

Advanced Databases

INZ000109P

Project

Assignment 6 - Indexes (spec.)

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◆ B-Tree Index

- **B-tree indexes** are useful when there is **less or no duplicate values** (high cardinality)
- A B*-tree index is the standard type of index available in Oracle, and it's very useful for selecting rows that meet an equivalence criterion or a range criteria.
- **B-tree index** uses a **tree-like structure** with index nodes.
- B-tree and Bitmap indexes are internally different but functionally they are same in retrieving rows faster than a full-table scan.
- **Syntax :** `CREATE INDEX idx_btree_colName ON table_name (col_name);`

- **First Usage :**

```
CREATE INDEX idx_btree_prdouct_name ON MUTABAY.products(product_name);  
DROP INDEX idx_btree_prdouct_name;
```

- **Second Usage :**

```
CREATE INDEX idx_btree_store_city ON MUTABAY.stores (city);  
DROP INDEX idx_btree_store_city;
```

◆ Bitmap Index

- Bitmap indexes are used on the columns which has lots of duplicate values(low cardinality)
- Bitmap index uses a two-dimensional array with zeros and ones (bits) values.
- For columns that have few unique values, a bitmap index may be able to improve query performance.
- Bitmap indexes should only be used when the data is batch loaded (as in many data warehousing or reporting applications).
- Syntax : `CREATE BITMAP INDEX index_name ON table_name (columns)`
- First Usage :
`CREATE BITMAP INDEX idx_bitmap_orders_required_date ON
MUTABAY.orders(required_date);
DROP INDEX idx_bitmap_orders_required_date;`
- Second Usage :
`CREATE BITMAP INDEX idx_bitmap_orders_order_date ON MUTABAY.orders(order_date);
DROP INDEX idx_bitmap_orders_order_date;`

◆ Function-based indexes

- Instead of indexing a column, such as Name, you can index a function-based column, such as UPPER(Name).
- The function-based index gives the Oracle optimizer additional options when selecting an execution path.
- Syntax : `CREATE INDEX fbi_idx_btree_col_name ON table_name (col_name);`
- First Usage :
`CREATE INDEX FBI_IDX_LOCATION_category_name ON
MUTABAY.categories(UPPER(category_name));
EXPLAIN PLAN FOR SELECT * FROM MUTABAY.categories WHERE
UPPER(category_name)=1 ;
SELECT PLAN_TABLE_OUTPUT FROM TABLE(DBMS_XPLAN.DISPLAY());
DROP INDEX FBI_IDX_LOCATION_category_name;`
- Second Usage :
`CREATE INDEX FBI_IDX_LOCATION_street ON MUTABAY.stores(LOWER(street));
EXPLAIN PLAN FOR SELECT * FROM MUTABAY.stores WHERE LOWER(street)=3 ;
SELECT PLAN_TABLE_OUTPUT FROM TABLE(DBMS_XPLAN.DISPLAY());
DROP INDEX FBI_IDX_LOCATION_street;`