COMS4111 Homework 1

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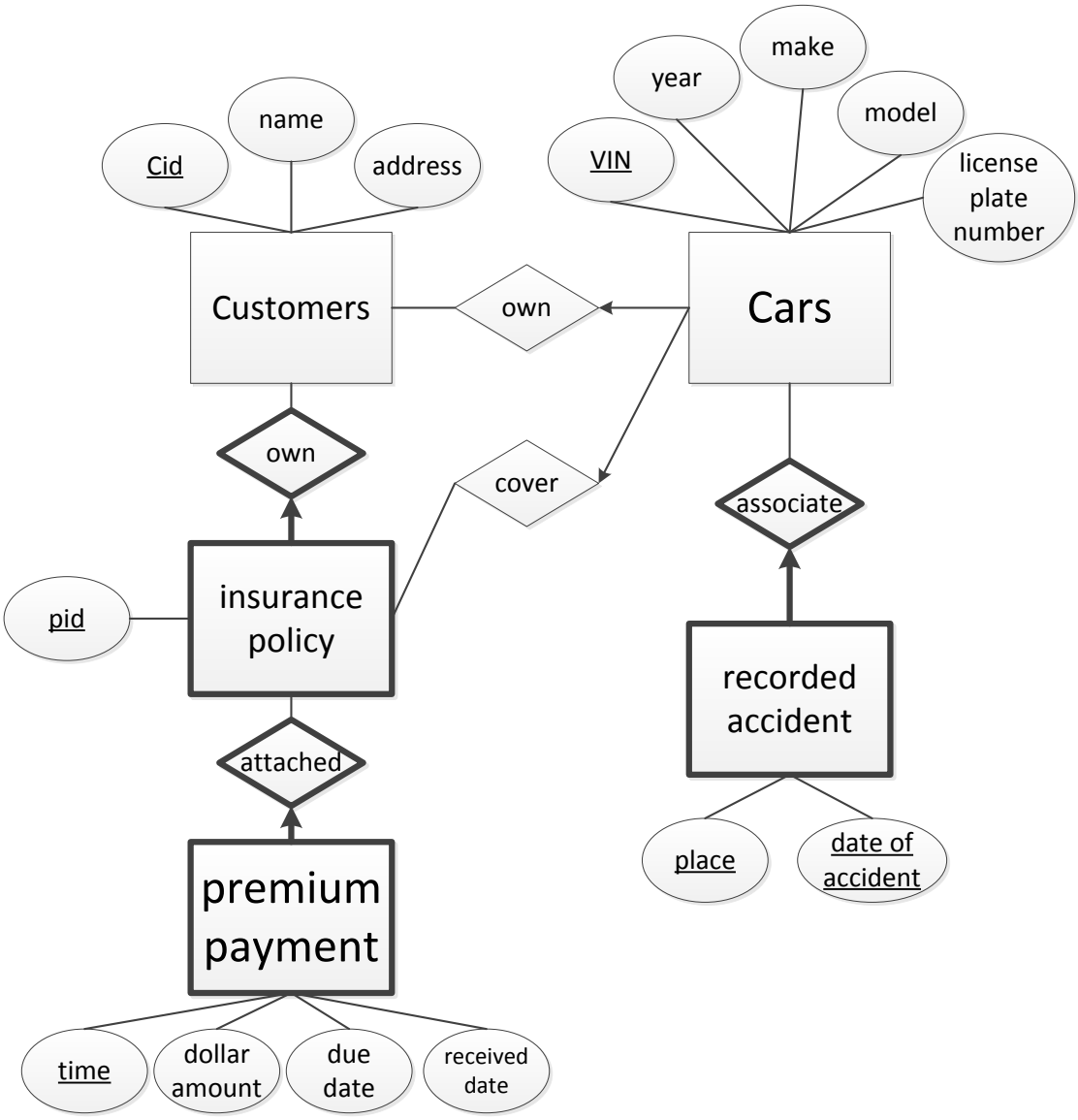
Problem 1



Cannot be captured by the ER diagram

From the ER diagram, we cannot find out whether the cars which covered by same insurance policy are owned by the same person.

Problem 2

Customers(cid, name, address, PK (cid))

C_own_C(cid, VIN, PK(cid, VIN), FK(cid)→Customers, FK(VIN)→Cars)

Cars(VIN, license_plate_number, make, model, year, PK(VIN))

I_cover_C(pid, VIN, PK(cid, VIN), FK(pid)→insurance_policy, FK(VIN)→Cars)

insurance_policy(pid, cid, PK(pid, cid), FK(cid)→Customers)

premium_payment(pid, time, dollar_amount, due_date, received_date, PK(pid, time), FK(pid)→ insurance_policy)

recorded_accident(VIN, place, date_of_accident, PK(VIN, place, date_of_accident), FK(VIN)→ Cars)

Problem 3

a)

A	R
10	5
25	6

b)

A	B	C
10	b	6
25	c	3
10	a	5

c)

Q	B
a	b

d)

A	Q	R	B	C
10	a	5	b	6
10	a	5	a	5
25	a	6	c	3

Problem 4

a)

$\Pi_{pn}(\Pi_{ssn}(P - \sigma_{city=NYC}P) \cap \Pi_{ssn}(\sigma_{city=SF}(P \bowtie W \bowtie_{W.cn=C.cn} C)) \cap \Pi_{ssn}(\sigma_{city=LA}(P \bowtie W \bowtie_{W.cn=C.cn} C)) \bowtie P)$

b)

$\Pi_{cn}C - \Pi_{cn}(P \bowtie W \bowtie C)$

c)

$\Pi_{cn}C - \Pi_{cn}(\sigma_{P.age<=30}(P \bowtie W \bowtie_{W.cn=C.cn} C)$

d)

$\Pi_{cn,\ P.city}(P \bowtie W \bowtie_{W.cn=C.cn} C) / \Pi_{city}P$