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Course No. - COMP 3005

ASSIGNMENT – 3

PART 1

1. Mini World – Some part of real world about which data is stored in a database.

2. Data Model - A set of concepts to describe the structure of a database, and certain constraints that the database should obey.

3. Database System – The DBMS software together with the database itself. Sometimes the applications are also included.

4. Domain – it is the name used with the attribute specification; a data domain also refers to all the values which a data element may contain.

5. Relational Model - it is a method of structuring data using relations, which are grid-like mathematical structures consisting of columns and rows.

6. Attribute – these are the data types refers to a database component such as table, also describe the instances in the row of database.

7. Relation – A relation is a data in row- column format. We can specify a new relation by giving it a name, specifying each of its attributes and their data types, and defining constraints.

8. Primary Key – it is one of the constraints specified in front of an attribute such that its value cannot be duplicated and cannot be null, also a table cannot have two primary keys.

9. Logical Data Independence – it is the ability to change the conceptual scheme without changing External view or external API or programs.

10.SQL – It is a Structure query language. SQL statements are used to perform tasks such as update data on Database or retrieve data from a database.

PART 2

1. Get the names of hobbies that “lastname” plays.

A1) {N | (exists P#, H#, T, PN, A) (Hobby (H#, N) and Play (P#, H#, T) and Person(P#, PN, A) and PN = ‘Lastname’) } ;

Result:
Chess
Dancing

2. Get the names of persons who play Bowling.

A2) {N | (exists P#, A, H#, T , HN)(Person(P#, N, A) and Play(P#, H#, T) and Hobby(H#, HN) and HN = 'Bowling')};

Result:
Smith
Jones

3. Get the names of persons who play a hobby more than 3 times.

A3) {N | (exists P#, A, H, T)(Person(P#, N, A) and Play(P#, H, T) and T > 3)};

Result:
Smith
Jones
Lastname

4. Get the names of persons who play either chess or dancing.

A4) {N | (exists P#, A, H1, H2, T)(Person(P#, N, A) and
((Play(P#, H1, T) and Hobby(H1, 'Chess'))
or
(Play(P#, H2, T) and Hobby(H2, 'Dancing')))
)};

Result:
Smith
Jones
Blake
Lastname

5. Get the names of persons who play both chess and dancing.

A5)

{N | (exists P#, H1, H2)(Person(P#, N, _) and Play(P#, H1, _) and Hobby(H1, 'Chess') and Play(P#, H2, _) and Hobby(H2, 'Dancing'))};

Result:
Smith
Jones
Blake
Lastname

6. Get the person name/hobby name pairs such that the indicated person plays the indicated hobby.

A6) {N, HN| (exists P#, A, H#, T)(Person(P#, N, A) and Play(P#, H#, T) and Hobby(H#, HN))};

Result:

Smith	Bowling
Smith	Chess
Smith	Dancing
Smith	Hiking
Smith	Skate
Smith	Ski
Jones	Bowling
Jones	Chess
Jones	Dancing
Jones	Hiking
Blake	Chess
Blake	Dancing
Lastname	Chess
Lastname	Dancing

7. Get the names of persons who do not play Ski.

A7)

{N | (exists P#, A, H#, T, HN)(Person(P#, N, A) and Play(P#, H#, T) and Hobby(H#, HN) and HN!= 'Ski')};

Result:
Jones
Blake
Lastname
Adams

8. Get the names of persons who do not play any hobby.

A8) {N | (exists P#, A)(Person(P#, N, A) and not (exists H#) Play(P#,H#, _))};

Result:
Adams

9. Get the names of persons who play all hobbies.

A9) {N | (exists P#, A)(Person(P#, N, A) and (forall H#)(not Hobby(H#,_) or Play(P#,H#,_)))};

Result:
Smith

10. Get the names of persons who play all hobbies that "lastname" plays.

A10) {N | (exists P')(Person(P', N, _) and N != 'lastname' and (exists P)(Person(P, 'lastname', _) and (forall H)(not Hobby(H, _) or Play(P,H,_))) or Play(P', H, _))};

Result:
Smith
Jones
Blake

11. Get the names of persons who play only all the hobbies that "lastname" plays.

A11) {N | (exists P')(Person(P', N, _) and N != 'lastname' and (exists P)
(Person (P, 'lastname', _) and (forall H)
(if Hobby (H, _) and Play (P, H, _) then Play (P', H, _)) or
(if Hobby (H, _) and not Play (P, H, _) then not Play (P', H, _))))};

Result:
Blake

12. Get the names of persons who play all hobbies except Skating and Ski.

A12) {N | (exists P#)(Person(P#, N, _) and
(forall H#)
(not (exists HN) (Hobby (H#, HN) and HN != 'Skating' and HN != 'Ski') or Play(P#, H#, _))
or
(not (exists HN) (Hobby (H#, HN) and HN = 'Skating' and HN = 'Ski') or Play(P#, H#, _))
)};

Result:
Jones

13. Get the names of persons who play hobbies, the number of hobbies and total number of times they play those hobbies.

A13) {N, count(H#), sum(T) | (exists P#)Person(P#, N, _) and Play(P#, H#, T) };

Result:

Smith	6	13
Jones	4	14
Blake	2	5
Lastname	2	7

14. Get the names of persons who play hobbies but play the least number of hobbies.

A14) T(N, HT) := {N, count(H#) | (exists P#)Person(P#, N, _) and Play(P#, H#, _) };

{N , min(HT)| (T(N, HT) };

Result:

Blake
Lastname