Q1
4 Points

Consider the following schema:

Supplier(sid: integer, sname: string, address: string)

Part(pid: integer, pname: string, colour: string)

Catalog(sid: integer, pid: integer, cost: real)

The relation Supplier stores suppliers and the key of that relation is sid. The relation Part stores parts, and pid is the key of that relation. Finally, Catalog stores which supplier supplies which part at which cost. The key is the combination of the two attributes sid and pid.

Q1.1 Find the names of suppliers who supply a red part.

- $\pi_{sname}(((Part) \cup Catalog) \times Supplier))$
- $(\sigma_{colour} = \text{`}red'(\pi_{sname}((Part) \bowtie Catalog) \times Supplier))$
- ⊙ $\pi_{sname}((\sigma_{colour} = \text{`}red'(Part) \bowtie Catalog) \bowtie Supplier))$

Q1.2 Find the IDs of suppliers who supply some red or green part. More than one answer can be correct

- ⊙ $\pi_{sid}(\sigma_{colour} = \text{`}red'(Part) \bowtie Catalog) \cup \pi_{sid}(\sigma_{colour} = \text{`}green'(Part) \bowtie Catalog)$
- $\pi_{sid}(\sigma_{colour} = \text{`}red' \wedge colour = \text{`}green'(Part) \bowtie Catalog)$
- $\pi_{sid}(\sigma_{colour} = \text{`}red' \vee colour = \text{`}green'(Part) \bowtie Catalog)$

Q1.3

Find the IDs of suppliers who supply some red and green part.

- ⊙ $\pi_{sid}(\sigma_{colour} = \text{`}red'(Part) \bowtie Catalog) \cap \pi_{sid}(\sigma_{colour} = \text{`}green'(Part) \bowtie Catalog)$
- $\pi_{sid}(\sigma_{colour} = \text{`}red' \wedge colour = \text{`}green'(Part) \bowtie Catalog)$
- $\pi_{sid}(\sigma_{colour} = \text{`}red' \vee colour = \text{`}green'(Part) \bowtie Catalog)$
- none of the above

Q1.4

Find the names of suppliers who supply some red part or are based at 21 George Street

- ⊙ $\pi_{sname}(\sigma_{colour} = \text{`}red'(Part) \bowtie Catalog \bowtie Supplier) \cup \pi_{sname}(\sigma_{address} = \text{`}21...'(Supplier))$
- $\pi_{sname}(\sigma_{colour} = \text{`}red'(Part) \bowtie Catalog \bowtie Supplier) \cup (\sigma_{address} = \text{`}21...'(Supplier))$
- $\pi_{sname}(\sigma_{colour} = \text{`}red'(Part)) \cup \pi_{sname}(\sigma_{address} = \text{`}21...'(Supplier))$