Student Lab #1.1: Introduction to the Project and Books Table Creation and Data Importation in Microsoft Access

Introduction

In this project, students will be creating a mock Amazon database entirely on their own. The Amazon database that students will build will consist of three components:

- 1. Six (6) **Product** tables (and accompanying support tables)
- 2. One (1) Customer table, and
- 3. One (1) Customer Orders table.

The data that is used to populate the **Products** table will be obtained from Amazon.com, where the student will learn how to obtain the most popular items in 6 different categories (namely, books, movies, kitchen supplies, pet supplies, clothing, and makeup) according to quantity ordered. Using the collected data, the respective tables that the student has created will be populated.

Appendix A, located at the end of this document, includes the links that lead to the location of the data sources used for all 6 tables.

The data that will be used to populate the **Customer** and **Customer_Orders** tables will be covered in Labs 4 and 5 and is not discussed in this document.

Requirements for this Lab:

- 1. You will need a (minimum) 32 GB USB thumb drive to build the mock Amazon database. Students are responsible for providing their own USB drives.
- Microsoft Windows 8 or above. Mac users must create a VM, get the ISO here:
 (https://e5.onthehub.com/WebStore/ProductSearchOfferingList.aspx?srch=windows+8
 &ws=3671467e-8a9b-e011-969d-0030487d8897&vsro=8)
- 3. Microsoft Access 2016:

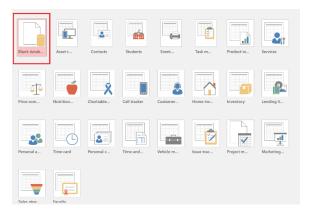
(https://e5.onthehub.com/WebStore/ProductSearchOfferingList.aspx?srch=access&ws=367146 7e-8a9b-e011-969d-0030487d8897&vsro=8)

Purpose of this lab:

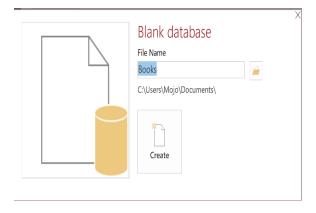
- You will learn how to create the Microsoft Access tables needed for the mock Amazon database.
- You will learn how to populate the tables with appropriate data.
- You will gain foundational understanding of relational databases.

Creating the tables

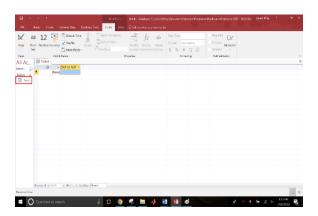
1) After downloading and opening Microsoft Access, open a new blank database as shown:



2) Save this Microsoft Access database using the name "Books". This database is where you will store all of the interrelated tables that contain make up the "Books" database. You will make a new database for every product category, as well as for customers.



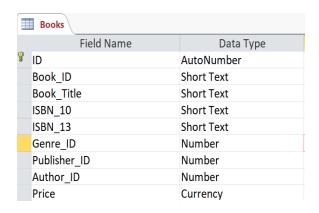
3) You will now create the "Books" product table. To do so, right click where it says "Table 1" on the left-hand side pane. Select **Design View**. You will be prompted to enter a name for the table. You can call it "Books" and press OK.



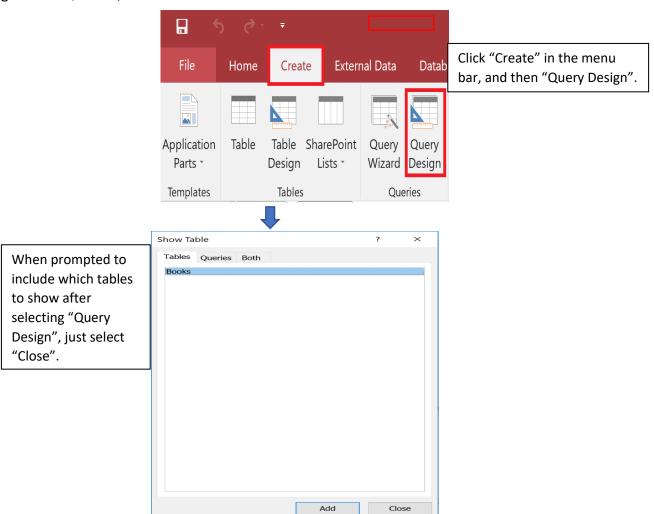
Note #1: You will now be in **Design View**, which is used to provide you with control over the structure of the tables. For example, you may add fields (also known as columns). You can also edit the datatype for each field (column). The datatype lets Microsoft Access know how to allocate memory that will be used to store the data as well as the format of the data itself (i.e., text, byte, integer, currency, date/time etc...).

