

Purdue University  
Computer Science Department  
CS 348: Information Systems (Spring 2008)  
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## **Homework # 2**

1. Explain the distinctions among the terms primary key, candidate key, and superkey. (See section 2.1.3)
2. Give an example of
  - (a) simple and composite attributes
  - (b) single-valued, multi-valued, and derived attribute.
3. What is the difference between a database schema and a database instance? Give an example.
4. What is the difference between a procedural and a non-procedural query language? Give an example.
5. When is the operation "outer join" useful? Give an example.
6. What are the properties of a relation in a relation database system? How does it differ from a simple table of data?
7. Consider the relations in Figures 2.1 till 2.7. Give relational algebra expressions for
  - (a) Different account numbers
  - (b) Branch names in Brooklyn
  - (c) Customer names with an amount of loan greater than or equal to 900
- 8.

Table T1

P	Q	R
10	a	5
15	b	8
25	a	6

Table T2

A	B	C
10	b	6
25	c	3
10	b	5

Considering the two tables T1 and T2, show the result of the following operations:

a.  $T1 \bowtie_{T1.P = T2.A} T2$

b.  $T1 \bowtie_{T1.Q = T2.B} T2$

c.  $T1 \bowtie_{T1.P = T2.A} T2$

d.  $T1 \bowtie_{T1.Q = T2.B} T2$

e.  $T1 \cup T2$

f.  $T1 \bowtie_{(T1.P = T2.A \text{ AND } T1.R = T2.C)} T2$