(Note: this document was issued to all students prior to the examination as pre-reading material)

Stock Photography Exchange Project Description

1.   Background

There are many web-based services in today's market that allow professional photographers to upload and annotate high-resolution digital images. Internet users are then able to search the stock library, view high-resolution versions of the photograph, and make image purchases online.

Currently, most of these web-based services rely on network technology whereby there is no clear distinction between data and presentation layer. Data is tightly coupled with presentation, making the software cumbersome and inflexible.

The *Stock Photography Exchange (SPX)* is very similar to many of the photograph broker applications available today. However, its main difference is that it targets amateur photographers. It provides an opportunity for the amateur photographers to sell their images over the web to media publishers and image collectors.

Furthermore, with the advent of new Internet technology, it is able to separate the image data information from its presentation, thus making the software very flexible in terms of portability.

2.   General Characteristics

The SPX aims to provide a stock library and market for digital images. The system will allow photographers to upload and annotate high-resolution digital images, which are stored on a server. Internet users will then be able to search the stock library using keywords, and view scaled down versions of the images.

The system shall support the following major functions of a web-based broker:

- Membership Registration.
- Image Uploading.
- Image Reviewing and Approving.
- Image Searching and Viewing.
- Image Purchasing.
- Administration and Maintenance.

This will be a new web-based system and it aims to provide quality services to both producers and consumers of stock images.

Although the system will not include an electronic payment feature initially, it should be readily extensible to include such functionality in the future.

The web site must operate 24 hours daily to cater for the need of global consumers.

The detailed functional and non-functional requirements are presented in the following sections.

2.1   System Interfaces

SPX shall be a brokering system built upon a distributed model, consisting of three separate components:

a.   **Photography Broker Server** - serves as an electronic broker for photographers and buyers.

b.   **Photography Broker Client** - allows users to register, upload, monitor and buy digital photos.

c.   **Administrator Client** - performs user administration and database maintenance.

The following information shall be stored in the database in order to support the operations of the system:

a.   **Image and its characteristics** - shall consist of image files and their characteristics, such as size, resolution, description, price, photographer, etc.

b.   **User Data** - shall consist of information about the Photographers and Buyers, such as their particulars, the number of pictures on sale, number of images sold, total profits made, number of purchases made, frequency of visits, etc.

c.   **Billing** - shall consist of every purchase transaction made by the buyers. It will contain the name of buyers, images purchased, total amounts due, date of purchases, etc.

d.   **Transaction** - shall consist of every transaction performed by the system such as user login, user logout, image upload, user account termination, etc.

2.2   User Characteristics

The users of the SPX are:

a.   **Registered Users (Photographers and Buyers)** - are Internet users. They can access SPX from any PC with Internet access. They are assumed to be familiar with computers and generally know how to surf the web for information.

b.   **System Administrator** - be familiar with SPX in general. This person must also be proficient with Oracle Database in order to maintain and housekeep business information.

c.   **Artistic Director** - will check for the quality of the images before they are displayed online. Undesirable or objectionable images will be promptly censored.

2.3   Design Constraints

The general constraints are:

a.   The SPX project shall be web-based.

2.4   Assumptions and Dependencies

The assumptions are as follows:

a.   The electronic payment portion of Image Purchasing module will not be implemented in this phase.

b.   The database server can be easily interfaced to the SPX with JDBC drivers.

3.   System Requirements

3.1   Membership Registration

3.1.1 Inputs:

a.   User's personal information:

      i.   First Name.

      ii.   Middle Name.

      iii.   Last Name.

      iv.   Address.

      v.   Country.

      vi.   Zip Code.

      vii.   E-mail address.

      viii.   Telephone number.

      ix.   Fax number.

      x.   Pseudo name.

b.   User's login id, password and re-confirm password.

c.   User's e-mail address for password recovery.

3.1.2 Processing Requirements:

The SPX shall target at the amateur photographers and professional bodies such as desktop publisher and magazines.

The SPX shall facilitate the following types of users:

a.   Registered Member (Photographer).

b.   Registered Member (Buyer).

c.   Administrator.

d.   Artistic Director.

