

1. Formulate an SQL command for the query: (1 point) (you should check your query on a data sample [here](#))

```
SELECT e.studentid
FROM enrollment AS e
LEFT JOIN course AS c ON e.courseid=c.courseid
WHERE (c.name='Matematika A' OR c.name='Matematika B')
AND e.typeofcompletion=c.recommendedcompletion
```

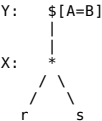
```
SELECT e.studentid FROM enrollment AS e LEFT JOIN course AS c ON e.courseid=c.courseid WHERE (c.name='Matematika A' OR c.name='Matematika B') AND e.typeofcompletion=c.recommendedcompletion
```

2. Transform your SQL command into a relational algebra expression: (0,5 point) (see the rel. alg. syntax defined above; you should the correctness of your expression on a data sample [here](#))

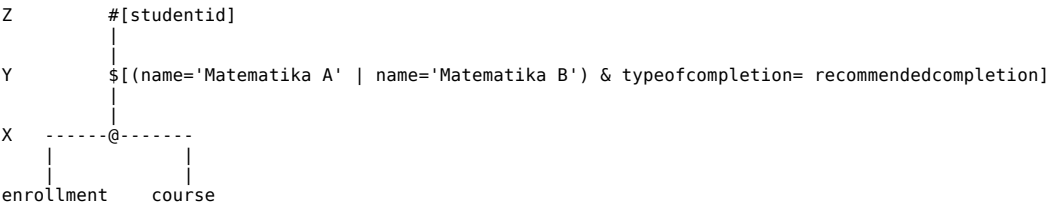
```
#[studentid]($[(name='Matematika A' | name='Matematika B') & typeofcompletion=recommendedcompletion](enrollment @ course))
```

```
#[studentid]($[(name='Matematika A' | name='Matematika B') & typeofcompletion=recommendedcompletion](enrollment @ course))
```

3. Prepare an evaluation plan for the relational algebra expression formulated in the previous subtask. (1 point)
Draw the plan as a tree structure, as suggested below. Assign a unique identifier to each operation in the plan (this will be needed in the following subtask) like in this example:

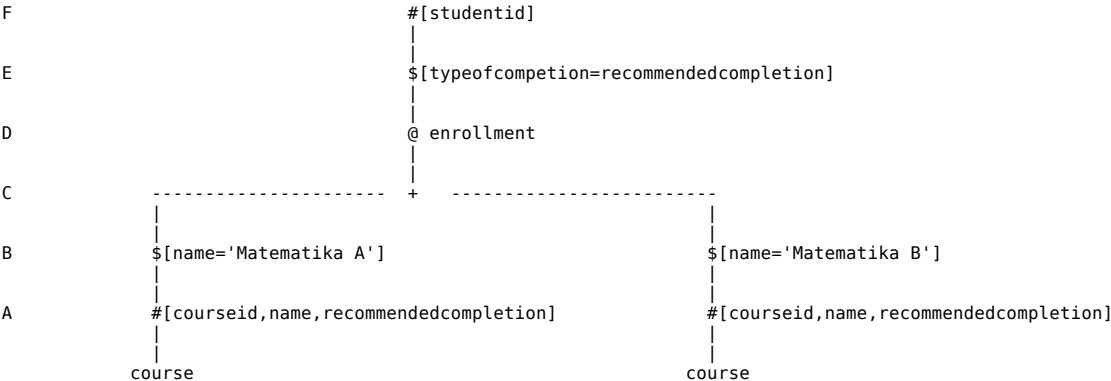


```
:[studentid]($[(name='Matematika A' | name='Matematika B') & typeofcompletion=recommendedcompletion](enrollment @ course))
```



Tento vyraz sa da upravit na:
#[studentid](\$[typeofcompletion=recommendedcompletion]((#[name='Matematika A'](#[courseid,name,recommendedcompletion](course)) + \$[name='Matematika B'](#[courseid,name,recommendedcompletion](course))) @ enrollment))

