Database System
Lab 1 (**relational algebra**) key answer

student_num: _____ name: _____

Answer the questions:

5 請寫出所執行 relational algebra 的意義	
(1)	找出物理系的老師所有欄位資料
(2)	取出所有老師的 ID, name 及 salary 欄位
(3)	執行 r1 - r2: 找出在 2009 年 Fall 學期有開課但在 2010 年 Spring 學期沒有開課的課程 id 執行 r1 ∪ r2 找出在 2009 年 Fall 學期或 2010 年 Spring 學期有開課的課程 id
(4)	找出物理系開課的老師 name 及課程 id
(5)	找出老師中的最高薪水值

6. 請寫出對應的 relational algebra 及查詢結果	
(1)	(1) Find the titles of courses in the Comp. Sci. department that have 3 credits. $\pi_{\text{title}}(\sigma_{\text{dept\_name='Comp. Sci.'} \wedge \text{credit}=3}(\text{course}))$
(2)	(2) Find the IDs of all students who were taught by an instructor named Einstein. $\pi_{\text{sID}}((\sigma_{\text{name=='Einstein'}}(\text{Instructor} \bowtie \text{teaches})) \bowtie \text{takes})$
(3)	(3) Find the highest credit of all courses. 執行 d=π_{credit}(course) 執行 d2=$\pi_{\text{course.credit}}(\sigma_{\text{course.credit<d.credit}}(\text{course} \times \text{d})$ 執行 d-d2
(4)	(4) Find the IDs of all instructors who didn't teach any course. $\pi_{\text{iID}}(\text{instructor}) - \pi_{\text{iID}}(\text{teaches})$

(5)	(5) Find the course_id of all courses whose teacher didn't in the table of instructors. $\Pi_{course\_id}(teaches) - \Pi_{course\_id}(teaches \bowtie Instructor)$
(6)	(6) Find all instructors earning the lowest salary. $s = \pi_{salary}(instructor)$ $d2 = \pi_{id,\ name}(\sigma_{instructor.salary>s.salary}(instructor \times s)$ $\pi_{id,\ name}(instructor) - d2$