# ACIT 1630 - Relational Database Design and SQL

# Intro to Draw.io and Entity Relationship Diagrams (ERDs)

ACIT 1630 Relational Database Design and SQL
Intro to Draw.io and
Entity Relationship Diagrams (ERDs)

Introduction:

The goal of this document is to serve as a walkthrough of the creation of Entity Relationship Diagrams (ERDs) using Draw.io

There are 3 relationship types (sometimes referred to as connectivity and cardinality):

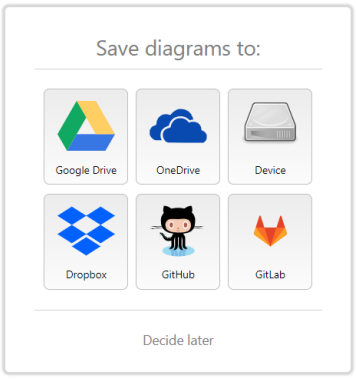
1. One-to-One (1:1 or 1..1)
2. One-to-Many (1:M or 1..*)
3. Many-to-Many (M:M or M:N or *..*)

We will use Draw.io to diagram all 3 relationship types.

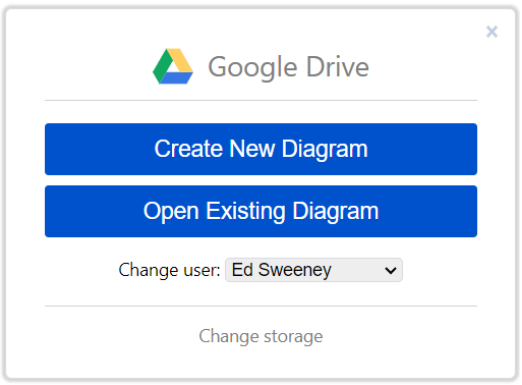
Step 1:
Open Draw.io

https://app.diagrams.net/

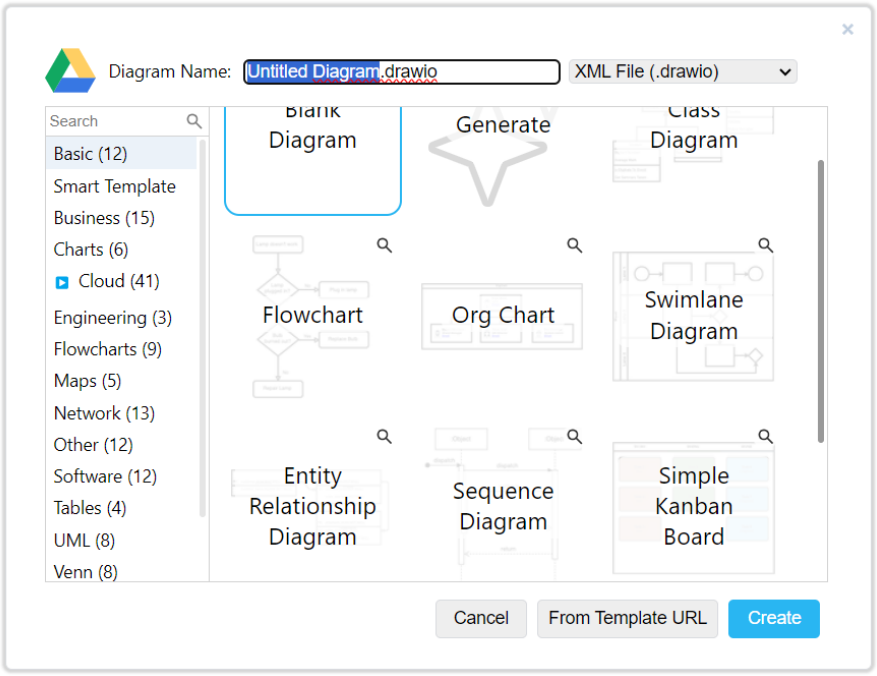
Step 2:



