

EE4717 / IM4717

NANYANG TECHNOLOGICAL UNIVERSITY

SEMESTER 1 EXAMINATION 2019-2020

EE4717 / IM4717 – WEB APPLICATION DESIGN

November / December 2019

Time Allowed: 2 hours

INSTRUCTIONS

1. This paper contains 1 question and comprises 6 pages.
 2. Answer all 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. *Sunny Lagoon Resort* is a popular holiday resort destination in Sentosa, Singapore. It offers luxurious and cosy room types like suite, deluxe, superior and standard. Each room at this resort comes with free WiFi, flat-screen TV with satellite channels. Some of room types feature an ocean view, direct beach access and balcony. The resort has an outdoor pool, sauna, tennis courts and table tennis. Guests staying at the resort can enjoy a continental buffet breakfast at a reasonable price.

Figure 1 (on page 6) shows the home page of the *Sunny Lagoon Resort* booking system. There are two vertical panels on the left column, one is for query refinement and the other for detailed search filtering. Photo images of the room selection types available for booking and the rates are displayed on the main content area. Guest users are given the access to do query search for the room check-in and check-out dates, view the room types, and number of rooms required. They are also entitled to do search filtering based on the selection of breakfast, smoking/non-smoking room and option to pay later. Users are able to click on each room to view more options and detailed information about the room facilities such as room size, types of beds and orientation of the room.

Guest users are required to sign-up as registered users in order to go to the order page. After successfully registering or login to the booking system, the registered users are able to proceed to book the room(s) in the order page, before making credit card payment in the payment page. A confirmation email is sent to the users after successful transaction.

Note: Question No. 1 continues on page 2.

EE4717 / IM4717

The *Sunny Lagoon Resort* booking system home page's navigation bar consists of hyperlinks to other web pages such as Rooms and Suites, Resort Facilities, Resort Map, FAQs, user's Log In and Sign Up.

- (a) Study the above web application scenarios and design the overall web application using a client-server architecture model.
- (i) Show the website organization using a site map, and list the titles of all the web pages you have designed.
 - (ii) Draw the storyboards for all the possible user activities, including user login and registration, browsing and booking of rooms. Your storyboards should cover both the client-side and server-side activities.

(20 Marks)

- (b) The wireframe of the *Sunny Lagoon Resort* booking system home page is shown in Figure 1. The detailed features in the home page layout are as follows:
- The page is centered, with a fixed width of 1000 pixels. There is a page border of 5 pixels width, with a color code of #003366.
 - The body text uses Verdana font, or a font in the Sans-Serif family, with a text color code of #0033FF and a white background.
 - The top banner area consists of an image logo of size 980×30 pixels, on a background with a color code of #003366. The image logo also serves as an alternative hyperlink to the home page.
 - The horizontal navigation area is located below the banner area, with hyperlinks to other pages of the website, including user login and sign-up, as shown in Figure 1.
 - Below the navigation bar, there is an animated image banner of size 980×60 pixels, in GIF format, highlighting the current promotional offers for the room rates.
 - There are two columns below the promotional offers banner.
 - The left column is used for query refinement and search result filtering, with a column width of 330 pixels. The upper half consists of a search query panel, with input fields for Check-in Date, Check-out Date, Room Type and Number of Rooms. The lower half consists of a search filter panel, with input buttons for Breakfast, Non-Smoking Room and Pay Later options, as shown in Figure 1. Upon submission of this form, the web server will run the *room_search.php* script.

Note: Question No. 1 continues on page 3.

EE4717 / IM4717

- The right column is the main content area for displaying photo images of available rooms with a column width of 640 pixels. The 200×160 pixels room images, in PNG format, are tabulated three-in-a-row, starting from the lowest room rates, as shown in Figure 1. The room rates and “View More” hyperlinks are shaded with a light background with a color code of #99CCFF. The room images also serve as alternative hyperlink for viewing the selected room’s detail page.
- There is a footer area with a copyright notice in white, centered and in small font size, with a background color code of #003366.

