

# PHYSICS PRACTICAL SHEETS

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Object of the Experiment (Block Letter)

CAMPUS

Purusottam Adhikari

Experiment No. ....

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Chapter 2

1. Discuss the object-oriented database approach with its characteristics.

Object-oriented database (OODB) are databases that represents data in the form of objects and classes. In object-oriented terminology, an object is a real-world entity and a class is a collection of programming (oop).

Object-oriented programming + Relational Database feature = Object-oriented database model.

An object typically has two components: state (value) and behavior (operations). It can have complex data structures as well as specific operations defined by the programmers.

The main goal of oodatabase is to combine the advantages of data-oriented technologies and traditional database. It helps with improving the modelling of real-world concepts in the database. We can define persistence, concurrency, transactions, recovery, querying and performance as the basic database capabilities.

Characteristics:-

- It keeps up a direct relation between real world and database objects
- OODBs provide system generated object identifiers

for each objects

- OODBS are extensible, which identifies new datatypes and operations to be performed on them.
- provides encapsulation, feature which data & representation and method implementation are hidden from external entities.
- provides inheritance properties.

Q. Write down the advantages and disadvantages of OODBMS.

### Advantages

- i) Enhanced capabilities since data are more closely related to real world.
- ii) Extensibility:- concept which are future growth are taken into consideration and created by inheritance.
- iii) Capable of handling a large variety of data types such as pictures, audio, video etc.
- iv) Expressive power: provides an ability to handle objects like records in RDBMS and easy.
- v) Support for long-duration transaction because there will not be any expiration in the session.
- vi) Improved performance.

### Disadvantages

- i) Lack of universal data model because there is no universally agreed data model.

• slow performance and inconsistent coordination of transaction processing

ii) Lack of experience

not easy for end users & need programmers to interact

iii) complexity: implementation is complex

iv) Lack of support for views, manipulation

v) competition with object relational DBMS

vi) Lack of supports for security

vii) Lack of standards

Q. Explain the different database extensions to SQL.

SQL is standard language for RDBMS. In SQL 3 features of object databases were incorporated into SQL standards.

Following are some of object database features that have been included in SQL.

i) Type constructors have been added.

Basically two types of constructor

- Row type - tuple (or struct) constructor
- collection type - set, list and Bag constructor.

ii) Mechanism of specifying object identity through mechanism of reference type is included

iii) Encapsulation of operation is provided through mechanism of user-defined types (UDT)

iv) Inheritance mechanisms are provided using keyword UNDER

eg

CREATE TYPE person-type AS

Customer & Information Management

Customer-name VARCHAR(35),

birth-date CHAR, DATE,

sex CHAR,

phones USA-PHONE-TYPE ARRAY[4],

addr USA-ADDR-TYPE

INSTANTIABLE

NOT FINAL

REF IS SYSTEM GENERATED

INSTANCE METHOD age() RETURNS INTEGER;

CREATE INSTANCE METHOD age() RETURNS INTEGER

FOR person-type

BEGIN

RETURN

/\* Code to calculate age from birthdate \*/

END;

8.

one standard is adopted around the world - ODMG standards (in which there is no standard)

#### 4. Discuss about ODMG object model.

A consortium of DBMS vendors and users develop the Object Data Management Group (ODMG) standards

ODMG 1.0

ODMG 2.0

ODMG 3.0

ODMG standard is made up of several parts which form the object model

- object definition language (ODL)

- object query language (OQL)

- binding to object-oriented programming language.

#### Characteristics

- Easy to link with programming language
- No need for user defined type keys
- easy modeling
- can store non-textual data

#### Advantages:

i) Speed: Access to data can be faster because an object can be referred directly without a search by following pointer

ii) Improved performance: best for oop

iii) extensibility :- any kinds of data structure are used to hold data

iv) capable of handling variety of data.

v) it avoids the impedance mismatch because it uses standard transmission object to go with standard ODMG.

### 5. Differentiate objects and literals.

#### Objects

i) objects have both object identifier and state (current value)

ii) value can be modified

iii) object may be transient or persistent

#### Literals

i) literals has a value (state) but no object identifier

ii) constant value

iii) may be atomic, structure or collection

### 6. Differentiate the persistent and transient objects

Transient objects are exist during the execution but destroyed once the program terminates.

Persistent objects are stored into database even if program terminates.

an example of transient objects are temporary files (i.e. temporary file in browser and also temp file in windows).  
Temporary files are used for storing private copy of data and

use of local temporary buffer (ii).

## 7. Discuss object database conceptual model and differentiate with RDB.

Object oriented programming follows a conceptual framework called object model and is implemented by writing classes and objects to make its style clear and free from procedure-oriented language.

conceptual design is the first stage in database design process. The goal at this stage is to design a database that is independent of database's logical and physical details. The output of this process is a conceptual data model that describes data entities, attributes, relationships and constraints of given problem domain.

