

Date Management AS1 Riaz Khan

by Riaz-Ur Khan

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Data Management (Design)
Business Information Technology
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1. What is a database

A database is information that has been collected by a user that is then organized so that it can be easily seen, updated and managed.

The traditional type of database that is used nowadays is known as a relational database. This was created by E.F. Codd at IBM in 1970. As stated by [techtargget.com](#)[1] “....is a tabular database in which data is defined so that it can be reorganized and accessed”. This means that data within the database is split into different tables so that navigation is clear and that the information within the database can be easily understood.

Before relational databases were introduced, we had what is called flat file databases. These databases were just raw data that had not been sorted the same way in which relational databases are.

Some advantages of relational databases over flat file are explained by [techwalla.com](#)[2]:

Flexibility – Relational databases allows for flexible structures to be made that can be amended for certain requirements. It allows for changes to be made without impacting the quality of data or the actual data itself. There are also no limits as to how many tables can be created.

Data Integrity – Strong validity checks ensure that data falls within the correct range and that the data is required is present. Data integrity makes completion of records inevitable which means that databases are not kept incomplete.

Better security – Splitting data into tables makes it possible to make some confidential. This can be helpful for handling important and fragile information. A log in function can be added to the database which limits a users’ access to certain information depending on the authorisation that they have been given.

1.1 Key terms of a database

Normalisation – This is the process of reorganising data so that it meets two certain requirements. [Techopedia.com](#)[3] suggests that these requirements are less redundancy of data and logical data dependencies.

Data redundancy relates the data fields that are repeated within a database. This repetition can occur if a field is repeated in 2 or more tables or if the same field is repeated within a table. Defit.org[4] defines some disadvantages of data redundancy as:

- . Unnecessary data – waste of memory space.
- . Data inconsistency – the same data is stored as two different formats, duplicates data such as name and addresses.
- . Decreases efficiency of database
- . Can cause the data to be corrupted

Entities – An entity in a database is an object within a system that we want to store information about e.g. the title of the table. Some entities can be shown as people, places, events which are relevant to the database.

Attributes – In a relational database the columns are known as attributes. These attributes put together is information that defines an entity. For example an entity can be a student in a school. The attributes of that student would be their name, address, date of birth, contact details and more information could be added if the user felt like it. More general information about attributes can be found at study.com[5].

2. What is a determinacy diagram?

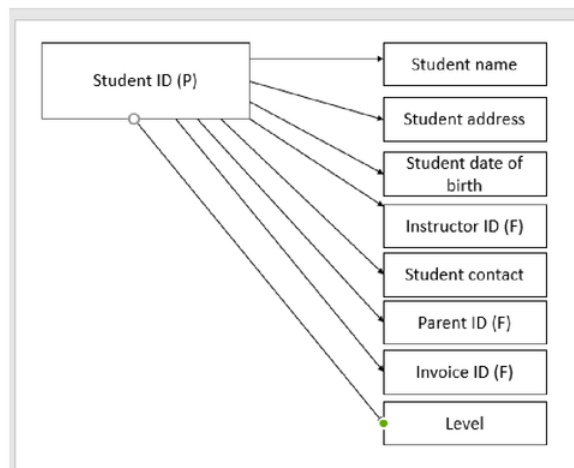
When designing a database some users will use what is called a determinacy diagram. This diagram shows the dependencies between attributes of an entity. This means that the diagram shows which primary key attribute determines the other attributes of an entity.

3. Shark Attack determinacy diagrams

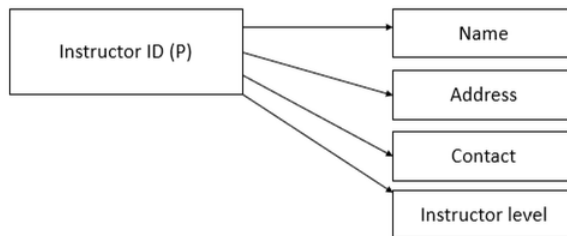
These screenshots relate to each table that will be included in the database. In each image it will show the determinants on the left and the arrows pointing to the right indicate the attributes that they determine.

Student – This diagram shows the student table; the primary key is the student ID number. The foreign keys are the instructor ID, parent ID and the invoice ID. Many of the tables within the database will have a similar determinacy layout to this.

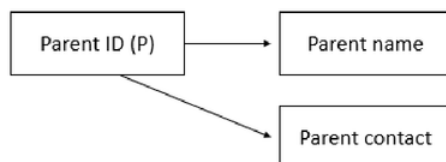
This diagram shows that the attributes on the right are dependent on the primary key which means that the student ID entails all the information on the right.



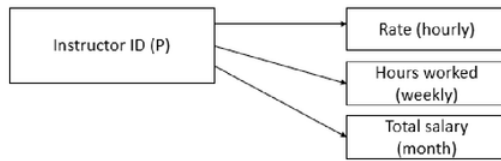
Instructor – This is the instructor table and the foreign key is the instructor ID.
As we can see the information on the right is dependent on the ID.



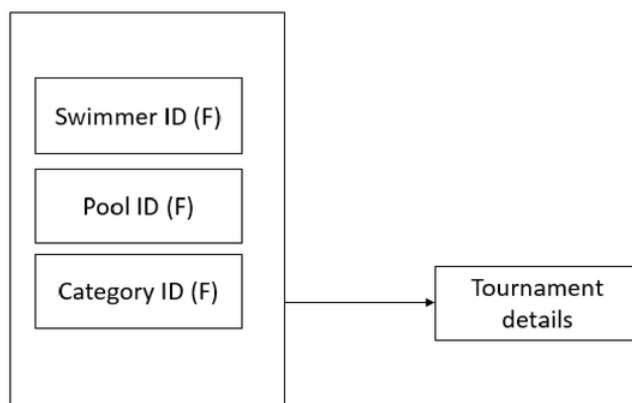
Parents – This is the parent table. It is very small compared to the other tables, but this is since this information will only be used to support another table. For us to determine the information of parents the parent ID must be visible.



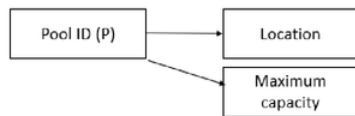
Wages –



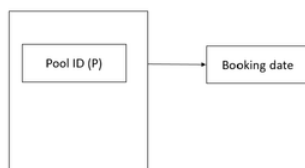
Tournament table – The tournament details are dependent on the swimmer ID, pool ID and the category ID. The user must know who is competing, where the event is taking place and what category the swimmers are competing in.



Pools – To access the general information of the pool the Pool ID number must be present.



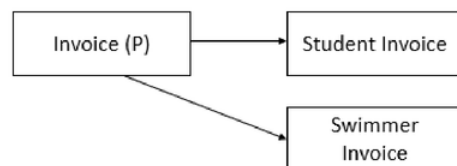
Bookings – The user must have access to the pool ID in order for him to see the booking date, this means that the booking date is dependent on the pool ID.



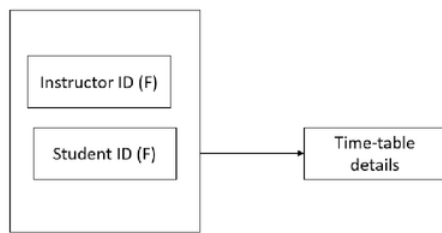
Category – In this diagram we can clearly see that the category ID is the determinant of the category type.



