

Assignment 3

Using the attached relational model, make correct relational algebra expressions that retrieve the desired data. Make sure that your attribute references are unambiguous - use project, natural join, and rename as needed to insure this. Use correct notation, including the correct special characters. Your solutions must be typed and turned in to Canvas as a PDF or Microsoft Word document - hand-written work will not be graded.

1. (10 points) Find the catalog number, description, and number of units for all courses that are more than 3 units.

$$\text{RESULT} \leftarrow \Pi_{\text{catnum}, \text{description}, \text{units}} (\sigma_{\text{units} > 3} (\text{COURSE}))$$

2. (15 points) Find the first and last name of all students who received a grade of F in Spring 2020.

$$\text{RESULT2} \leftarrow \Pi_{\text{first}, \text{last}} (\sigma_{\text{grade} = 'F'} (\text{STUDENT} \bowtie_{\text{ID} = \text{studentid}} \text{ENROLLED}))$$

3. (20 points) Find the catalog number, description, and section number of all course sections taught by a professor named Alice Cooper in Fall 2020.

$$\begin{aligned} \text{SECTION_PROFESSOR} &\leftarrow \sigma_{\text{first}, \text{last} = 'Alice', 'Cooper'} (\text{SECTION} \bowtie_{\text{prof_ID} = \text{ID}} \text{PROFESSOR}) \\ \text{SPEC_PROF} &\leftarrow \sigma_{\text{Semester} = 'Fall 2020'} (\text{COURSE} \bowtie_{\text{catnum} = \text{catnum}} \text{SECTION_PROFESSOR}) \\ \text{RESULT3} &\leftarrow \Pi_{\text{Catnum}, \text{description}, \text{secnum}} (\text{SPEC_PROF}) \end{aligned}$$

4. (25 points) Find the catalog number, section number, semester, and ratings left by students for all sections taught by a professor named Marilyn Manson.

$$\begin{aligned} \text{SECTION_PROFESSOR} &\leftarrow \sigma_{\text{first}, \text{last} = 'Marilyn', 'Manson'} (\text{SECTION} \bowtie_{\text{prof_ID} = \text{ID}} \text{PROFESSOR}) \\ \text{ALL_SEM} &\leftarrow (\text{STUDENT} \bowtie_{\text{ID} = \text{studentid}} \text{ENROLLED} \bowtie_{\text{secnum} = \text{secnum}} \text{SECTION_PROFESSOR}) \\ \text{RESULT4} &\leftarrow \Pi_{\text{catnum}, \text{spectrum}, \text{semester}, \text{rating}} (\text{ALL_SEM}) \end{aligned}$$

5. (30 points) List the student ID, first and last names of all students who do **not** have an email address.

$\text{NO_EMAIL} \leftarrow \text{STUDENT} - \text{STUDENT_EMAIL}$

$\text{RESULT5} \leftarrow \Pi_{\text{ID, first, last}}(\text{NO_EMAIL})$