

HISTORY PLACES: Design Brief

INTRODUCTION

Learning aims

In this integrative project you will apply principles of database design and information retrieval to create a small but relatively complex information system. You will learn to use professional development tools and technologies (NetBeans 5.0, JSP, PostgreSQL, JDBC, Lucene search API). Most importantly, you will learn how to design and implement an information system that satisfies a relatively vague, open-end problem statement. Through this process you will gain confidence for tackling complex technical problems and come to appreciate some of the beauty that underlies information systems.

Objective

The objective of this project is to develop a detailed specification and a working prototype of History Places. To guide this 10 week process, you will prepare a set of deliverables.

Root concept

History Places is an information system that enables people to submit photographs, and other media such as audio files, of places so that people can perceive how a building, view, landscape feature, or artifact has changed over time. Being able to perceive and discuss change is a fundamental aspect of human discourse. Thus, a system that enables these tasks can be used for many purposes. That, at least, is the theory!

Short scenarios

Consider these short scenarios that reify the root concept:

- An environmental group aims to show how the natural landscape in the Western United States has changed. Thus, they decide on a set of sites and ask people to submit photographs of those sites.
- An architect wishes to capture the progress of a construction project. Thus, she takes pictures of the building site over a period of a year to document how it developed.
- An elementary school teacher wishes to develop his students' interest in history. Thus, he gives cameras to his students and asks them to go into the community with their parents to take pictures. The system is seeded with a set of historic photographs—students begin by browsing these photographs and selecting one or two locations for their own shots.

Before reading further, please identify a similar scenario that might benefit from a History Places approach. What features of your scenario make it like these examples?

User Tasks in History Places

Consider the following user tasks that people might perform in History Places. In these tasks, SMALL-CAPS-TEXT represents an entity/noun and underlined-text represents an operation/verb.

1. A USER can submit a PHOTOGRAPH or AUDIO RECORDING for a PLACE.
2. A USER can browse a directory of arbitrary depth and breadth and discover PLACES.
3. A USER can find a particular PLACE or PHOTOGRAPH by a keyword.
4. A USER can find PHOTOGRAPHS that are similar to another PHOTOGRAPH.
5. A USER can browse a timeline and discover PLACES or PHOTOGRAPHS.
6. A USER can vote on the quality of a PLACE or PHOTOGRAPH.
7. A USER can discover the most popular PLACES or PHOTOGRAPHS.
8. A USER can find similar USERS.
9. A USER can comment on a PLACE or PHOTOGRAPH.
10. A USER'S BEHAVIOR is tracked and recorded for future analysis.

Before reading further, select a scenario from above or one of your own choosing and consider which tasks you think are most relevant. Does your scenario seem to raise new tasks? Do some tasks for your scenario need to be modified?

Please note: You will not need to implement solutions for all these tasks!

General Requirements

Your solution to the History Places project should satisfy the following requirements:

1. Develop a general abstraction for the concept of place. It should be possible to represent a hierarchy of places of arbitrary depth (e.g., World : South Pacific : Fiji : Viti Levu : Suva : Central Square).
2. Develop an abstraction that allows you to represent both static media (e.g., Pictures) and dynamic media (e.g., Audio recordings).
3. Develop an abstraction that allows you to track what users submitted what media to what places. This abstraction will be important to giving credit to frequent users and for identifying users that may be abusing the system.
4. Develop an abstraction for users that includes a profile, including such information as age, gender, interests, favorite places, and so on.
5. You should impose no editorial control on your system (i.e., submissions are not to be reviewed by an editor).

6. Assume that image, audio and other such files are stored in an external storage infrastructure and these files have unique identifiers that can be accessed by hypertext links. Thus, a file upload function is not required.
7. Do not implement a secure user authentication scheme. You may encode unencrypted user identifiers on HTTP requests.
8. A high quality visual design is not required. The emphasis of this project should be on interesting and powerful functions. The user-interface needs only to reveal these functions and be neat and clear.

As you proceed through the project, you should repeatedly return to this list of requirements and explore how they can help you reduce the complexity of your project.

Team Organization

Teams will consist of three people and will be selected by the instructor and teaching assistant based on a skills profile. As outlined below some deliverables are the joint responsibility of the team. Other deliverables are the responsibility of individual team members. For the individual deliverables, you should collaborate closely and help each other, but the design and coding must be done individually by a designated lead person. This person must be clearly identified in the submitted deliverables. The objective of this project is to develop a detailed specification and a working prototype of History Places. To do this, you will be asked to prepare a set of deliverables (see below).

DELIVERABLES

As it stands, History Places is a large ill-defined project. To help you manage its complexity a set of deliverables and a timeline is proposed below.

Preliminaries

You will submit two draft reports, one in week #4 and one in week #8, and the final report in week #10.

The audience for these reports is a technical project manager; that is, someone with a background in information system design who plans and manages projects. This person will appreciate concise, clear, interesting writing and seeks to understand **what you did** and **why you did it**. In addition, this person will appreciate innovative ideas, critical discussion about their merits, and realistic plans for evaluating them.

You should create a simple website to post your project reports and any other necessary materials. Your website, of course, should link to the History Places prototype.

The front door of your website should include the team name, team members, the course name, course date, and so on.

For a degree of privacy, you may select an obscure URL for your website. You will give this URL to the teaching assistant and instructor so they can grade your work.