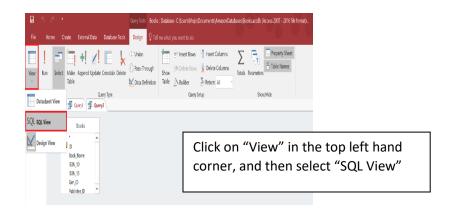
Note #2: Before we get started, it would be wise to learn about primary keys. From Microsoft"s website, "A primary key is a field or set of fields with values that are unique throughout a table. Values of the key can be used to refer to entire records, because each record has a different value for the key. Each table can only have one primary key. Microsoft Access can automatically create a primary key field for you when you create a table, or you can specify the fields that you want to use as the primary key." Primary keys normally have a datatype of a number, and do not allow duplicates. This ensures that each record has a unique identifier. If, you were to use names as a primary key, you may run into collisions because many people may share names. In the "Books" table, the primary key will be called "ID". The "ID" field is used to distinguish each book in the "Books" table, and the "Book_ID" is used to distinguish each book's ID across multiple product tables.

4) In *Design View*, modify the "Books" table by adding the fields below to your table. Be sure to use the exact field names and datatype for each column, just as shown below. When you've finished adding fields to your table, right click on the "Books" tab and click "Save" to save the table. Then, right click on the "Books" tab and select "Close" to close the table.

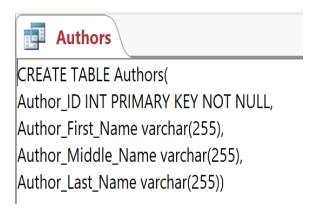


Note #3: This way of designing tables, along with their field names and datatypes is known as the graphical method of table creation. It is very simple to "point and click", however, the capabilities are limited. The more powerful, controllable method of creating tables is accomplished by using the SQL (Structured Query Language) command syntax. From this point on, we will create the tables and their layouts using SQL commands in Microsoft Access. To get into **SQL View**, follow the screenshots below.





5) We will now write a **query** to generate the rest of the tables that will create the books table. After running a query, save each query you ran by right clicking on the active query"s tab, and selecting "Save". The name for each query should be the name of the table you created, followed by the word "Query". For example, the query to create the "Authors" table should be saved as "AuthorsQuery". Copy and paste the italicized text (the query) into the query editor. To run a query, select "Run" in the top left hand corner. The "Run button looks like an exclamation point (!). Copy and paste only one query into the text editor. Once the query has run and it has been saved. Create a new query in Microsoft Access, and paste the next query. The screenshot below exemplifies this.



AuthorsQuery:

CREATE TABLE Authors(
Author_ID INT PRIMARY KEY NOT NULL,
Author_First_Name varchar(255),
Author_Middle_Name varchar(255),
Author_Last_Name varchar(255))

BooksQuery:

CREATE TABLE Books (
ID INT PRIMARY KEY NOT NULL,
Book_ID varchar(255),
Book_Title varchar(255),
ISBN_10 varchar(255),
ISBN_13 varchar(255),
Genre_ID NUMBER,
Publisher_ID NUMBER,
Author_ID NUMBER,
Price CURRENCY)

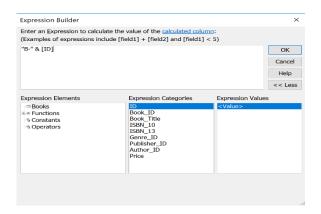
Book_GenreQuery:

CREATE TABLE Book_Genre(
Genre_ID INT PRIMARY KEY NOT NULL,
Genre varchar(255))

Book PublishersQuery:

