

Q 9.

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$$\text{temp} \leftarrow \Pi \{c.cnum, c.term, c.section, p.pnum\}$$

$$(\sigma((s.day = 'Monday' \wedge s.day = 'Friday')$$

$$\wedge s.cnum = c.cnum \wedge s.term = c.term \wedge s.section = c.term$$

$$\wedge c.pnum = p.pnum \wedge p.dept = 'cs')$$

$$(p_c(course) \times p_s(schedule) \times p_p(professor)))$$

$$\text{max-grade} \leftarrow \text{temp} - \left[\begin{array}{l} \sigma(t1.grade > t2.grade \wedge t1.cnum = t2.cnum \\ \wedge t1.term = t2.term \wedge t1.section = t2.section) \\ (p_{t1}(\text{temp}) \times p_{t2}(\text{temp})) \end{array} \right]$$

$$\text{min-grade} \leftarrow \text{temp} - \left[\begin{array}{l} \sigma(t1.grade < t2.grade \wedge t1.cnum = t2.cnum \\ \wedge t1.term = t2.term \wedge t1.section = t2.section) \\ (p_{t1}(\text{temp}) \times p_{t2}(\text{temp})) \end{array} \right]$$

$$\text{results} \leftarrow \Pi \{cnum, term, section, pnum, min, max\}$$

$$\sigma(\text{max.cnum} = \text{min.cnum} \wedge \text{max.term} = \text{min.term} \wedge \text{max.section} = \text{min.section})$$

$$(p_{\text{max}}(\text{max-grade}) \times p_{\text{min}}(\text{min-grade}))$$