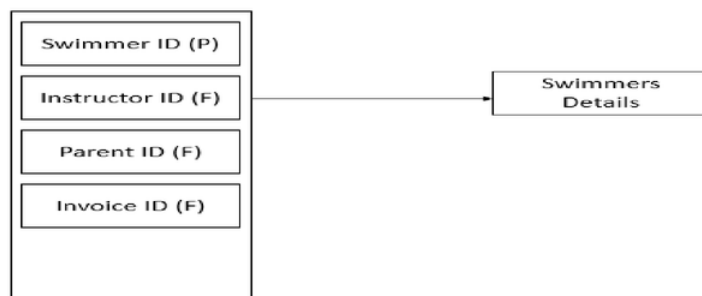
Invoice – This shows that the information regarding the invoice for students and swimmers is dependent on the ID of the invoice.



Time-table – The details of the time-table such as the date and time are dependent on the student ID and instructor ID.



Swimmers – The table which holds the swimmers' details will contain many foreign keys to determine each one of them. The details of the swimmer will mainly be dependent on the swimmer ID which is the primary key, the instructor ID, parent ID and invoice ID which will all be shown as foreign keys.



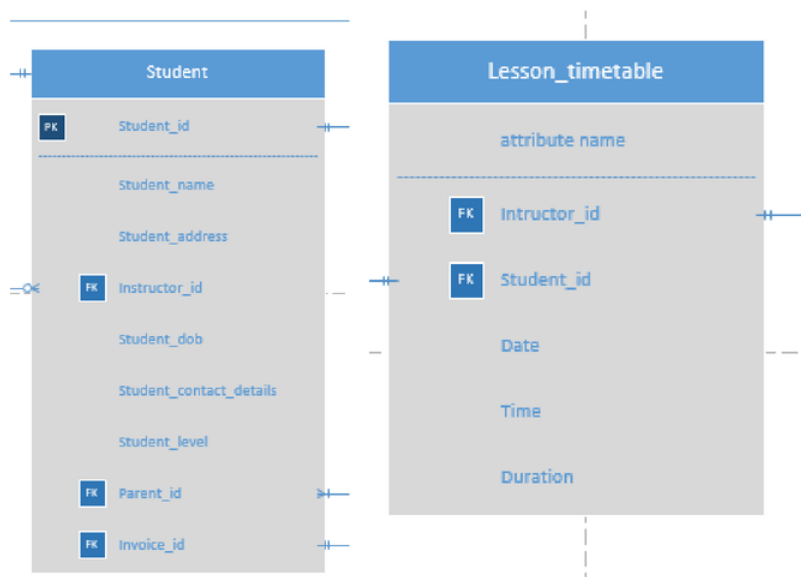
4. Why use an entity relationship diagram?

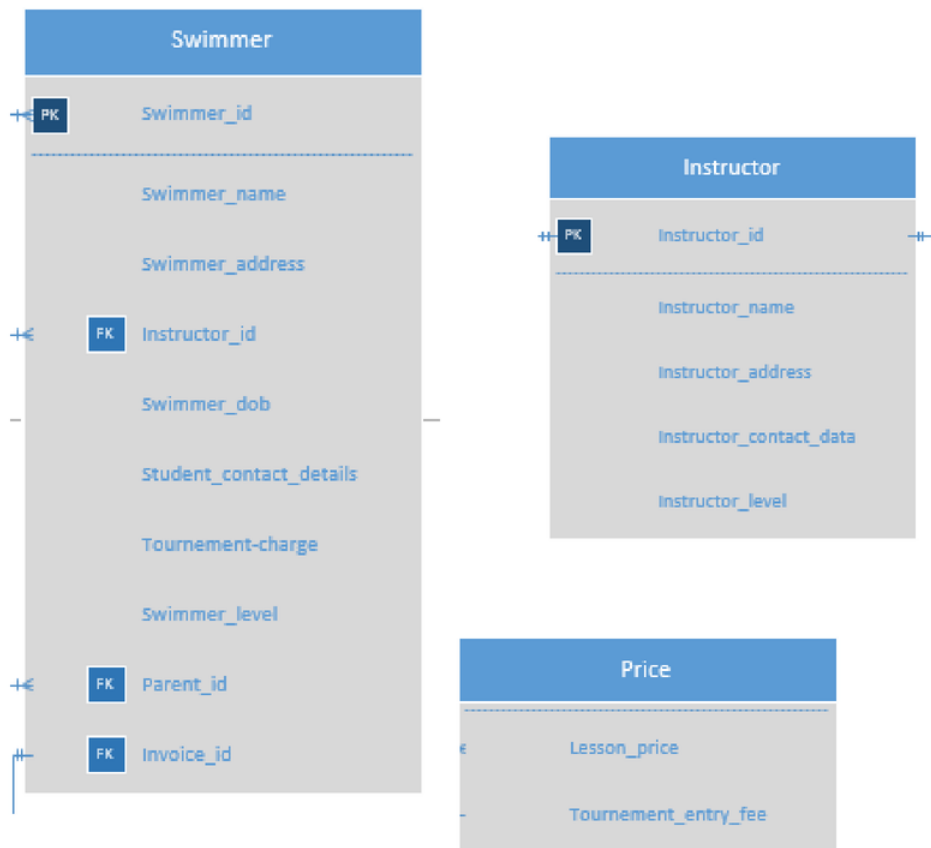
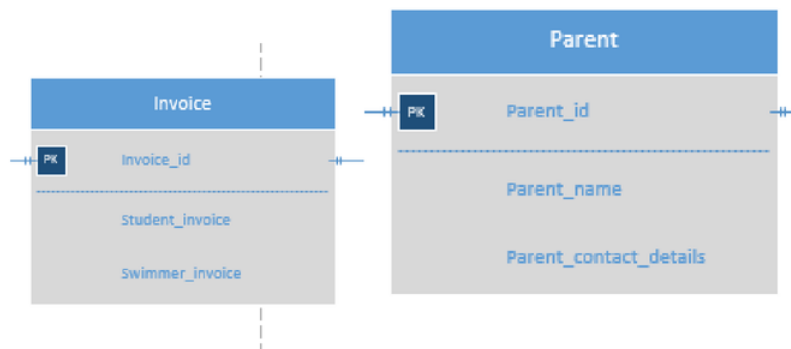
An entity relationship is a representation of a database systems that shows the relationships between people, places and events within that system. This diagram is a method that can help analyse business processes and can be used as the foundation of a relational database.

