

UNIVERSITY OF LONDON

GOLDSMITHS COLLEGE

Department of Computing

B. Sc. Examination 2016

IS52031A

Programming for Dynamic Websites

Duration: 2 hours 15 minutes

Date and time:

This paper is in two parts: part A and part B. You should answer ALL questions from part A and TWO questions from part B. Part A carries 40 marks, and each question from part B carries 30 marks. The marks for each part of a question are indicated at the end of the part in [.] brackets.

There are 100 marks available on this paper.

No calculators should be used.

**THIS PAPER MUST NOT BE REMOVED
FROM THE EXAMINATION ROOM**

Part A
Multiple choice

Question 1 This question has one correct answer

What is SQL?

[2]

- A. Standard Query Language: a standardised query language understood by all database management systems.
- B. Structured Query Language: a special-purpose language commonly used to manage data held in relational databases.
- C. Specialised Query Library: a software library written specifically for web applications to interact with databases.
- B. Sun Query Library: a software library originally developed by Sun Microsystems for interacting with relational databases.

Question 2 This question has one correct answer

Relational database management systems mainly use row-based data storage. This makes them more suitable for which of the following tasks?

[2]

- A. Queries affecting many different records
- B. Reporting on a large data set
- C. Analysing relationships between entities in a database
- D. Queries affecting a single record

Question 3 This question has one correct answer

What is the main reason why a Single Point of Entry might be advantageous in a database-driven web application?

[2]

- A. It may reduce development time by easing centralised tasks such as database connection and session handling as only one file will need to be modified.
- B. It will improve performance of the application as all the requests will be served by a single script.
- C. It will improve security as users will not be able to see which scripts are being loaded in the URL.
- D. It will improve performance by preventing multiple connections being opened on the database.

Question 4 This question has one correct answer

What is the underlying protocol which defines how data is formatted and transmitted across the World Wide Web?

[2]

- A. Hyper-Text Transfer Protocol
- B. Secure Socket Layer
- C. Transmission Control Protocol
- D. Internet Protocol

Question 5 This question has one correct answer

- How may data be transmitted to a web server in an HTTP GET request? [2]
- A. It may be sent within HTML form data
 - B. It may be sent within the body of the request
 - C. By appending the request URL with a query string containing field-value pairs
 - D. It can't. Data can only be retrieved with a GET request

Question 6 This question has one correct answer

- In a relational database table, what name is given to the field or combination of fields that uniquely identifies each record? [2]
- A. PRIMARY KEY
 - B. FOREIGN KEY
 - C. SUPER KEY
 - D. CANDIDATE KEY

Question 7 This question has one correct answer

- In the 3-tiered application model, a web application's architecture is segmented into 3 parts or tiers. In which of these 3 tiers would a web and/or application server reside? [2]
- A. Presentation tier
 - B. Middle tier
 - C. Data tier
 - D. Any of the above

Question 8 This question has one correct answer

- In SQL, what is the purpose of the JOIN clause? [2]
- A. To merge two or more tables in the database
 - B. To insert data in two or more tables with a single query
 - C. To update data in two or more tables with a single query
 - D. To combine records from two or more tables in a single result set

Question 9 This question has one correct answer

- A MySQL database administrator wants to allow a user called 'jhon001' the ability to 'read' data from all tables in a single database called 'db1'. They do not want the user to be able to modify the data in any way. Which of the following SQL statements would best achieve this? [2]
- A. GRANT ALL ON 'db1'.* TO 'jhon001'@'somehost';
 - B. GRANT SELECT ON *.* TO 'jhon001'@'somehost';
 - C. GRANT SELECT ON 'db1'.* TO 'jhon001'@'somehost';
 - D. GRANT ALL ON *.* TO 'jhon001'@'somehost';

