

Quiz 5: Relational Algebra

Initial Score (out of 10)**Taken by:** _____**Name****Student ID**

- We will discuss the answers right after the quiz.
 - You are to self-grade and record your actual *initial* score (above) as we do so.
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1) Consider the following schema, where the key field(s) are underlined (e.g. *sid* is the key for Sailor), and the domain of each field is listed after the italicized field name. The Rent relation contains the dates Sailors rented a boat. Write the following queries in relational algebra. (2 pts. each)

Sailors (*sid*: integer, *sname*: string, *rating*: integer, *age*: integer)

Boats (*bid*: integer, *bname*: string, *color*: string)

Rent (*sid*: integer, *bid*: integer, *date*: date)

1.1) Find the *sids* of sailors who rent a blue boat.

1.2) Find the *sids* of sailors who rent a green boat and have a rating of 5.

1.3) Find the bids of boats rented by every sailor with an age of 18. (**Hint:** use division)

2) Consider the Sailors-Boats-Rent schema from the previous question. State what the following queries compute. (2 pts. each)

2.1) $\pi_{sname} (((\sigma_{color='red'} Boats) \bowtie (\sigma_{date > '2019-04-25' \text{ and } date < '2019-04-30'} Rent))) \bowtie Sailors)$

2.2) $(\pi_{sid} ((\sigma_{color='red'} Boats) \bowtie Rent)) \cap$
 $(\pi_{sid} ((\sigma_{color='blue'} Boats) \bowtie Rent)) \cap$
 $(\pi_{sid} \sigma_{age > 21 \text{ and } rating > 7} Sailors)$