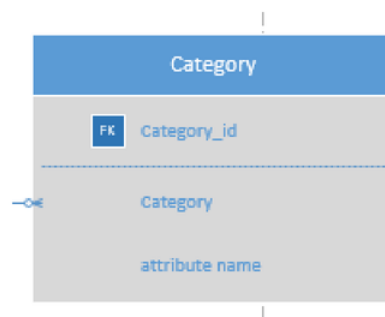
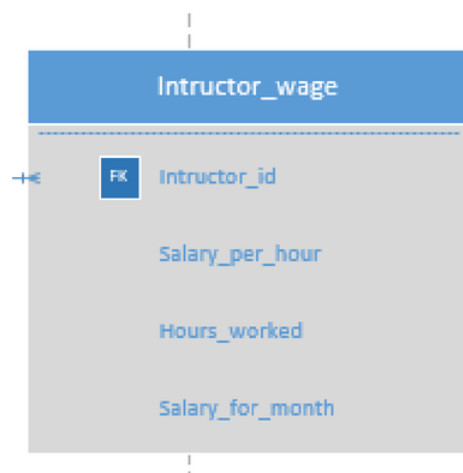
5. Shark Attack Entity Relationship Diagram (visio)

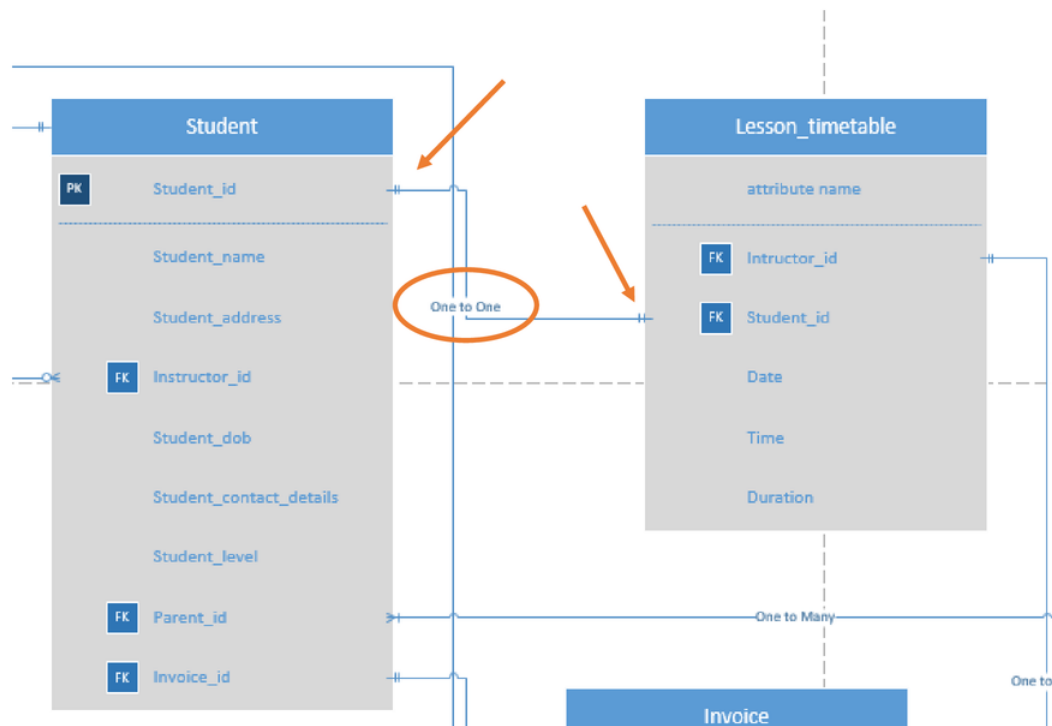
This is the Entity relationship diagram that the designer has created in Microsoft Visio for the database. This diagram will help the writer to structure the database when it comes to creating it. As you can see in the diagram there are many tables that link with others, these are known as relationships. The writer will explain what each table includes and how all the tables are related.

The writer will first show a screenshot of each table and then he will provide annotated screenshots of the relationships between the tables. A full view of the entity relationship diagram will also be shown.