### ODB

- i) Relationships are typically handled by having relationship properties than include oid of related objects.

ii) considered as oid references to related objects

iii) structures are built into model so mapping is achieved by using inheritance construct such as derived (.) and extends

### RDB

- i) Relationships among tuples are specified by attributes with matching values.

ii) considered as value references and specified via foreign keys.

iii) there are several options to choose since no built-in construct exist for inheritance

iv. Valid behaviour or operation  
A requirement in object model

i) Relational model does not mandate the database designer to predefine a set of valid behaviour or operations.

v) It handles large and complex data

v) It handles simple data.

8. Explain the mapping from EER to ODL schema

Step 1: Create an ODL class for each EER entity type or sub-class.

Step 2: Add relationship properties or reference attributes for each binary relationship into the ODL classes that participate in relationship.

Step 3: Include appropriate operations for each class.

Step 4: An ODL class that corresponds to the subclass in EER schema, inherit the type and methods of its superclass in ODL schema.

Step 5: Weak entity type can be mapped in the same way as regular entity.

Step 6: Union types in EER schemas are difficult to map to ODL.

Step 7: An n-ary relationship with degree  $n > 2$  can be mapped into separate class with appropriate references to each participation.

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9. Explain the object query language in detail.

- OQL is an SQL like declarative language that provides a rich environment for efficient querying of database objects, including high-level primitives for object sets and structures.
- The OQL syntax for queries is similar to the syntax of the relational standard query language SQL, with additional features of ODBC concepts such as object identity, complex objects, operations in inheritance, polymorphism and relationships. It is designed to work closely with programming languages for which an ODBC binding is defined such as C/C++, Smalltalk and Java.

e.g:

SELECT c.address

FROM Persons p,

p.children c

WHERE p.address.street = "Main street" AND

Count(p.children) >= 2 AND

c.address.city != p.address.city

• Simple OQL Queries, Database Entry point and Iterator Variables.

The basic OQL syntax is select - from - where  
- structure as it is for SQL for e.g.

Query to retrieve the names of all departments in the college of engineering can be written as follows:

Q1 : select D.Dname

FROM D in Departments

WHERE D.college = 'Engineering';

Here Department is entry point refers to a persistent collection of objects. Whenever a collection is referenced in an OQL query we should define a iterator variable D in Q1. that ranges over each object in collection.

Query Result and path expression:

- The result of a query can be of any type that can be expressed in ODM or object model.
- A query does not have to follow `SELECT --from --where --structure`; in the simplest case any persistent name on its own is a query, whose result is a reference to persistent object.

Q1 : DEPARTMENTS;

Returns the col reference to the collection of all persistent DEPARTMENTS objects, whose type is `SET <DEPARTMENT>`.

Q2A : C1-DEPARTMENT;

It return a reference to the individual object of type DEPARTMENT.

The path expression typically starts at a persistent object name, or at iterator variable that ranges over individual objects in a collection. This name will be followed by zero or more relationship

names or attribute names connected using dot notation.

Q2 : CS-DEPARTMENT.chair

Q2A : CS-DEPARTMENT.chair.Rank

Q2B : CS-DEPARTMENT.Has-faculty.

Q2 and Q2A returns single values because both chair and Rank are single-valued & applied to single object. But third expression Q2B is different & returns an object type set <faculty> even when applied to single because there do type of relationship Has-faculty of department class.

10: Discusses the language binding in ODMG standard.

The ODMG standard's Java, C++ and Smalltalk bindings define object manipulation language that extend the programming language to support persistent objects. The binding also include support for OQL, navigation and transactions. The OML enables developers to work inside a single language environment without a separate database language.

. C++ language Binding:-

C++ binding provides language-transparent extension that provides facilities for object creating, naming, manipulation and deletion and transactions and database operations. It allocates persistent capable classes to be created by inheritance.

- Small talk language Binding:-  
It provides the ability to store, retrieve and modify persistent objects in small talk
- It includes a mechanism to invoke OQL and procedures for transactions and operations on database.

### • Java language Binding

- same principles as small talk and c++.
- It established java language practice and style to be natural to java environment and programmers.

### II. Differentiate between OODBMS and RDBMS.

#### OODBMS

- |                                               |                               |                                     |                                      |                                                      |                                              |                                           |                          |                                                                 |                      |                                               |
|-----------------------------------------------|-------------------------------|-------------------------------------|--------------------------------------|------------------------------------------------------|----------------------------------------------|-------------------------------------------|--------------------------|-----------------------------------------------------------------|----------------------|-----------------------------------------------|
| i) object oriented database management system | ii) Data is stored as objects | iii) handles large and complex data | iv) It implements data encapsulation | v) handles both data and functions operating on data | vi) OID is used to uniquely identify objects | ii) Relational database management system | iii) handles simple data | iv) It helps to keep data independent from application programs | v) handles only data | vi) Primary key is used to identifies objects |
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