

# • Class XII – Computer Science – Notes

## • Practicals

### • Chapter 01 : Data Basics

#### 1.1 Overview

Q : 01-01-01 : Define Data, Information and Explain Operations on Data ?

**Answer :**

**Data :** Data is a collection of facts, figures and statistics - related to an object, that can be processed to produce a meaningful information.

**Information :** The manipulated and processed data is called information e.g., the percentage of students results. It is an output of a certain process.

**Operations :** Manipulation of data (after capturing from different sources) to achieve the required objectives and results. For this purpose, a software (program) is used to process raw data which is converted to meaningful information.

These are categorized into three basic activities :

**Data Capturing :** Data must be recorded or captured in some form before it can be processed.

**Data Manipulation :** The following operations may then be performed on the gathered data.

**Classifying :** Organizing data into classes /groups. Items may be assigned predetermined codes, they can be numeric, alphabetic or alphanumeric.

**Calculations :** Arithmetic manipulation of the data.

**Sorting :** Data is arranged in logical sequence (numerically or alphabetically).

**Summarizing :** Masses of data are reduced to a more concise and usable form.

**Managing The Output Results :** Once the data is captured & manipulated it may be :

**Storing and Retrieval :** Data is retained for future reference. Accessing / fetching the stored data and / or information is the Retrieve Activity.

**Communication and Reproduction :** Data may be transferred from one location or operation to another, for further processing. It is sometimes necessary to copy or to make duplicate of data, called Reproduction.

#### 1.2 Traditional File System

Q : 01-02-01 : Define and Explain Record and File ?

**Answer :**



**Record** : A collection of related fields (facts about something) treated as a single unit is called a record. Let us see one student's biographic information (record) :

Roll Number      13-3101  
Student Name     Muhammad Saleem  
Class              XI

**File** : A collection of related records treated as a single unit is called a file or a data set. Records of all the students together, make a file.

Q : 01-02-02 : Explain Types of File from Usage Point of View ?

**Answer :**

**Master File** : These are the latest updated files which never become empty, ever since they are created. They maintain information that remains constant over a long period of time.

**Transaction File** : Files in which data prior to the stage of processing is recorded. It may be temporary file, retained till the master file is updated.

**Backup File** : Permanent files, for the purpose of protection of vital data.

Q : 01-02-03 : Explain Types of File from Functional Point of View ?

**Answer :**

**Program Files** : These files contain the software instructions i.e. source program files and executable files. The source program files may have the extension as .cpp and the executable files as .exe.

**Data Files** : These files contain data and are created by the software being used. A few of these are : Word Processor .doc, rtf (document), Spread Sheet .xls and .wks (worksheet), Video files .avi, .mpg etc.

Q : 01-02-04 : Explain Types of File from Storage (File Organization) Point of View ?

**Answer :**

**File Organization (Storage Point of View) :**

**Sequential Files** : Files are stored or created on the storage media in the order the records are entered i.e., one after another in the sequence.

**Direct or Random Files** : These files reside on the storage media according to the address which is calculated against the value of the key field of the record.

**Indexed Sequential** : The key field of the records (in a file) are stored separately along with the address of each record. These require relatively more space on the storage media but the processing is as fast as random / direct files.

### 1.3 Databases

Q : 01-03-01 : Define & Explain Database ?

**Answer :**

**Database** : A database is a collection of logically related data sets or files. For example;

A bank may have separate files for its clients i.e.



Savings A/C  
 Automobile loan  
 Personal loan  
 Clients biographic information etc.

The bank's clients / customer database would include records from each of these files. Using a series of programs, data for any client may be added, retrieved or updated depending upon the activity at a particular time. The user of the database normally has following facilities :

- Adding new, blank files to the database.
- Inserting new data into the existing files.
- Retrieving data from existing files.
- Updating data in existing files.
- Deleting data from existing files.
- Removing existing files, empty or otherwise from the database.

Q : 01-03-02 : Explain Database Objectives ?

