Database Design

6-1
Artificial, Composite, and Secondary UIDs
Objectives

This lesson covers the following objectives:

• Define the different types of unique identifiers (UIDs)
• Define a candidate UID and explain why an entity can sometimes have more than one candidate UID
• Analyze business rules and choose the most suitable primary UID from the candidates
• Recognize and discuss the issues of identification in the real world
Purpose

• The unique identifier (UID) is very important in relational databases.

• It is the value or combination of values that enables the user to find that one unique item among all the rest.

• Identifying just the right attribute, or combination of attributes and relationships, is a skill that any database designer must master.

• The unique identifier enables you to find your record in a file, a particular card in a deck of cards, your package in a warehouse, or a specific piece of data in a database.
Simple UIDs vs. Composite UIDs

• A UID that is a single attribute is a simple UID.
• However, sometimes a single attribute is not enough to uniquely identify an instance of an entity.
• If the UID is a combination of attributes, it is called a composite UID.

CONCERT TICKET
# ticket number
* name

CONCERT TICKET
# date of performance
# seat number

Simple Unique Identifier

Composite Unique Identifier
Artificial UIDs

- Artificial UIDs are those that don’t occur in the natural world but are created for purposes of identification in a system.
- People are not born with “numbers,” but a lot of systems assign unique numbers to identify people: student numbers, customer IDs, etc.
Artificial UIDs

• A shoe has a color, a size, a style, but no truly descriptive “number.”

• However, a shoe store will assign unique numbers to each pair of shoes so they can be uniquely identified.
Artificial UID Example

• How can we uniquely identify a STUDENT?
• Could we use a combination of first name and last name?
  – Only if we are sure that the combination is unique.
• Often, it is simpler and more straightforward to create an artificial attribute and make it the unique identifier.
• A UID can be both artificial and composite.
UIDs from Barred Relationships

• Sometimes the UID is a combination of an attribute and a relationship.
• What is the UID of ACCOUNT? Is it artificial? Is it composite?
• Two people could have the same bank account number, but at different banks.
• Bank to bank transfers always need the bank routing number in addition to the bank account number.
UID from Barred Relationship Intersection Entity

• As we’ve seen before, the resolution of a M:M relationship often results in barred relationships from the intersection entity to the original ones.

• In this example, the UID of ENROLLMENT comes from STUDENT and SUBJECT.

• The bars on the relationships tell you this.
Artificial UID Intersection Entity

• It is possible for an intersection entity to use an artificial attribute as the UID, instead of the barred relationships to the originating entities.
Artificial UID Intersection Entity

• Each MANUFACTURER may produce one or more PRODUCTs (shoes, shirts, jeans, etc.).

• Each PRODUCT may be produced by one or more MANUFACTURERs (Nike shoes, Adidas shoes, Levi’s jeans, etc.).
Artificial UID Intersection Entity

- CATALOG ITEM resolves this many-to-many relationship.
- An item in a catalog can be uniquely identified by the manufacturer number and the product code.
- The relationships are not barred, because an artificial UID – catalog number – has been created instead.
Candidate UIDs

- Sometimes two or more possible UIDs exist.
- For example, when you order a product from a commercial website, you will usually be assigned a unique customer code and asked to enter your e-mail address.
- Each of these uniquely identifies you, and each could be chosen as the UID. These are both candidate UIDs.
- Only one of the candidate UIDs is chosen as the actual UID. This is called the primary UID.
- The other candidates are called secondary UIDs.
Candidate UIDs

• Student ID has been chosen as the primary UID in both of these STUDENT entities.

• The first entity has one secondary UID, while the second has two secondary UIDs (one of which is composite).
Identification: Database vs. Real World

• Unique identifiers make it possible for us to distinguish one instance of an entity from another.

• As you will see later, these become primary keys in the database.

• A primary key allows you to access a specific record in a database.

• In the real world, however, it is sometimes not so easy to distinguish one thing from another.
Terminology

Key terms used in this lesson included:

• Artificial UID
• Candidate UID
• Composite UID
• Primary UID
• Secondary UID
• Simple UID
• UID
Summary

In this lesson, you should have learned how to:

• Define the different types of unique identifiers (UIDs)
• Define a candidate UID and explain why an entity can sometimes have more than one candidate UID
• Analyze business rules and choose the most suitable primary UID from the candidates
• Recognize and discuss the issues of identification in the real world