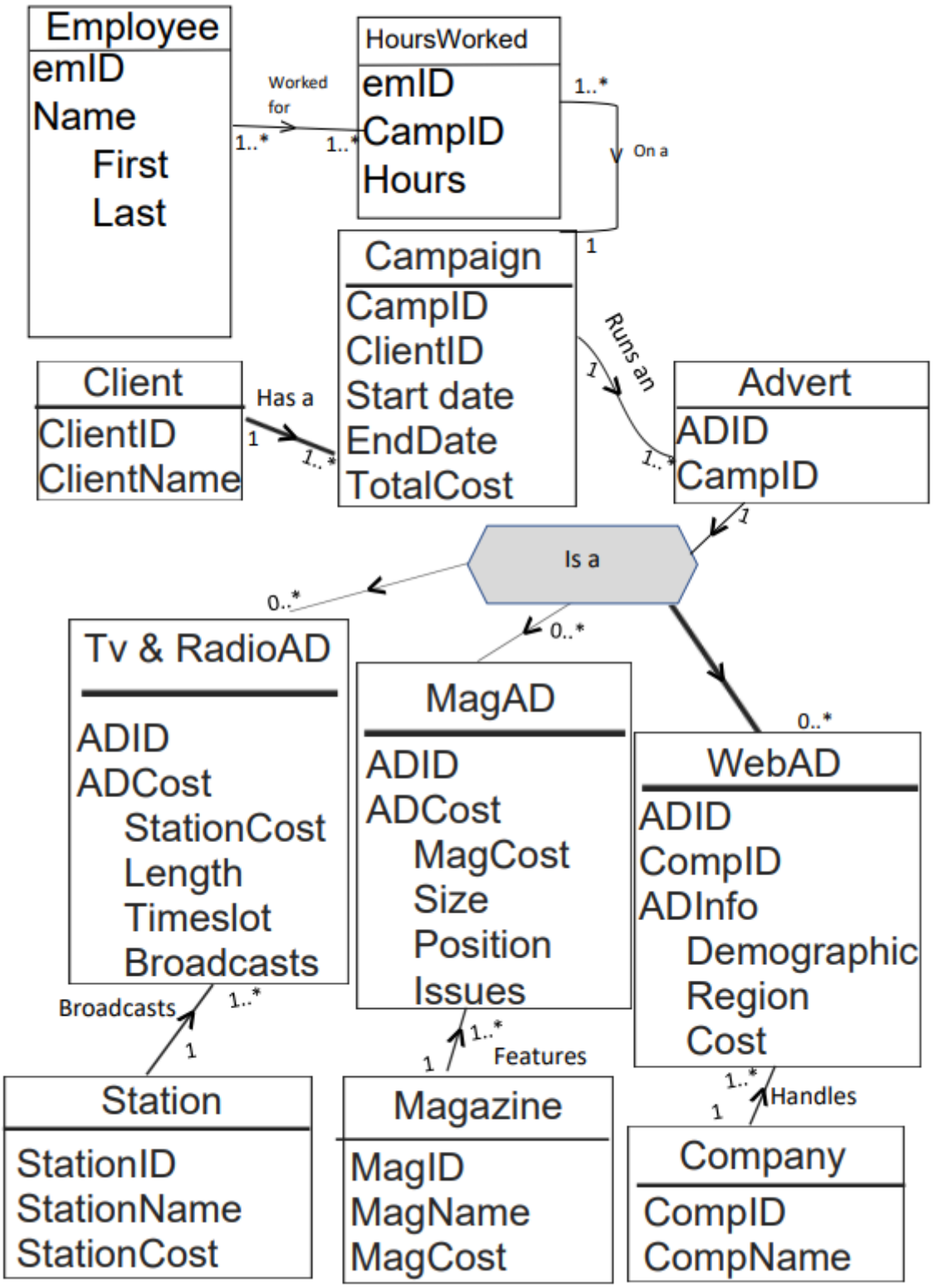
Student Signature *(type your name):* *CJ Pell*

Date: *16/02/2023*

Task 1 Conceptual Model:



Task 2: Translation into Relational Schema:

Client (ClientID: 11 digits, ClientFirstName: text(25), ClientLastName: text(25))

- ClientID is the Primary Key

Client (emID: 11 digits, EmployeeFirstName: text(25), EmployeeLastName: text(25))

- emID is the Primary Key

Campaign (CampID: 11 digits, ClientID: 11 digits, Start_Date: date, End_Date: date, Total_Cost: integer(0…9,999,999))

- CampID is the Primary Key
- ClientID is a Foreign Key referencing Client

HoursWorked (emID: 11 digits, CampID: 11 digits, Hours: 4 digits)