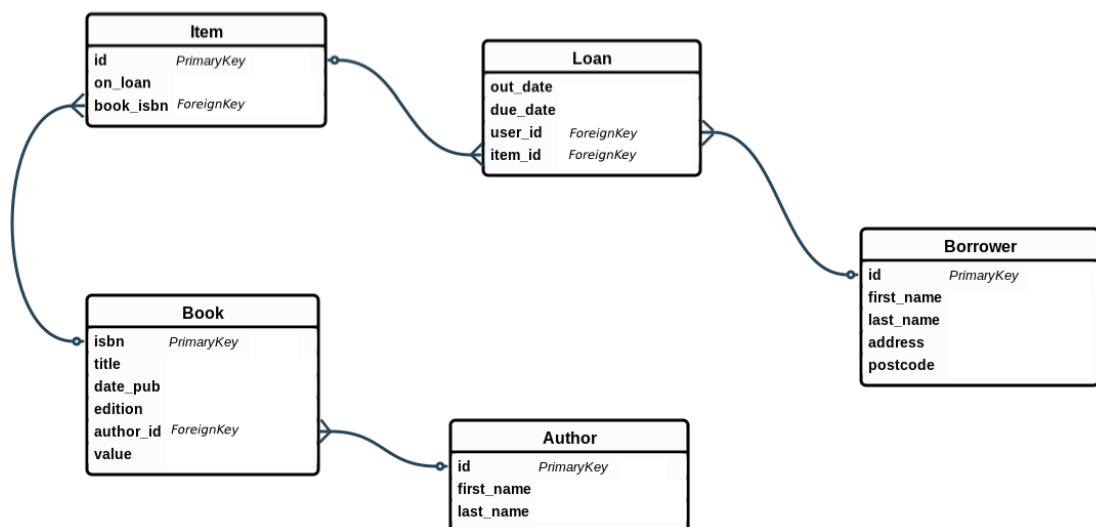
Question 10 This question has one correct answer

Which of the following is NOT a justification for database normalisation? [2]

- A. 'It helps eliminate redundant data'
- B. 'It helps ensure data is logically stored'
- C. 'It can increase the efficiency by which data is accessed and manipulated'
- D. 'It makes the process of joining data from multiple tables simpler'

Question 11 This question has one correct answer

According to the following entity relationship diagram for a book lending application, which of the following functional dependencies is TRUE? [2]



- A. Loan.item_id => Item.id
- B. Item.id => Loan.item_id
- C. Book.title => Item.book_isbn
- D. None of the above

Question 12 This question has one correct answer

If the schema given in question 11 were to be implemented in MySQL, how many columns would the Borrower table have? [2]

- A. 3
- B. 4
- C. 5
- D. It's impossible to tell

Question 13 This question has one correct answer

In a MySQL database based on the the diagram from question 11, which of the following queries would return the titles of books by Jane Austen? [2]

- A. `SELECT first_name, last_name FROM Author INNER JOIN Book ON Book.author_id=Author.id WHERE last_name='Austen' AND first_name='Jane';`
- B. `SELECT Book.title FROM Book WHERE Author.last_name='Austen' AND Author.first_name='Jane';`
- C. `SELECT Book.title FROM Book INNER JOIN Author ON Book.author_id=Author.id WHERE Author.last_name='Austen' AND Author.first_name='Jane';`
- D. `SELECT title FROM Book WHERE author='Jane Austen';`

Question 14 This question has one correct answer

According to the schema illustrated in question 11, which of the following statements should, logically, be FALSE? [2]

- A. A single instance of Author may be associated with many instances of Book
- B. A single instance of Book may be associated with many instances of Item
- C. A single instance of Loan may be associated with many instances of Borrower
- D. A single instance of Borrower may be associated with many instances of Loan

Question 15 This question has one correct answer

In the diagram from question 11, it is not indicated which field(s) will form the PRIMARY KEY of the Loan table. Which of the following solutions is NOT likely to be acceptable? [2]

- A. Make user_id the primary key
- B. Add an extra 'id' field and make it the primary key
- C. Make item_id the primary key
- D. Make user_id and item_id a compound primary key

Question 16 This question has one correct answer

According to the diagram from question 11, which of the following best describes the relationship between the Borrower and Loan tables? [2]

- A. One-to-Many
- B. Many-to-One
- C. One-to-One
- D. Many-to-Many

Question 17 This question has one correct answer

Which of the following data types would be more suitable for storing the Author first_name? [2]

- A. CHAR(25)
- B. VARCHAR(25)
- C. TINYTEXT
- D. TEXT

Question 18 This question has one correct answer

In a database following the relational model, what is a junction or link table? [2]

- A. A table with common fields from two or more tables (resolves a many-to-many relationship)
- B. A table that is linked to a table in a different database by a foreign key
- C. A table which shares a common field with another table (resolves a one-to-many relationship)
- D. A table in which all the fields are foreign keys

Question 19 This question has one correct answer

In SQL, what does the COMMIT command do? [2]

- A. Starts a local transaction on a database connection
- B. Undoes transactions that have not already been saved to the database
- C. Groups a set of related queries
- D. Saves changes invoked by a transaction to the database

Question 20 This question has one correct answer

In a data driven web application, which type of HTTP request is generally used when creating a new resource containing sensitive information (i.e. when setting up a profile on a dating website)? [2]

- A. PUT
- B. GET
- C. POST
- D. DELETE

Part B

Question 21

The company you work for are planning to launch a new website called which-movie.com.