The SPX shall create new user account for every Photographer and Buyer who registers with the system.

The SPX shall notify the Photographers and Buyers instantly once the registration has been approved.

The SPX shall also notify the Photographers and Buyers of their login ids and passwords via e-mail once the registration has been approved.

Registration with SPX shall be free of charge.

The SPX shall allow Photographers and Buyers to recall their passwords if they have forgotten them. The e-mail address shall be used as a key to recover the password.

3.1.3 Outputs:

a.   Instant acknowledgement to user.

b.   Notification of registration approval to user.

c.   Notification of recall-password mail to user.

3.2   Image Uploading

3.2.1 Inputs:

a.   Photographer's login id and password.

b.   Image's information.

c.   Images.

3.2.2 Processing Requirements:

The SPX shall allow the Photographers to contribute to the image database.

The SPX shall allow the Administrator and Artistic Director to contribute images through a special Photographer account.

The SPX shall accept JPEG and TIFF files from the Photographers.

The normal size of images accepted by SPX shall range from 0.5MB to 10MB but this setting shall be configurable.

The SPX shall prompt Photographers for login id and password before images are uploaded.

The SPX shall require Photographers to supply the following information before images can be uploaded:

a.   Keywords.

b.   Title.

c.   Price (range of prices recommended).

d.   Location of picture taken.

e.   Date and time taken.

f.   Technical Information (eg: types of cameras, lens, etc).

g.   Image description.

The SPX shall notify Photographers via e-mail once the images have been approved.

The SPX shall allow Photographers to modify information about the images and also to change the price of each image.

The SPX shall allow Photographers to delete their images that are put on sale.

3.2.3 Outputs:

a.   Notification of image approval to Photographer.

3.3 Image Reviewing and Approving

3.3.1 Inputs:

a.   Images.

3.3.2 Processing Requirements:

The SPX shall enable the Artistic Director to define a set of automatic standards/guidelines for checking the quality of images, and to conduct the review.

The SPX shall provide an approval process whereby it allows the Artistic Director to view, accept or reject the images.

The SPX shall have two levels of quality control:

a.   The first level consists of checking the image size, file format, resolution, etc. This check will be automated by SPX. If it fails, the image shall be rejected right away. An immediate response will be sent back to the Photographer.

b.   The second level consists of checking the content of the image. The Artistic Director will determine whether the image passes or fails this check. SPX shall also enable the Artistic Director to add extra keywords to the image.

The SPX shall notify Photographers via e-mail once the image has been approved.

3.3.3 Outputs:

a.   Notification of image approval to Photographer.

3.4 Image Searching and Viewing

3.4.1 Inputs:

a.   Keywords.

3.4.2 Processing Requirements:

The SPX shall allow keyword search for the images. The keyword may come from any of the following attributes:

a.   Keyword entered by the Photographer.

b.   Keyword entered by the Artistic Director.

c.   Title.

The SPX shall provide three levels of viewing images:

a.   When a keyword has been specified and the search has been completed, a list of search results shall be displayed as thumbnails.

b.   On selecting any of the thumbnails, the original size of the image shall be displayed, coupled with watermarking and information describing the image.

c.   If any portion of the image is *clicked*, a small rectangular section of the image shall be able to be viewed (without watermarking), so that the user can examine the quality in detail.

The SPX shall be able to display images in batches if the number of images retrieved is too large to be displayed on a single screen.

3.4.3 Outputs:

a.   Search results.

3.5   Image Purchasing

3.5.1 Inputs:

a.   Buyer's login id and password.

b.   Credit card information.

3.5.2 Processing Requirements:

The SPX shall store the billing and payment information in the Billing database.

The SPX shall follow the *pay-as-you-buy* scheme. A shopping cart (functionality that allows the Buyer to select all the items before making final payment) shall be used to manage the purchase transaction.

The SPX shall prompt the Buyer for login-id and password before a purchase can be made.

The SPX shall maintain a web page consisting of all the images purchased by a Buyer. The Buyer shall have exclusive access to this web page from which purchased items can be downloaded as and when required.

The SPX shall maintain a web page for every Photographer to update them about their current sale status. For instance, it will indicate the number of times the images have been purchased, and how much they have earned for that month.