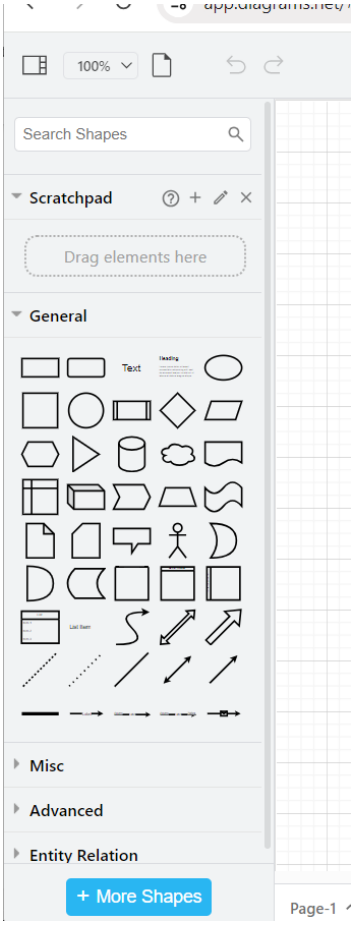

Choose your save location



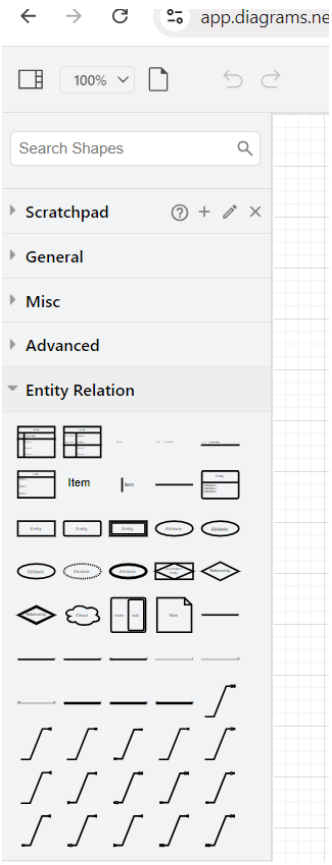

Create a new diagram




Change the name to Week2Lab.drawio, select Entity Relationship Diagram, and Create




Minimize the Scratchpad and General sections




Expand the Entity Relation section

We can create:

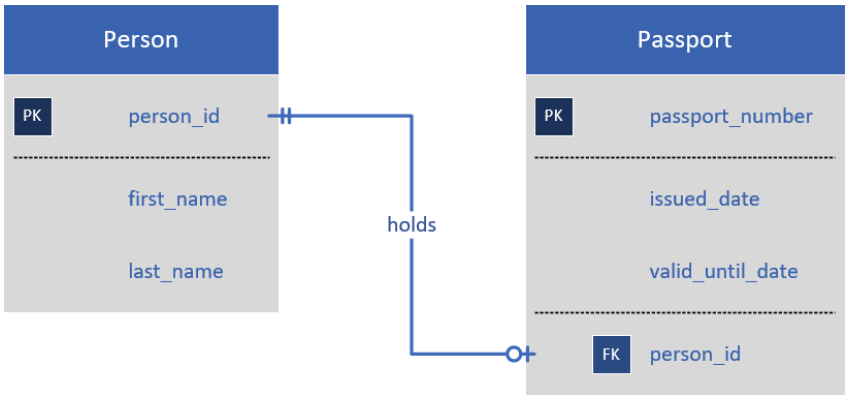
- Entities
- Relationships
- Attributes within Entities
- Primary Key Attributes within Entities
- Separators between Attributes (Primary Key Separator)

Step 3:
Create a simple One-to-One Relationship between a Person and their Canadian Passport (if they have one).

For this One-to-One Relationship we are going to make the assumption we are only concerned with people who may or may not have a Canadian Passport (it's optional). If they have another passport for another country (such as the US, China, India, UK, etc) it is **not** recorded here. If we recorded multiple passports, we would have a One-to-Many Relationship (and not a One-to-One Relationship).

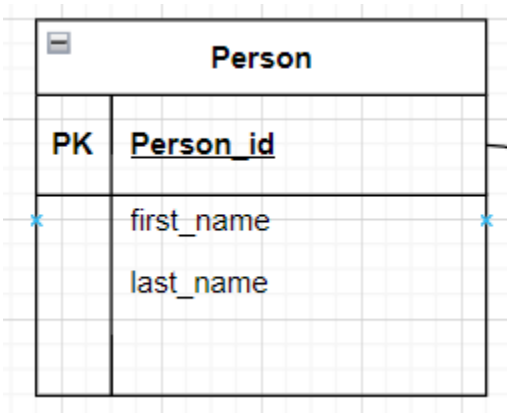
For this One-to-One Relationship the business rules are:
A person can *optionally* have *1* Canadian Passport (but cannot have more than *1*).
A Canadian Passport belongs to *exactly 1* Person.

