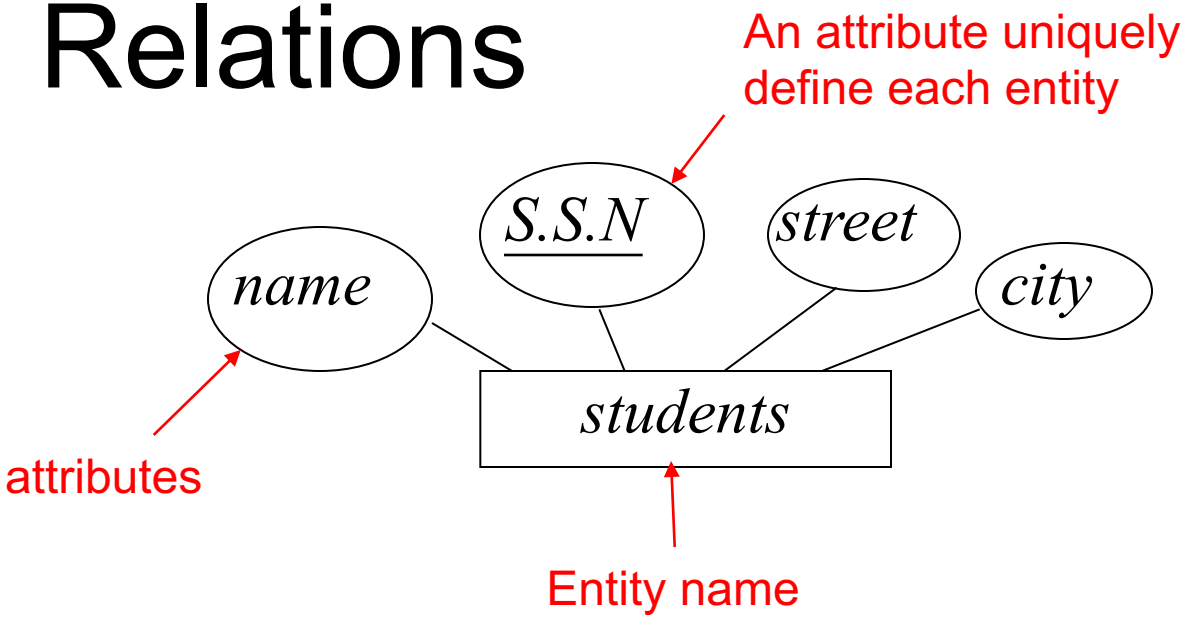
CSCI4333 Database Design & Implement

Lecture Seven – Relational Model 1

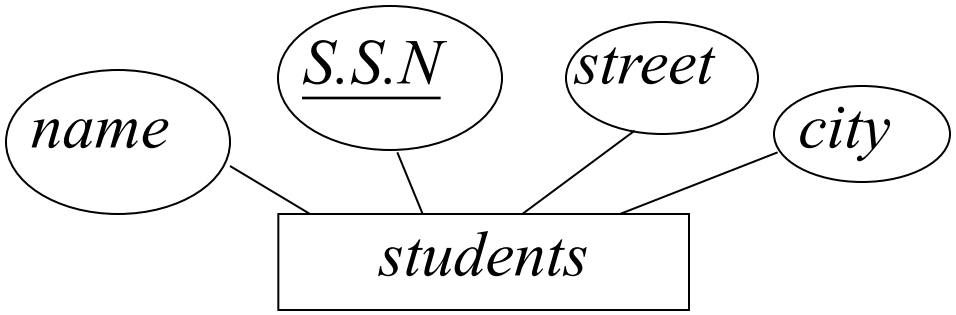
Instructor: Dr. Yifeng Gao

Relations


An attribute uniquely define each entity
S.S.N
street
name
city
students
attributes
Entity name

Relations

A **relation** is a more concrete construction, of something we have seen before, the ER diagram.



