Name: SHIMIRWA INEZA Bruno
Regno: 21rp03468
Class : ECO Y3

DATABASE WORK

Q1. DISCRIBE ORACLE MEMORY STRUCTURE AND BACKGROUND PROCESSES.

Oracle's memory structure consists of several key components that collectively manage and store data efficiently like:

1.<u>System Global Area (SGA):</u>

The SGA is a shared memory region that stores data and control information for an Oracle instance.
It includes:

Database buffer cache: Stores data blocks read from data files.
Redo log buffer: Stores redo entries before writing them to the redo log files.
Shared pool: Contains shared memory structures, such as SQL query statements, parsed execution plans, and PL/SQL code.
Large pool (optional): Used for large memory allocations, such as parallel execution buffers and RMAN backup operations.
Java pool (optional): Used for Java execution within the database.
Streams pool (optional): Used for Oracle Streams operations.

2.<u>Program Global Area (PGA):</u>

The PGA is a memory region specific to each server process or background process connected to the Oracle instance.
It holds session-specific information, such as sort areas, hash joins, and private SQL areas.

Background processes in Oracle are responsible for various tasks essential for the functioning of the database. Some of the key background processes include:

1.<u>DBWn (Database Writer):</u>

- Writes modified buffers from the database buffer cache to the data files on disk.
- Multiple DBWn processes can exist, known as DBW0, DBW1, and so on.

2.<u>LGWR (Log Writer):</u>

Writes redo log entries from the redo log buffer in the SGA to the redo log files on disk.

3.CKPT (Checkpoint):

Performs a checkpoint operation, which writes all dirty buffers in the buffer cache to the data files.

4.SMON (System Monitor):

Performs instance recovery, ensuring that any transactions left incomplete due to instance failure are either rolled back or committed as necessary.

5.PMON (Process Monitor):

Responsible for process recovery and cleanup.

6.ARCH (Archiver):

Copies redo log files to archival storage destinations, such as tape or remote disk, once they are no longer needed for instance recovery.

Q2. DESCRIBE ORACLE LOGICAL AND PHYSICAL STORAGE STUCTURES

Oracle uses both logical and physical storage structures to organize and manage data within a database.

Logical Storage Structures:

Tablespace:

A logical container for database objects such as tables, indexes, and clusters.

Segment:

A set of extents that contains all the data for a specific logical structure (table, index, or cluster).

Extent:

A contiguous set of data blocks allocated for a specific table or index.

Data Block:

The smallest unit of I/O in Oracle, containing actual data or metadata.

Table:

A logical structure that stores data in rows and columns.

Index:

- A logical structure that provides a fast access path to rows in a table.
- Organized as a B-tree structure.

Physical Storage Structures:

Data Files:

Physical files on disk that store the actual data of the database.

Control Files:

Binary files that store metadata about the database, including the physical structure and integrity of the database.

Redo Log Files:

Essential for recovery in the event of a system failure.

Temp Files:

Used for temporary storage, typically for sorting and joining operations.

Archive Log Files:

Copies of redo log files that have been archived to secondary storage.