



香港公開大學 科技學院
THE OPEN UNIVERSITY OF HONG KONG
SCHOOL OF SCIENCE AND TECHNOLOGY

ELEC S321

Internet Technology for Business Applications

2017 Autumn Presentation

Tutor Marked Assignment 2 (TMA02)

Due on 10 February 2018, 23:59

Question 1 (50 marks)

The subject of this TMA is a small company that deals in the processing and manipulation of images. This company is considering transferring some of its business processes to the Web in the form of web services. As part of a feasibility study, you are asked to carry out some prototyping activities to act as proof-of-concept for this transformation.

Read the information given in **Appendix: Company background** and then answer the questions below.

When an image is to be processed, a paper form is filled in by an expert from the company to specify what changes the image should undergo. **Figure 1** represents a sample form filled in for an image to be processed for a client.

To demonstrate that it is feasible to use an XML document to capture image manipulation requests for the company, you are asked to create a sample XML document and accompanying XML Schema instance. The XML document should contain sample data illustrating that it can contain the same information as the request form above. The XML Schema instance should be used to validate the XML document.

- (a) Provide a source listing of the XML document containing sample data such as that in the request form above. Please also include a copy of the file with your submission. **(10 marks)**
- (b) Provide a source listing of the XML Schema document that can validate the XML document you created in part (a). Please also include a copy of the file with your submission. **(10 marks)**
- (c) For the following two pieces of information in the request form, describe the XML Schema features that you used to define an equivalent XML element. For each, briefly justify your choice of XML Schema features, stating any alternatives that you considered:
 - (i) information on the category of processing required (i.e. correct exposure, colour balance, etc.) **(10 marks)**
 - (ii) the library search keywords. **(10 marks)**
- (d) In your study of XML, you need tools for XML and XML Schema editing. Suggest a tool that you will use. Then, briefly describe three features that you have found either useful or a hindrance when creating and editing XML documents and XML Schema instances. **(10 marks)**

Figure 1

<u>Processing order form</u>		
<u>Client details</u>		
Organisation name:	[J Jarndyce Ltd]
Postal address:	[Bleak House]
	[Fort Road]
	[Broadstairs]
	[CT10 1EY]
Email:	[jjarndyce@hotmail.com]
Phone:	[01234 567890]
Account number (if applicable):	[1783]
<u>Fix required</u>		
Processing instructions:	<input type="checkbox"/> correct exposure <input type="checkbox"/> resize image <input checked="" type="checkbox"/> colour balance <input type="checkbox"/> sharpen <input type="checkbox"/> blur background <input checked="" type="checkbox"/> create composite <input type="checkbox"/> repair image fading <input type="checkbox"/> other (give details below)	
For composite:	<input type="radio"/> image attached <input checked="" type="radio"/> library image required	
Library search keywords:	[european courtroom judge law]
Special instructions:	[resize to A4]
	[]
	[]
	[]
Date submitted:	[20 Oct 2008]
<u>Results</u>		
Image size:	<input type="radio"/> small (< 2 megapixels) <input type="radio"/> medium (2–6 megapixels) <input checked="" type="radio"/> large (> 6 megapixels)	
Return results by:	<input checked="" type="radio"/> CD-ROM <input type="radio"/> email <input type="radio"/> hard copy	

Question 2 (50 marks)

In a web services implementation of the company's activities, the results of a picture search for a library image such as that specified above would also form an XML document. This would contain information about each image that matches the search criteria. The company stores its images in digital form in a database. These digital image files contain metadata about their content, ranging from the shutter speed used to copyright information. This information could be included in the picture search results document.

Two sample metadata files are provided. Study them and then answer the questions below. You do not need to understand the detailed content of these files.

- (a) The sample metadata files contain a number of namespaces.
 - (i) List all the namespaces used in these files. **(8 marks)**
 - (ii) What benefits are offered by the use of namespaces in XML documents? **(6 marks)**
 - (iii) Looking at the namespaces used, which do you think are likely to correspond to de facto and which to de jure standards? **(6 marks)**
- (b) While some items of information in the image metadata files are likely to be of use to clients, others are not. It is therefore proposed that only some of the elements from these files are incorporated into the overall picture search results document.

It has been suggested that XSLT is a technology that could be used to extract relevant information from the metadata files. Select an alternative method and briefly describe both methods, giving advantages and disadvantages of each technology. **(10 marks)**

- (c) Using this scenario as an example, compare the benefits and disadvantages of using (i) industry standard schemas and (ii) a new schema developed specifically for one purpose. **(10 marks)**
- (d) As part of a report to the company's management, you are asked to consider the issue of how best to extract and use existing image metadata in picture search results, drawing on the investigations you have carried out earlier in this assignment. Give your recommendations with a brief justification. **(10 marks)**

What to submit

You should submit a word-processed document containing your answers to the assignment questions given above. Your tutor will mark and comment on this document, so it is important that it includes all the material you have created. This should include listings (in source code form) of the XML and XML Schema documents you are asked to create.

You should also submit files containing the XML and XML Schema documents you create. Your tutor may use these to confirm the correct functioning of the documents.

You will need to combine your word-processed document and the additional files into a zip archive for submission to the assignment submission system.