**Answer :**

**Data Integration :** Information is coordinated from different files and operated on a single file.

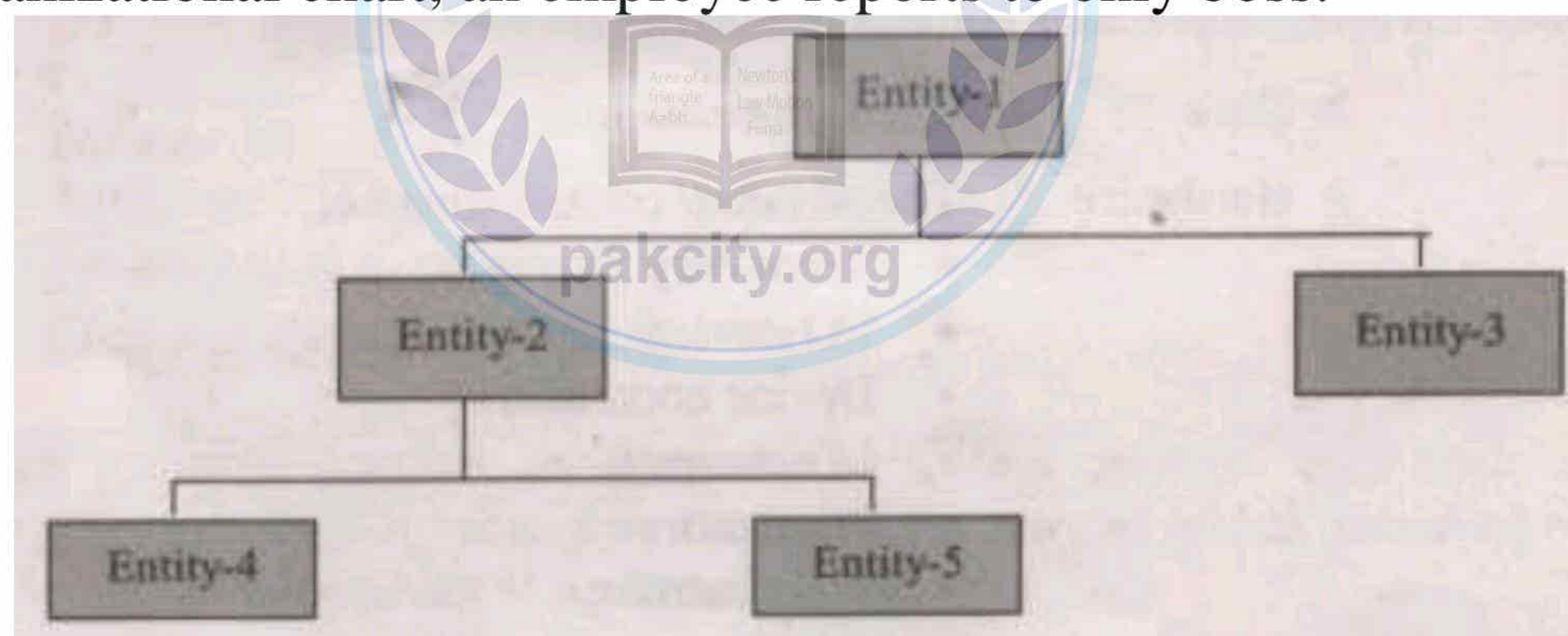
**Data Integrity :** If a data item is contained in more than one file, then all files must be updated if that item is changed.

**Data Interdependence :** When the format of a file is changed, then all the programs have to be changed. However, a database allows the organization of data to be changed without the need to re-program. It allows programs to be modified without re-organization of data.

Q : 01-03-03 : Explain Various Types of Database Models ?

