

EE4717 / IM4717

NANYANG TECHNOLOGICAL UNIVERSITY

SEMESTER 1 EXAMINATION 2015-2016

EE4717 / IM4717 – WEB APPLICATION DESIGN

November / December 2015

Time Allowed: 2 hours

INSTRUCTIONS

1. This paper contains 1 question and comprises 6 pages.
 2. Answer 1 question.
 3. This is an open-book examination.
 4. Unless specifically stated, all symbols and acronyms have their usual meanings.
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1. A student club in a university wants to set up a website to promote the club and its activities. The club organizes club events such as sport activities, seminars, and sometimes short courses. To enjoy participating in the club events free of charge or at a discounted rate as a club member, a student must be a student currently enrolled in the university.

A student can join the student club by signing up on the website. Information such as student's name, matriculation number, gender, contact address, email address, and phone number must be filled-in in the online sign-up form. After sign-up, the student's membership status is "application-in-progress". An organizing committee member assigned to take care of the membership application will review the application and then inform the student by email whether the application is successful or not. If the application is successful, the student's membership status becomes "member"; otherwise, the status becomes "rejected".

Note: Question No. 1 continues on page 2.

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On the home page of the club's website, there is a list of brief announcements of events. If a student is interested in an event, he/she can click on any part of the brief event description text. An event registration page containing the full event information and a registration form will be shown. In the registration form, the current number of vacancy available and the event charge will be shown as well. A student can register for the event by entering his/her name and matriculation number. After the membership status of the student is verified by the web application, an email notification will be sent to the student to confirm the event registration.

The website also has a page showing the current organizing committee members and their contact emails.

- (a) Study the above web application scenario and design the overall web application software architecture. Illustrate the website organization using a site map. List the titles of the web pages you have designed. Draw the storyboard for all the possible user activities, including membership sign-up and event registration. Your storyboard should cover both the client-side activities and the server-side activities.

(20 Marks)

- (b) The home page of the student club's website should look like the one shown in Figure 1 on page 5. The main features in the design of the home page are as follows:

- The page content area is centered and occupies 80% of the browser window width, but subject to a minimum width of 850 pixels.
- The font selected for the text is either Verdana or Arial, or a font in the Sans-Serif family.
- The background of the page area is grey, while the content area has a white background.
- The top banner area is a banner image of size 800×100 pixels on a background with a color value of #8080AA.
- Below the banner area, there is a row of image buttons, i.e. image links to other parts of the website.
- In the content area, there is a list of events with brief descriptions as the main text in the home page. The text for the heading of each event has a color value of #869dc7.
- There is an image of size 400×300 pixels in GIF format, which is an animated image capable of playing a slide-show of photos taken from recent club events, displayed on the right of the list of events.
- There is a footer area with a copyright notice.

Note: Question No. 1 continues on page 3.

You may make further assumptions after studying Figure 1.

- (i) What image format should be used for the banner image? Explain your choice.
- (ii) Write the CSS3 codes in an external CSS file for ensuring the website to have a consistent look and feel.
- (iii) Write the HTML5 codes for the home page.

(30 Marks)

- (c) Students wishing to sign-up for the membership of the student club are required to register their student's particulars through an online sign-up form. On submission of the form, all input information is to be validated by the browser before transmitting them to the web server. Express the regular expressions using JavaScript core object *RegExp()* to validate the following student's particulars:

- (i) Student's name – It is a string of individual character words separated by character spaces between them. The character words may include the hyphen ('-') but not any numeric digit. The first and last characters of the string should be an alphabet character.
- (ii) Student's matriculation number – It consists of a string of 7 numeric digits. The string is preceded by two or three characters and ends with a single character. There should be no character space within the entire string.
- (iii) Student's email – It comprises a username part and a domain name part. The two parts are separated by a single character symbol '@'. The username character string should begin with a character and may include the period ('.') and hyphen ('-'). The domain name string may have one or more address extensions, each separated by a period ('.'). The last address extension, however, should have only between 2 and 4 characters.
- (iv) Student's phone number – It consists of 8 numeral digits and begins with the digit '6', '8' or '9'. The phone number may also be preceded with a country code literal "+(65)".
- (v) Write the JavaScript test statement to validate the student's phone number using the *RegExp()* "test" method. You may assume that the name of the DOM element for registering student's phone number is "phnumber".

