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Exam SQL Case Study: Monash Automotive

Monash Automotive (MA) is a small business operating from a single location, which services automotive vehicles.

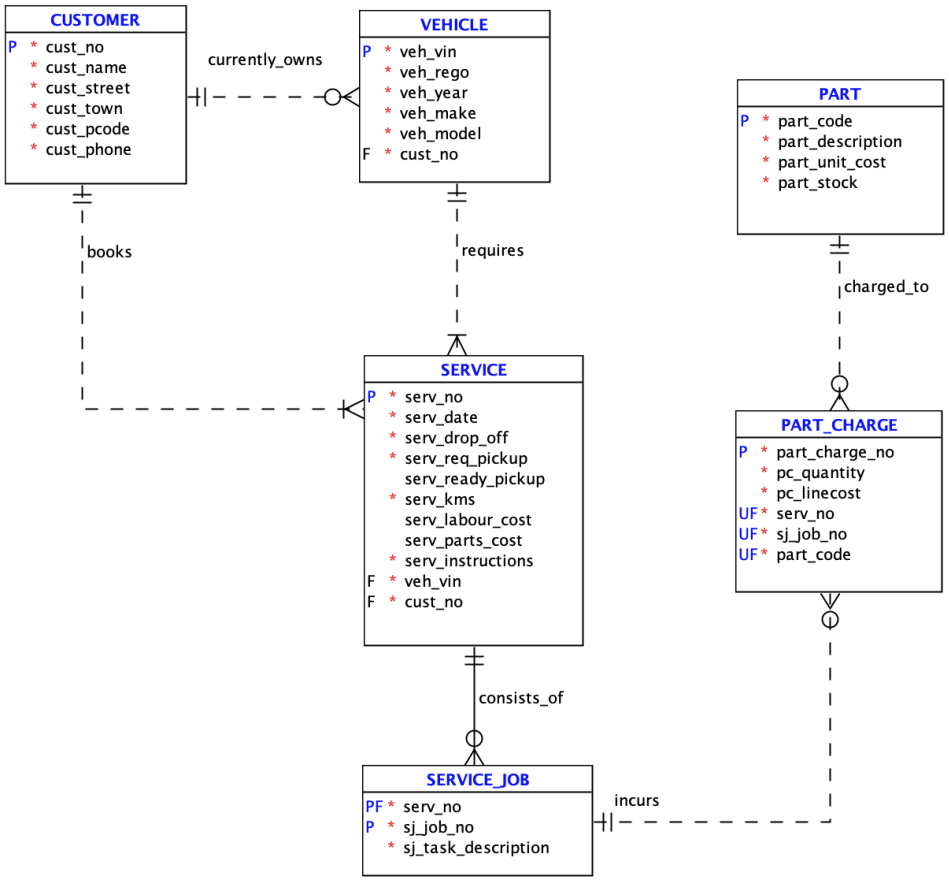
Customers drop their vehicle off at the Monash Automotive service centre where a reception staff member makes a service entry into the system. Each service is assigned a unique service number, which the system should automatically generate. The customer provides instructions for the work which needs to be carried out.

The vehicle will then be worked on by MA mechanics, a cumulative total of the hours spent on the service is recorded in the workshop and a final service labour charge entry struck when the service is completed. As the work is carried out, all parts, which are required for the service, will be obtained from the MA Spare Parts division.