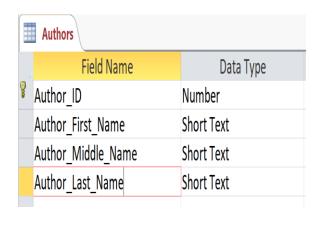
CREATE TABLE Book_Publishers(
Publisher_ID INT PRIMARY KEY NOT NULL,
Publisher_Name varchar(255))

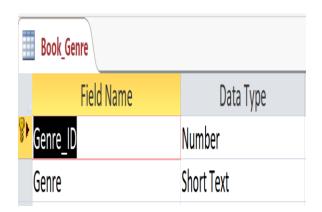
6) To ensure that all items have a unique identifier that distinguish their ID's from the same ID number from a different product's table, they must be assigned a global identifier. This will be accomplished by appending a "B-" in front of every book's ID number. For example, if a book has an ID of 5, its "Book_ID" will be B-5. To do this, go into "Design View" for the "Books" table, and change the "Book_ID" data type from "Short Text" to "Calculated". Enter the text into the window as shown below, and then hit "Ok".

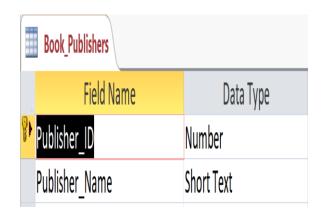


7) After running these queries, your tables should look like this:

Books				
Field Name	Data Type			
Book_ID	Calculated			
Book_Title	Short Text			
ISBN_10	Short Text			
ISBN_13	Short Text			
Genre_ID	Number			
Publisher_ID	Number			
Author_ID	Number			
Price	Currency			



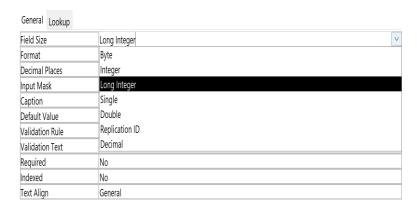




8) Your left-hand side pane should look like this:



9) Now, you must change the field sizes of the "Genre_ID", "Author_ID", and "Publisher_ID" fields in the "Books" table. These are the foreign keys that identify the genre, author, and publisher based on their assigned ID numbers in their respective tables. These fields must be of the same field size, which will allow relationships to properly be created between the tables. To do so, change into "Design View" and refer to the photo below. This grid can be found directly below the table when in "Design View". Microsoft Access automatically assigns the "Number" datatype to have a field size of "Double". Change the field size from "Double" to "Long Integer".



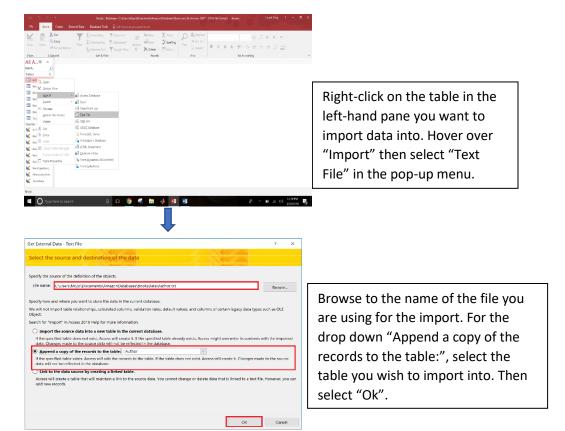
Adding Records to the Database

- 10) Navigate to the link in the Appendix that was used to obtain the data for the "Books" table.
- 11) Select any book in the list that you find interesting. Find the publisher of the book, the genre of the book, and the author of the book. Insert the names of each publisher, genre, and author into their respective tables, with an ID of 1. Now, go into the "Books" table and insert the title, ISBN-10, and ISBN-13 numbers that you find from Amazon. For the "Genre_ID", "Publisher_ID", and "Author_ID", assign a value of 1, since that is the corresponding ID for their genre, publisher, and author.
- 12) Repeat this process for 9 other books. For every book you add, if the author, publisher, or genre already exists in a table with an ID, you can add the book to the "Books" table, and use the ID number of whichever author, publisher, or genre is in the database already.
- 13) If an author, publisher, or genre does not exist anywhere in the database, you will have to add them as a record in their respective tables, with a new ID number. When assigning ID's, they will increment sequentially, starting from 1.