You may make further assumptions after studying Figure 1.

(i) Write the CSS3 codes for an external style sheet named *sunny_lagoon_resort_site.css*, to ensure that the entire website has a consistent look and feel.

(ii) Based on the external style sheet *sunny_lagoon_resort_site.css* in part (b)(i), write the HTML5 codes for the *Sunny Lagoon Resort* booking system home page.

(30 Marks)

(c) A user is required to sign-up on the *Sunny Lagoon Resort* registration platform to book for the accommodation. The registration details to be required are: Login-Name, Login-Password, Email-Address, National Identification Number (NIN) and Contact-Number. Write the literal regular expression in JavaScript for registration details before the user is successfully registered in the system as the following:

(i) Login-Name should consists of case insensitive alphanumeric word characters and may include character spaces (' '), hyphen ('-') and underscore ('_'). It should begin with alphabet character and should not end with a non-word character. For validation, write a JavaScript code using the test method and the result should output message “Login-Name entered correctly”. If user does not enter anything, an alert message should appear as “You must enter a valid Login-Name”.

(ii) Login-Password should consists of at least 1 uppercase character, at least 1 numeric digit and at least 1 non-word character, such as !@#\$%.

(iii) Email-Address consists of username, ‘@’ symbol and followed by domain name. The username consists of word characters and may include a period ('.'). The domain name comprises only alphabets and has at-least two but not more than four extensions; where each extension is separated by a period ('.') .

Note: Question No. 1 continues on page 4.

EE4717 / IM4717

- (iv) NIN consists of a case insensitive alphabet followed by 7-9 numerical digits and at the end another case insensitive alphabet. Write the corresponding literal regular expression in JavaScript.
- (v) As per the regular expression created in part (c)(iv), the NIN should contain 9-11 word characters in length. Write a JavaScript to validate the NIN and output a message “Correct NIN” or “Incorrect NIN” on the condition of the validation result.
- (vi) Contact-Number consists of 8 numerical digits and begins with the digit ‘6’, ‘8’, or ‘9’. Write the corresponding literal regular expression in JavaScript.
- (30 Marks)
- (d) *Sunny Lagoon Resort* booking system has a database which maintains the record of the users, booking information and support various search functions to provide best room options to the customer.
- (i) Design the database schema with relevant tables to provide the following database functions:
- Records of the registration details of the user which includes Login-Name, Login-Password, Email-Address, National Identification Number (NIN) and Contact-Number.
 - Records of the room booked on the *Sunny Lagoon Resort* room booking system by users. It includes duration for which room is booked, i.e. the check-in and check-out dates.
 - Search records based on the query refinement of the attributes of the room profile based on room types and number of rooms required. The booking system supports following set of the values for room booking:
 - Room types: standard, superior, deluxe and suite
 - No of rooms: 1,2,3,4,5
 - Records of room booking attributes to allow detailed search filtering based on options like include breakfast, non-smoking room and pay later. *Sunny Lagoon Resort* booking system allows the following set of values for the booking of the room attributes:
 - Include breakfast: All, Yes, No
 - Non-smoking room: All, Yes, No
 - Pay later: All, Yes, No

Note: Question No. 1 continues on page 5.

EE4717 / IM4717

The database schema should clearly specify the primary and the foreign keys. Primary key should be highlighted with double underline and foreign key by single underline.

- (ii) Based on the database schema designed in part (d)(i), construct a MySQL query in PHP to include the following search criteria:

- Room Type: suite with breakfast
- Number of rooms: 3

This search is based on available ‘suite with breakfast’ rooms from check-in date: 10-12-2019 and check-out date: 14-12-2019. It is based on the assumption that the ‘suite with breakfast’ rooms are available when there is a new check-in date that is later than the last check-out date.

- (iii) Based on the database query schema designed in part (d)(ii), write PHP statements to further filter the room search results that meet the criteria of ‘Non-smoking room’ with ‘Pay later’ option.

(20 Marks)

Note: Question No. 1 continues on page 6.