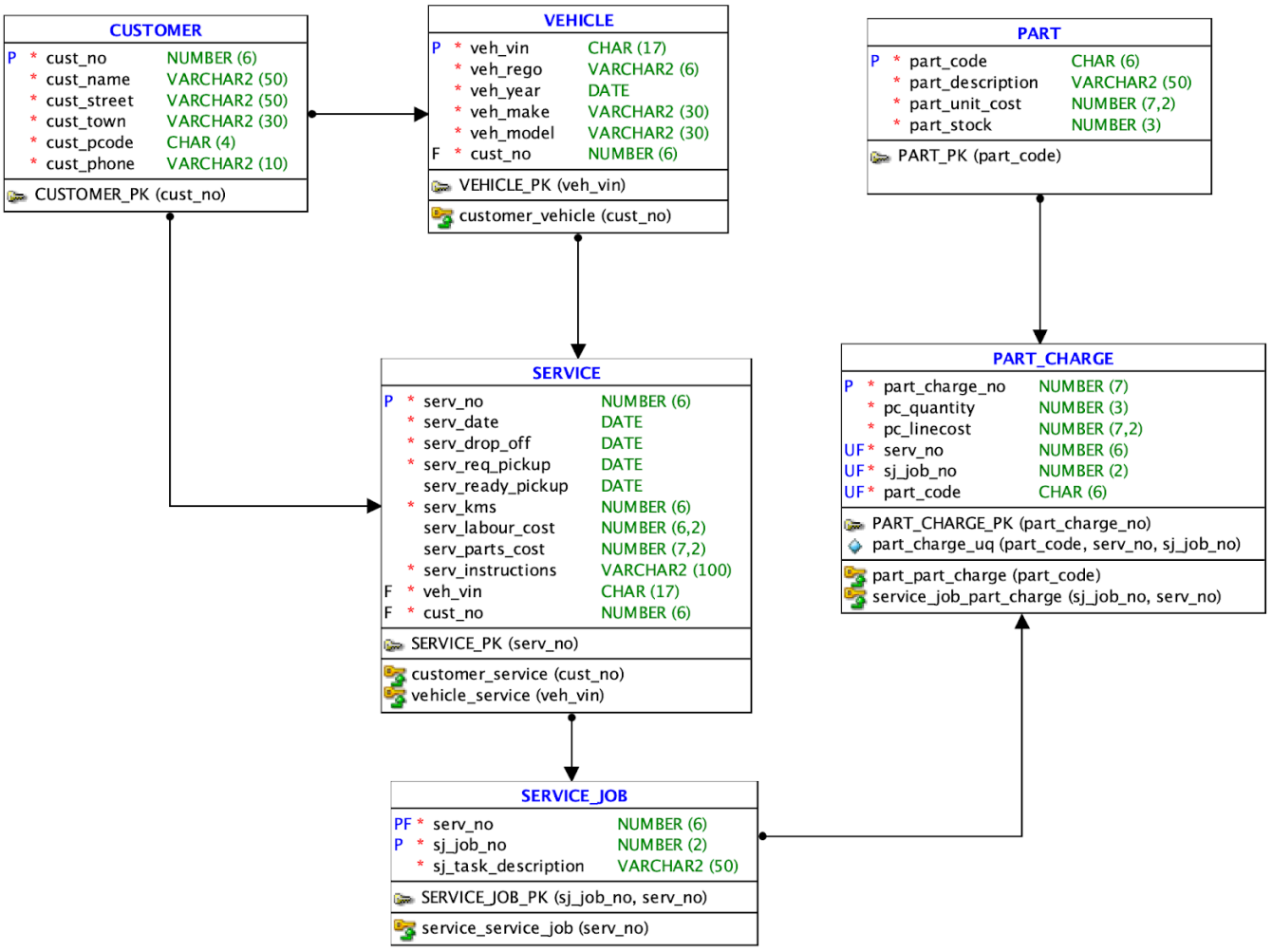
The mechanic will request an item/s and the Spare Parts division attendant will make a part charge entry, which will record the part number, the service number, the job number within that service, the quantity of items used and the total line cost for this/these item/s.

When all required work has been carried out the total labour and total parts cost are updated in the service entry. The last service entry update carried out is to update the ready for pickup time, this signifies that the service has been closed. When customers pick up their vehicle they are required to pay the full amount of the service.

