

# Exercise Session: 4

7 December 2017

## 1 Relational algebra (2 parts, 8p)

- 4a. Given the relation `Planets(star, position, distance, mass, atmosphere, oxygen, water)` write a relational algebra query that returns, for each star with more than 5 planets, the total combined mass of all planets with an atmosphere. The query should return tuples of the form `(star, totalMass)`. (4p)
- 4b. Given the relations `P(star, position, distance, mass, atmosphere, oxygen, water)` and `G(star, position, gravity)`, translate the following relational algebra query to SQL (4p):

$$\tau_{maxg}(\pi_{position, maxg}(\gamma_{position, AVG(mass) \rightarrow avgm, MAX(gravity) \rightarrow maxg}(P \bowtie G)))$$