3.5.3 Outputs:

a.   Downloaded images.

b.   Purchase Invoice.

c.   Sales Statement.

3.6   Administration and maintenance

3.6.1 Inputs:

a.   Administrator's login id and password.

3.6.2 Processing Requirements:

The SPX shall allow the Administrator to modify or delete an existing user account.

The SPX shall allow the Administrator to terminate any Photographer or Buyer account if required. A notification mail will be sent to inform the user.

The SPX shall allow the Administrator to configure the range of prices that Photographers can select from for their images.

The SPX shall allow the Administrator to have the right to reject any image after acceptance. A notification mail will be sent to inform the owner.

The SPX shall allow the Artistic Director to modify or delete any approved images.

The SPX shall allow Photographers to modify or delete their own images.

The SPX shall log every transaction performed by the system such as user login, user logout, image upload, image purchase, etc.

The SPX shall make use of billing data to produce purchase invoice, sales statement, etc.

The SPX shall maintain an e-mail account for customer feedback. This e-mail account will not be configurable.

The SPX shall maintain links to other web sites, such as the home page of a particular photographer.

3.6.3 Outputs:

a.   Purchase Invoice of the Buyer.

b.   Sales Statement of the Photographer.

4.   Quality Requirements

4.1   Reliability

The system shall aim for 100% reliability. That means the system shall not have any down time.

4.2   Systems Administration and Maintenance

The Administrator functionality is as follows:

a.   User administration.

b.   Image housekeeping which should be conducted regularly to ensure sufficient storage space for the images.

c.   Database maintenance which shall be able to be conducted at any time while the system is still running.

4.3   Security

SPX shall make use of applet signing to enable access to the system.

Passwords shall be encrypted when transmitted or persisted.

5.   Operational Requirements

5.1   Availability

The system shall be available 24 hours a day, 7 days a week.

The system shall support 100 concurrent users.

5.2   Response Time

The system shall maintain an online response time not exceeding 20 seconds.

The system shall have an average response time of 15 seconds for 90% of the user transactions.

6.   External Interface Requirements

6.1   User Interfaces

6.1.1 Display and Data Entry Requirements

The SPX web site shall have a professional look, and a user-friendly web-based interface.

Each registered member shall be assigned specific access rights to the functions that they are entitled. Password security shall be enforced to restrict access.

6.1.2 Help Requirements

On-line help shall be available for the Photography Broker Client and Administrator Client.

6.1.3 User Screen Requirements

The screens to be made available to each type of user are as follows:

a.   **System Administrator** - shall be provided with screens to facilitate user administration and to generate reports.

b.   **Artistic Director** - shall be provided with screens to facilitate the approval of images.

c.   **Photographer** - shall be provided with screens for membership registration, uploading of images and viewing sales statements.

d.   **Buyer** - shall be provided with screens for member registration, performing transactions, downloading images and viewing purchase invoices.

6.2   Hardware Interfaces

The system shall be developed and implemented on the following hardware platforms:

6.2.1 Client

The system client shall be a personal computer that has Internet access capability.

6.2.2 Server

The application server and database server shall be a server-class personal computer.

6.2.3 Network

Client and server machines shall be networked through the Internet.

6.3   Software Interfaces

The system shall be implemented using 100% pure Java, Servlet, Java Script, HTML and XML. JDBC will be used to access an Oracle Database.

The system shall be developed and implemented on the following software platforms:

6.3.1 Client

The client shall be any PC running Internet Explorer 9.0 or above, or Mozilla Firefox 3.0 or above.

6.3.2 Server

The application server shall run on the Windows Server 2008 operating system.

6.3.3 Database

The database server shall be using Oracle 11 or above, running on Windows Server 2008.

6.3.4 Network

Client and server machines shall communicate through HTTP.

7. Capacities and Volumes

7.1 Expected Volumes

The number of expected registered members is about 1000.

The total number of internet users expected to surf the web site is about 1000 per day.

7.2 Future Growth

Future growth shall not be considered by this project.

8. System Architecture

The following is indicative of the system architecture of SPX: