Index Report - Analytics Page

Candidate Indices
CREATE INDEX index_users_state ON users (state) - 58.92
CREATE INDEX index_users_id ON users(id, state); - 58.87
CREATE INDEX index_products_categoryid ON products(category_id); - 60.03
CREATE INDEX index_products_price ON products(price); 59.49
CREATE INDEX index_orders_price ON orders(price); 59.22

Beneficial Indices
CREATE INDEX index_products_price ON products(price); - 57.49

Index_products_price should be beneficial because the price attribute in products is accessed multiple times (for the same product) during the summing computation since many users may have ordered the same product.

CREATE INDEX index_orders_userid ON orders(user_id); -
CREATE INDEX index_orders_productid ON orders(product_id); -

Index_orders_userid and index orders_productid should be beneficial because there are many orders that correspond to the same user, and many users that have the same products in their orders. This leads to many tuples with the same user_id or product_id, which would be grouped together by the pointers in the index.

CREATE INDEX index_products_categoryid ON products(category_id);

Index_products_categoryid should be beneficial because as a foreign key referencing an id in the categories table, there should be many instances of products sharing the same category_id, and indexing on that attribute should reduce the number of comparisons.

Note: Many of the indices we expect to improve performance do not result in any speedup. We suspect this is the case because our queries rarely have WHERE clauses. Instead, we nest queries and assign names to those subqueries without creating additional tables. Our conditional statements in our queries are performed on the results of those individual sub queries, so we cannot create an index on them.

Experimental Indices
CREATE INDEX index_users_state ON users (state) - 58.92 (not useful)
CREATE INDEX index_users_id ON users(id, state); - 58.87 (not useful)
CREATE INDEX index_orders_price ON orders(price); - 59.22 (not useful)
CREATE INDEX index_products_price ON products(price); - 57.52 (useful)

Final Choice of Indices

```sql
CREATE INDEX index_products_price ON products(price);
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