University of Portsmouth

School of Engineering

Academic Year 2015/16

ENG720s1 Client-Server Network Architecture

Coursework

Deadline For Submission: 8 January 2016

Hand-in Instructions: The completed report must be submitted online. *A copy of your assignment code or programs must be saved in* ***~/eng720s1/assignment*** *directory, where* ***~/*** *refers to your home account on the University of Portsmouth computer system.*

Instructions for completing assessment: The coursework will be assessed by means of a formal report and on-line assessment of the program functions and program code. The report must have a cover page. **The second page of the report must contain the URL of your website, the administrator's username and password and any other details that may be required to fully assess the system. Each student must submit an individual work.**

Examiners: Professor Andrew Nix
Dr David L Ndzi

INSTRUCTIONS

Submission Date: 8th January 2016

This coursework contributes 60% to your overall unit mark.

The final coursework submission will be assessed by means of a formal report and on-line assessment of the program functions and program code. The report must have a cover page. **Each student must submit an individual work**.

The completed report must be submitted online by **8th January 2016**. Late submissions will attract the standard academic penalty. The assignment also has scheduled formative assessments. The breakdown of the marks and the assessment criteria are provided in this document.

All coursework will be checked for possible plagiarism. The report must be appropriately referenced and contributions from anybody other than the student submitting the work must be acknowledged.

The implementation must be operating system or platform independent. All work submitted for assessment must be running on the University of Portsmouth system on the specified servers. Programs not running on the University of Portsmouth server(s) or submitted on disc or any media will not be assessed and will be considered as a non-submission.

A copy of your assignment code or programs must be saved in ~/eng720s1/assignment directory, where ~/ refers to your home account on the University of Portsmouth computer system. This will automatically be collected on the submission date.

1. Publication Management System

You have been asked to design and implement a web-based publication and information management system for the School of Engineering called Engineering Publication Library (EPL). The library system will be accessible to the general public, registered users and School of Engineering staff and students.

The library stocks a wide range of publications. These include student project reports, Masters and PhD theses, conference papers, journal papers and research progress reports. These are all in electronic form. Whilst the general public can search the EPL catalogue, access to material is generally restricted to registered users only. However, there is an option that can be selected by EPL staff to make individual material accessible to the general public. For material not made accessible to the general public, users have to sign in to access them and the system must keep track of which material the user has accessed or downloaded. The system keeps records about all users which include, when and how often they use the library and users may be restricted to a specified number of downloads of material per calendar month.

In this coursework, you are required to use the design and specification from **Coursework 1** design and implement the system. You should modify your designs or analysis from Coursework 1 as necessary for the implementation.

This assignment is divided into two parts: Part 1 is to develop a library cataloguing system and Part 2 is to develop a user management system.

1.1. Part 1: Library Catalogue System

Develop a system that would allow the library users to:

- Search the catalogue for material either by title, keyword(s), author(s), publication number or a combination of these;
- Register;
- Login;
- After logging in, a user can see the publications that are restricted for access by registered users only.

1.2. Library Management System

In addition to the functions listed in Section 1.1., there are additional functions that library staff will use. These include:

1. Register:
   - a new publication (title, author(s), publisher, date, language, ISBN or publication reference number, type[electronic, printed], subject area [e.g. engineering, computing], etc.);
   - journal papers, conference paper, research progress report, undergraduate project report, MSc project report, PhD thesis, research grant, etc.
   - provide an option for a file to be upload and a link to its location to be inserted;
2. Modify the entry for any material in the catalogue;
3. Delete material from the catalogue;
4. Search for a registered user;
5. Suspend or re-enable a user's account;
6. Delete a user;
7. Contact a user;
8. Register a new user or modify a user's account,
9. Reset the password of a user.

The implemented system should enable the public to access the EPL website, search the catalogues and see a list of publications that the library holds. All users must be presented with an appropriate user interface and relevant information.

2. Instructions and Guidelines on Assessment

The assignment involves the complete development of an information system. You are required to analyse the requirements, produce design and implementation specifications, and develop the system. Use the work you submitted in Coursework 1 as much as necessary. The developed system must have the following features:

- information entry, retrieval, processing and presentation to users;
- interactive web access;
- server-side processing, interaction with users and updating of records;
- client-side processing of user information;
- database for data storage and management.

Although you are not supposed to implement a comprehensive security, security aspects must be taken into account when designing and implementing your system.