Report #1: System Design, Rough Draft

1. *Executive Summary*

Concisely summarize the project, indicating the vision, key technical components, and current status

2. *Present a table of contents for the final report.*

3. *Present a brief introduction to History Places, propose a vision for your system, and list a set of functional requirements.*

The introduction should orient the reader to the report and describe what History Places is, why you are working on it, and so on.

The vision should briefly describe who the users are and what they will do with the system. You can select one of the above scenarios and elaborate it with your own ideas or you can propose a new scenario that is consistent with the root concept for history places.

Next, include a list of functional requirements for your system. Functional requirements are terse statements of what the system will do but not how. They take the following form:
The system will have the ability to ...

4. *Describe the conceptual model for History Places*

This section will consist of a conceptual model for History Places. The conceptual model describes the entities, attributes, and relationships of the system independent of the target implementation platform.

You must use Enhanced-Entity Relationship modeling and UML notation. In addition to the diagram, this section must include a brief description of the key features of the model.

5. *Describe the logical model for History Places*

This section will consist of a logical model for History Places, where the conceptual model is transformed into a set of entities, attribute names and types, and 1-1 and 1-M relationships.

In addition, you should a) specify the primary and foreign keys; b) specify the integrity constraints for the model; b) indicate what parts of the overall model you will implement; and c) include the SQL script used to define your database.

6. *Describe the Information Retrieval module for History Places*

This section will consist of a description of the best-match searching that History Places offers. Referring back to the conceptual model, you should include a description of how you documents, what meta data they contain, the indexing policies used, and how the Information Retrieval module is kept consistent with the data base module.

7. *Describe the system architecture for History Places.*

This section should clearly describe the system architecture that you have used to implement History Places. It should describe what these technologies are and how they fit together: JSP pages, HTTP requests and responses, Java application classes, PostgreSQL, Lucene, Tomcat web server, JDBC, web browsers, WAR files, and so on.

8. *Design tools and process*

In Appendix A, please describe how your team is working together. You should indicate: 1) How often you meet and where; 2) What communication tools you used; 3) What tools you used to coordinate and plan your work; 4) What documents you use to make progress; and 5) The challenges you experience when working together and how you overcome them.

Please note: For the first report, please outline your team's ideas for sections 4-7 as best you can. You will revise and add to these sections in subsequent reports.

Report #2: Design & Code, Functions 1-2

Report #2 should be a revision of report #1 plus these six sections:

9. *Functions #1*

- 1A. Create a place
- 1B. Upload an image
- 1C. Create a user

10. *Functions #2*

- 2A. Browse a hierarchy of places (arbitrary depth)
- 2B. Browse photographs on a timeline (arbitrary period of time)
- 2C. Browse a list of users (assume the number of users > 1,000)

Each section should consist of the following subsections:

- 1) A use case
- 2) A wireframe sketch of the interface
- 3) A brief description of any noteworthy features or limitations.

In addition, the Java and JSP code for each of these functions must be easily accessed on your website. (Please do not include the code in your report.)

9. *Design tools and process*

Please update Appendix A with a second report.

Please note: 1) Revise section 1-7 for a second round of feedback; 2) Indicate who designed and wrote the code for each function.

Report #3: Final System

The final report should be a revision of report #2 plus these sections:

11. Functions #3

- 3A. Search places/photographs by keyword
- 3B. Search photographs by keyword and date range
- 3C. Given a user, find some users that are similar

As above, please include a use case, a wireframe sketch of the interface, and brief description of any noteworthy features or limitations.

12. Status and next steps

Summarize the state of History Places in terms of design and development and what you would do next.

13. Team Reflection

Please update Appendix A and provide brief personal statements of what you learned, how you helped each other, what worked, what you would do differently next time, and what you would like to do next.

Report Outline

Title page (1 page)

Executive summary (1)

Table of contents (1)

Introduction, Vision, Functional Requirements (~3)

Design

Conceptual Model (~ 2)

Logical Model (~2)

Information Retrieval Module (~2)

System Architecture (~2)

Functions (~18 pages; ~2 pages/function)

For each function,

Responsible person

A use case

A wireframe sketch (if necessary, put additional sketches in Appendix B)

A brief description of any noteworthy features or limitations

Status and next steps (~1)

References

Appendices

Appendix A: Design Tools, Process and Team Reflection (~4)

Appendix B: Additional wireframe sketches if needed

Other appendices if needed

Notes

- Please use 1.5 line-spacing for written material. Use a 11 point serif font (e.g., Times New Roman) for the body text and at least 1 inch margins
- Please try to keep to the page limits – conciseness and clarity are valued
- All figures and tables must have captions
- On the title page, please include an URL to the website
- The code for the system should be readily available at the website.

GRADING GUIDELINES**General**

- The design is elegant and simple;
- Decisions are made explicit and justified;
- Notations are used fully and rigorously;
- The writing is clear, concise, and interesting.

1. Overall 10%

- All report sections present;
- Absence of spelling and grammatical errors;
- Captions and legends explain diagrams and charts.

2. Front and Back 10%

- The project is introduced and concluded in an effective manner.

3. Information System Specification 20%

- Data models show entities, relationships, attributes, types, and so on;
- The overall architecture is presented in an effective manner.

4. Implementation 60%

1. Use cases specify flow through the system and contingencies at an appropriately detailed level;
2. Wire-frames reveal the exchanges of information between user and system and correspond to the use cases.
3. The prototype demonstrates that the use cases were implemented correctly;
4. The working prototype is annotated to explain bugs, noteworthy limitations, and cool features.

Notes:

1. All members of the team will receive the same grades for the first three components of the report;
2. The fourth component of the report may be graded individually.