Exercise Sheet 3

Exercise 1

Give the query graphs for the two queries from the first exercise sheet.

```
SELECT s1.name
FROM studenten s1
JOIN hoeren h1 ON s1.matrnr = h1.matrnr
JOIN hoeren h2 ON h1.vorlnr = h2.vorlnr
JOIN studenten s2 ON h2.matrnr = s2.matrnr
WHERE s2.name = 'Schopenhauer'
AND s1.name != 'Schopenhauer';
s1.name != 'Schopenhauer'
       \cap
   studenten s1 \frac{s_{1.matrnr} = h_{1.matrnr}}{h_{1.matrnr}} hoeren h1 \frac{h_{1.vorlnr} = h_{2.vorlnr}}{h_{1.vorlnr}} hoeren h2
                                                          h2.matrnr = s2.matrnr
                                                                      studenten s2
                                                                   s2.name == 'Schopenhauer'
SELECT p.persnr, p.name
FROM professoren p
JOIN vorlesungen v ON v.gelesenvon = p.persnr
JOIN hoeren h1 ON h1.vorlnr = v.vorlnr
JOIN hoeren h2 ON h2.vorlnr = h1.vorlnr
WHERE h1.matrnr != h2.matrnr;
professoren\ p \xrightarrow{p.persnr\ =\ v.gelesenvon} vorlesungen\ v \xrightarrow{\quad v.vorlnr\ =\ h1.vorlnr\quad } hoeren\ h1
                                     {\tt h1.vorlnr\,=\,h2.vorlnr\,\wedge\,h1.matrnr\,!=\,h2.matrnr}
                                                                     hoeren h2
```

Exercise 2

$$|R_1| = 1, |R_2| = 40, |R_3| = 40, |R_4| = 1, f_{1,2} = 0.75, f_{2,3} = 0.01, f_{3,4} = 0.75$$

$$R_1 \xrightarrow[1]{f_{1,2} = 0.75} R_2 \xrightarrow[40]{f_{2,3} = 0.01} R_3 \xrightarrow[40]{f_{3,4} = 0.75} R_4$$

X	$C_{ m out}$	1
11	$\sim_{ m out}$	X
$R_1 \bowtie R_2$	30	30
$R_2 \bowtie R_3$	16	16
$R_3 \bowtie R_4$	30	30
R_1XR_3	40	40
R_1XR_4	1	1
$R_1 \bowtie R_2) \bowtie R_3$	42	12
$(R_2 \bowtie R_3) \bowtie R_1$	28	12
$(R_1XR_3)\bowtie R_2$	52	12
$(R_1XR_3)\bowtie R_4$	70	30
$(R_1XR_4)\bowtie R_2$	31	30
$(R_1 \bowtie R_2) \bowtie (R_3 \bowtie R_4)$	69	9
$(R_1XR_3)\bowtie (R_2XR_4)$	90	9
$(R_1XR_4)\bowtie (R_2\bowtie R_3)$	26	9
$((R_1 \bowtie R_2) \bowtie R_3) \bowtie R_4$	51	9
$((R_2 \bowtie R_3) \bowtie R_1) \bowtie R_4$	37	9
$((R_1XR_3)\bowtie R_2)\bowtie R_4$	61	9
$((R_1XR_3)\bowtie R_4)\bowtie R_2$	79	9
$((R_1XR_4)\bowtie R_2)\bowtie R_3$	40	9