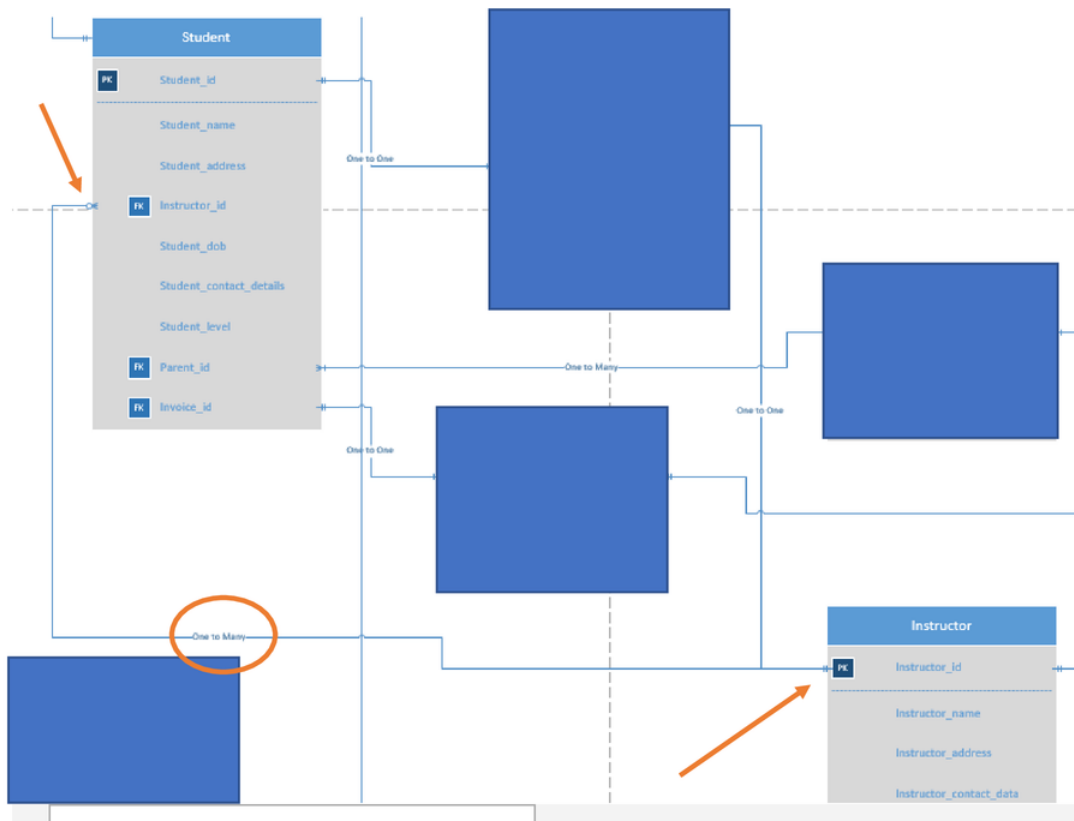






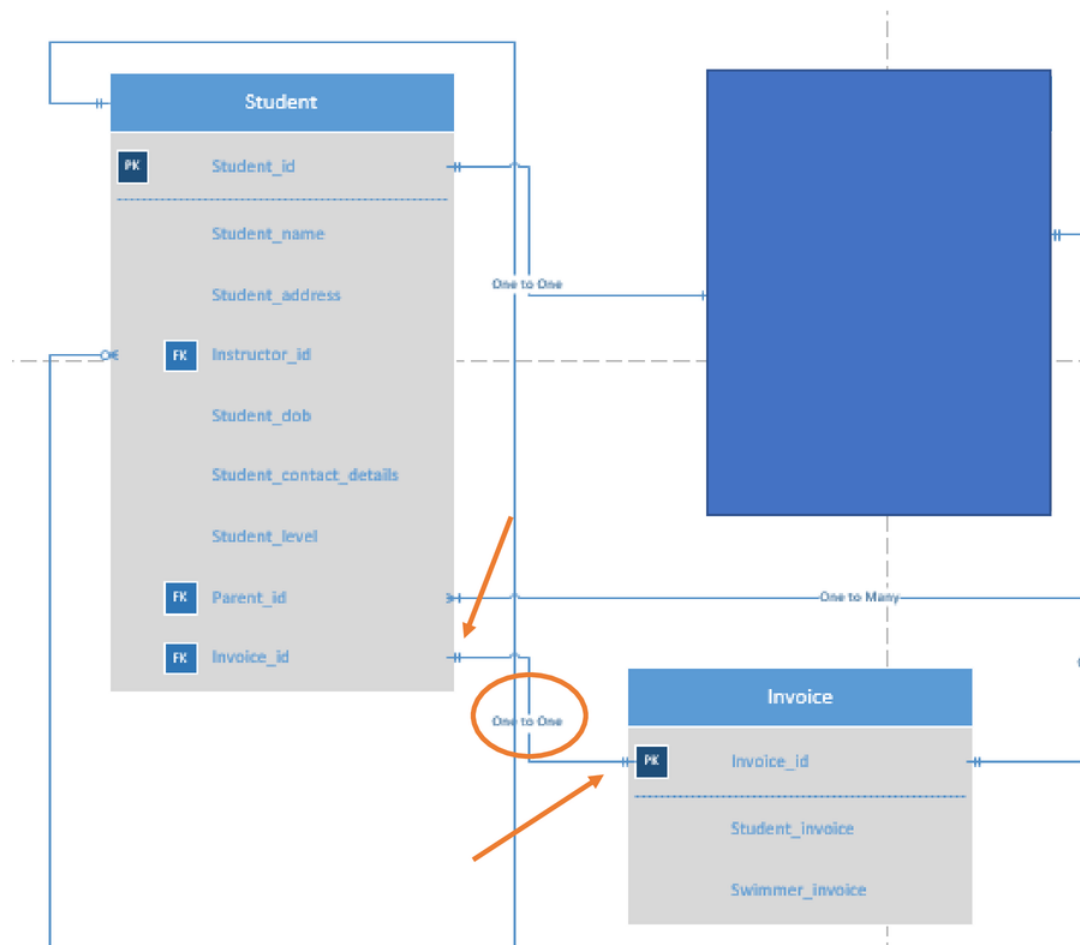
The relationship between the student table and the time-table table is shown as a one to one relationship. This means that one student will only have one time-table and that one time-table will be available for a student.

Student and Instructor



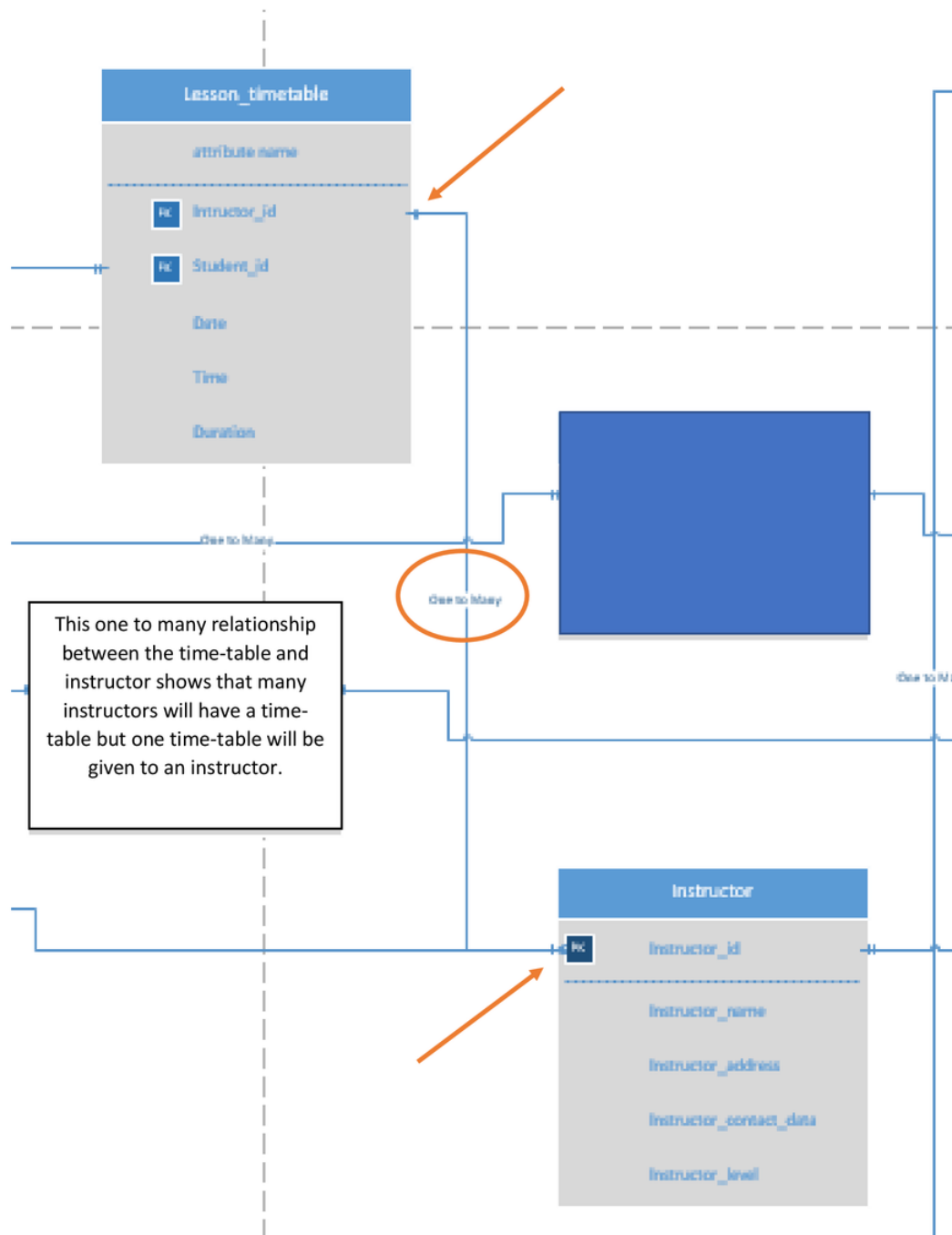
This screenshot shows how the student is related to the instructor. It is shown as a one to many relationship because many students can be taught by one swimming instructor.