This is what the completed One-to-One Relationship will look like when completed:




To start let's create our Person Entity.

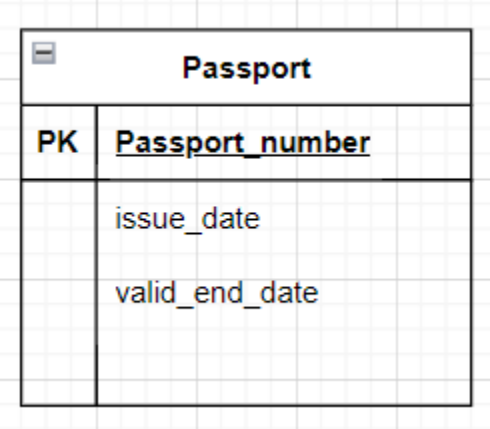
Once dropped on the page it should look like this:



Add a Passport Entity:

Create a Passport Entity like so:

Entity name: Passport
Primary key: passport_number
Attribute 1: issued_date
Attribute 2: valid_end_date



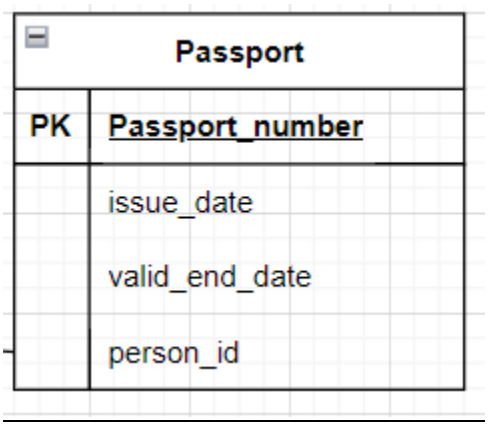
Create the One-to-One Relationship:

We have created our 2 entities (Person and Passport) but there is no relationship between them yet.

Before we add the relationship, we need one more attribute in our Passport Entity.
This attribute, called a foreign key, will link the passport to its Person Entity.

Add the Person Entity foreign key attribute to the Passport Entity:

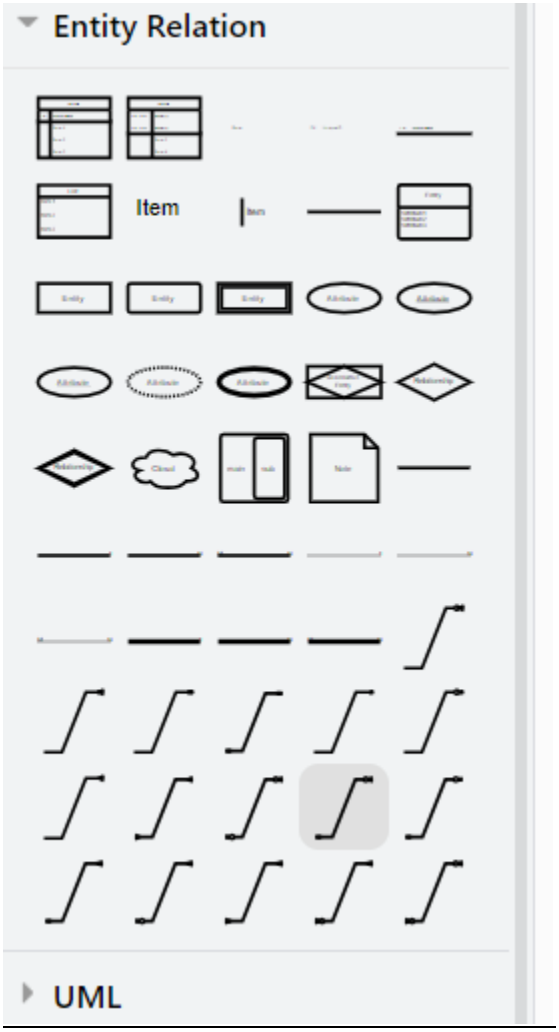
Drag the Attribute shape from the shape window onto the passport entity below our valid_end_date.