<u>Importing Data into the Tables</u>

Note #4: There are many methods of inputting data into a table in Microsoft Access. These methods include manually entering the data when in "Datasheet View", importing a data file directly into a table, or creating a data entry form (a concept you will be introduced to in a later lab). Throughout this project, you will become familiar with importing both .txt files and Excel files, as well as creating data entry forms. In this lab, however, you will be importing .txt files.

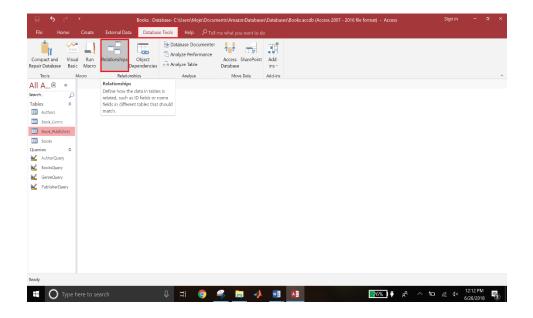
14) Once you have all tables made, you will import the text file datasets directly into the tables. The tables share the same name as their corresponding text datasets. Refer to the screenshots below for the process of data importation.



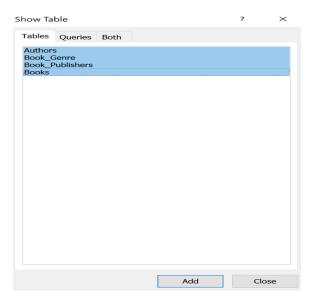
- 15) Once you have hit "Ok", you may hit "Finish" to follow through with the rest of the import steps.
- 16) Repeat this process for all tables. If you come across any problems with the importation of any dataset, please bring it to the attention of the lab administrator.

Creating the Relationships Between Tables

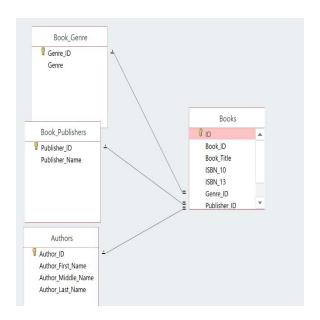
17) Now, we must create a visual schema of the data relationships in Microsoft Access, which provides Microsoft Access with the instructions necessary to remove data redundancy and create relationships between primary and foreign keys. Remember, foreign keys are used to link two tables together. To do so, click on "Database Tools" and then "Relationships", as shown below.



18) You will then be prompted to include which tables you want to create relationships between. Include all tables by holding down "CTRL" and selecting all tables. Hit "Add" and then "Close".



19) When creating the layout of the relationship between tables, the tables can be moved in the diagram by clicking and dragging. To create a relationship between two fields across tables, click on the field you wish to start with, and while holding the click, drag the line across to the destination field. Select "Enforce Referential Integrity" and hit "Create". By enforcing referential integrity, you are ensuring that the foreign keys between the fields are valid, and that there are no missing values. Your relationships should look like the photo below.



Student Lab #1.2: Makeup Table Creation and Data Importation in Microsoft Access

Introduction

In this module of Lab 1, you will be creating the "Makeup" table, along with its supporting tables. Recall the process you followed in creating the "Books" table in Lab 1.1. Create the tables in "SQL View" in Microsoft Access. Edit the proper field sizes in "Design View" as needed (all field with "ID" in the name must have a field size of "Long Integer"). Import the data into the tables in Microsoft Access, and finally, create the relationships between the tables. You will be given the SQL queries to run to make the proper tables, as well as a schema of the relationships between the tables. Be sure to create a new database entitled "Makeup".

