数据库原理

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关系代数

1. 练习
2. 表达式树（Expression Tree）

College(cName,state,enrollment)

Student(sID,sName, GPA,sizeHS)

Apply(sID,cName,major, decision)

1.查询GPA大于3.7分的学生信息

2.查询GPA大于3.7分且所在高中学生少于1000人的学生信息

College(cName,state,enrollment)

Student(sID,sName, GPA,sizeHS)

Apply(sID,cName,major, decision)

3.查询Stanford大学 CS专业的申请信息

4.查询所有申请的录取的结果（包括sID和decision

College(cName,state,enrollment)

Student(sID,sName, GPA,sizeHS)

Apply(sID,cName,major, decision)

5.查询GPA大于3.7分的学生的ID和姓名

6.查询每个大学和专业的申请信息

College(cName,state,enrollment)

Student(sID,sName, GPA,sizeHS)

Apply(sID,cName,major, decision)

7.查询所在高中学生多于1000人且申请CS专业并被拒绝的学生的学号，姓名和GPA成绩

College(cName,state,enrollment)

Student(sID,sName, GPA,sizeHS)

Apply(sID,cName,major, decision)

8.查询所在高中学生多于1000人且申请录取人数在20000人以上的大学的CS专业并被拒绝的学生的学号，姓名和GPA成绩

College(cName,state,enrollment)

Student(sID,sName, GPA,sizeHS)

Apply(sID,cName,major, decision)

9. 查询所有的大学名和学生名

College(cName,state,enrollment)

Student(sID,sName, GPA,sizeHS)

Apply(sID,cName,major, decision)

10.查询所有没有申请任何大学的学生的ID和姓名

College(cName,state,enrollment)

Student(sID,sName, GPA,sizeHS)

Apply(sID,cName,major, decision)

11. 查询既是学生名又是大学名的所有名字。

College(cName,state,enrollment)

Student(sID,sName, GPA,sizeHS)

Apply(sID,cName,major, decision)

12. 查询在同一个州的大学名字对

讨论

Movies

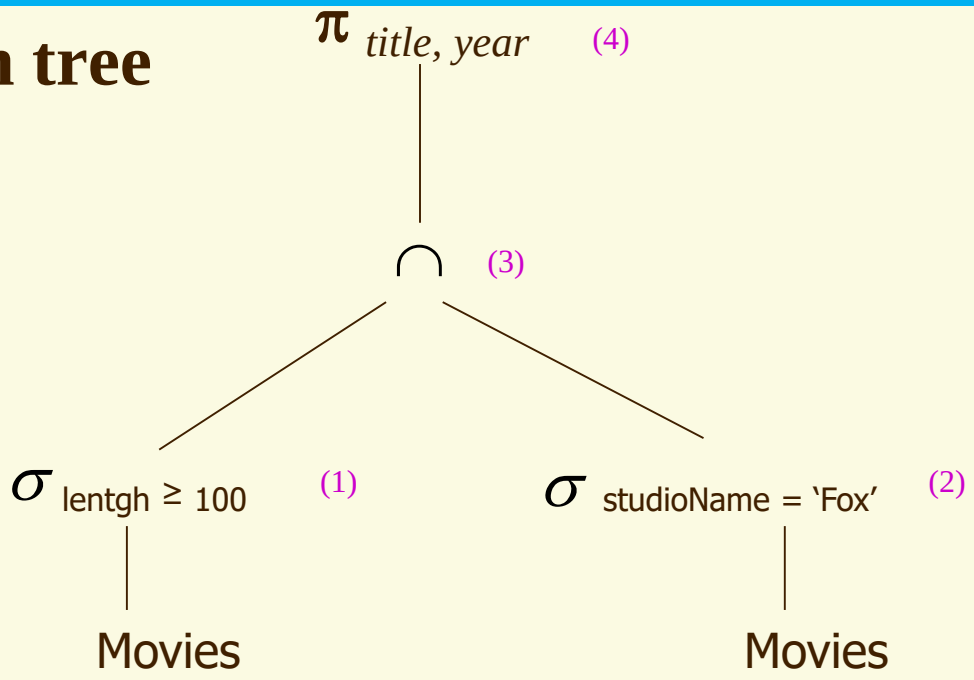
title	YEAR	LENGTH	genre	studioName
Galaxy Quest	1999	104	comdedy	DreamWorks
Pretty Woman	1990	119	comedy	Disney
Star Trek	1966	98	sciFi	Paramount
Star Wars	1977	124	sciFi	Fox
Superman	1978	143	sciFi	Warner Bros

查询时长至少为100分钟且为‘Fox’公司出品的影片的名字和发行年份

$$\prod_{\text{title,year}}\left(\sigma_{length\geq 100\ \wedge\ studioName='Fox'}(\text{Movies})\right)$$

$$\prod_{\text{title,year}}\left(\sigma_{\text{length}\geq 100}(\text{Movies})\cap\sigma_{\text{studioName='Fox'}}(\text{Movies})\right)$$

Expression tree



$$\prod_{title,year}(\sigma_{length \geq 100}(\text{Movies}) \cap \sigma_{studioName='Fox'}(\text{Movies}))$$

Expression Trees

- 两类结点
  - 叶子结点 → 关系
  - 其余结点 → 操作符（应用于其孩子结点）

实例

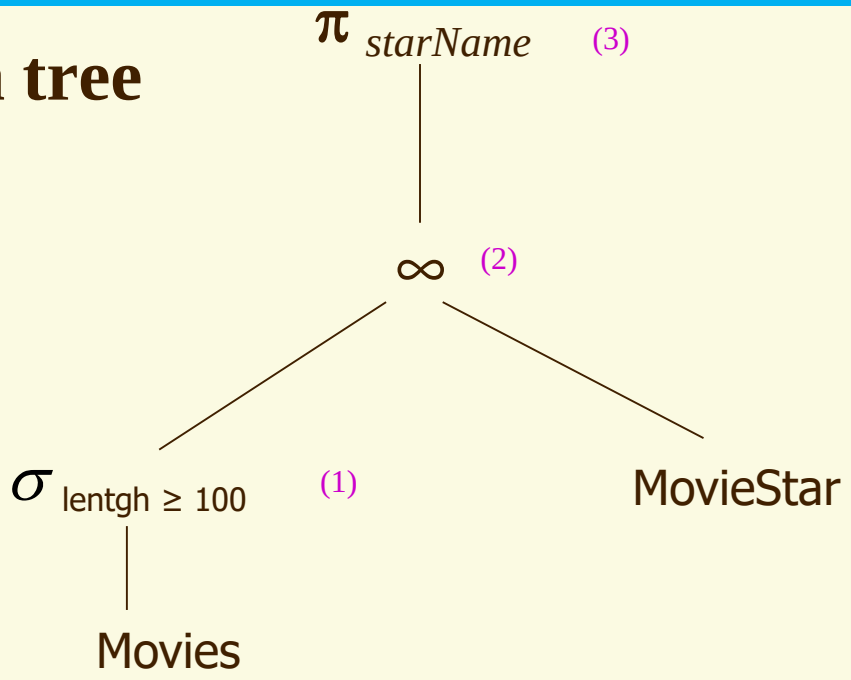
Movies(title,year,length,filmType,studioName)

MovieStar(title,year, starName)

Find the stars of movies that are at least 100 minutes long.

$\Pi_{starName}(\sigma_{length \geq 100}$ (Movies) ∞ MovieStar)

Expression tree



$$\prod_{starName}(\sigma_{length \geq 100}(Movies) \infty \ MovieStar)$$

College(cName,state,enrollment)

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Expression tree – GPAs of students applying to CS in CA