Student and Invoice

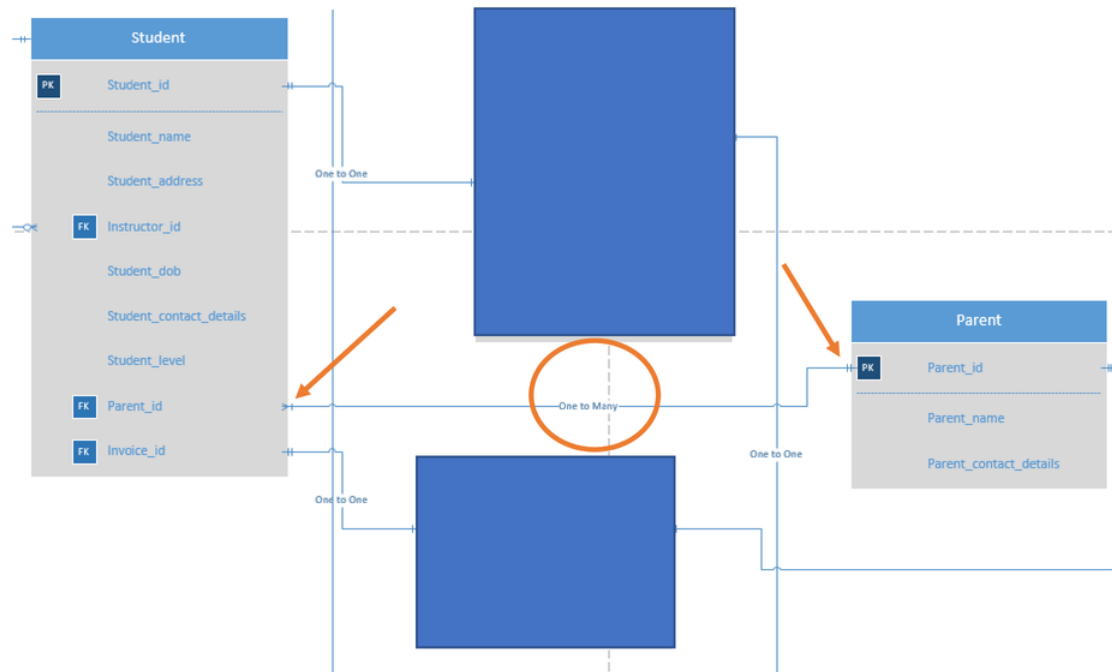


A one to one relationship is shown between the student and invoice table. Only one invoice can be given to each student every term.

Time table and Instructor

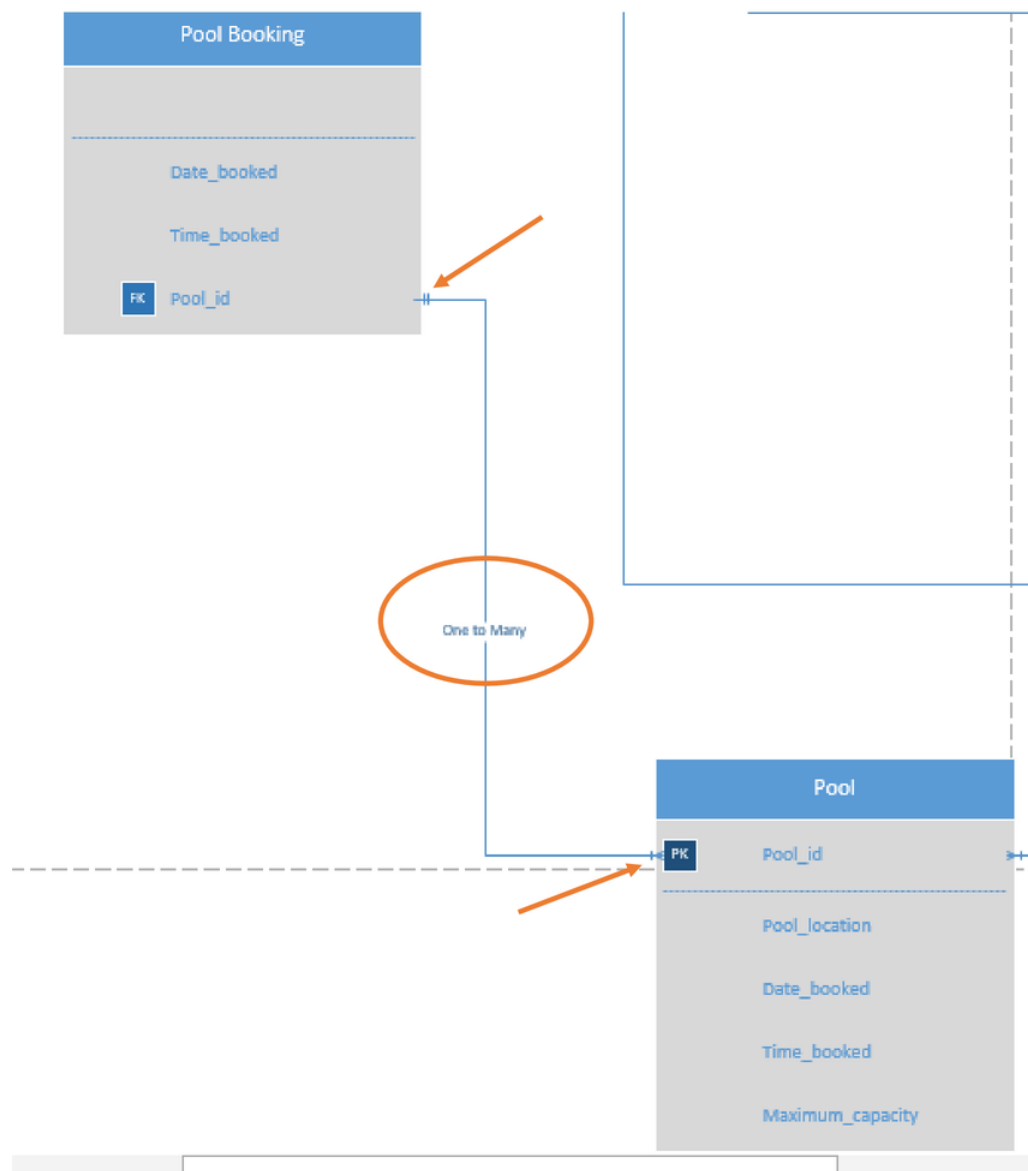


Parent and Student



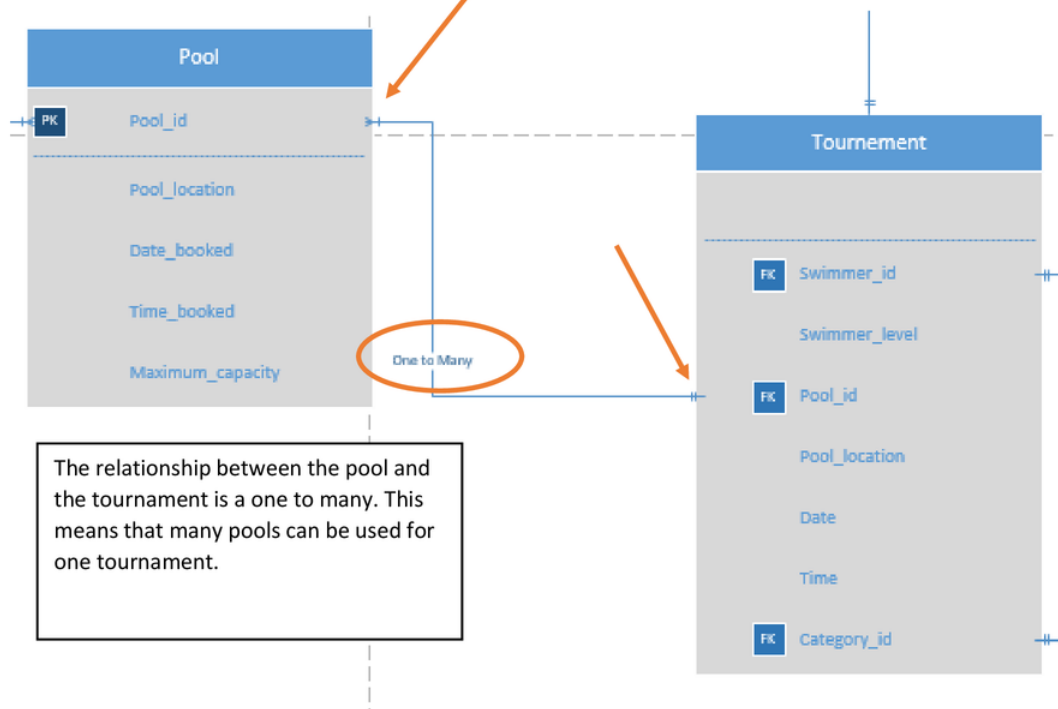
The screenshot above shows the one to many relationship between the student and parent. This means one parent can have many students under their name.