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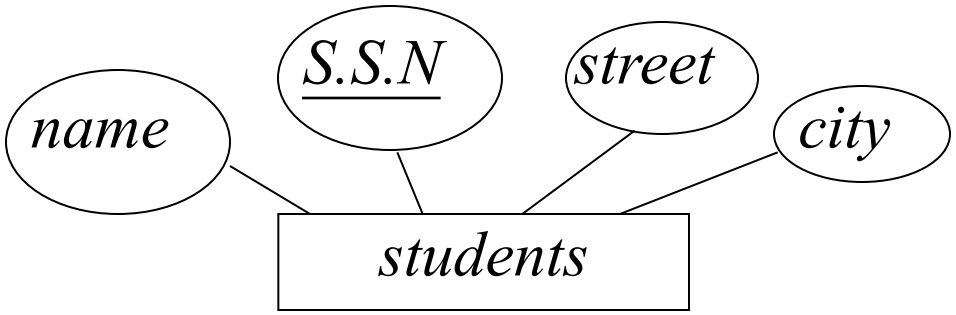

A relation is (just!) a table!

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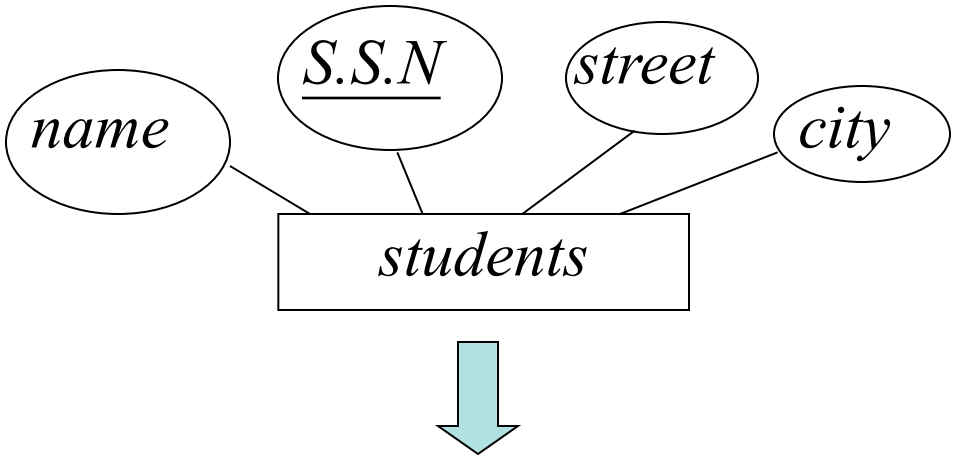
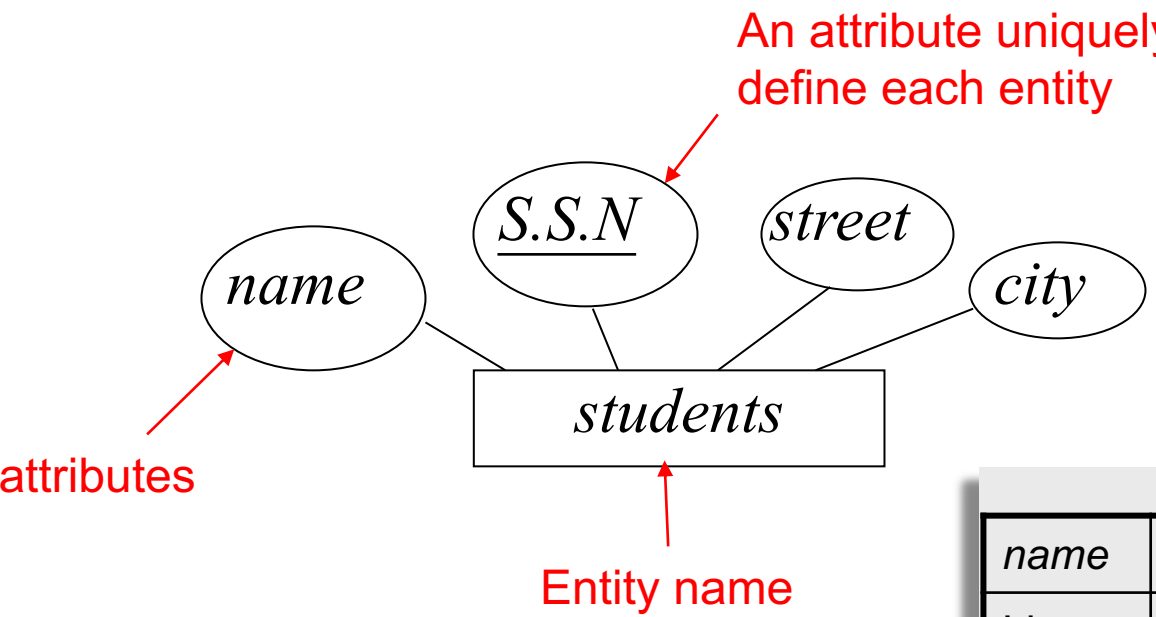
A relation is (just!) a table!



