Key concepts:

Atomic Key: is a key consisting of a single attribute, normally primary key.

Natural key: is a column or set of columns that already exist in the table, e.g. SSN, ISBN, TaxId, etc. If there is no natural key, then we normally use surrogate key, e.g. person table.

Candidate Key:

A candidate key is a column or set of columns that can uniquely identify a record without referring to any other data. Each table may have one or more candidate. One of these candidate keys is selected as the table primary key. e.g. , STUD_NO in STUDENT table.

Only one Candidate Key can be Primary Key.

Primary Key:

Primary Key is a unique key in a table, which can be a column or a set of columns that uniquely identify a record. Normally, all tables should have a primary key.

why? If you ever need to update or delete a record you need to know how to identify a record.

Surrogate key:

Surrogate key is an artificially generated key that can be used for primary key.

They're useful when there is no natural key, e.g. a Person table, since it's possible for two people born on the same date with the same name.

ID numbers are mostly surrogate keys. Most often GUIDs (Globally Unique Identifier) generated automatically are used as Surrogate key.

Not all tables need surrogate keys, e.g. If you have a table that lists the states in America, you don't really need an ID number for them. You could use the state code as a primary key.

The main advantage of the surrogate key is that they're easy to guarantee as unique.

The main disadvantage is that they don't have any meaning, e.g. there's no meaning that "6" as Colorado, it's better with 'CO'.

Foreign key:

A foreign key is the primary key of one relation that is placed into another relation to form a link between the relations/tables.

A foreign key can be a single column or a composite key.

A FOREIGN KEY is a key used to link two tables together.

Child table contains foreign key whereas Referenced or Parent table contains the primary key.