Pool and Booking

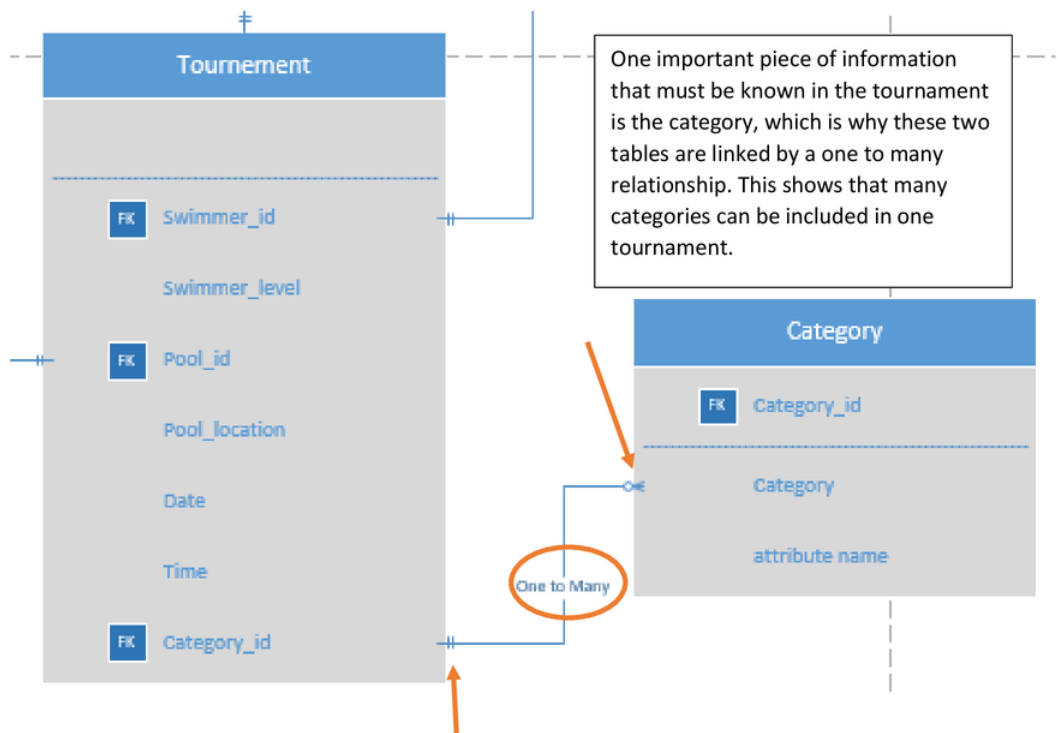


This is the relationship between the pool and the booking. The pool ID links them together and the relationship is a one to many. This shows the user that many pools can be requested for one booking.