name	*S.S.N*	*street*	*city*
Lisa	1272	10th	Mcallen
Bart	5592	Sugar	Edinburg
Lisa	7552	9th	Mission
Sue	5555	Coria	Brownsville

Students

Relations



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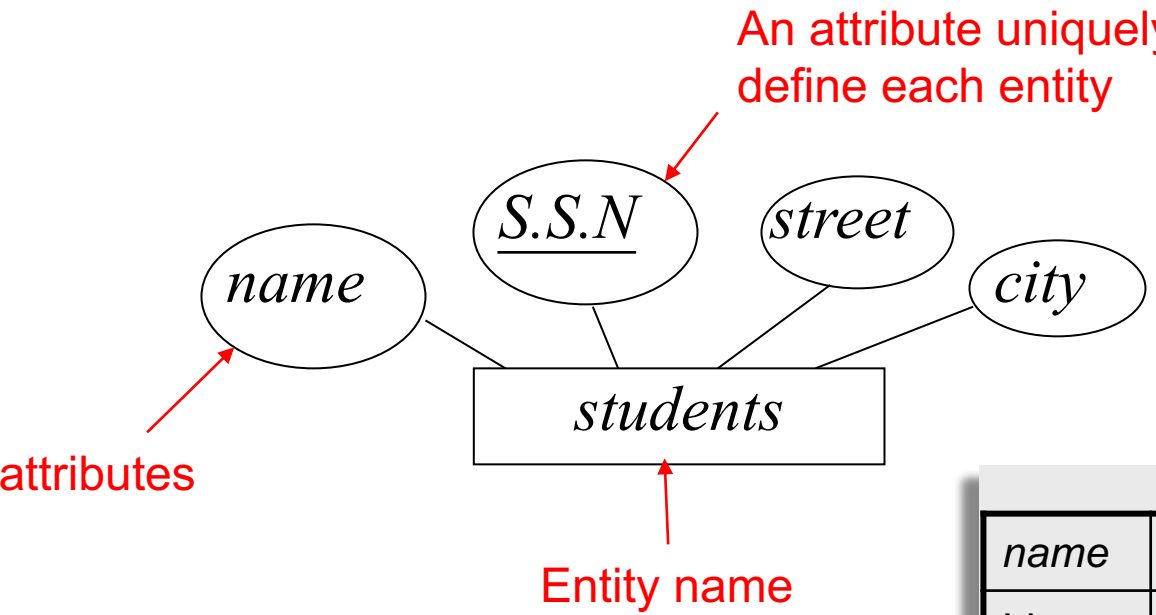

We will use **table** and **relation** interchangeably, except where there is a possibility of confusion.