You have been tasked with designing and developing a web application that will allow an end user to perform the following tasks:

- Search a database of movies by title, release year, genre, director, actor/actress, and average user rating
 - Create an account/user profile page (as shown in the wireframe below)
 - Rate a movie on a 5 point scale
 - Post a written review of a movie
- (a) Sketch out an entity relationship diagram for the whichmovie database. Indicate on the diagram what data types will be used, and any constraints that will be applied. [12]
- (b) It has been decided that the whichmovie database will use the MySQL database management system. Referring to your answer from part (a), write the SQL query/queries that will need to be run when a user sets up their profile page via the HTML form shown in the wireframe below. Where values are required in the query string(s), insert appropriate 'dummy' values. [8]

LOGO Log in | Sign Up

NAV

Create an Account

Username *

Password *

Confirm password *

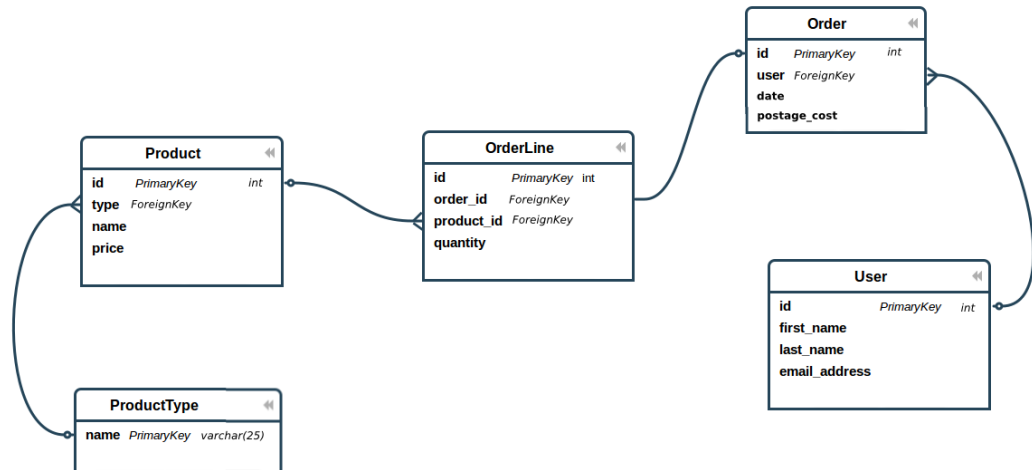
Email *

Favourite genre ▼

- (c) Explain how a simple search feature could be implemented which will return a list of film titles based on one or more of the criteria mentioned in (a). Use diagrams and/or extracts of code to illustrate your answer where appropriate. [10]

Question 22

Pictured below is an entity relationship diagram for an online pet store.



- i. Write an SQL query to set up the Product table, specifying appropriate data types and defining constraints where necessary. [10]
- ii. Write one or more SQL queries to return details about the order with the id 1432. [10]
- iii. Write one or more SQL queries to set the cost of postage to '0.00' on all orders worth 100 pounds or more. [10]

Question 23

(a) Explain the difference between a dynamic and a static web page and discuss their respective advantages and disadvantages. You may include diagrams where applicable. [10]

(b) You have been presented with the following requirements for an e-commerce web application:

- A user may search for a product by entering keyword(s) into a search bar
- They are then presented with a list of product names containing one or more of their search terms.
- Clicking on a product name from the list will display the full details about that product

Describe how you would implement this application, indicating how and where dynamic content will be inserted. You may include code/pseudo-code where appropriate. [12]

(c) Describe two different types of data stores that could be used by this application and discuss the suitability of each in relation to the following administrative tasks:

- Retrieving details about a specific order
- Retrieving the email addresses of all customers who have ordered a certain item within the last month
- Analysing customer demographic and sales data to identify purchasing patterns and predict future trends

Within your answer, you may also mention other factors which will influence the choice of database technologies used. [8]