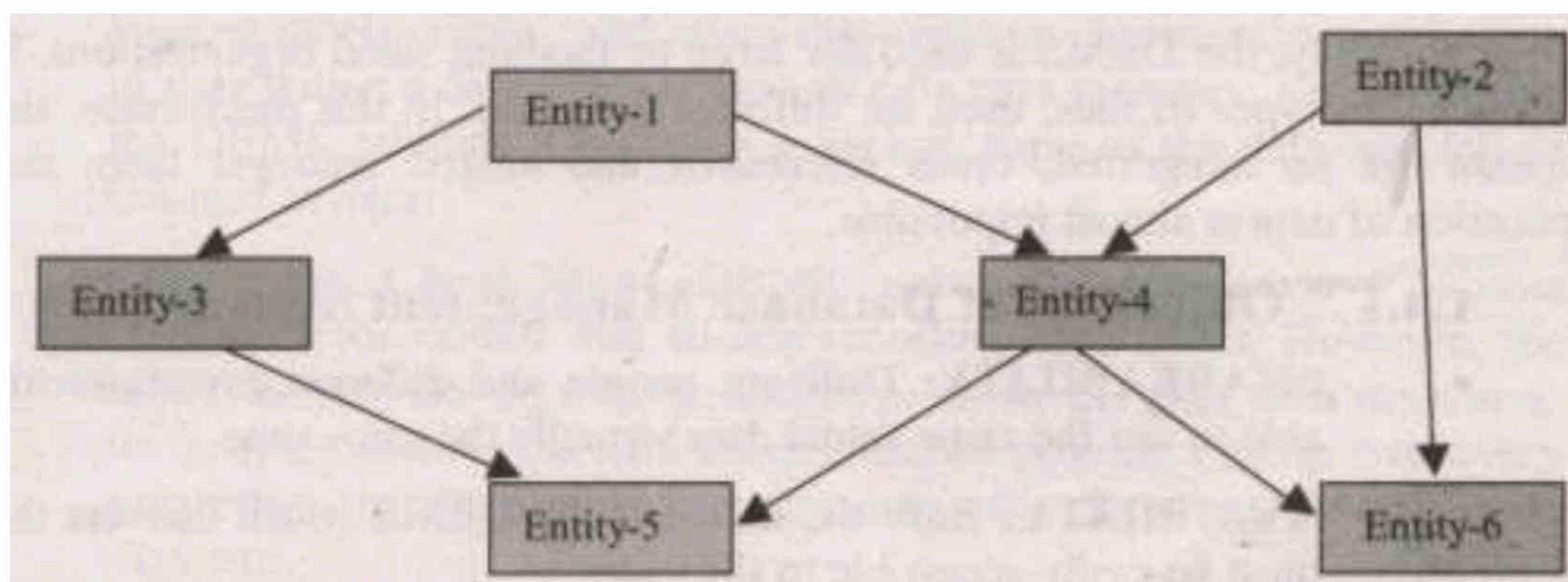
**Answer :**

**Hierarchical Model :** This Model has the general shape or appearance of an Organizational Chart. A node on the chart, is subordinate at the next highest level, just as on an organizational chart, an employee reports to only boss.

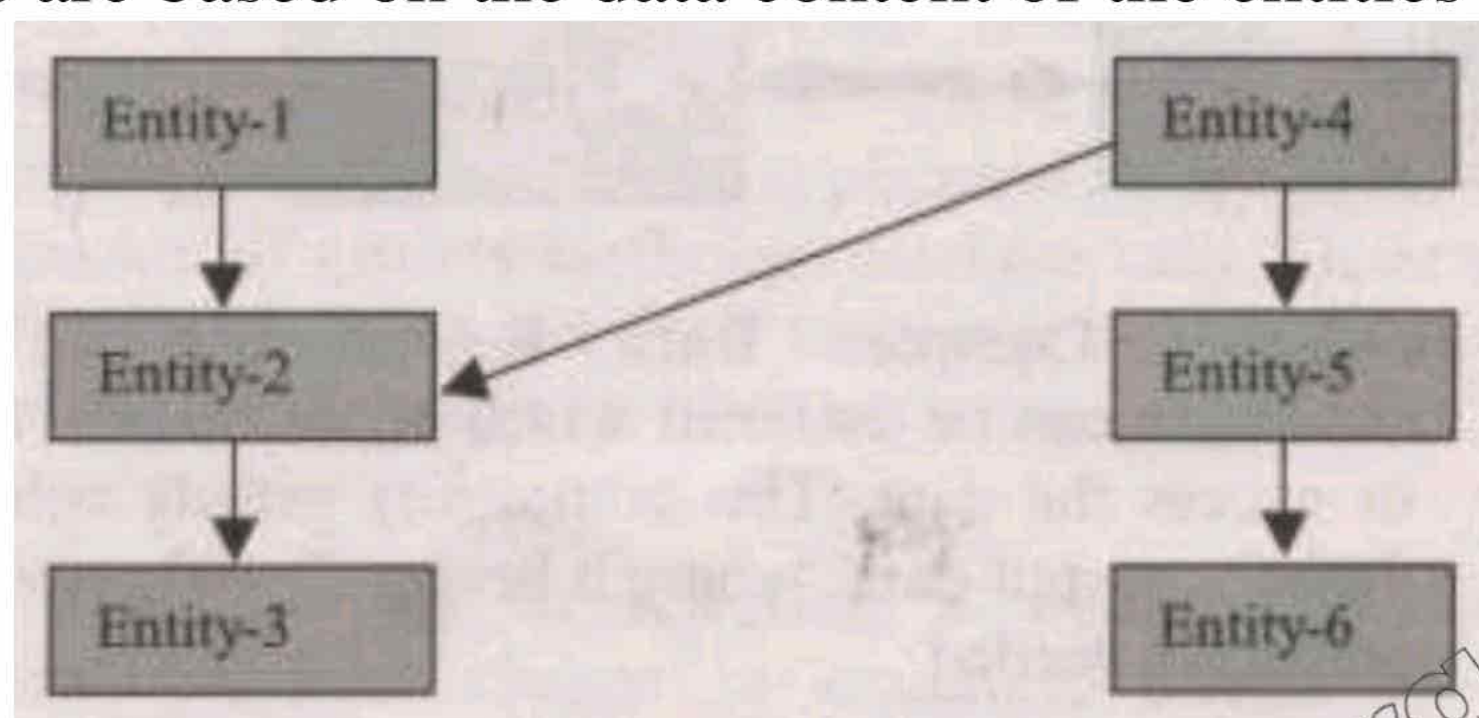


**Network Model :** Similar to Hierarchical model but subordinate entities, depicted by arrows on the network diagram, may participate in as many subordinate relationships as desired.