2.1. Formative Assessment Submission Schedule

This scheduled intermediary formative assessment is designed to help all students and provide feedback on your progress.

- **24th November 2015**: feedback on database structure, Information Flow Diagram (IFD) and programs that process and store user inputs.
- **8th December 2015**: feedback on programs that access the catalogue and allow users to search the catalogue and display matching entries.

2.2. Programming Languages and Servers

Each student must justify his choice of programming languages used in the implementation. When selecting a programming language to use, it should be kept in mind that technical support would be available only for the following languages: JavaScript, Perl, PHP and Java. However, there is a Student Computer Surgery session every Wednesday afternoon that supports students with programming problems. The School of Engineering web server (Apache) supports PHP and CGI, and has a mySQL server for students' work. Contact the unit lecturer or the system administrator in Room A2.4 if you do not have an account on the web and database servers.

Important considerations for web accessible systems include:

- maintenance and management;
- hosting (how easy is it to find a company to host your web site and how much does it cost?);
- portability;
- upgrading;
- security.

2.3. Assessment

This coursework will be assessed by means of a formal report and full assessment of the program functions and code after the submission deadline. Your program code will be collected on the submission deadline from your account.

The coursework marks are distributed (marking scheme is) as follows:

1. Report: 45%
    - user(s) requirement analysis 5 %
    - database design 10%
    - implementation/web flow diagrams 15%
    - test results and screenshots 10%
    - critical analysis of system 5%

2.	System functions and program code:		50%
	• new users can register	5 %	
	• registered users can login/logout	5%	
	• staff can register new or modify old material(reports, papers,..)	10%	
	• users can search of material and see results(reports, papers,..)	10%	
	• users can access material, download or view	10%	
	• staff can serach registered users	5%	
	• staff can modify details of registered users	5%	
3.	Innovation and critical analysis		5 %

The software must be running on the School of Engineering web server and each student must create a back-up copy in a directory called ~/eng720s1/assignment; where **~/** refers to the student's University of Portsmouth home account. Any software not on the University server will NOT be assessed.

The lecturer will make notes during scheduled formative assessments. Although the formative assessments do not carry marks, they will inform the lecturer of your development process. Students who do not demonstrate sufficient progress may be called upon to demonstrate and explain their system after the submission date. Guidelines on what you may be asked to do during the demonstration are provided below.

Program Code Guidelines

You are required to adhere to the following coding style:

- You should use descriptive names for all of your variables and functions.
- You should include a good comment at the start of each subroutine or function you define. A good comment describes the function it is referring to, yet is unambiguous and succinct.
- You should keep each subroutine or function short and it should do only one thing.
- You should use a consistent and readable scheme for indentation, spacing and blank lines.
- If a variable is used only in a subroutine or function, it should be made a local variable.

Software Assessment Guidelines

- A new user should be able to register by completing a registration form that requires the user to provide, at least, a unique login ID, a password (and verification), full name, and an email address.
- Material can be added and deleted from the catalogue.
- System can be searched for material and users.
- A user can select and unselect different items.
- Details of material downloaded by a user can be retrieved and displayed.
- At least 4 groups of users are cartered for: the public, registered users, staff and system administrator.
- User accounts and previleges can be changed by an administrator.

Report Guidelines

- Table of contents
- An introduction that puts the project into context and a short referenced literature review (*use Havard APA Referencing standard http://referencing.port.ac.uk*).
- The report must include user requirements analysis, design objectives and justify all the decisions made.
- Database design
- The choice of technology and the programming languages used in the implementation must be justified. Full details of how these choices affect the maintenance, portability, efficiency and long term use of the developed system should be provided.

- Information flow diagram (IFD), use case, webflow diagram, or some other representation of the flow of data between the tasks and the system should be provided. The IFD format is described below. This include step-by-step description of the program(s).
- The report should also discuss the implementation considerations. Screen shots and diagrams should be used to illustrate the system and its structure. That is, how the files are stored, file dependencies and database structure.
- The problems encountered in the course of doing the assignment and how the problems were solved or could be solved should be discussed, in addition to the limitations of the system.

