Project operation selects (or chooses) certain attributes discarding other attributes. The Project operation is also known as vertical partitioning since it partitions the relation or table vertically discarding other columns or attributes.

Notation:

$$\pi_A(R)$$

where 'A' is the attribute list, it is the desired set of attributes from the attributes of relation(R), symbol 'π(pi)' is used to denote the Project operator,
R is generally a relational algebra expression, which results in a relation.

Example –

$$\pi_{Age}\,(Student)$$
$$\pi_{Dept,\ Gen}\,(Emp)$$

Example –
Given a relation Faculty (Class, Dept, Position) with the following tuples:

Class	Dept	Position
5	CSE	Assistant Professor
5	CSE	Assistant Professor
6	EE	Assistant Professor
6	EE	Assistant Professor

1. **Project Class and Dept from Faculty –**

$$\pi_{Class,\ Dept}(Faculty)$$

Class	Dept
5	CSE
6	EE

2. **Project Position from Faculty –**

$\pi_{Position}(Faculty)$

Position
Assistant Professor

Here, we can observe that all the duplicate tuples are removed from the relation in the resulting relation. This is called as Duplicate elimination.

3. **Project Class from Faculty –**

$\pi_{Class}(Faculty)$

Class
5
6

Important points:

1. The Project operation removes duplicate tuples.
2. The Project operation is not commutative, that is :
   $\pi_{Attribute\ List\ 1}(\pi_{Attribute\ List2}(R))\ != \pi_{Attribute\ List\ 2}\ (\pi_{Attribute\ List1}(R))$
3. The following expression is valid only if Attribute List 1 is a subset of Attribute List 2.
   $\pi_{Attribute\ List\ 1}(\pi_{Attribute\ List2}(R))$

   Moreover, writing the above expression is as good as writing the expression below:

   $\pi_{Attribute\ List\ 1}(\pi_{Attribute\ List2}(R)) = \pi_{Attribute\ List\ 1}\ (R)$
4. In SQL, SELECT DISTINCT query is exactly as same as PROJECT here.

It displays the specific column of a table. It is denoted by pie (∏). It is a vertical subset of the original relation. It eliminates duplicate tuples.

Syntax
The syntax is as follows –

$$\prod_{regno}(student)$$

Example
Consider the student table:

Regno	Branch	Section
1	CSE	A
2	ECE	B
3	CIVIL	B
4	IT	A

To display regno column of student table, we can use the following command −

$$\prod_{regno}(student)$$

Output

RegNo
1
2
3
4

To display branch, section column of student table, use the following command –

$$\prod branch,section(student)$$

The result is as follows −

Branch	Section
CSE	A
ECE	B
CIVIL	B
IT	A

To display regno, section of ECE students, use the following command −

$$\prod regno,section(\sigma_{branch=ECE}(student))$$

Output

Regno	Section
2	B

Note: Conditions can be written in select operation but not in projection operation.

Consider the employee table to know more about projection.

- If no condition is specified in the query then, Π empid, ename, salary, address, dno (emp).
- If condition is specified then, the composition of the select and projection is as follows −

$$\prod empid, ename, salary, address, dno (\sigma_{salary>20000}(emp))$$