The logical model for this scenario was configured as:



The relational model for the scenario is:



The schema file for this model is listed below:

```
DROP TABLE customer CASCADE CONSTRAINTS;

DROP TABLE part CASCADE CONSTRAINTS;

DROP TABLE part_charge CASCADE CONSTRAINTS;

DROP TABLE service CASCADE CONSTRAINTS;

DROP TABLE service_job CASCADE CONSTRAINTS;

DROP TABLE vehicle CASCADE CONSTRAINTS;

CREATE TABLE customer (
    cust_no      NUMBER(6) NOT NULL,
    cust_name    VARCHAR2(50) NOT NULL,
    cust_street  VARCHAR2(50) NOT NULL,
    cust_town    VARCHAR2(30) NOT NULL,
    cust_pcode   CHAR(4) NOT NULL,
    cust_phone   VARCHAR2(10) NOT NULL
);
```

```
COMMENT ON COLUMN customer.cust_no IS
    'Customer number';

COMMENT ON COLUMN customer.cust_name IS
    'Customer name';

COMMENT ON COLUMN customer.cust_street IS
    'Customer street address';

COMMENT ON COLUMN customer.cust_town IS
    'Customer town';

COMMENT ON COLUMN customer.cust_pcode IS
    'Customer post code';

COMMENT ON COLUMN customer.cust_phone IS
    'Customer contact phone number';

ALTER TABLE customer ADD CONSTRAINT customer_pk PRIMARY KEY ( cust_no );

CREATE TABLE part (
    part_code         CHAR(6) NOT NULL,
    part_description  VARCHAR2(50) NOT NULL,
    part_unit_cost    NUMBER(7, 2) NOT NULL,
    part_stock        NUMBER(3) NOT NULL
);

COMMENT ON COLUMN part.part_code IS
    'Part code';

COMMENT ON COLUMN part.part_description IS
    'Part description';

COMMENT ON COLUMN part.part_unit_cost IS
    'Part unit cost';

COMMENT ON COLUMN part.part_stock IS
    'Current part stock';

ALTER TABLE part ADD CONSTRAINT part_pk PRIMARY KEY ( part_code );

CREATE TABLE part_charge (
    part_charge_no  NUMBER(7) NOT NULL,
    pc_quantity     NUMBER(3) NOT NULL,
    pc_linecost     NUMBER(7, 2) NOT NULL,
    serv_no         NUMBER(6) NOT NULL,
    sj_job_no       NUMBER(2) NOT NULL,
    part_code       CHAR(6) NOT NULL
);

COMMENT ON COLUMN part_charge.part_charge_no IS
    'Surrogate key to identify part charges';
```

```
COMMENT ON COLUMN part_charge.pc_linecost IS
    'Total line costs for these parts';

COMMENT ON COLUMN part_charge.serv_no IS
    'Service identifier';

COMMENT ON COLUMN part_charge.sj_job_no IS
    'Job number - task to complete within service';

COMMENT ON COLUMN part_charge.part_code IS
    'Part code';

ALTER TABLE part_charge ADD CONSTRAINT part_charge_pk PRIMARY KEY ( part_charge_no
     );

ALTER TABLE part_charge
    ADD CONSTRAINT part_charge_uq UNIQUE ( part_code,
                                           serv_no,
                                           sj_job_no );

CREATE TABLE service (
    serv_no            NUMBER(6) NOT NULL,
    serv_date          DATE NOT NULL,
    serv_drop_off      DATE NOT NULL,
    serv_req_pickup    DATE NOT NULL,
    serv_ready_pickup  DATE,
    serv_kms           NUMBER(6) NOT NULL,
    serv_labour_cost   NUMBER(6, 2),
    serv_parts_cost    NUMBER(7, 2),
    serv_instructions  VARCHAR2(100) NOT NULL,
    veh_vin            CHAR(17) NOT NULL,
    cust_no            NUMBER(6) NOT NULL
);

COMMENT ON COLUMN service.serv_no IS
    'Service identifier';