(20 Marks)

Note: Question No. 1 continues on page 4.

- (d) To support the operation of the student club and event organization of student activities, a database system is to be implemented in the club's website to provide the convenience of online services and efficiency of electronic transactions to its club members.
- (i) Design the database schema to provide the necessary database supports for the following functions:
- Record of membership particulars, which contains student's name, matriculation number, gender, contact address, email address, and contact number.
 - Catalogue of event schedules, ticket pricing, seating capacity, including brief and full event descriptions.
 - Booking of events by members, including the amount and date of each booking.
 - Tracking the various events booked and the number of tickets booked for each event.
- (ii) The design should clearly indicate the use of foreign keys to minimize data redundancy and the necessary primary keys in each of the database tables. Highlight the primary keys with double underline and foreign keys with single underline.
- (iii) Based on the database schema designed in part (i), write object-oriented MySQL queries in PHP script to extract and compute the total number of tickets remaining for a given event.

(18 Marks)

- (e) Figure 2 in page 6 shows the sequence of event registration using multi-pages. Upon clicking on a brief event description, a student club member will bring up the registration login page as shown in Figure 2(a). When an attempt to login is unsuccessful, the page will be reloaded with a warning message "Could not log you in" as shown in Figure 2(b). On successful login with a member's name, such as "John William", the event registration page will be loaded with a logged in message "You are logged in as: John William" as shown in Figure 2(c). The club member may then enter the number of tickets to book for the events of interest. Upon confirmation of the event registration, an acknowledge email will be sent to the member.

Note: Question No. 1 continues on page 5.

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Explain the use of `isset()` function and superglobal variables in multipage generation. Illustrate your answer with appropriate PHP scripts for the scenario shown in Figure 2.

(12 Marks)