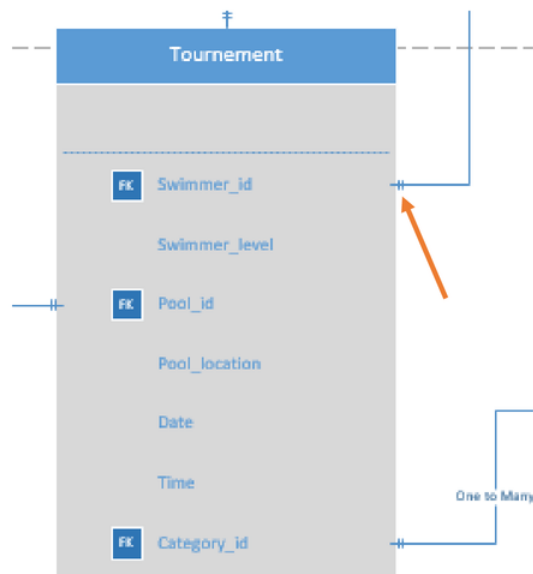
Pool and Tournament



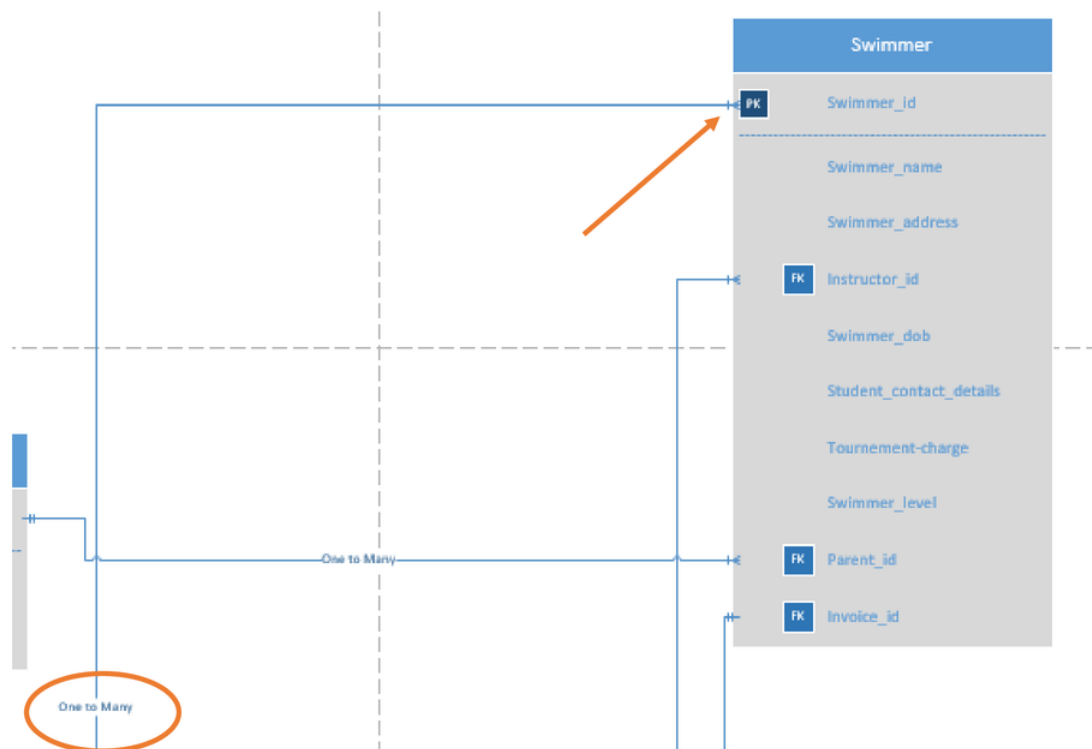
Tournament and Category



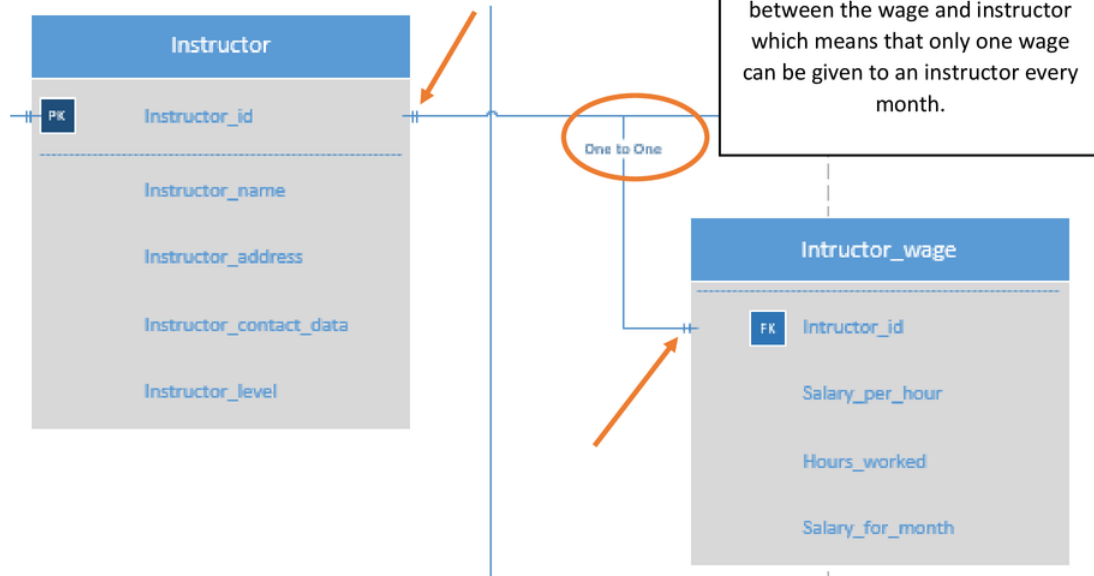
Tournament and Swimmer



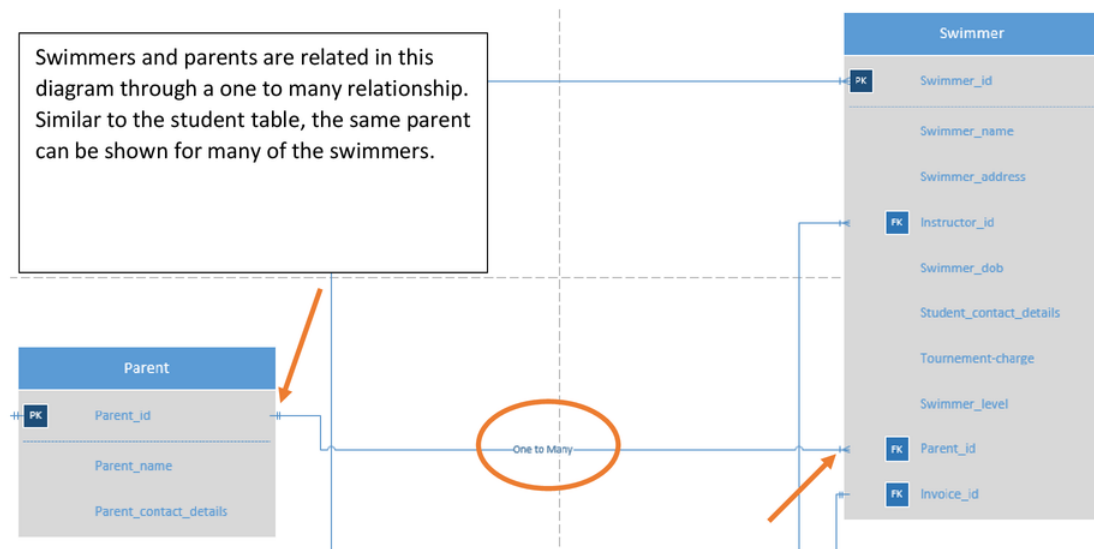
This is a one to many relationship that is shown between the swimmers and tournament table. This means that many swimmers are able to compete in one tournament.



