HelloWorld

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HelloWorld is a startup company that wants to pursue the exploding opportunities of online business. XXX, the founder of this startup, has monitored development of this e-business market for a while and identified Amazon.com as the primary market leader (to beat). He believes that, to grab market shares from Amazon.com, it is necessary to inject some new ideas into their business. While not being very innovative himself, he looked at another success story, eBay, and decided to bring a "bidding" flavor into his business model. Combining the strength of Amazon.com and eBay, plus a cool brand name, HelloWorld, he managed to invite enough investors to gain the initial round of funding and is ready to fly.

XXX is not a technical person, so he decides to find a technical team to prototype and validate his business ideas. The approach is to propose a design and explore the feasibility of the design through prototyping. This design-prototype approach is often adopted when the requirements are not well understood or the method of achieving them is not clear. On the other hand, a successful prototype can serve as the foundation for future production system in operation and will help to secure the next round of funding.

Being attracted by the large amount of stock options and the potential of getting rich and retired in a couple of years, you and your mates decide to give the project a shot. Since XXX is not very technically savvy, he tries to communicate his visions with the technical team and expects the team to figure out all the missing details. Basically, the technical team (i.e., you and your team members) will design a database application to manage the online business of HelloWorld. You will write several transactions to access the database in order to support the functions required for the system. The project consists of three phases:

1. Requirement Analysis and Conceptual Database Design
2. Logical Database Design and Normalization
3. System Prototype (Implementation, Testing, and Demonstration)

The first phase is to analyze the data (and business) requirements of HelloWorld and to come up with a conceptual database design by using entity-relationship model that you learn in class. The second phase is to decide which database management system to use, create a logical database design, refine and normalize the initial design, and populate the database. Finally, you will write a set of representative transactions to access the database, and implement the application.

OVERALL REQUIREMENTS

Before we jump into the description for each phase, let's talk about what you are expected to fulfill when working on the project.

Document formatting

We provide a project document template (as .docx file) that you are more than welcome to directly follow. However, you are also encouraged to create a template of your own, as long as it maintains a professional image, and includes all the components from our provided template. You can also write your documents in Latex or MarkDown languages. Your project reports for each phase will be turned in both electronically and in hardcopies. When turning in as electronic copies, make sure you covert them into PDF files; when turning in as hardcopies, make sure you bind the documents neatly (a lot of times the volume will be too thick for stapling, so you can come up with other ways to bind your documents.)

For each phase, find below for the minimum number of pages (excluding cover page, table of contents, and appendices):

Phase	Minimum number of pages
1	15
2	25
3	35

Please note that each phase's document extends the previous document with proper correction and modification.

Source control

It is required that every team member owns a GitHub account, and the team manages the codes for the project (including all your write-up files) in one shared repository. When assessing your project, the status shown on your repositories will become an important indicator, e.g., how frequent the repository is committed, how each team member is doing compared to the others. Also, make sure you maintain good documentation for your codes.

Project management

All the teams should manage your project's progress with an online task management tool, Asana. It is important to leverage Asana well, since your progress reports will be exported from this tool. Therefore, make sure you use Asana to carefully plan each task in the project, and keep the conversation/discussion between teammates going on the platform.

PHASE 1 – CONCEPTUAL DATABASE DESIGN

Due: February 5th, 2016

Checklist

✔	Task
	Requirement analysis
	Conceptual design

Task 1: Requirement Analysis

As mentioned earlier, HelloWorld will pattern features of (but not identical to) Amazon.com and eBay. Thus, it may help to explore these websites to better understand their functions and the requirements for HelloWorld. Below are the eleven basic functions that you must include in your design:

1. Sale Items: The focus here is the items for sale. These items can be pretty much anything. An item is sold either by listed price or by auction. The sources of the items may be a company (i.e., a supplier) or an individual (i.e., an online seller). A unique identifier is assigned to an item when it is in stock or put up for auction. A short description is associated with an item (provided by a supplier or a seller). The online seller may specify a reserve price (which is hidden from the buyers) for an item he posted for auction. A reserve price is the minimum price a seller is willing to accept for the item. At the end of the auction, if no bid is higher than the reserve price, the item will not be sold. The seller must also specify the location of the item.

2. Categories: The items available at HelloWorld are categorized using a predefined classification tree. Each node represents a set of items. The root of the tree is labeled "All" to represent all items. Each node has on average fifteen children (subcategories). Each, with a descriptive name, represents some subsets of the items represented by the parent. An item can be specified by a path through this classification tree. For example, we may categorize an item as:

1. Books > Audio Books > Business > Sales; or
2. Electronics > Wearable Technologies > Smart Watches; or
3. Beauty > Hair Care > Shampoo > Dry Shampoo.

The depth of the tree varies but is no more than ten levels deep.

3. Suppliers: All the suppliers of items sold at HelloWorld are maintained in the database. Supplier information includes company name, address, point of contact (person), phone number, company category, revenue, etc.

4. Registered Users: To sell or bid on an item, a user must be registered. A registered user is identified by a user name and authenticated with a password. In addition, the maintained information includes, email address, name, address (which consists of street, city, state, and zip), phone number, credit card info (including type of credit card, credit card number, expiration date), age, gender, annual income, etc. Also, there could be more than one address, phone number and credit card for each user.

5. Rating: We attempt to control fraud by allowing users to comment on the past behavior of other users. You can design a rating system that you think will lead to the best quality control. These ratings and a short explanation are then made to other users.

6. Browsing: Users are able to browse the items by traversing the category tree. At each point, they are given a summary of all the items that appear in that category.

7. Searching: Users are able to search the items by entering some keywords or conditions. As a search result, a list of items that satisfy the search criteria is returned to the users.

8. Sale: A customer can purchase an item based on listed price (instead of by the auction approach). HelloWorld places a charge on the credit card the customer supplied. If the charge is successful, the item is sent to the customer. The sale transaction will be maintained in the system for at least six months.

9. Bidding: A user can place one or more bids on an item as long as they are not the seller of the item. Each bid that is placed must be at least $2 higher than all previous bids and must be placed before the auction ends. At the end of the auction the seller and all bidders are notified of the highest bid and the user that placed it. Contact information is sent to the seller and the highest bidder so that they can complete the transaction. An auction starts when the seller registers the item for auction and ends exactly at the time the seller specified. Information about an auction in which the item is not sold can be discarded immediately.

10. Order and sale reports: Periodically (every week), a report summarizing the ordering and sale information based on categories of items are generated for HelloWorld to learn how the business is doing and understand the consumers' behaviors.

11. Delivery: The delivery of an auction item is complicated. You and your team can come up with a mechanism that will not only make sure the success for sellers to receive payments and buyers to receive products, but also reasonable for HelloWorld to implement.

Your team should present a concise (itemized) summary of the application and its operations. There is some vagueness in the descriptions of the basic requirements. You should clarify them and define exactly how HelloWorld should operate and what functions your systems will provide to support those operations. Clearly describe all the extensions (i.e., those not specified in the project description) for your design and

prototype. You may include in the document (or as an appendix) some figures (e.g., initial system framework or interface designs) to illustrate the functions and operations.

Task 2: Conceptual Design

Your team should present an entity-relationship diagram describing your design. Also, your project document should include a narrative description of the diagram. Please do not assume the underlying database system and do not map your design into relations – which is the task for Phase 2 of the project.