COMMENT ON COLUMN service.serv_date IS
    'Date of service';

COMMENT ON COLUMN service.serv_drop_off IS
    'Service drop off time';

COMMENT ON COLUMN service.serv_req_pickup IS
    'Customer requested service pickup time';

COMMENT ON COLUMN service.serv_ready_pickup IS
    'Time that the vehicle was ready for pickup';

COMMENT ON COLUMN service.serv_kms IS
    'Km reading of vehicle at service time';
```

```
COMMENT ON COLUMN service.serv_labour_cost IS
    'Total labour cost for this service';

COMMENT ON COLUMN service.serv_parts_cost IS
    'Total cost of all parts used for this service';

COMMENT ON COLUMN service.serv_instructions IS
    'Instructions from owner for this service (jobs to complete)';

COMMENT ON COLUMN service.veh_vin IS
    'Vehicle VIN';

COMMENT ON COLUMN service.cust_no IS
    'Customer number of customer who booked service in';

ALTER TABLE service ADD CONSTRAINT service_pk PRIMARY KEY ( serv_no );

CREATE TABLE service_job (
    serv_no              NUMBER(6) NOT NULL,
    sj_job_no            NUMBER(2) NOT NULL,
    sj_task_description  VARCHAR2(50) NOT NULL
);

COMMENT ON COLUMN service_job.serv_no IS
    'Service identifier';

COMMENT ON COLUMN service_job.sj_job_no IS
    'Job number - task to complete within service';

COMMENT ON COLUMN service_job.sj_task_description IS
    'Job task description';

ALTER TABLE service_job ADD CONSTRAINT service_job_pk PRIMARY KEY ( sj_job_no,
                                                                   serv_no );

CREATE TABLE vehicle (
    veh_vin    CHAR(17) NOT NULL,
    veh_rego   VARCHAR2(6) NOT NULL,
    veh_year   DATE NOT NULL,
    veh_make   VARCHAR2(30) NOT NULL,
    veh_model  VARCHAR2(30) NOT NULL,
    cust_no    NUMBER(6) NOT NULL
);

COMMENT ON COLUMN vehicle.veh_vin IS
    'Vehicle VIN';

COMMENT ON COLUMN vehicle.veh_rego IS
    'Vehicles current registration number';

COMMENT ON COLUMN vehicle.veh_year IS
    'Year vehicle was manufactured';
```

```
COMMENT ON COLUMN vehicle.veh_make IS
    'Make of vehicle';

COMMENT ON COLUMN vehicle.veh_model IS
    'Model of vehicle';

COMMENT ON COLUMN vehicle.cust_no IS
    'Customer number of current owner of vehicle';

ALTER TABLE vehicle ADD CONSTRAINT vehicle_pk PRIMARY KEY ( veh_vin );

ALTER TABLE service
    ADD CONSTRAINT customer_service FOREIGN KEY ( cust_no )
        REFERENCES customer ( cust_no );

ALTER TABLE vehicle
    ADD CONSTRAINT customer_vehicle FOREIGN KEY ( cust_no )
        REFERENCES customer ( cust_no );

ALTER TABLE part_charge
    ADD CONSTRAINT part_part_charge FOREIGN KEY ( part_code )
        REFERENCES part ( part_code );

ALTER TABLE part_charge
    ADD CONSTRAINT service_job_part_charge FOREIGN KEY ( sj_job_no,
                                                         serv_no )
        REFERENCES service_job ( sj_job_no,
                                 serv_no );

ALTER TABLE service_job
    ADD CONSTRAINT service_service_job FOREIGN KEY ( serv_no )
        REFERENCES service ( serv_no );

ALTER TABLE service
    ADD CONSTRAINT vehicle_service FOREIGN KEY ( veh_vin )
        REFERENCES vehicle ( veh_vin );
```