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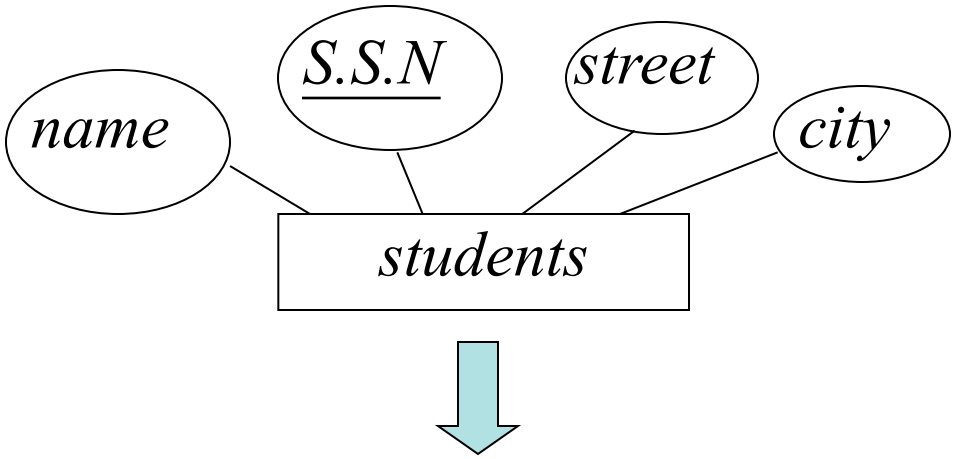
Students

Relations

Differences between **entities** must be expressed in terms of attributes.



entities

name	*S.S.N*	*street*	*city*
Lisa	1272	10th	Mcallen
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Lisa	7552	9th	Mission
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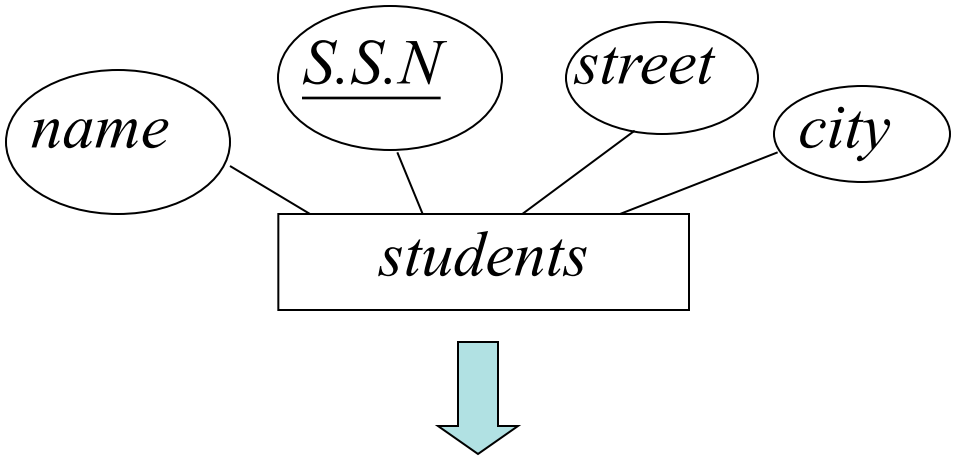
Keys

Differences between **entities** must be expressed in terms of attributes.



Key is a set of attribute that allow us to identify uniquely an entity in the entity set.

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Lisa	7552	9th	Mission
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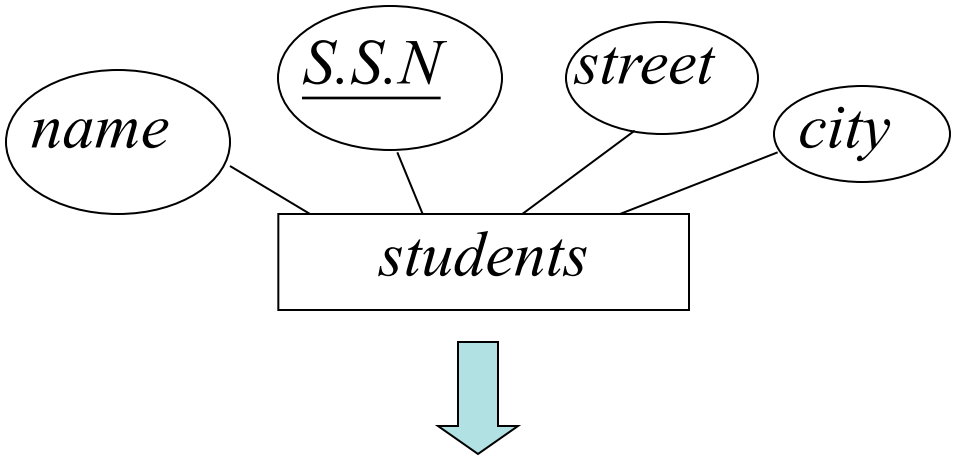

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In a table, every entity should be unique!