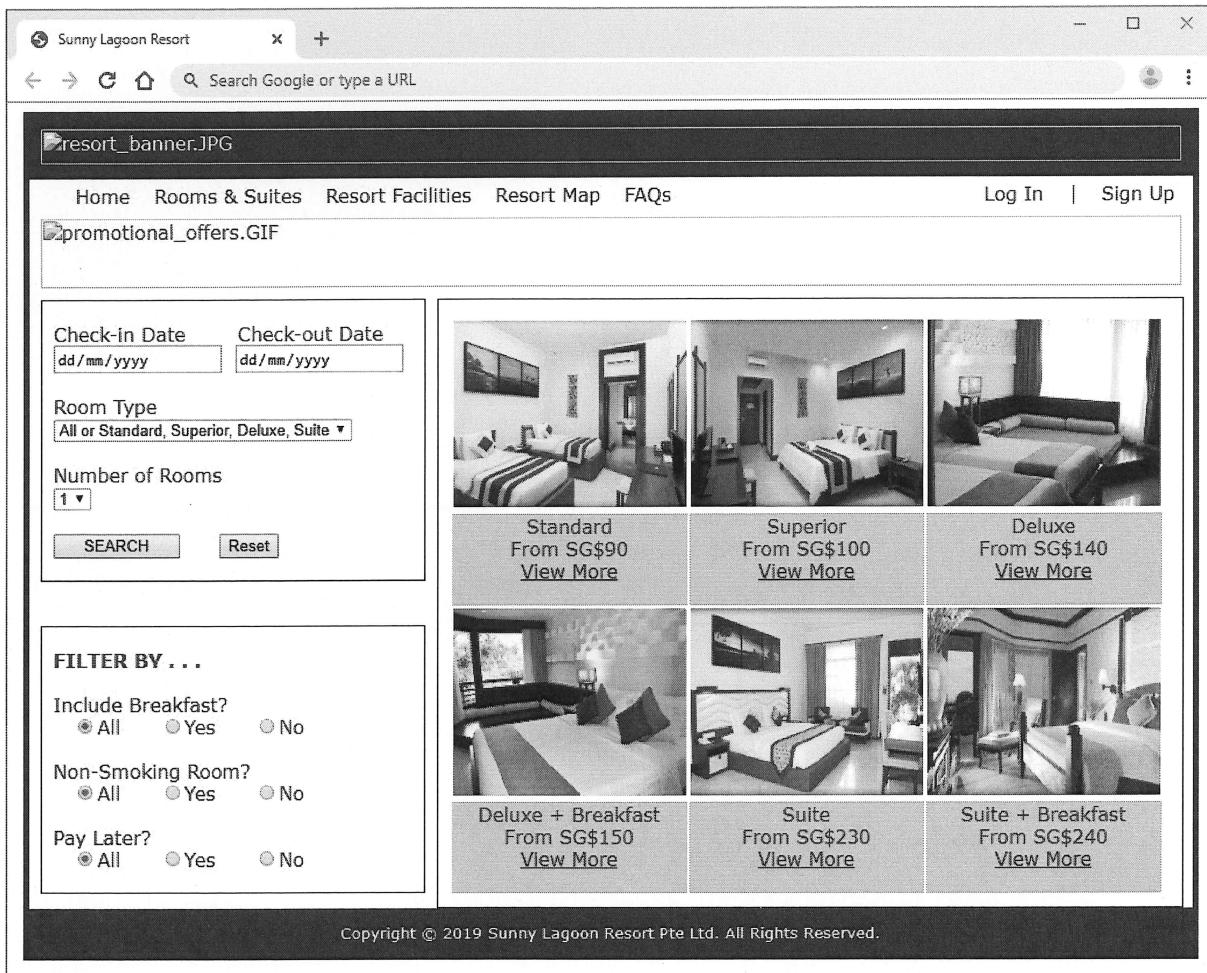


Figure 1: Sunny Lagoon Resort Booking System Home Page

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.