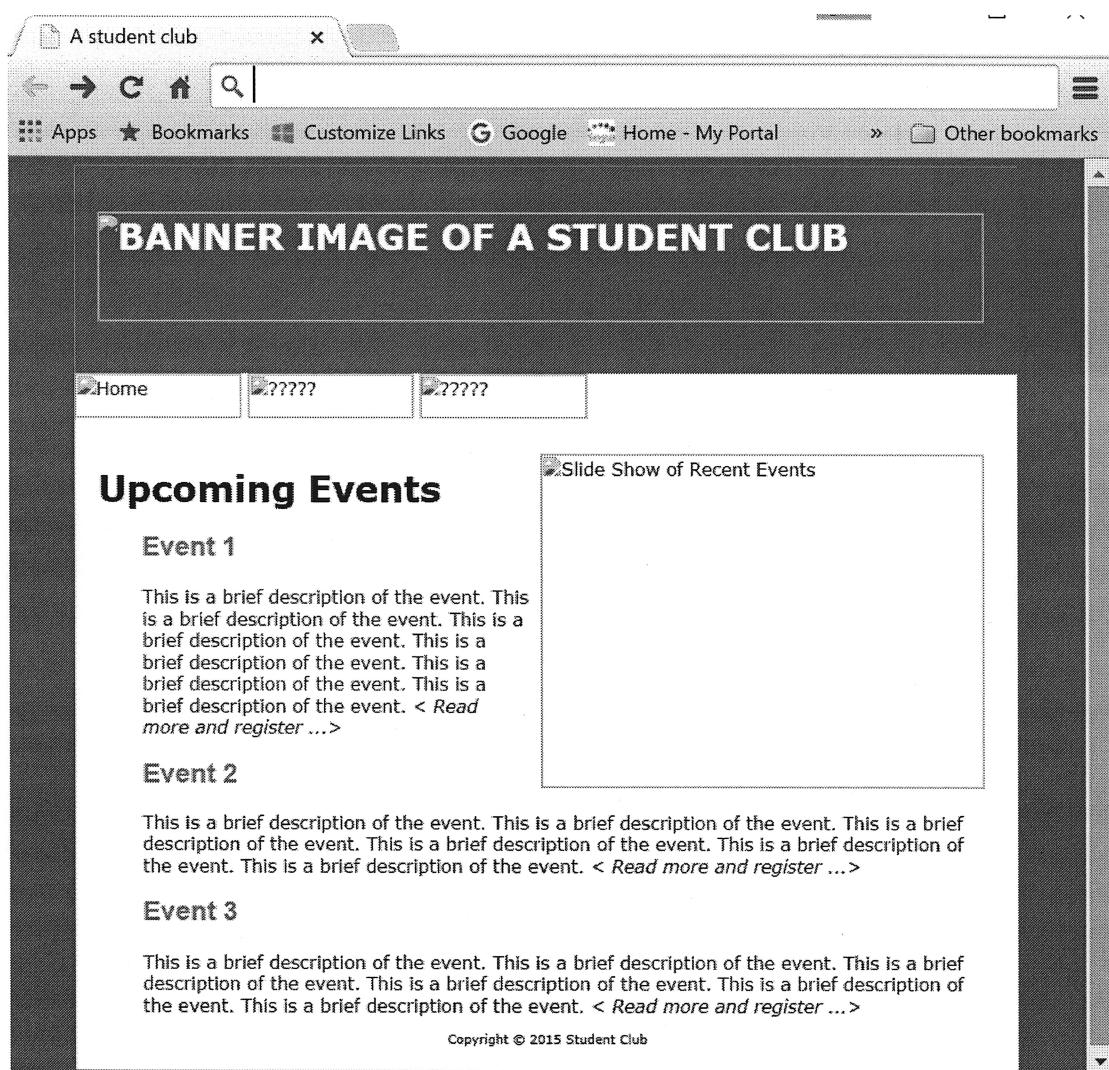


Figure 1: Home page

Note: Question No. 1 continues on page 6.

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The figure consists of two side-by-side screenshots of a web browser window. Both screenshots show the same URL: 192.168.56.2/f32ee/SessionExam. The browser interface includes standard navigation buttons (back, forward, search, etc.) and a bookmarks bar with items like 'Apps', 'News', 'Gideons', 'Academic', and 'Other bookmarks'.

(a) Initial login page: The main content area displays the title "Event Registration". Below it, a message says "Please login to register for events....". There are two input fields: "Userid:" and "Password:", each with a corresponding text input box. A "Log in" button is located below the password field. At the bottom of the page, there is a link "Back to Home Page" and a button labeled "Back to Home Page".

(b) Failed attempt to login: The main content area displays the title "Event Registration". Below it, a message says "Could not log you in.". The "Userid:" and "Password:" fields are present, along with their respective input boxes and a "Log in" button. At the bottom of the page, there is a link "Back to Home Page".

(a) Initial login page

(b) Failed attempt to login

This screenshot shows the same web browser interface as above, but now with a different content area. The title "Event Registration" is displayed. Below it, a message says "You are logged in as: John William".

A table is displayed, listing three events with columns for Event ID, Event Title, Price, Vacancy, and Tickets. The table data is as follows:

Event ID	Event Title	Price	Vacancy	Tickets
F-001	Health and Fitness Training Programme	40	30	
A-010	Classical guitar ensemble for all	10	80	
B-020	Photography and visual literacy education	20	50	

At the bottom of the page, there is a "Confirm Registration" button.

(c) Event registration page on successful login

Figure 2: Sequence of event registration using multi-pages

END OF PAPER

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Please read the following instructions carefully:

- 1. Please do not turn over the question paper until you are told to do so. Disciplinary action may be taken against you if you do so.**
2. You are not allowed to leave the examination hall unless accompanied by an invigilator. You may raise your hand if you need to communicate with the invigilator.
3. Please write your Matriculation Number on the front of the answer book.
4. Please indicate clearly in the answer book (at the appropriate place) if you are continuing the answer to a question elsewhere in the book.