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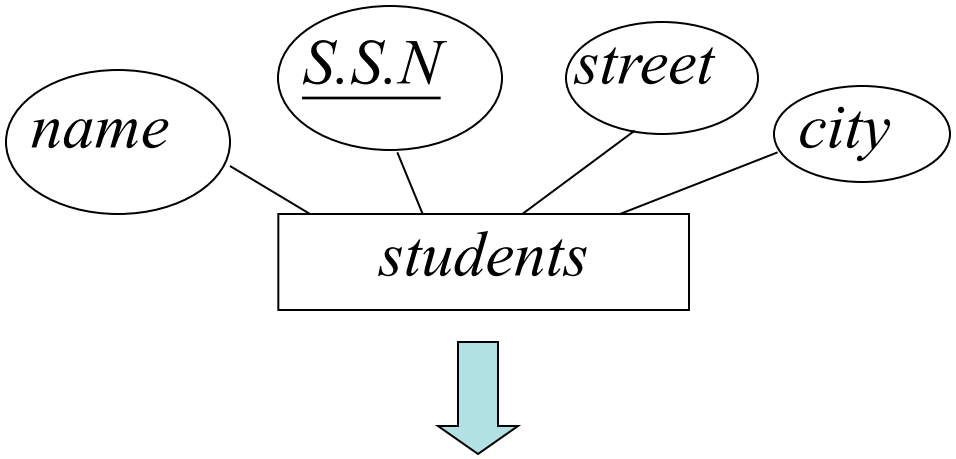

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Ex. SSN is a key

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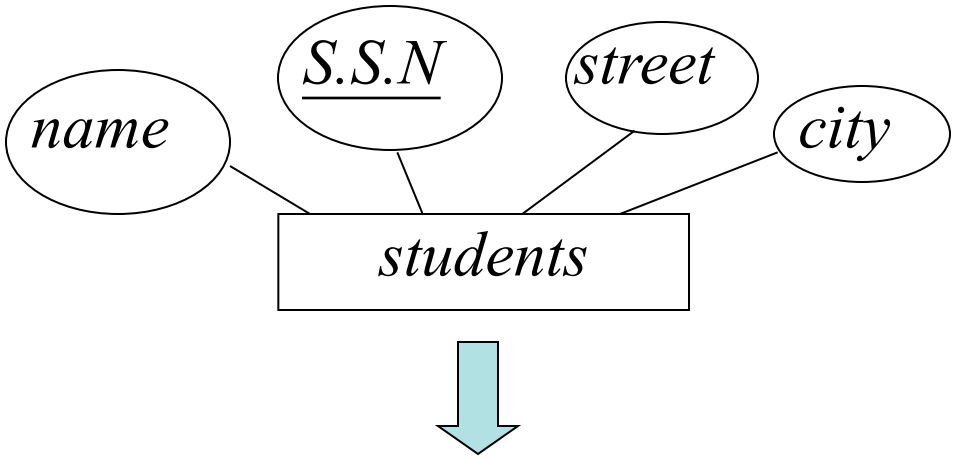

Key is a set of attribute that allow us to identify uniquely an entity in the entity set.

Question:

Is (name, SSN, street) a key?

Is (street) a key?