- emID and CampID form a composite Primary Key
- emID is a Foreign Key referencing Employee
- CampID is a Foreign Key referencing Campaign

Advert (ADID: 11 digits, CampID: 11 digits)

- ADID is the Primary Key
- CampID is a Foreign Key referencing Campaign

Station (StationID: 5 digits, StationName: text(50), StationCost: integer(0…9,999,999))

- StationID is the Primary Key

TVRadioAD (ADID: 11 digits, ADCOST: integer(0…9,999,999) , StationID: 5 digits, Length: integer(0…999), Timeslot: [prime time|day|night], Broadcasts: integer (0…999))

- ADID and StationID form a composite Primary Key
- ADID is a Foreign Key referencing Advert
- StationID is a Foreign Key referencing Station

Magazine (MagID: 5 digits, MagName: text(50), MagCost: integer (0…9,999,999))

- MagID is the Primary Key

Company (CompID: 5 digits, CompName: text(64))

- CompID is the Primary Key

MagAD (ADID: 11 digits, ADCost: integer(0…9,999,999), MagID 5 digits, Size: integer (0…100) Position: [inside front|inside back|other], Issues: 10 digits)

- ADID and MagID form a composite Primary Key
- ADID is a Foreign Key referencing Advert
- MagID is a Foreign Key referencing Magazine

WebAD (ADID: 11 digits, CompID: 5 digits, ADINFO: text(50), Demographic: text(50), Region: text(176), Cost: integer(0…9,999,999))

- ADID and CompID form a composite Primary Key

- ADID is a Foreign Key referencing Advert
- CompID is a Foreign Key referencing Company

Task 3: Implementation of the Schema in MariaDB:

```
DROP TABLE IF EXISTS `WebAD`, `MagAD`, `Company`, `Magazine`, `TVRadioAD`, `Station`, `Advert`, `HoursWorked`, `Campaign`, `Employee`, `Client`;

-- Drops any existing tables required for the database, to

-- ensure the correct ones are created next


CREATE TABLE IF NOT EXISTS Client (

-- Each table uses IF NOT EXISTS to stop any errors occuring if they are already there.

  ClientID int(11) NOT NULL AUTO_INCREMENT,

  PRIMARY KEY (ClientID),

-- Creates the primary key CLientID, which uses an auto increment, meaning it is unique.

  ClientFirstName varchar(25) NOT NULL,

-- Since all the columns in the database are required - NOT NULL is used

-- to ensure that there is data in each column.

  ClientLastName varchar(25) NOT NULL

);


CREATE TABLE IF NOT EXISTS Employee (

  emID int(11) NOT NULL AUTO_INCREMENT,

  PRIMARY KEY (emID),

  EmployeeFirstName varchar(25) NOT NULL,

  EmployeeLastName varchar(25) NOT NULL

);


CREATE TABLE IF NOT EXISTS Campaign (

  CampID int(11) NOT NULL AUTO_INCREMENT,

  PRIMARY KEY (CampID),
```

```
  ClientID int(11) NOT NULL,
  FOREIGN KEY (ClientID) REFERENCES Client(ClientID),
-- The foreign key created here uses the ClientID from the client table, to
-- keep track of which client the campaign belongs to
  Start_Date date NOT NULL,
  End_Date date NOT NULL,
  Total_Cost int(7) NOT NULL
);

CREATE TABLE IF NOT EXISTS HoursWorked (
  emID int(11) NOT NULL,
  FOREIGN KEY (emID) REFERENCES Employee(emID),
  CampID int(11) NOT NULL,
  FOREIGN KEY (CampID) REFERENCES Campaign(CampID),
  Hours int(4) NOT NULL,
  UNIQUE(emID, CampID)
-- There is no primary key for this table, so UNIQUE has been used
-- to create a unique identifier for the table
);

CREATE TABLE IF NOT EXISTS Advert (
  ADID int(11) NOT NULL AUTO_INCREMENT,
  PRIMARY KEY (ADID),
  CampID int(11) NOT NULL,
  FOREIGN KEY (CampID) REFERENCES Campaign(CampID)
);

CREATE TABLE IF NOT EXISTS Station (
  StationID int(5) NOT NULL AUTO_INCREMENT,
```

```
  PRIMARY KEY(StationID),
  StationName varchar(50) NOT NULL,
  StationCost int(7) NOT NULL
);

CREATE TABLE IF NOT EXISTS TVRadioAD (
  ADID int(11) NOT NULL,
  FOREIGN KEY (ADID) REFERENCES Advert(ADID),
  ADCOST int(7) NOT NULL,
  StationID int(5) NOT NULL,
  FOREIGN KEY (StationID) REFERENCES Station(StationID),
  Length int(3) NOT NULL,
  Timeslot ENUM('Prime Time', 'day', 'night') NOT NULL,
-- The timeslot must be one of the 3 options (Prime Time, day, night)
  Broadcasts int(3) NOT NULL,
  UNIQUE(ADID, StationID)
);
CREATE TABLE IF NOT EXISTS Magazine (
  MagID int(5) NOT NULL AUTO_INCREMENT,
  PRIMARY KEY(MagID),
  MagName varchar(50) NOT NULL,
  MagCost int(7) NOT NULL
);

CREATE TABLE IF NOT EXISTS Company (
  CompID int(5) NOT NULL AUTO_INCREMENT,
  PRIMARY KEY(CompID),
  CompName varchar(64) NOT NULL
);
```

```
CREATE TABLE IF NOT EXISTS MagAD (
  ADID int(11) NOT NULL,
  FOREIGN KEY (ADID) REFERENCES Advert(ADID),
  ADCOST int(7) NOT NULL,
  MagID int(5) NOT NULL,
  FOREIGN KEY (MagID) REFERENCES Magazine(MagID),
  Size int(3) NOT NULL,
  Position ENUM('inside front', 'inside back', 'other') NOT NULL,
  Issues int(10) NOT NULL,
  UNIQUE(ADID, MagID)
);

CREATE TABLE IF NOT EXISTS WebAD (
  ADID int(11) NOT NULL,
  FOREIGN KEY (ADID) REFERENCES Advert(ADID),
  CompID int(5) NOT NULL,
  FOREIGN KEY (CompID) REFERENCES Company(CompID),
  ADINFO varchar(50) NOT NULL,
  Demographic int(50) NOT NULL,
  Region varchar(176) NOT NULL,
  Cost int(7) NOT NULL,
  UNIQUE(ADID, CompID)
);

-- The test data is inserted into the database, to ensure it all works together with PK/FK's.
-- Each table has some data in it. The NULL's are used to make the auto
-- increments be used to create unique identifers (Primary keys)
```