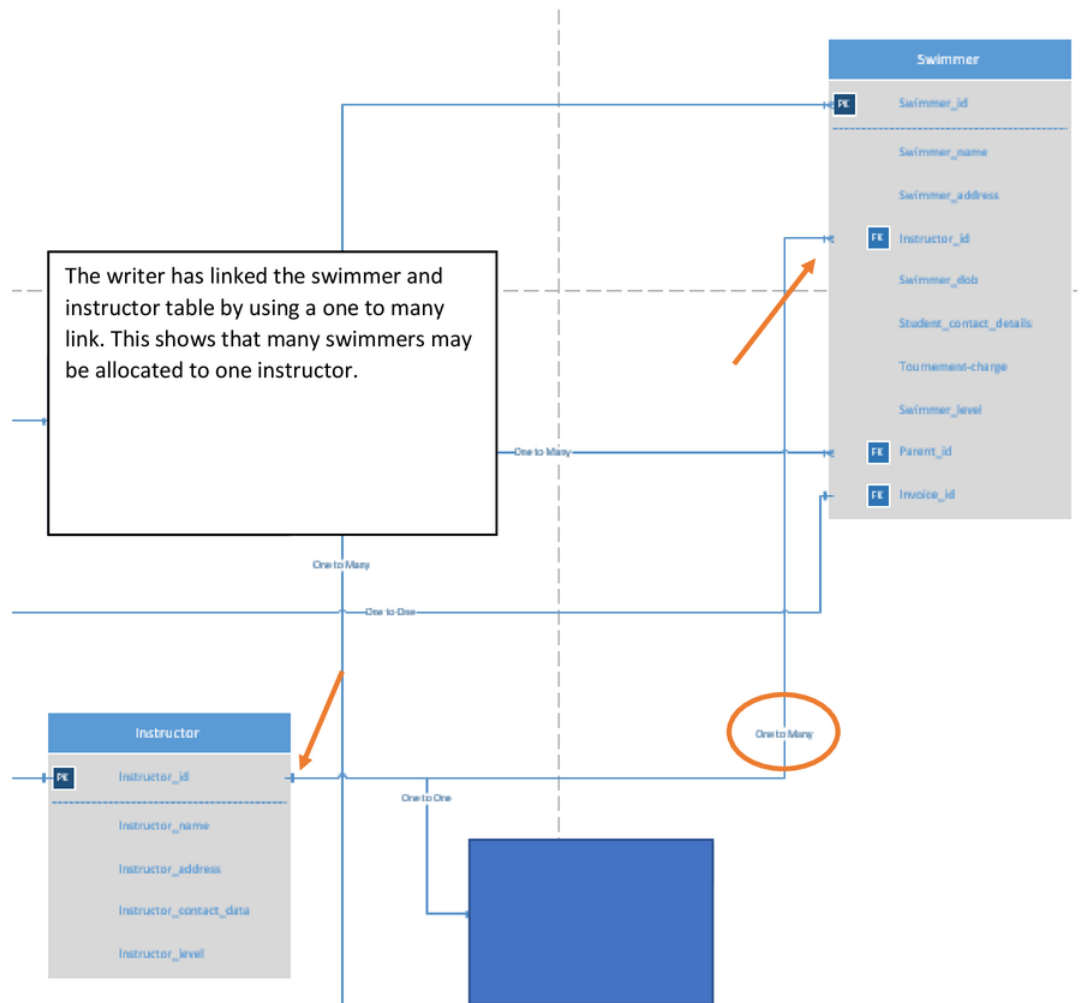
Instructor and Wage



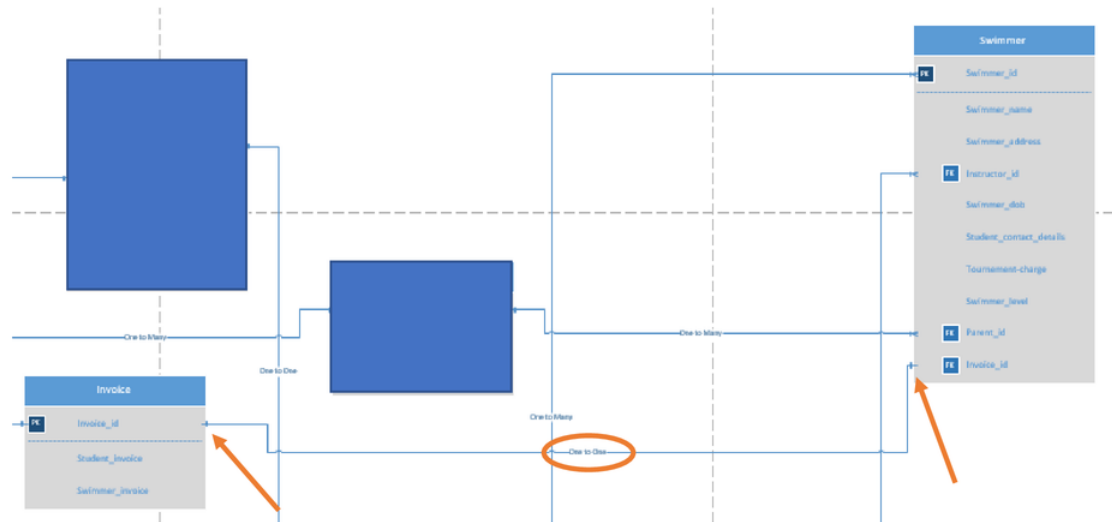
Swimmer and Parent



Swimmer and Instructor

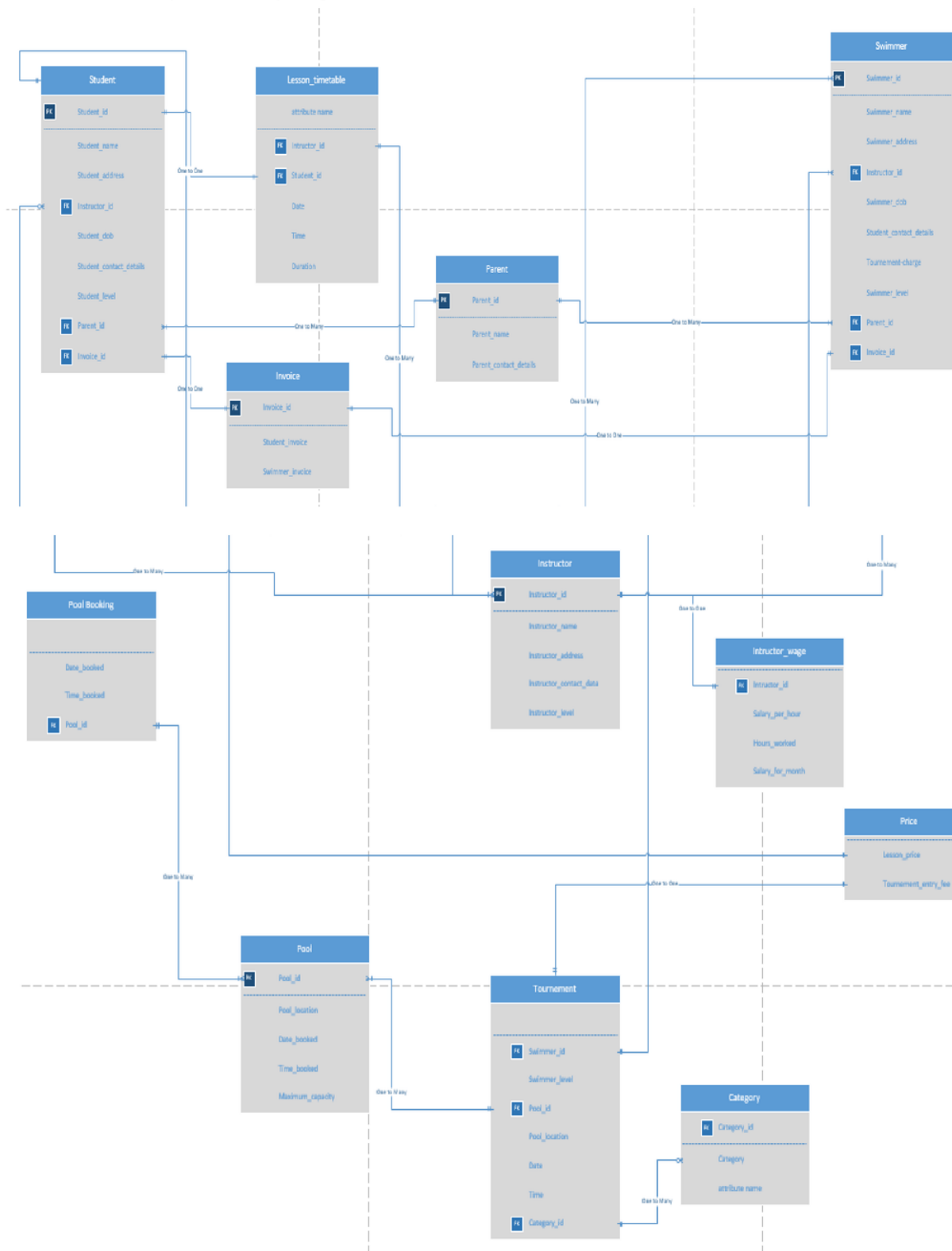


Swimmer and Invoice



The swimmer and invoice relationship shows that only one invoice can be given to a student each term.

Full Entity Relationship Diagram



6. References

- [1] "What is database (DB)? - Definition from WhatIs.com." [Online]. Available: <http://searchsqlserver.techtarget.com/definition/database>. [Accessed: 02-Feb-2018].
- [2] "What are the Advantages of a Relational Database Model? | Techwalla.com." [Online]. Available: <https://www.techwalla.com/articles/what-are-the-advantages-of-a-relational-database-model>. [Accessed: 02-Feb-2018].
- [3] "What is Normalization? - Definition from Techopedia." [Online]. Available: <https://www.techopedia.com/definition/1221/normalization>. [Accessed: 02-Feb-2018].
- [4] "Data Redundancy definition and information." [Online]. Available: <https://www.defit.org/data-redundancy/>. [Accessed: 02-Feb-2018].
- [5] "What is an Attribute in a Database? | Study.com." [Online]. Available: <https://study.com/academy/lesson/what-is-an-attribute-in-a-database.html>. [Accessed: 02-Feb-2018].

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GRADEMARK REPORT

FINAL GRADE

60/100

GENERAL COMMENTS

Instructor

You have presented your work to a suitable standard and talks about the theory behind database design. You have presented many sand determinants he diagrams which do adequately represent your data but what about a main determinants he diagram you are not proving your work to 3rd normal form. To do this you need to use test data and there is in any present in your report.

You have used the video well to build the entity relationship diagram and you have provided a detailed explanation of your choice of relevant entities and their subsequent data. Looking at your overall design you do have some errors for example how do you calculate the invoice of the have a table called invoice we are meant to store the monetary values will be able to calculate the monetary values I'm not sure this would work within your design some parts are very difficult to follow because of the way you have used the relationships between the entities sometimes it is better to have only one relationship between the tables. Defined a student and a swimmer not the same?

You have worked hard but I do feel that to improve your mark you would have to use test data to prove some of your theories. If you use test data this may have highlighted some of the unnecessary entities in your overall design.

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