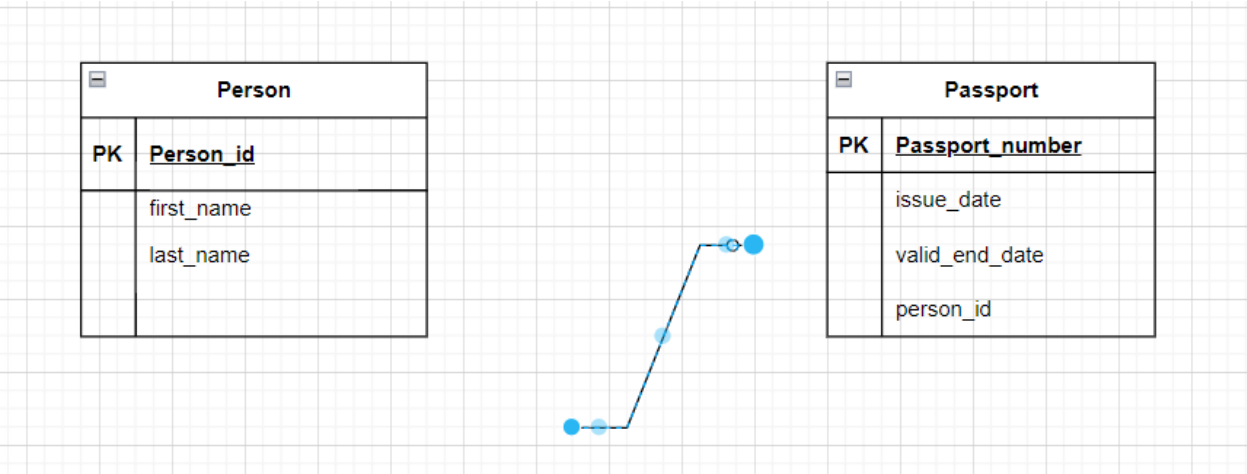


Now that we have the foreign key in the Passport Entity, we can add the One-to-One relationship between Person and Passport.

Relationships in Draw.io for our diagram are lines that connect the entities.

Drag a Relationship shape from the Entity Relation window to an empty spot on your drawing (we'll attach the relationship to our entities next).




Person
PK
Person_id
first_name
last_name
Passport
PK
Passport_number
issue_date
valid_end_date
person_id

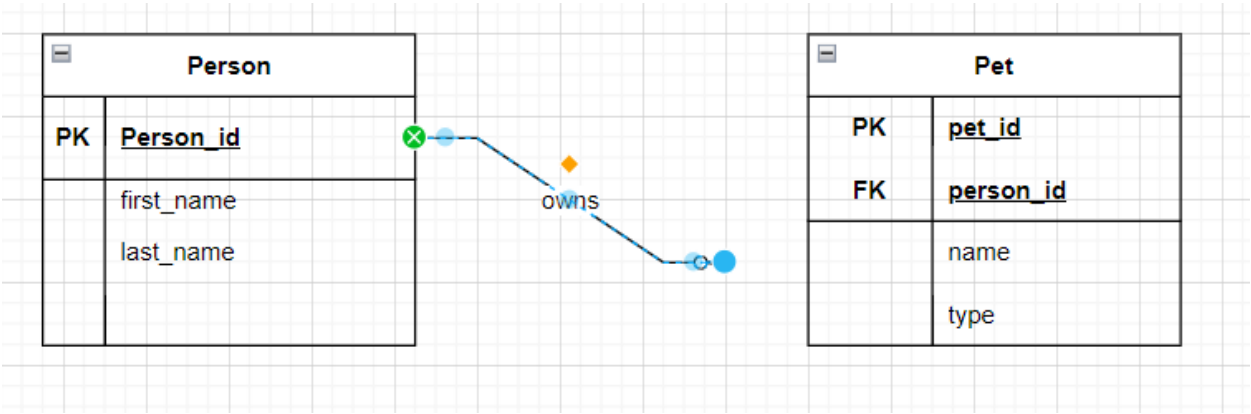
| Cardinality | Line End Symbol |
|---|---|
| Zero or more |  |
| 1 or more |  |
| 1 and only 1 |  |
| Zero or 1 |  |

An easy way to remember them is:

- The circle is, 0. 
- The line is, 1. 
- The multiple diagonal lines, is many. 

<u>Connect the relationship:</u>
We are going to connect the Person and Passport Entities together with our relationship by the 2 person_id attributes. Remember that the person_id in the Person Entity is the primary key and the person_id in the Passport Entity is a foreign key.

With the relationship still selected, drag one end to line up with the person_id primary key in the Person Entity:



Drag the end points to the correct field in the corresponding table.

Make sure that the relationship is glued to the Connection Point. This will make moving and resizing the entities later much easier.

