**Report**

This project implements the functionalities of Relational Algebra Operators like Select, Project, Minus, Union and Joins (Natural and Equi) using Java.

We have implemented the following methods in the Class – Table:

* **Project:** The project method in the Table class was implemented, it takes the **tuples** Comparable type objectand uses extract function to extract each rows value which corresponds with the attribute in the ‘attributes’ variable passed while called the method.
* **Select** - Selection operator is used to select tuples from a relation, based on some condition.

Select function gets the key value as parameter and uses a foreach loop to iterate over key- value pairs. The key value pair in the Relation is mapped using a TreeMap The Map is iterated over the indexes using a ‘index’ method of Table Class. Each indexed item is then compared for its value and is added to the ‘row’ ArrayList is it satisfies the Select condition.

* **Minus** - For the relations A and B, the minus operator returns the tuples that are present in 'A' but not in 'B'. Here, A and B should be Union compatible. Once the compatibility is checked, then the tupples are iterated and each tuple in A is compared for all schema values, so that same doesn’t appears in the relation B. If so, then it is added into the rows list.
* **Union** - For the relations, A and B, the union operator returns the tuples that are present either in 'A' or in 'B' without any duplicates. Here, A and B should be union compatible.

All tuples in A are added into ‘rows’ list then tuples in B are iterated over and compared with each tuple in A, if there is no match then it is added else ignored.

* **Equi Join** - It joins two tables based on a value match of attribute as passed while calling the method. If all Values in a row of first table matches with all in second row of only the attributes requested then the row is added into the ‘rows’ list.
* **Natural join** - It is a special case of Equi Join in which the join happens on the attributes which are common in both the Tables. If there are none common attributes, null is returned.