

Assignment 1

This file contains some LaTeX templates you can use in your assignment.

Unary operators on relations:

- $\Pi_{x,y,z}(R)$
- $\sigma_{condition}(R)$
- $\rho_{New}(R)$

Binary operators on relations:

- $R \times S$
- $R \bowtie S$
- $R \bowtie_{condition} S$
- $R \cup S$
- $R \cap S$
- $R - S$

Logical operators:

- \vee
- \wedge
- \neg

Assignment:

- $New(a, b, c) := R$

General LaTeX tips:

- Some sequences of letters look terrible in “math mode” (inside dollar signs). For example, $\$Offer\$$ comes out as *Offer*. You can use `\var` to fix that. For example, $\$\var{Offer}\$$ comes out as *Offer*.
- When an expression is deeply nested, it can be hard to match the brackets with your eyes. You can vary the size of the brackets to make that easier. This LaTeX:

`\Big(\big[\Big(\big(\big) \Big) \big] \Big)`

produces this result:

$$\left(\left[\left(\left(\right) \right) \right] \right)$$

- Some of your expressions will become very wide because there are multiple, long conditions on a select. You can stack those conditions using `\substack`. Here’s an example:

$$\sigma_{x < 20 \substack{\wedge \\ y = 10}}(Some\ big\ expression)$$

Notice that this requires using the package called “amsmath”, which is accomplished by saying `\usepackage{amsmath}`.

Below we've included a nonsense example of how a query might look in LaTeX. As required in this assignment, it uses “–” to indicate comments. Note that we have added less vertical space between comments and the algebra they pertain to than between steps in the algebra. This helps the comments visually stick to the algebra.

– sID has a grade of at least 85.

$$HaveHighGrade(sID) := \Pi_{sID} \sigma_{grade \geq 85} Took$$

– sID passed a course taught by Atwood.

$$PassedAtwood(sID) := \Pi_{sID} \sigma_{instructor := \text{“Atwood”} \wedge grade \geq 50} (Took \bowtie Offering)$$

– sID got 100 at least twice.

$$AtLeastTwice(sID) :=$$

$$\Pi_{T1.sID} \sigma_{T1.oID \neq T2.oID \wedge T1.sID = T2.sID \wedge T1.grade = 100 \wedge T2.grade = 100} [(\rho_{T1} Took) \times (\rho_{T2} Took)]$$