- 1. sa spravi projekciu nad course(atributy courseid,name,recommendedcompletion) a nasledne selekciu 'Matematika A' to iste ale s selekciou 'Matematika B'
- 2. spravi sa zjednotenie tychto dvoch dotazov
- 3. spravi sa natural join s vysledkom a tabulkou enrollment
- 4. vyberem vysledky kde typeofcompletion=recommendedcompletion
- 4. projekcia studentid



```
:[studentid]($[(name='Matematika A' | name='Matematika B') & typeofcompletion=recommendedcompletion](enrollment @ course)) Z #[studentid] || Y $[(name='Matematika A' | name='Matematika B') & typeofcompletion=recommendedcompletion] || X -----@----- ||| enrollment course Tento vyraz sa da upravit na: #[studentid]($[typeofcompletion=recommendedcompletion]((#[name='Matematika A'](#[courseid,name,recommendedcompletion](course)) + $[name='Matematika B'](#[courseid,name,recommendedcompletion](course))) @ enrollment)) - 1. sa spravi projekcia nad course(atributy courseid,name,recommendedcompletion) a nasledne selekciu 'Matematika A' to iste ale s selekciou 'Matematika B' - 2. spravi sa zjednotenie tychto dvoch dotazov - 3. spravi sa natural join s vysledkom a tabulkou enrollment - 4. vyberem vysledky kde typeofcompletion=recommendedcompletion - 4. projekcia studentid F #[studentid] || E $[typeofcompletion=recommendedcompletion] || D @ enrollment || C + || B $[name='Matematika A'] || A #[courseid,name,recommendedcompletion] || course
```

4. Statistics about the relations (fill in the missing values): (0.5 point)

T(student)	V(student,studentId)	V(student,name)	V(student,surname)	V(student,fieldOfStudy)
6100	6100 ✓ (6100)	3000	5900	10
T(enrollment)	V(enrollment,studentId)	V(enrollment,courseId)	V(enrollment,typeOfCompletion)	
27000	5000	90	3 ✓ (3)	
T(course)	V(course,courseId)	V(course,name)	V(course,numberOfCredits)	V(course,recommendedCompletion)

100

100

✓ (100)

100

8

3

✓ (3)

In addition, we know that **10% students do not have the mathematics courses mandatory**, so they can select other type of completion than the recommended one. **Half of these students do so.**

Hint: What is the primary key of the relation? | Hint: How many possible types of completion are there? | Hint: What is the primary key of the relation? | Hint: How many possible types of completion are there?

5. **Estimate the number of records in the query result.** (2 points)

Compute the necessary statistics for each operation in the query evaluation plan (i.e. each unique identifier), starting from leaves and moving up.

(describe your approach including all the formulas you use)

```
A: T(A) = 100.....100
B: T(B) = 100/100 = 1.....1
C: T(C) = 2
D: natural join sa urobi na attribute courseid -> T(enrollment,courseid) = 90
T(priebezny_vysledok) = 2 s toho plynie 2 < 90

T(W) = T(R1) * T(R2)/V(R2,spojovaci_atribut)
T(D) = 2 * 27000/90 = 600
T(E) = 600/3 = 200 (T(replaceX)/V(replaceX,atribut))
T(F) = 200
```

A: T(A) = 100.....100 B: T(B) = 100/100 = 1.....1 C: T(C) = 2 D: natural join sa urobi na attribute courseid -> T(enrollment,courseid) = 90
T(priebezny_vysledok) = 2 s toho plynie 2 < 90 T(W) = T(R1) * T(R2)/V(R2,spojovaci_atribut) T(D) = 2 * 27000/90 = 600 T(E) = 600/3 = 200
(T(replaceX)/V(replaceX,atribut)) T(F) = 200

- [Zpět na výběr operace](#)

Znění testových otázek je autorským dílem. Šíření otázek bez písemného souhlasu autora je porušením autorských práv a jako takové může být postihováno dle platných zákonů.

Bez uložení:

- [Zpět na výběr odpovědníku](#)
- [Moje studium](#)
- [Osobní administrativa](#)