Group B3, task 12

Here's a summary of the optimization methods tested in the previous phases of the project. This summary includes average execution times and costs of query plans for each transaction from the workload, comparing no optimization with each optimization method. The best results are indicated, and two methods that give the best results for each transaction are selected.

Query 1: Comparing B-tree vs Bitmap Index

No Optimization

- **Average Execution Time**: 2.914 seconds
- **Query Plan Cost**: 9275

B-tree Index

- **Average Execution Time**: 2.891 seconds
- **Query Plan Cost**: 8295
- **Improvement**: Slight reduction in execution time and cost.

Bitmap Index

- **Average Execution Time**: 2.896 seconds
- **Query Plan Cost**: Same as original (Bitmap index not used)
- **Improvement**: Marginal reduction in execution time, no change in cost.

Best Results for Query 1: B-tree Index (slightly better execution time and cost)

Query 2

No Optimization

- **Average Execution Time**: 3.67 seconds
- **Query Plan Cost**: 13354

Index on HealthRecords (UserID, RecordDate)

- **Average Execution Time**: 1.02 seconds
- **Query Plan Cost**: 3235
- **Improvement**: Significant reduction in both execution time and cost.

Best Results for Query 2: Index on HealthRecords (major improvement in performance)

Partitions

Query 1: Partition by Range on BodyMeasurementsMod

- **Average Execution Time**: 3.12 seconds
- **Query Plan Cost**: 15974
- **Change**: Execution time increased, cost higher.

Query 2: Partition by Hash on HealthRecordsMod

- **Average Execution Time**: 3.256 seconds
- **Query Plan Cost**: 18453
- **Change**: Execution time decreased slightly, cost higher.

Query 2: Partition by Range for UserID on HealthRecordsModNew

- **Average Execution Time**: 0.605 seconds
- **Query Plan Cost**: 18478
- **Improvement**: Significant reduction in execution time, slight increase in cost.

Best Results for Partitions:

- Query 1: No partition method improved performance.
- Query 2: Range partition for UserID on HealthRecordsModNew (significantly better execution time).

Final Recommendations

- For **Query 1**, the **B-tree Index** method provides the best results in terms of both execution time and cost.
- For **Query 2**, the **Partition by Range for UserID on HealthRecordsModNew** is the best method, with the partition providing the most significant overall improvement.

Comparison Table for Query Optimization Methods

Query	Optimization Method	Average Execution Time (seconds)	Query Plan Cost	Improvement in Execution Time	Improvement in Cost
1	No Optimization	2.914	9275	-	-
1	B-tree Index	2.891	8295	Slight Reduction	Reduced
1	Bitmap Index	2.896	9275	Marginal Reduction	No Change
1	Partition by range on BodyMeasurementsMod	3.12	15974	None	None
2	No Optimization	3.67	13354	-	-
2	Index on HealthRecords	1.02	3235	Significant Reduction	Greatly Reduced
2	Partition by Range (UserID)	0.605	18478	Significant Reduction	Increased