Appendix: Company Background

Background

The company 'Your Best Image Ltd' (YBI) is a small to medium-sized enterprise (SME) with a core business in sourcing and processing images. The company focuses on sourcing images for commercial clients. These companies usually want to produce promotional material either in print or online (or both). They typically provide a description of the type of images they require and outline how they are to be used.

Images are either purchased from other organizations that hold collections of images or produced by commissioning a photographer. In rare cases the company already has some suitable images, or images that can be processed to produce a suitable result.

In addition to sourcing images, YBI has expertise in the high-quality processing of images. The company can make a range of alterations to images, from simple retouching (for example, removing a skin blemish from a portrait of an individual) to combining images together (for example, a picture of a celebrity at home can be combined with a picture of the surface of the moon so that it appears the celebrity has been to the moon).

The company started out ten years ago with one salesperson and a single expert in sourcing digital images. Today the company employs around 30 people.

The company uses sophisticated digital image manipulation technology, but has no expertise in e-business technologies. It has a set of ongoing relationships with other companies, both clients and image suppliers, that have stated they are adopting an e-business approach, and so it needs to investigate how it can use technology such as web services to keep up with the competition and also to maintain its relationships.

Originally the company offered only sourcing of images. The company established close relationships with a range of potential suppliers, including museums and archives that could provide unusual and high-quality images. Images were sent either by email or on CD-ROM between the company and both clients and suppliers.

The staff who work in image processing are not just familiar with the technology of image manipulation; they are also trained artists or designers. This combination of skills allows them to offer a very specialist service within a niche market.

Client business

Client businesses are normally companies producing promotional publications. They are focused on producing original and high-quality material to distinguish them from competitors. In recent times, YBI has also attracted local government as new clients. This new type of client also produces publications about their activities within the local community and has a requirement for images related to these activities (waste disposal, recycling, sport and leisure facilities, etc.).

YBI attracts client companies by providing a 'one-stop shop' for all their image requirements. A client can outline just a general theme or provide a full and detailed specification of the required images. The company is currently focusing on establishing a better insight into clients' businesses so that it can be more creative in ways that will be beneficial to clients. The aim is to add value to images by being more creative in proposing themes and selecting/matching images, and to move away from merely sourcing selections of images.

Some of the client businesses, particularly in the retail area, give YBI very tight deadlines as they have to meet production deadlines of their own. This has resulted in some tension between creativity, the results of which need to be reviewed and often revised, and the need for speedy services to clients. If possible, the company wants to gain more 'creativity time' by improving speed of delivery in other areas, such as using email rather than posting discs.

The company's services are promoted through a web site. This demonstrates the work the company has done in its two main areas, using some clients' publications and links to web sites where YBI contributed theming and images, and some sample images with 'before and after' examples of processed images for clients.

The web site also lists an email address for the company, which has been increasingly used to email in images and enquiries. Clients have used email to send images and accompanying instructions, although many still use CD-ROMs. The customers with tight deadlines have increasingly begun to use email.

In some cases, the process of creating a set of appropriate images for a client's publication or web site involves several cycles of 'proposal and feedback'. Initially YBI may propose a set of themes and accompanying images for each theme. The client will then either meet to provide feedback or email some comments. The process generally further specifies the theme and images until the client is satisfied. These processes can continue through several cycles, but customers are charged for each new version of or alteration to the image(s). If images are exchanged on CD-ROM, this process can take some time and not be feasible for tight deadlines.

Third-party materials

For company clients, in most cases YBI uses images from third parties, which are combined and matched to provide a coordinated set for a publication. There are two current ways of doing this:

1. Images are provided by a third party from their archive. To achieve this YBI provides details such as a theme, a subject area, a colour scheme or any combination of these. A theme might be 'African', a subject area 'cultural items' and a colour scheme 'blue and hues'.
2. Images are commissioned. This involves providing a briefing for a photographer to shoot some new images. In the past the company has employed the services of a small number of local professionals, but this is very restrictive as local subject material is limited (Africa is not very local). The company would ideally like to widen the range of photographers who tender to provide pictures.

The company always takes great care over image rights and ensures that all clients have appropriate rights to use the images that are supplied as intended (in printed publications, on the Web, etc.).

The company also maintains its own archive of images, as this allows it occasionally to provide images it previously commissioned for new uses at a greater profit. The company retains the right to reuse images that were commissioned for past projects for clients.

One of the current problems the company faces is the increasing pressure of deadlines for image delivery, combined with the demand for greater client input into the production process. Clients increasingly want to be involved in the creative process and to have several cycles of selecting themes and images, but within ever-shortening timescales. Although unsure of the specifics, the company has the impression that adopting an e-business approach may help in this respect.

YBI internally

Like most other organizations, YBI has a set of internal processes for accounting and ensuring quality. The internal processes perform two major functions:

1. They ensure that YBI serves its clients professionally. This includes allocating staff to manage client accounts, recording client deadlines for images and appointing staff as responsible for meeting deadlines.

2. They ensure the proper running of the internal affairs of YBI itself. This includes proper accounting, payment of taxes and VAT, billing clients, payment to image suppliers, etc.

The company outsources its accounting function to a local accountant.

Internally, YBI is again under pressure to act more rapidly. Billing clients earlier, so that revenue is received earlier, would improve the company's financial situation greatly.