**Relational Model :** Collection of simple files/Relations (Entities), each of which has no structural or physical connection like hierarchical or network systems. The various entities possess the interrelationships as depicted by a network like diagram but these relationships are based on the data content of the entities involved.



#### 1.4 Database Management System

Q : 01-03-03 : Describe Database Management System (DBMS) and state Objectives of DBMS ?

**Answer :**

**Database Management System (DBMS) :** The data management system (a collection of programs) which is used for storing and manipulating databases is called database management system (DBMS). DBMS software (database manager) controls the overall structure of a database and access to the data itself.

**Objectives of Database Management System (DBMS) :**

**Share Ability :** Different people and processes must be able to use the same data at the same time.

**Availability :** Both the data and DBMS must be easily accessible to the users.

**Evolvability :** The ability of the DBMS to change in response to growing user needs and advancing technology.

**Database Integrity :** Since data is shared among multiple users, adequate integrity control measures must be maintained.

Q : 01-03-03 : Describe Advantages of Database Management System (DBMS) ?

**Answer :**

**Advantages of Database Systems :**

**Data Independence :** Application programs are not aware of the physical implementation of the data sets. The DBMS sits in between the application programs and the actual data sets that make up the database.

**Support Complex Data Relationships :** Fairly complex structures can be designed



which allow various ways to logically access the data.

**Sophisticated Data Security Features** : Provide enhanced security mechanisms for access to data. Data base security mechanisms typically go much further in adding more extensive security features.

**Data Base Backup / Recovery** : Provide sophisticated backup / recovery mechanism. Backup / Recovery capabilities often distinguish between true DBMS and a software package that only claims this facility.

**Advanced Capabilities** : DBMS normally have advance access capability for on-line and ad-hoc reporting capabilities.

Q : 01-03-03 : Describe Disadvantages of Database Management System (DBMS) ?

**Answer :**

**Disadvantages of Database Systems :**

**Require additional System Overhead** : Additional overhead is required to access data, in case of doing some simple jobs; like reading and processing a tape file, which might take a little time and resources to do the job. If we have to do it on DBMS, it is like “requiring too much to do too little”.

**Additional Training Required for Training of Staff** : Application programmers require a sort of precise training to code efficient programs that will run under a DBMS.

**Problems can multiply in selecting a wrong type of Database Environment** : A later change in structure, forced by changing requirements, can be costly in terms of conversion and testing of existing programs.

**Data must be considered a Corporate Resource** : The data in a company’s database no longer belong to one organization alone. One organization normally has the primary responsibility for creating a database, many can share the same data across applications.

**A Need of a Dictionary** : To share data across application systems, the internal data contents of a company’s databases need to be documented in a consistent manner, thus another overhead on the DBMS.

Q : 01-03-03 : Describe Features of Database Management System (DBMS) ?

**Answer :**

**Features of a DBMS :**

**Data Dictionary** : Some databases have a data dictionary, a procedures document or disk file that stores the data definitions or a description of the structure of data used in the database. The data dictionary may monitor the data being entered to make sure it conforms to the data definition rules i.e., file names, field names, field sizes, data types etc. It may be used for data access authorization for the database users.

**Utilities** : The DBMS utilities are the software programs that are used to maintain the database by manipulating the data, records and files. Some programs are also used for backup and recovery procedures of the databases.

**Query Language** : Normally, SQL (Structured Query Language) is used for creating table structures, entering data into them and retrieving/updating the selected records, based on the particular criteria and format indicated, within the databases. Typically,



the query is in the form of a sentence or English-like command i.e., SELECT, DELETE, CREATE, MODIFY, UPDATE and INSERT commands.

**Report Generator** : A report generator is a program that is used to produce an on-screen or printed document from the database. The report format can be specified in advance i.e., row headings, column headings, page headers etc. Even the non-experts can create very useful and attractive reports by using this facility.

**Access Security** : By using this facility, the database administrators can assign specific access privileges for the users of the databases.

**Backup and Recovery** : It is an important feature available in almost all the DBMS programs. By using this feature, we are able to have the backup of our data and can later, use it to reinstate it in case of data failure, corruption or loss.