Creating the Tables

Makeup_BrandsQuery:

CREATE TABLE Makeup_Brands (
Brands_ID INTEGER PRIMARY KEY NOT NULL,
BrandsName varchar(255))

Makeup_CategoriesQuery:

CREATE TABLE Makeup_Categories (
Category_ID INTEGER PRIMARY KEY NOT NULL,
CategoryName varchar(255))

ColorQuery:

CREATE TABLE Colors (
Color_ID INTEGER PRIMARY KEY NOT NULL,
Color varchar(255))

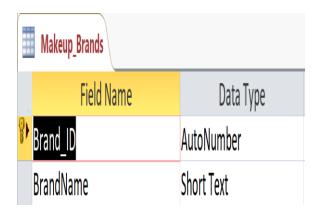
FeatureQuery:

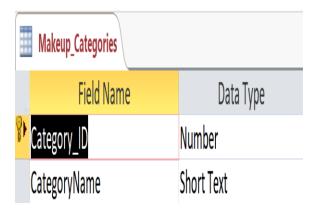
CREATE TABLE Feature (
Feature_ID INTEGER PRIMARY KEY NOT NULL,
Feature varchar(255))

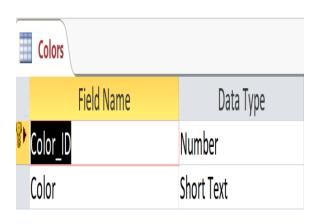
MakeupQuery:

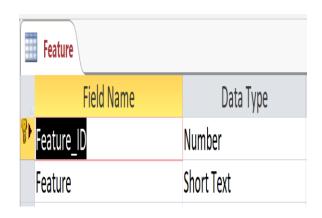
CREATE TABLE Makeup (
ID INTEGER PRIMARY KEY NOT NULL,
Makeup_ID SHORT TEXT,
Makeup_Name varchar(255),
Category_ID NUMBER,
Brand_ID NUMBER,
Feature_ID NUMBER,
Color_ID NUMBER,
ASIN varchar(255),
Price CURRENCY)

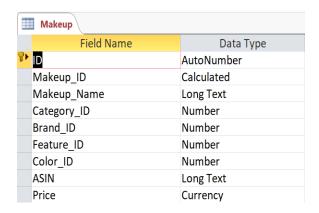
Note #1: After running the above queries, you should have 5 tables that look like the photos below. Remember to change the field size of "Category_ID", "Brand_ID", "Feature_ID", and "Color_ID" to "Long Integer" in the "Makeup" table. Furthermore, remember to change "Makeup_ID" to a calculated value. The identifier for the "Makeup" table is "MK-".











Note #2: Once you have created the tables in Microsoft Access, you must now import the text datasets into each table. Use the same process of importation as you did in Lab 1.1. The name of each dataset corresponds to the table it is to be imported into.

Creating the Relationships

Note #3: In the previous module of Lab 1, you learned how to graphically create foreign key relationships between tables, whereby you clicked and dragged boxes, and used a graphical user interface (GUI). Now, in this module, you will be introduced to the SQL method, where you will run SQL queries in the same manner as you did earlier to create the tables, to create relationships between tables. The SQL method is more commonly used as it is faster and allows for easier replication of tables and their properties. Run and save the following queries.

FK Category:

ALTER TABLE Makeup ADD CONSTRAINT Category_ID_FK
FOREIGN KEY (Category_ID) REFERENCES Makeup_Categories (Category_ID);

FK_Brand:

ALTER TABLE Makeup ADD CONSTRAINT Brands_ID_FK FOREIGN KEY (Brand_ID) REFERENCES Makeup_Brands (Brand_ID);

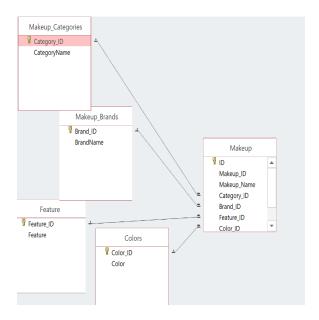
FK_Color:

ALTER TABLE Makeup ADD CONSTRAINT Color_ID_FK FOREIGN KEY (Color_ID) REFERENCES Colors (Color_ID);

FK Feature:

ALTER TABLE Makeup ADD CONSTRAINT Feature_ID_FK FOREIGN KEY (Feature_ID) REFERENCES Feature (Feature_ID);

Note #4: After running and saving all of the above SQL queries in Microsoft Access, your relationship schema will look like the following image:

