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Geog 463
Exam 1

**Advantages and Limitations of databases**

The Main advantage to using the database approach for both data storage and use is its computer based functionality. A computer is capable of manipulating data faster than a human is alone, including documenting, sharing and processing.  A computer is able to save data that may be user entered, or even automatically calculated, to hardware that is able to contain the same amount of information of paper based documents in a much smaller space. This not only allows for possibly endless storage capabilities but also allows the data to be shared to almost anyone, anywhere. Sharing of databases allows for not only anyone with a 'connected' computer to use this data but it also allows for other various information systems to access and use it, even at the same time through a database management system. These various information systems are used because of how efficient a computer can work with a database. A database allows the computer or user to quickly retrieve the specific data they are interested in through queries and then they are able to perform analysis on that data based on the relations that are also stored within. These relations allow a database to contain the relationships of a physical multi-dimensional object virtually in bits of 1s and 0s.

While the database approach has its advantages, the conventional DBMS for geospatial data has limitations. Spatial data may involve polygons representing areal data that doesn't directly align with the typical table setup of a database creating problems with storing the structure of spatial data. The space saving method of the standard relational database hinders the performance of "on the fly" assemblies of data through having to process multiple joins.  This requires the user to wait for a map to be redrawn for example when changing one of the related tables which can sometimes take longer than it did to make the change in the data. In regards to the speed of retrieval, standard relational databases use indexing to point to files for faster searching. Spatial data comes with some of its own "spatial indexes" to allow for faster spatial queries that are sometimes not supported in classic RDMBSs.

**ER Diagram:**

My diagram contains the three mentioned entities as well as Trade Routes and Oceans, represented with entity boxes. Each entity has a primary attribute and may include others. Entities with relations to one another are represented with the diamonds as well as their cardinality. These include the three from the problem as well as others I thought would be of interest in terms of global trade. The one relationship with what the river flows into is an 'or' relationship. I wasn't sure if this could be represented this way or if they should be split up into two different named relationships.
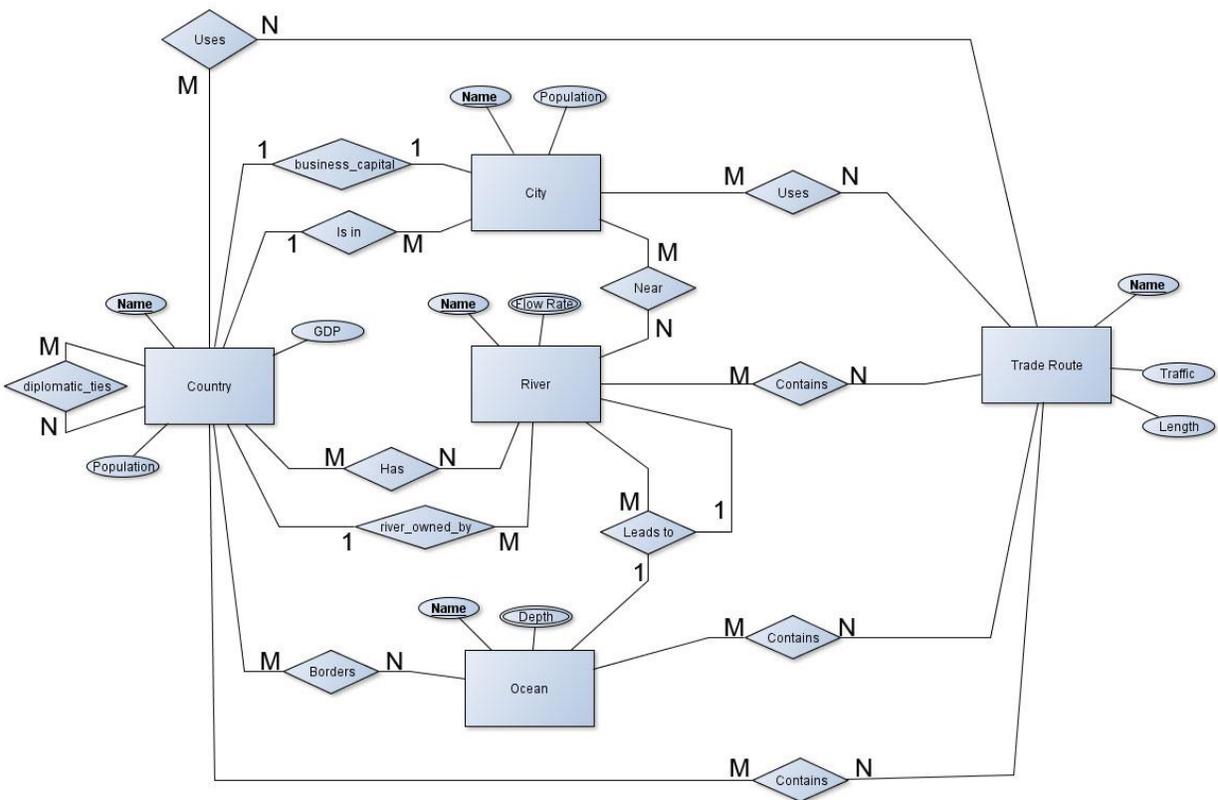


Made in 'yEd' and 'Photoshop'(cardinality)