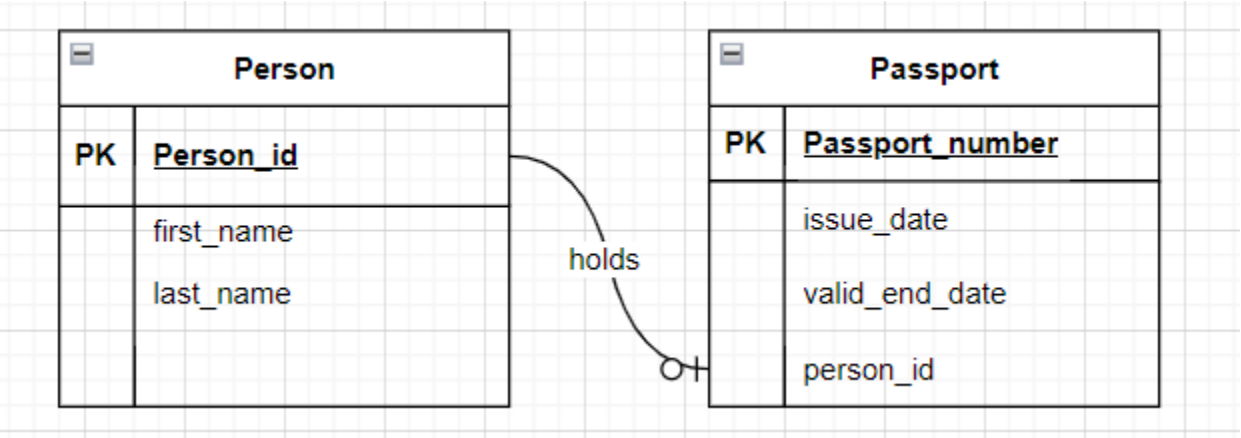
Add a relationship name:

Add a couple of finishing touches an we are done. Relationships sometimes need a bit of clarification to help explain the business rules they define. We'll add our relationship name as text to our relationship to help describe it. Relationship names are often *verbs* that describe the active or passive interaction of our participating entities.

To read the business rules associated with this relationship:

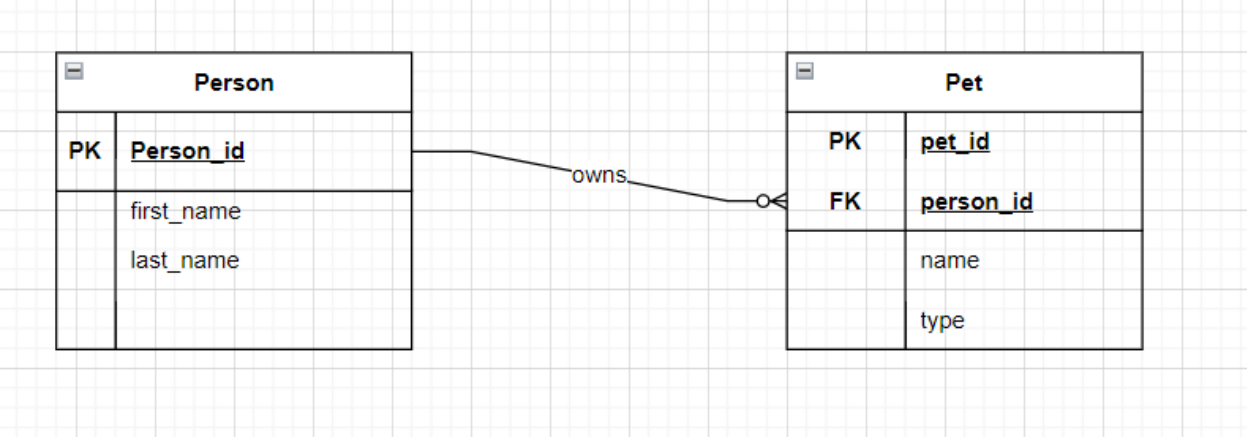
- A Person holds *zero or 1* Canadian Passport.
- A Passport is held by *exactly 1* Person.

Your finished One-to-One Relationship should look like this:



Step 3:
Create a simple One-to-Many Relationship between the Person Entity and the Pet Entity.