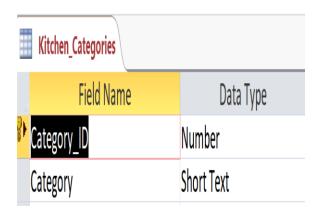


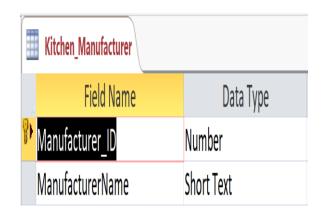
Student Lab #1.3: Kitchen Table Creation and Data Importation in Microsoft Access

Introduction

In this module of Lab 1, you will be creating the "Kitchen" table, along with its supporting tables. Recall the process you followed in the last two modules. In this module, you will be given only the tables you need to make, as well as the final intra-table relationship schema. You are responsible for using either method of table creation and relationship creation (graphical method or SQL method). Don't forget to import the data sets into the tables. The identifier for "Kitchen_Item_ID" is "K-".

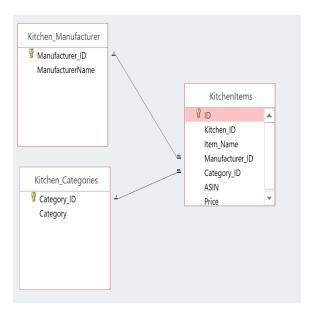
Tables to Create and Populate





KitchenItems				
Field Name	Data Type			
<mark>₿▶</mark> ID	AutoNumber			
Kitchen_ID	Calculated			
Item_Name	Short Text			
Manufacturer_ID	Number			
Category_ID	Number			
ASIN	Short Text			
Price	Currency			

Relationship Schema

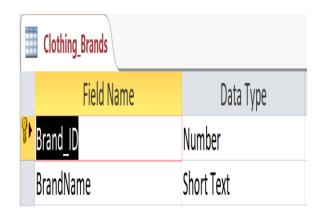


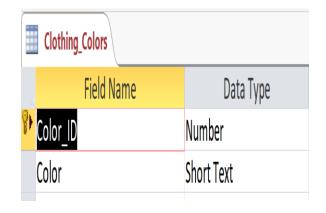
Student Lab #1.4: Clothing Table Creation and Data Importation in Microsoft Access

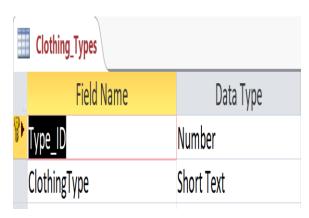
Introduction

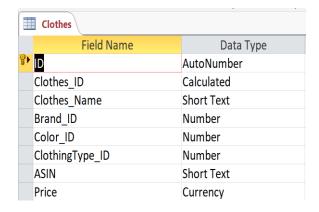
In this module of Lab 1, you will be creating the "Clothing" table, along with its supporting tables. Recall the process you followed in the earlier modules. In this module, you will be given only the tables you need to make, as well as the final intra-table relationship schema. You are responsible for using either method of table creation and relationship creation (graphical method or SQL method). Don't forget to import the data sets into the tables. The "Clothes_ID" identifier is "C-".

Tables to Create and Populate

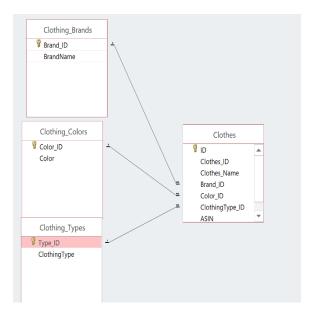








Relationship Schema

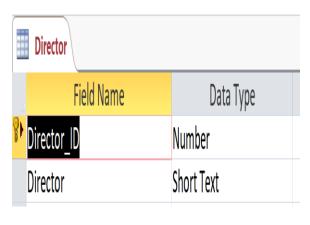


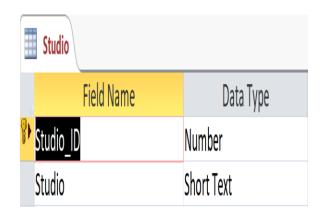
Student Lab #1.5: Movies Table Creation and Data Importation in Microsoft Access

