Homework - Week 1

Important note: All homework is to be done individually -- you are not to work with others on it.
Total Points: 15
Question (a-k): 1 points
Question (l-m): 2 points

a. Can SQL be used as a general-purpose programming language? a) yes b) no
__**no**____

b. What is another word for "table"? __**relation**, or **relation instance**_____

c. Is SQL a procedural language or a declarative language? a) procedural b) declarative
__**b**_____

d. Fill in the blank: The value of a programming language variable is to a relation instance as the type of a programming language variable is to a ___**relation schema**_____.

e. Fill in the blanks: if attribute "student_id" is the primary key of a table, then no two _**rows**_____ of the table can have the same value of _**student_id**_____.

f. What is the name of the standard Java API to a database? _**JDBC**__.

g. Suppose a relation schema has attributes {a,b,c,d,e}. If {a,b} is a candidate key for the schema, then is {a,b,d} also a candidate key? (yes or no) __**no**____.

h. Can a relation schema have two primary keys? (yes or no) __**no**_____.

i. Fill in the blank: every operation of relation algebra produces _**a table or Relation**_ as output.

j. When union is applied to two tables, the tables have to be compatible. In what sense do they have to be compatible?__ **The tables must have exactly the same attributes.**

k. In many programming languages there are functions that will append one list to another list. Compare the 'union' operation of relational algebra with the append function by giving one way in which they are different.

_____**Union will remove duplicates but append will not**_____

l. Answer the question "what are the IDs of instructors who teach CS-138" using relational algebra.

$\Pi_{\text{"ID"}} (\sigma_{\text{course\_id = "CS-138"}} (\text{TEACHES}))$

m. Answer the question "which departments have a budget of over $60,000" using relational.

$\Pi_{\text{"dept\_name"}} (\sigma_{\text{budget > 60000}} (\text{DEPARTMENT}))$