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Lisa	1272	10th	Mcallen
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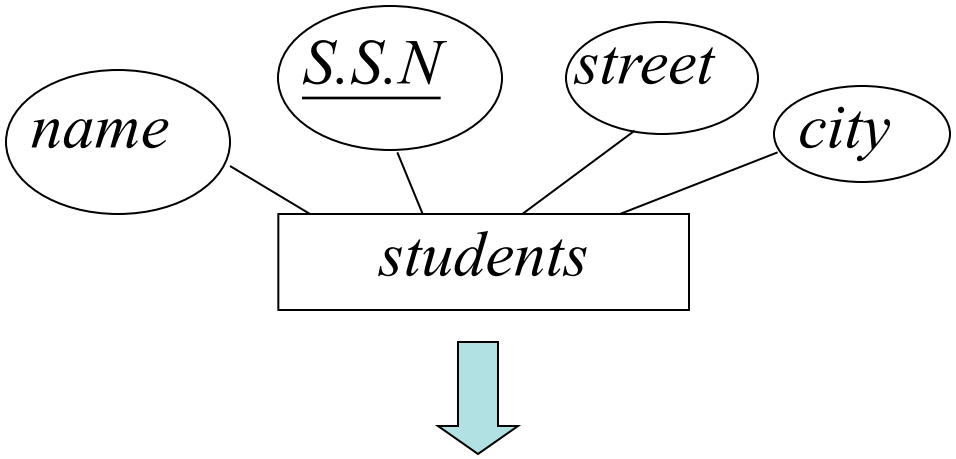

Key is a set of attribute that allow us to identify uniquely an entity in the entity set.

Question:

Is (name, SSN, street) a key?
Yes
Is (street) a key?
No

name	*S.S.N*	*street*	*city*
Lisa	1272	10th	Mcallen
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What Different Between Key **SSN** and (**Name, SSN, street**) ?

SSN belongs to (Name, SSN, street)

In fact, any attribute set contains SSN is a key!
(Name, SSN, street, city) is a key

Keys

SSN

(SSN, Name)

(SSN, Name, street)

(SSN, Name, street, city)

name	*S.S.N*	*street*	*city*
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Keys

SSN

(SSN, Name)

(SSN, Name, street)

(SSN, Name, street, city)

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We have multiple keys in a table. But not all keys are very useful!
Types of key:
1. **superkey:** a set of one or more attributes which, taken collectively, allow us to identify uniquely an entity in the entity set

2. **candidate key:** A superkey for which no subset is a superkey.

Keys

SSN:
candidate key
(SSN, Name)
superkey
(SSN, Name, street)
superkey
(SSN, Name, street, city)
superkey

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Types of key:

superkey: a set of one or more attributes which, taken collectively, allow us to identify uniquely an entity in the entity set
candidate key: A superkey for which no subset is a superkey.

Keys

Look at the following table. Answer following questions:

Make	Model	Owner	State	License #	VIN #
Ford	Focus	Mike	CA	SD123	34724
BMW	Z4	Joe	CA	JOE	55725
Ford	Escort	Sue	AZ	TD4352	75822
Honda	Civic	Bert	CA	456GHf	77924

Keys

Look at the following table. Answer following questions:

(State, License#, VIN#) Key? Superkey? Candidate Key?

(Make, Model, Owner) Key? Superkey? Candidate Key?

(State, License#) Key? Superkey? Candidate Key?

(VIN#) Key? Superkey? Candidate Key?

Make	Model	Owner	State	License #	VIN #
Ford	Focus	Mike	CA	SD123	34724
BMW	Z4	Joe	CA	JOE	55725
Ford	Escort	Sue	AZ	TD4352	75822
Honda	Civic	Bert	CA	456GHf	77924

Keys

Look at the following table. Answer following questions:

(State, License#, VIN#): superkey
(Make, Model, Owner): Not a key
(State, License#): candidate key
(VIN#): candidate key

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A table can have multiple candidate keys!

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A table can have multiple candidate keys! But each table we only choose one.

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Keys

Different Types of Key:

superkey: a set of one or more attributes which, taken collectively, allow us to identify uniquely an entity in the entity set

candidate key: A superkey for which no subset is a superkey.

primary key is a candidate key (there may be more than one) chosen by the DB designer to identify entities in an entity set.