*Midterm Exam*

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Last Name, First Name

Important Notes:

* Please do NOT attempt to run and compile the questions that ask for writing Java code since this will take significant amount of time; provide only code snippets that capture the logic/answer required for every question, provide something similar to the code snippets that we covered during class.
* There are 6 questions in the exam paper
* Type your answers (No Hand-Writing will be accepted) below every question, and please make sure you distribute your time wisely to cover all questions.
* Your midterm exam is due on D2L as SINGLE PDF document at 11:55pm, Tuesday 4/25/17.

1. (5 points) Explain the n-tier architecture

The n-tier architecture (also called as multi-tier architecture) is a client-server architecture. The client issues request, and the server sends the response. And it physically separates presentation, application processing, and data management function by the network. The three-tier architecture is popular to use. The presentation layer is held on some web server, and the main function as the user interface is to translate task and result to something the user can understand. Then web server talks to backend app servers over the network for making logical decisions and evaluation, and performs calculations. Then app server talks to a database server. The information is stored and retrieved from database. Then the information will be passed back to the logic, and finally back to the user.

And it related with MVC (Model-View-controller) because the Model layer may have an internal implementation that calls a database for storing and retrieving data. The controller may reside on the web server and remotely call app server to retrieve data. The View is related to user interface.

1. (5 points) What is the difference between the Cookie object and Session object?

Cookie will store in client side.

It is a bit of data stored by the browser and sent to the server with every request.

It is stored limit amount of data.

It can only store strings.

We can save cookie for future reference.

Cookie data are easy to modify as they are stored at client side.

Session will store in server side.

It is a collection of data, and associated with a given user.

It is stored unlimited amount of data.

It can store objects.

We can’t save session for future reference. When users close the browser, they also lost the session.

Session data are not easy to modify as they are stored at server side.

1. (5 points) Which one is more expensive to load and execute by the container/app server: Servlet or JSP request? Explain

JSP is more expensive to load and execute because JSP is translated into Servlet before it executed.

1. (5 points) What is the difference between XML and HTML?

XML was developed to describe data and to focus on what the data represent.

It is not either a programming language or a presentation language.

It describes the data.

It is case sensitive.

It is extensible markup language.

It must be well-formed and valid before they can be interpreted

HTML was developed to display data about to focus on the way that data looks.

It is presentation language.

It only defines the data.

It is case insensitive.

It is hypertext markup language.

It can be still being interpreted even if it is malformed and invalid.

1. (20 points) Create an HTML page that has a FORM that allows the user to enter a sentence, then send it to a Servlet which will count the number of occurrences for each character and then return a table back to the browser; the table is composed of 2 columns: character, and frequency.

Please check the code on sentence.html and sentenceServlet.java

1. (60 points) Write a web-based application using Servlet/HTML for the OutdoorPowerEquipment retailer described below.

Please check the code on OutdoorPowerEquipment folder.

 

Consider the following high-level description for OutdoorPowerEquipmentDepot retailer:

* The intent is to build a web-based application using servlets/html/xml that will allow the customer to buy or rent equipment from the retailer online
* There are two categories of products that the customers can buy or rent online: Lawn Mowers and Snow Blowers
* There are a number of equipment Manufacturers and each offers its own models.
* Every equipment has an extended warranty plan that could be bought separately from the retailer
* The customer can choose one of the following options when buying a new equipment
  1. Buy the new equipment with no replacement
  2. Buy the new equipment with 1 year replacement for 50% fee of the equipment retail price; under this plan the customer can replace the equipment by a new one any time during the year (Equipment can be replaced only once for the customer).
  3. Buy the new equipment with lifetime replacement for 65% fee of the equipment retail price; under this plan the customer can replace the equipment by another new one any time (Equipment can be replaced only once for the customer).
* The customer can rent equipment. However, there are a number of lease plans that the store like to offer its customers
  1. Limited duration rental (for example renting an equipment for 2 days)
  2. Single season rental (for example rent a snow blower for the entire winter season for a $100 fee per season)
* The customer can place an order, check the status of an order, or cancel an order.
* The customer can choose home-deliver or in-store pickup for the equipment purchase or rental. Equipment delivery or pick up shall be done 5 days after order is placed by the customer.
* The customer can cancel an order (within 2 days) after order is placed by the customer.
* Some of the equipment may have store special-discounts
* Some of the equipment may have manufacturer rebates
* Your Application must provide 4 models/types of lawn mowers and 4 models/types of snow blowers produced by different manufacturers
* Hard-code the values you choose for the retail prices, rental charges per day, warranties, discounts, rebates, home delivery cost, etc.
* A customer must be able to buy or rent (order online) one or many products in the same session. The customer must be able to add/delete products to/from the shopping cart, and edit the shopping cart. Once the customer is done with the items selection, the customer will click the Checkout Button and the customer will be provided with a page to enter name, address, and credit card number. After that, the user will click the Submit Button, and the system shall generate an itemized bill for the total amount to be paid and provide the customer with a confirmation number which is the concatenation of the first 3 characters of the last name and the last 4 digits of the credit card number.

*Your application (*Servlets/HTML*) must implement (only CODE SNIPPETS Required. Do NOT spend time to compile your code) the functionalities listed above in order to allow the customer to perform the different functionalities listed above.*

*Also, please note that you can Reuse/refactor the code you wrote for* Sports Depot store in the practice exam