Your finished Person, Pet (1:M) Relationship should look like this:



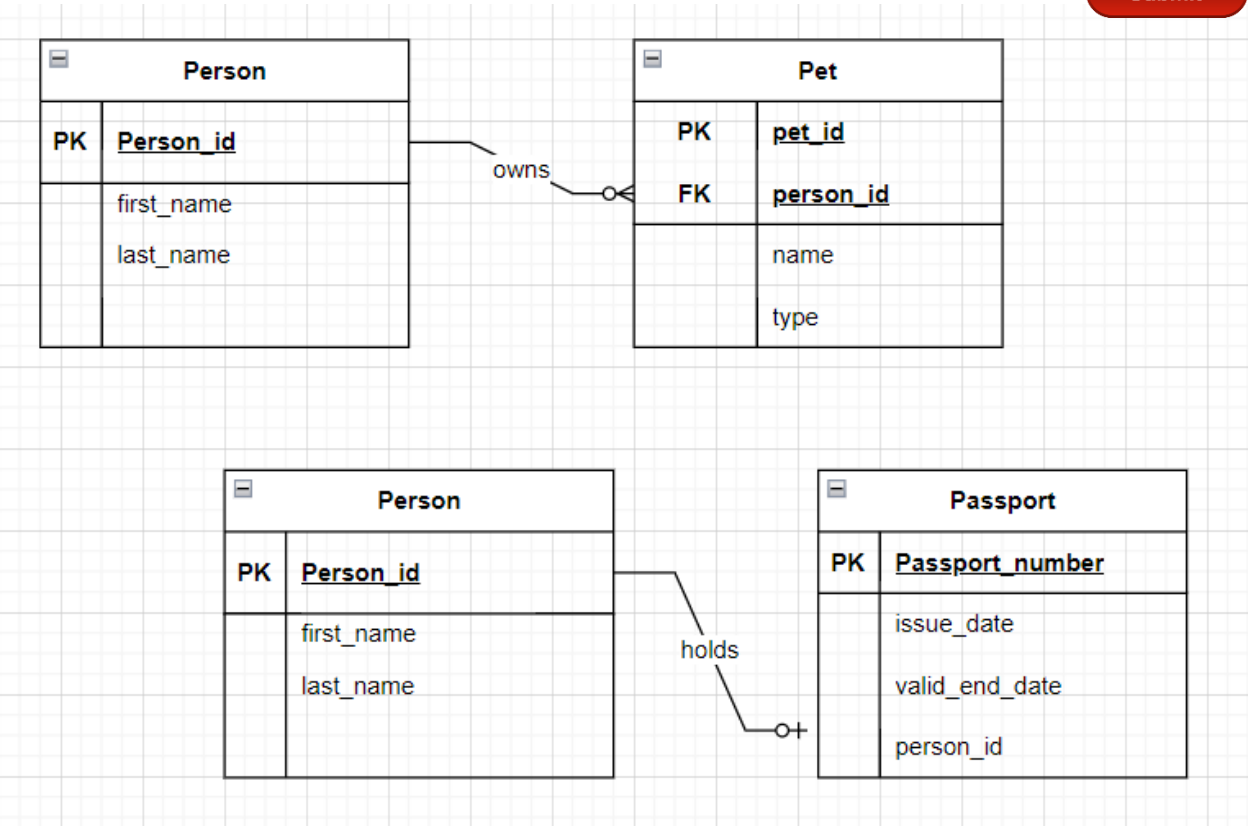

To read the business rules associated with this relationship:

- A Person can *optionally* own *multiple* Pets.
- A Pet has *exactly 1* owner.

Save your Draw.io drawing as a **.pdf** which you create by printing the diagram and selection the PDF writer as the printer. Then submit it to the learning hub at learn.bcit.ca.
You Draw.io drawing should include both the Person, Passport (1:1) Relationship and the Person, Pet (1:M) Relationship.

Filename: **01_ERD_with_Simple_Relationships.pdf**

Submit



Marking Criteria:

| **Criteria** | **Marks** |
|---|---|
| Set Design Theme Variant to "Parallels Variant 2". | **2 marks** |
| Entities created with:<br>• Correct names<br>• Line separators between Primary Keys, Foreign Keys, and other Attributes | 3 marks / entity<br>**12 marks total** |
| Entity Attributes with:<br>• Correct names<br>• Primary Keys and Foreign Keys are indicated if applicable. | 2 marks / attribute<br>**8 marks total** |
| Entity Relationships:<br>• Correct line ends.<br>• Correct name. | 3 marks / relationship<br>**12 marks total** |
| **Total:** | **34 marks** |