1. Given $|R_1|$, $|R_2|$, the Domain of $R_1.x$ and $R_2.y$, and the information if $R_1.x$ and/or $R_2.y$ are keys of $R_1$ and $R_2$.

   (a) How can you estimate the selectivity of $\sigma_{R_1.x=c}$ if $c$ is a constant? (2)

   (b) How can you estimate the selectivity of $\exists_{R_1.x=R_2.y}$? (3)

2. Implement a program, that transforms input of the form 

```java
from
vorlesungen v
professoren p
where
p.persnr=v.gelesenvon
;
```

into a canonical execution plan and then executes the plan. Assume that the input is correct (one entry per line etc.). For the execution you can use the `tinydb` package linked from the lecture web site, the `samples` directory includes some examples (`JoinSample.java` might be useful). (5)