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Systems Analysis and Design

INT 4202 - 1952-202310\_INT4203\_M

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**Week 11 Assignment**

**1. Describe primary key, candidate key, secondary key, foreign key, and a combination key.**

Primary Key – A primary key is a key which is either a field or combination of fields which must be unique and minimally identify a particular member of an entity (Tilley, S. p. 276). An example of a primary key is a Customer ID, all customer’s will have a unique ID which cannot be duplicated, this field is also minimal and easily able to be identified as the primary key (Tilley, S. p. 276). When looking at primary keys they can also be made up of two or more fields, for example a student registers for multiple courses, their student number will be in all three records for the registration system, if a course has many students many separate records will exist for that course number with one record for each student, however, in the registration file the student number and the course id is not unique so they cannot be primary keys in which case we would want to make a combination key (Tilley, S. p. 276). Primary keys cannot be null, meaning there has to be something in them, and it is possible to simply use an auto incrementing primary key so you don’t have to worry about the complexities of doing something different for primary keys, however, in a more complex system you may want to consider doing something else.

Candidate Key – Any field that is capable of being used as a primary key is called a candidate key, however, it can also be multiple fields of field combinations (Tilley, S. p. 278). An example may be if there are multiple employees and they each have unique employee numbers, this employee number may be used as a primary key (Tilley, S. p. 278). It is also important to know that some things there can be duplicates of which are not good candidate keys, for example, if a social security number is used multiple times, it cannot be considered unique (Tilley, S. p. 278). It is also important to note that you want to use the field that has the least amount of data, so it is easier to use and be selected (Tilley, S. p. 278). Any field which is not a primary key or a candidate key is also called a monkey field (Tilley, S. p. 278).

Secondary Key – A secondary key is a field or a combination of fields which is capable of being used to access or retrieve records, they are also not unique (Tilley, S. p. 278). Secondary keys may also be used to sort or display records in specific orders so that you can find the information which you are looking for more efficiently (Tilley, S. p. 278). Since a table can only have one primary key this is why secondary keys are important (Tilley, S. p. 278).

Foreign Key – In tables and databases it is possible for there to be fields which may look like duplicates or have data in common, these fields are able to be used to form relationships, or links between the different tables and databases (Tilley, S. p. 278). If we take an advisor number as an example it may appear in the student table and in the advisor table, which in essence joins the tables together, however, the advisor number in the advisor table must be a primary key and is a foreign key in the student table (Tilley, S. p. 278). Foreign keys can be automatically grabbed when creating tables so you can use them as reference and purposefully input them as foreign keys rather than they appearing as coincidence. A foreign key does not need to be unique and may appear multiple times, however, it is important to note that the primary key from where the foreign key comes from have to be unique as that is what they are being used from (Tilley, S. p. 278). Foreign keys can also be used as composite primary keys (Tilley, S. p. 278).

**2. What is cardinality, and what symbols do you use in the crow's foot notation method?**

Cardinality is how we are able to define relationships in an ERD in detail (Tilley, S. p. 283). With cardinality we must describe the “numeric relationship between two entities and show[s] how instances of one entity relate to instances of another entity” (Tilley, S. p. 283). In other words, cardinality allows us to take a numeric relationship which already exists between two different entities and then use this relationship to show how they relate to one another. An example of this is if we take a customer and order entity, one customer is capable of having no, one, or multiple orders, however, a single order may only have one customer (Tilley, S. p. 283). This is done by using cardinality notation which uses special symbols to represent the relationship.

In the Crow’s foot notation method we use circles and bars to show entities cardinalities. We use a single bar to symbolize one, a double bar to show one and only one, a circle to show zero and a crow’s foot to indicate many (Tilley, S. p. 283). An example of this can be found below as Figure 9-17 and Figure 9-18 from the book *Systems Analysis and Design*.

Graphical user interface

Description automatically generated with medium confidence

(Tilley, S. p. 283).

References

Tilley, S. (2020). Systems analysis and design (12th ed.). Cengage.

I have neither given nor received unauthorized aid in completing this work, nor have I presented someone else's work as my own.

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