Demonstration

You may be asked to demonstrate and explain your system as part of the assessment process. Although no marks will be awarded specifically for this demonstration, failure to demonstrate the system, when asked, may result in a penalty being awarded. For your demonstration, plan on a 5-10 minute interactive session. During your demonstration you will be asked to do the following:

For at least two tasks, you will be asked to:

1. show the steps that a user would perform;
    - Demonstrate the kind of errors (missing or invalid inputs, etc.) that your system can handle gracefully.
    - Explain how your system ensures the integrity of the database.
2. describe and justify the major design decisions/adjustments you made that departs from your initial design;
3. demonstrate any extra functionality that you may have included, apart from the standard functions stipulated in the assignment;
4. describe the system's limitations and your thoughts on how you might improve it; and
5. the assessor will ask you technical questions.

Details of Information Flow Diagram (IFD)

In describing this type of diagram, we use the university database example (see Fig. 1). The IFD describes, at a high-level, the following aspects of your system:

1. Documents: any data relevant to your application (could be internal or external to your system). In IFD, documents are represented as rectangles.
    - Internal documents represent data that is to be stored in the system itself (e.g., student records, enrollment records, etc.).
    - External documents represent data that is either (1) input by users or (2) generated dynamically by the system (e.g. login and password selected by a user, a user's transcript).
2. Tasks: any action the system performs.
3. System boundary: this is represented as a rectangle. All external aspects of the system (external documents) lay outside the rectangle and all internal aspects (internal documents, as well as tasks) lay inside.

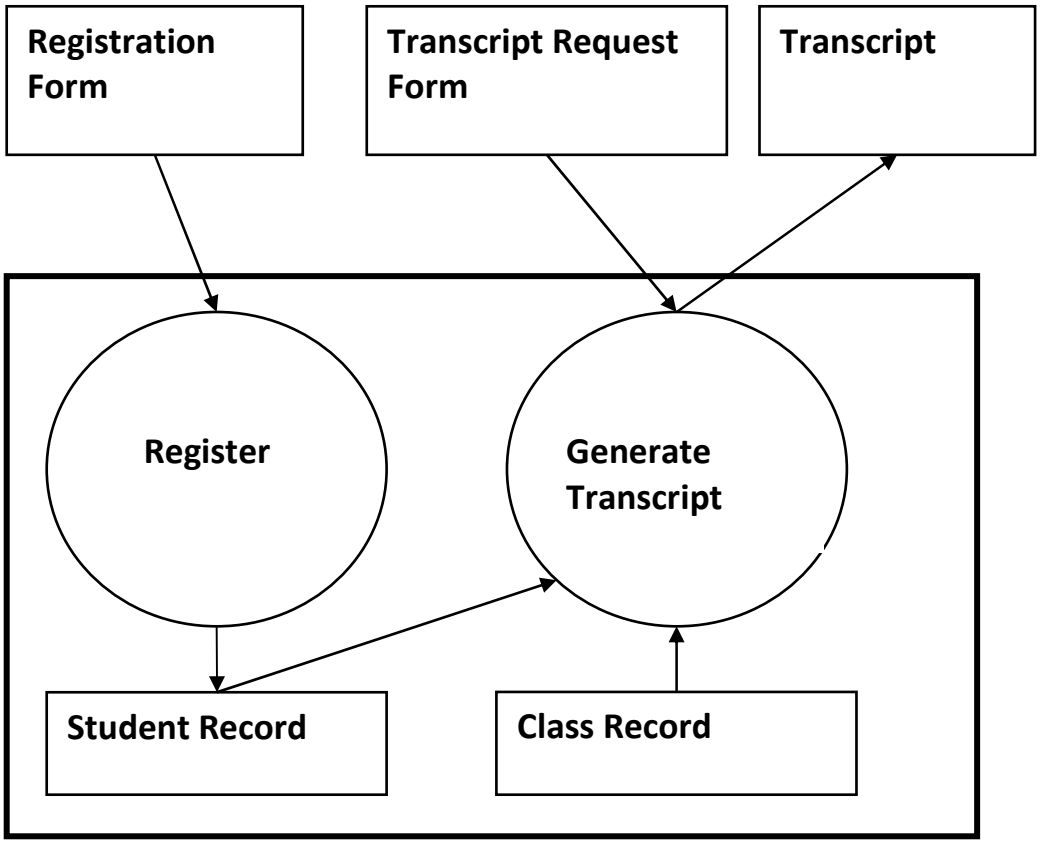

Fig. 1: Information Flow Diagram of University System for Transcript Requests