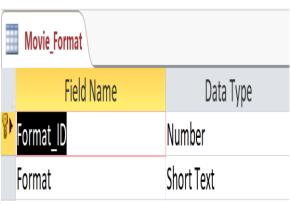
Introduction

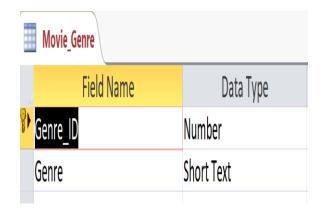
In this module of Lab 1, you will be creating the "Movies" table, along with its supporting tables. Recall the process you followed in the earlier modules. In this module, you will be given only the tables you need to make, as well as the final intra-table relationship schema. You are responsible for using either method of table creation and relationship creation (graphical method or SQL method). Don't forget to import the data sets into the tables. The identifier for "Movie_ID" is "M-".

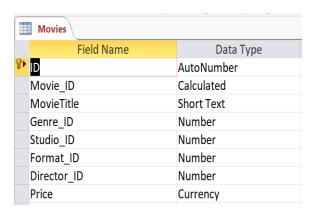
Tables to Create and Populate



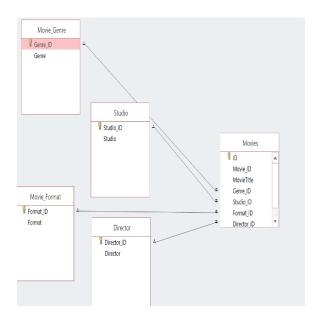








Relationship Schema

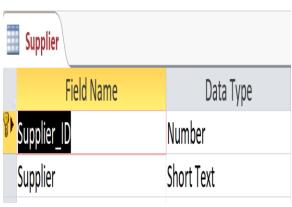


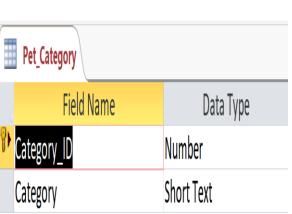
Student Lab #1.6: Pet Supplies Table Creation and Data Importation in Microsoft Access

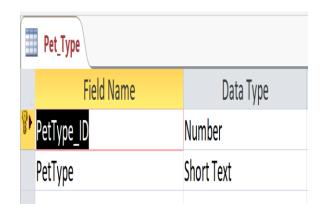
Introduction

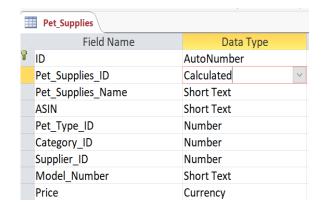
In this module of Lab 1, you will be creating the "Pet_Supplies" table, along with its supporting tables. Recall the process you followed in the earlier modules. In this module, you will be given only the tables you need to make, as well as the final intra-table relationship schema. You are responsible for using either method of table creation and relationship creation (graphical method or SQL method). Don't forget to import the data sets into the tables. The identifier for "Pet_Supplies_ID" is "PS-".

Tables to Create and Populate

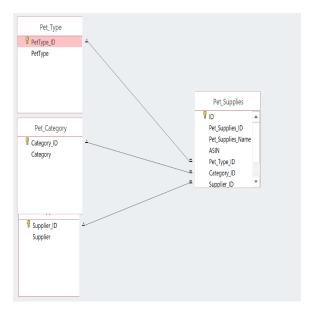








Relationship Schema



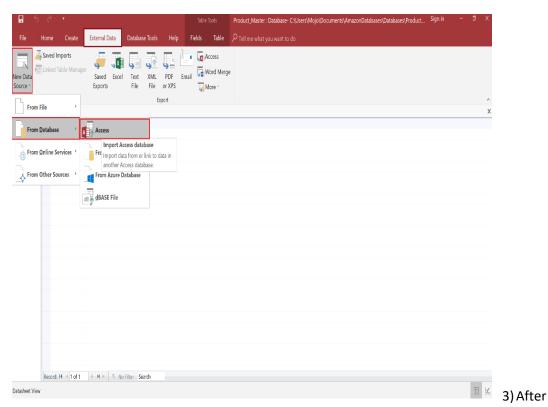
Student Lab #1.7: Combining all Product Tables Into a Master Database in Microsoft Access

Introduction

In this module of Lab 1, you will be creating the master Product database that will contain all product tables, along with their associated supporting tables in Microsoft Access. This database will be used in the coming labs, as you will be creating forms and menus to view the data.

