CSE 414 HW2 SOLUTIONS

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1) Write a trigger that increase (10%) salary of your employees in your company and show salary difference of employees after the salary increment. The employee table details are given as fallows.
Employee (name, payment, empid)

Answer:

In order to increase salary with trigger we have to use "instead of" trigger because we will insert %10 incremented salary into database instead of original salary.

Trigger

```
create trigger trg_salary
on Employee
instead of insert
as
insert into Employee (select name, (payment + ((payment * 10) / 100)),
empid from inserted)
select name as Name, payment as OldSalary, (payment +
((payment * 10) / 100)) as NewSalary, ((payment * 10) / 100)
as Incremented from inserted
```

In above trigger when a new employee inserted salary of that employee will be increased by %10,

For example

```
insert into Employee Values ('Akif', 100, 1)
```

after running this query the result will be as fallows.

Name	OldSalary	NewSalary	Incremented
Akif	100	110	10

2) Write a trigger that maintains referential integrity for on delete cascade. Using a trigger when a department is deleted, the employees on that department also have to delete. The details of the are given below.

Employee (name, Age, Adress, Depid)

Department (Depid, DepName)

Answer:

In this question again we have to use "instead of" trigger. Because when we try to remove an employee in the "after" trigger the query will give error since they are relational.

Trigger

```
create trigger trg_deleteCascade
on Department
instead of delete
as
delete from Employee where Depid = (Select Depid from deleted)
delete from Department where Depid = (select Depid from deleted)
```

By using instead of trigger we are removing the records manually in trigger. Therefore the records that are relational will be deleted safely.

3) What are the advantages and disadvantages of using NoSQL databases. Explain each of them?

Answer:

Advantages

* Large data volumes ⇒ Good for big data
* Scalable replication ⇒ Easy to distribute
* Less structured data ⇒ Queries run fast
* Flexible schema ⇒ Design is not complex
* Non-Relational or distributed database system ⇒ Implementation is easy.

Disadvantages

* These databases are not so good for complex queries
  - we don't have relations.
* Compability issues with SQL instructions.
  - Most of them are not support SQL queries
* ACID transaction properties are not needed.
  - Problems with atomicty and consistency.

4) Give characteristics of blockchain databases. Explain each of the characteristic. What are the differences between blockchain databases and traditional database.

Answer:

A blockchain is kind of a database because it is a digital ledger that stores information in data structures called blocks. On the other hand a traditional database is a data structure used for storing information.

Characteristics of blockchain database

* Decentralized Control ⇒ Generally, blockchains allow different parties to share information with each other without requiring a central administrator.
* History of itself ⇒ Centralized databases record present information only.
* Performance ⇒ they are considered as slow as databases when considered for digital transaction technology.

Differences between blockchain databases and traditional ones

	BlockChain	Traditional
Transaction	Data can only be read or added to the blockchain	Data can be created, read, updated or deleted.
Query Performance	slow	fast
Structure	Decentralized	Centrally Managed

5) What are the advantages and disadvantages of using a graph database? What are the characteristics of Neo4j graph database?

Answer:

A graph database stores nodes and relationships instead of tables or documents. Data is stored without restricting to a pre-defined model.

Advantages of graph database

* The structures are agile and flexible.
* The representation of relationships between entities is explicit
* Queries output real-time results. The speed depends on the number of relationships.
* Allow data analysts to federate data sets without having to create and run complex queries that join combinations of tables together as in the relational database model.

Disadvantages of graph database

* There is no standardized query langue. The language depends on the platform used.
* Graphs are inappropriate for transactional-based systems.
* The user-base is small making it hard to find support when running into a problem.

Characteristics of Neo4j graph database

* The most popular graph database
* Graph oriented
* ACID-compliant transactional database with native graph storage and processing.
* Everything is stored as an edge, a node or an attribute
* Each node and edge can have any number of attributes.
* Both the nodes and edges can be labelled.
* Labels can be used to narrow searches.