SQL Indexes

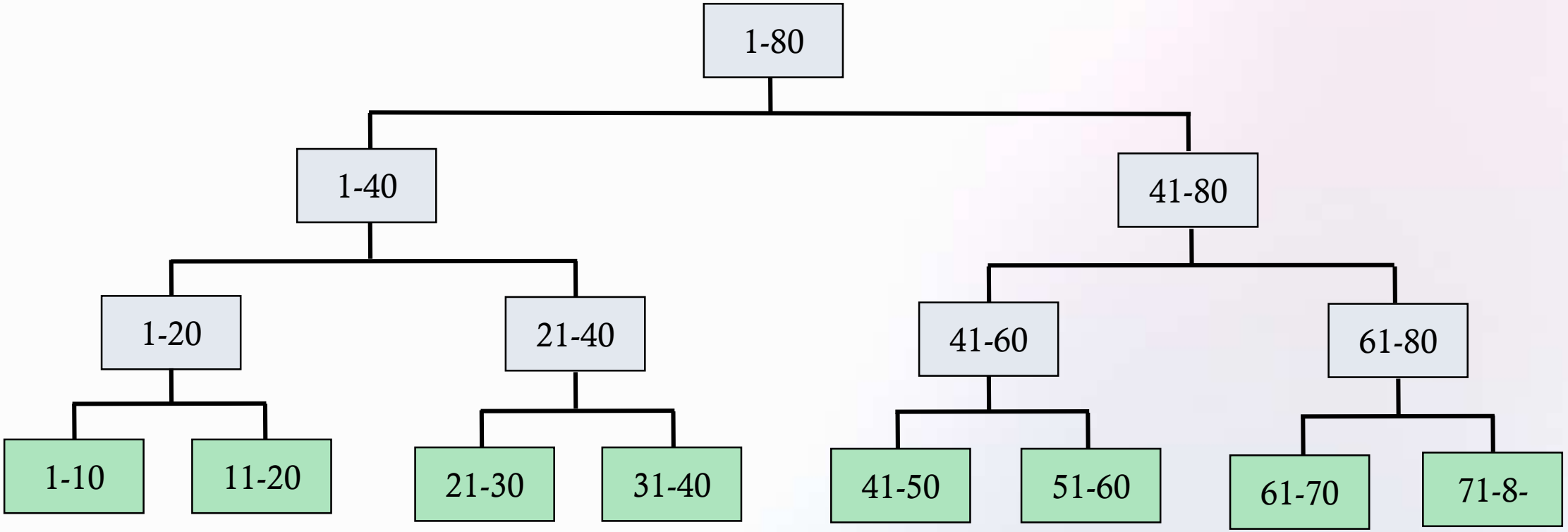
An index is an on-disk structure associated with a table that speeds retrieval of rows from the table. An index contains keys built from one or more columns in the table. These keys are stored in a tree like structure that enables SQL Server to find the row or rows associated with the key values quickly and efficiently.

There are 2 type of indexes:

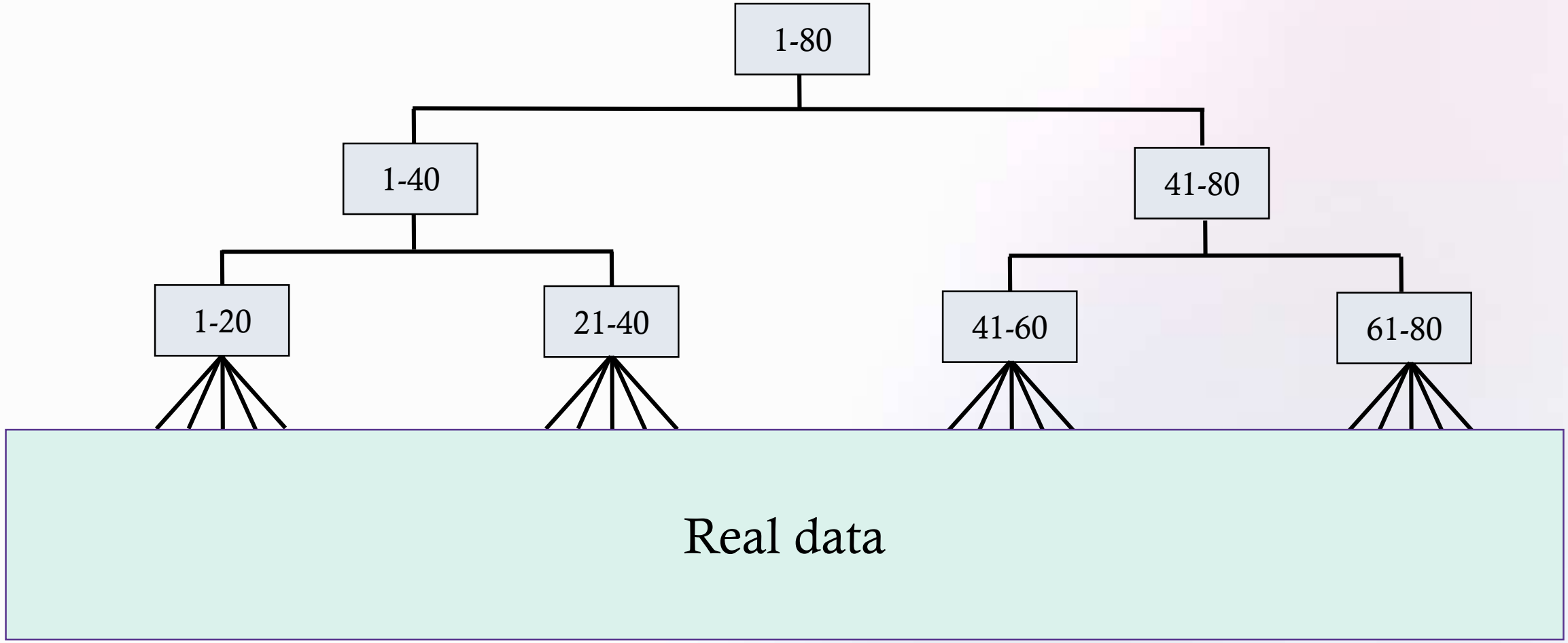
- Clusterd
- Non-Clusterd

Indexes are automatically created when PRIMARY KEY and UNIQUE constraints are defined on table columns. For example, when you create a table with a UNIQUE constraint, Database Engine automatically creates a nonclustered index. If you configure a PRIMARY KEY, Database Engine automatically creates a clustered index, unless a clustered index already exists. When you try to enforce a PRIMARY KEY constraint on an existing table and a clustered index already exists on that table, SQL Server enforces the primary key using a nonclustered index.

Clustered Index



Non-Clustered Index



column expressions

Column expressions let us write expressions in SQL queries. For example we can rename the column name:

```
SELECT name as FirstName FROM users;
```

We can do mathematical or other operations on column values:

```
SELECT id + 100 as bigId, concat('hello ', name) as greeting FROM users;
```

Also, we can write constants values:

```
SELECT 'Some text', 1 FROM users;
```

We cannot use custom column names in select expressions:

```
SELECT name as fisrtName, concat('hello ', firstname) as greeting FROM users;
```