INSERT INTO Client (ClientID, ClientFirstName, ClientLastName) VALUES (NULL, 'Alan', 'Whyte'), (NULL, 'Kris', 'Reid');

INSERT INTO Campaign (CampID, ClientID, Start_Date, End_Date, Total_Cost) VALUES (NULL, 1, '2023-01-30', '2023-02-28', 2000), (NULL, 2, '2023-01-30', '2023-03-08', 2000), (NULL, 1, '2023-01-17', '2023-01-31', 5000);

INSERT INTO Advert (ADID, CampID) VALUES (NULL, 1), (NULL, 1), (NULL, 2), (NULL, 3);

INSERT INTO Station (StationID, StationName, StationCost) VALUES (NULL, 'ITV', 1), (NULL, 'C4', 1);

INSERT INTO TVRadioAD (ADID, ADCOST, StationID, Length, Timeslot, Broadcasts) VALUES (2, 100, 1, 50, 'Prime Time', 50), (1, 200, 1, 50, 'night', 5);

INSERT INTO Magazine (MagID, MagName, MagCost) VALUES (NULL, 'Databases 101', 25), (NULL, 'Computing 101', 20);

INSERT INTO MagAD (ADID, ADCost, MagID, Size, Position, Issues) VALUES (1, 75, 2, 5, 'inside back ', 2), (2, 55, 2, 11, 'inside front', 8);

INSERT INTO Company (CompID, CompName) VALUES (NULL, 'MACS'), (NULL, 'Edinburgh Council');

INSERT INTO WebAD (ADID, CompID, ADInfo, Demographic, Region, Cost) VALUES (1, 1, 'Educational', 19, 'Edinburgh', 75), (2, 2, 'Trips', 25, 'Scotland', 300);

INSERT INTO Employee(emID, EmployeeFirstName, EmployeeLastName) VALUES (NULL, 'Neil', 'Boyd'), (NULL, 'Ian', 'Macfarlane');

INSERT INTO HoursWorked(emID, CampID, Hours) VALUES (1, 2, 6832), (2, 1, 46);

Task 4 Indexes:

CREATE INDEX Region ON WebAD (Region);

-- to search for adverts in a specific region

CREATE INDEX Timeslot ON TVRadioAD (Timeslot);

-- to search for adverts at a specific time

CREATE INDEX StartDate ON Campaign(Start_Date);

-- to search for when a advertising campaign starts

```
CREATE INDEX EmployeeName ON Employee(EmployeeFirstName, EmployeeLastName);
-- to search for the full name of employees
CREATE INDEX Issues ON MagAD(Issues);
-- to search for a specific issue of a magazine advert
```