

## Task 1: Relational Database Queries – Relational Algebra

(a) List the part code, part description for all parts supplied by the vendor named "Supercheap Auto".

Answer:

$R1 = \sigma_{\text{vendor\_name} = \text{"Supercheap Auto"}} (\text{VENDOR})$

$R2 = \text{PART} \bowtie (\text{PART.vendor\_id} = \text{VENDOR.vendor\_id}) R1$

$R = \pi_{\text{part\_code}, \text{part\_description}} (R2)$

(b) List the part code and part description for all parts which have not been used in any service.

Answer:

$R1 = \pi_{\text{part\_code}} (\text{PART\_CHARGE})$

$R2 = \text{PART} \bowtie (\text{PART.part\_code} = \text{PART\_CHARGE.part\_code}) R1$

$R3 = \text{PART} - R2$

$R = \pi_{\text{part\_code}, \text{part\_description}} (R3)$

(c) List the customer's name, phone number and vehicle registration number (rego) for all owners of vehicles who had their vehicle serviced on 22/02/2024 and where the service kilometres were greater than 80,000 km.

Answer:

$R1 = \sigma_{\text{serv\_date} = \text{"22/02/2024"} \wedge \text{serv\_kms} > 80000} (\text{SERVICE})$

$R2 = \text{VEHICLE} \bowtie \text{VEHICLE.veh\_vin} = R1.veh\_vin R1$

$R3 = \text{CUSTOMER} \bowtie \text{CUSTOMER.cust\_no} = R2.cust\_no R2$

$R = \pi_{\text{cust\_name}, \text{cust\_phone}, \text{veh\_rego}} (R3)$