Assignment 1: Who uses databases?

In this assignment, you will identify three companies and think critically about how they use databases to enable their business. After completing this assignment, you should be able to identify the types of data a company might be interested in storing, and how it is related to other data. You should also begin to see complexities in identifying how data is stored.

Attempt this assignment yourself, then when you feel either **Lost** or **Successful**, watch this walkthrough video and correct any mistakes you might have made: <https://bit.ly/DB1-A1>

**1.** Choose **three** of the categories below and identify one **specific** company, organization, or service from each.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Banking/Finance** | **Retail** | **Education** | **Entertainment** |
| Examples | Banks  Investment firms  Insurance | Physical stores  Online stores  Convenience stores | Grade schools  Colleges  Training seminars  Online learning | TV, music, and movies Streaming services  Television networks  Gaming |
|  | **Food Services** | **Healthcare** | **Service** | **Transportation** |
| Examples | Restaurants  Groceries  Farming  Food production | Doctors, dentists, etc.  Hospitals/urgent care  Pharmacies | Government svcs.  Postal service  Construction  Lawn care | Auto manufacturing  Taxi services  Airlines  Shipping |

2. For each company, identify **two entity types** they need to keep track of.

3. For each type of data, identify **five attributes** for each entity type you identified in #2

4. Create **a data dictionary** showing the column names, table names, data type, and length for the entities in #2. See page 15 in your book for an example.

5. Draw an ERD showing the **relationship** between the two **entities**. Include the **cardinality** and **participation** constraints. You do not need to show the attributes in the ERD. It is easiest to make these drawings in software such as PowerPoint or Visio.

6. For each entity, provide 3-7 **instances** using fictional data. Create and populate a table for each entity that includes sample **values** that demonstrate the participation and cardinality.

7. Write out at least four **business rules** that are presented in your ERD. The business rules should describe the **entities, attributes, domain constraints** (optional, but should be included if needed), **cardinality, and participation**. You may write this in long form or bullet points.

**Use the example in this document as a template for what your submission should look like.**

Notes

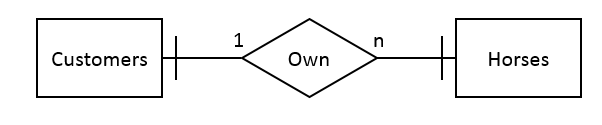
1. Do not pick multiple companies from one category, and do not use the same company for multiple categories.
2. Do not use the same (or very similar) entities for every company. For example, don’t use “Customers purchase products” for every company. Not cool and won’t count.
3. Use attributes that companies would realistically have access to. For example, most retailers would not know (or need to know) a customer’s weight.
4. Some companies fit in to multiple categories – i.e., Walgreens could be considered both “retail” and “healthcare”. Choose the category that matches the aspect you are describing.
5. You may choose a “service” rather than a company – for example, Amazon Prime Video is a service owned by Amazon, but would be an acceptable service.
6. I anticipate each company will take approximately 1.5-2 pages – so your final deliverable should be around 5-6 pages.
7. If you have read ahead or have database experience and want to demonstrate your knowledge you can include artificial and foreign keys, do not count them as one of your 5 attributes.
8. Please put some thought into the companies you select and do not just go with obvious/easy choices. For example, “Amazon” is likely the first e-commerce company you thought of – and I don’t want everyone to pick Amazon. This is both very boring to grade and does not encourage you to think critically. You don’t need to pick a company that is super obscure, but try to pick something interesting.
9. Your submission should look similar to my example (on the next page). Provide all seven deliverables for company 1, then move on to company 2 and so on. **Do not mix them together.**

**Assignment 1 Example**

1. Company #1: Mark’s Horse Hostel (Service)
2. Entity types: Horses, Customers
3. Attributes:   
   Horses (Name, Weight, Gender, Color, Owner Name)  
   Customers (Name, Phone, Address, Email, Balance)
4. Data Dictionary

|  |  |  |  |
| --- | --- | --- | --- |
| **Column** | **Table** | **Data Type** | **Length** |
| Name | Horses | Text | 30 |
| Weight | Horses | Number | 16 |
| Gender | Horses | Text | 1 |
| Color | Horses | Text | 10 |
| Owner Name | Horses | Text | 30 |
| Name | Customers | Text | 30 |
| Phone | Customers | Text | 12 |
| Address | Customers | Text | 50 |
| Email | Customers | Text | 50 |
| Balance | Customers | Number | 16 |

1. ERD



1. Tables

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Horses** | | | | |
| **Name** | **Weight** | **Gender** | **Color** | **Owner Name** |
| Amy | 700 | F | Brown | Norman Johnson |
| Dave | 1200 | M | Brown | Mark Grimes |
| Ed | 1000 | M | Black | Richard Scamell |
| Sarah | 1500 | F | Red | Mark Grimes |
| Tom | 1100 | M | Black | Richard Scamell |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Customers** | | | | |
| **Name** | **Phone** | **Address** | **Email** | **Balance** |
| Mark Grimes | 281-777-6666 | 40 Wallaby Way | gmgrimes@uh.edu | 2000 |
| Norman Johnson | 281-666-7777 | 41 Wallaby Way |  | 3000 |
| Richard Scamell | 281-555-9999 | 42 Wallaby Way | rscamell@uh.edu | 2000 |

1. Business rules

Mark’s Horse Hostel is a business that cares for horses owned by customers. All customers must own at least one horse, but some customers have many horses. All horses kept at Mark’s Horse Hostel are owned by exactly one customer. Due to size limitations of the stables, all horses must weigh less than 2,000 pounds. A horse’s color may be specified as Black, White, Dark Brown, Light Brown, Red, Yellow, or Other. Customers are not required to provide their email address.

Or you can use bullets:

* All customers have at least one horse
* A customer may have multiple horses
* A horse is owned by exactly one customer
* All horses must weigh less than 2,000 pounds
* Horse color is classified as Black, White, Dark Brown, Light Brown, Red, Yellow, or Other
* Customer’s email address is optional

**Notes about the assignment:**

For the length of text attributes, put what you think a reasonable number of characters would be. For example, for gender we can just store “M” or “F”. For Number values, the length is the number of bits – so 16 means 2^16 = 65,536 (any number between 0 and 65,535 will fit). You can just use 16 for the length of numbers, unless you want to be more precise in your answer.

I provided some domain constraints in the business rules – I would encourage you to do the same where it is appropriate (You don’t need a constraint for every attribute, but if there are places a domain constraint would be beneficial you should mention it).

You can make the ERD directly in word (using the shapes on the “Insert” tab), or make it in PowerPoint, Visio, etc. using the drawing tools. There are several ways to save your drawings as an image you can insert into the word document, one easy way is to take a screenshot (Google or ask a friend if you need help with this).