Creating the Master Product Database

- 1) Open Microsoft Access and create a new database entitled "Product_Master".
- 2) Select "External Data", then "New Data Source", then hover over "From Database", and then select "Access".

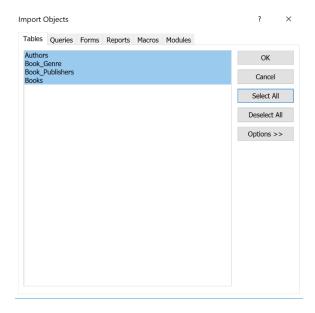


selecting "Access", you will be prompted to indicate which Microsoft Access database you will

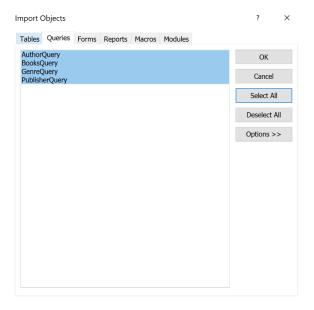
be importing tables from. Navigate to the directory where you have all of your databases saved and select "Books".



4) Select all tables by selecting "Select All" on the left-hand side.



5) Click on the "Queries" tab on the top of the same window, and hit "Select All" to select all queries, as well.



- 6) After all tables and queries have been selected, click "Ok" and then "Close" on the window that pops up next. You will then see all of the tables and queries from your "Books" database have populated into your new "Product_Master" database.
- 7) Repeat the same process for all product databases.

Review of Lab 1

By this point, you have completed all of the modules of Lab 1. You have successfully created a products database with 6 unique product tables. You became familiar with the concepts of primary and foreign keys, data relationship models, and data importation. The next lab will show you how to create forms in Microsoft Access. These forms will allow you to view, add, delete, and modify records in the products tables.

Appendix

- https://www.amazon.com/best-sellers-books-Amazon/zgbs/books (Books)
- https://www.amazon.com/best-sellers-movies-TV-DVD-Blu-ray/zgbs/moviestv/ref=MoviesHP H1 BestSellers/ref=MoviesHP H1 BestSellers (Movies)
- https://www.amazon.com/gp/bestsellers/pet-supplies/ref=sr_bs_0_pet-supplies_1 (Pet Supplies)

- https://www.amazon.com/b/ref=s9 acss bw cg whpnav 2a1 w?node=1040660&pf rd m=AT VPDKIKX0DER&pf rd s=merchandised-search2&pf rd r=02NFDSHR5QHDA8QKXWPB&pf rd t=101&pf rd p=08cc321f-56ca-414e-98e5e1e6515db9ac&pf rd i=7147440011 (Clothing, Women's)
- https://www.amazon.com/b/ref=s9 acss bw tt x fhp men w?node=7147441011&pf rd m= ATVPDKIKX0DER&pf rd s=merchandised-search-3&pf rd r=8M9K2SCPPG7J158H782D&pf rd t=101&pf rd p=7a73ed52-120e-46a9-8a35dca18e15f720&pf rd i=7141123011 (Clothing, Men's)
- https://www.amazon.com/kitchen-dining/b/ref=sd_allcat_ki?ie=UTF8&node=284507 (Kitchen)
- https://www.amazon.com/Makeup-Cosmetics-Products-Beauty/b/ref=allmu_nav_beauty?ie=UTF8&node=11058281&pf_rd_m=ATVPDKIKX0DER&pf_rd_s=merchandised-searchleftnav&pf_rd_r=2R2CT1WJHJGWKYF79RH1&pf_rd_r=2R2CT1WJHJGWKYF79RH1&pf_rd_t=101 &pf_rd_p=674b72fb-c547-498b-805e-f2a166c1442c&pf_rd_p=674b72fb-c547-498b-805ef2a166c1442c&pf_rd_i=3760911 (Makeup)