Project: CIT Smart Multifunctional Sports Arena

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1 Introduction

CIT has just begun construction of a multifunctional sports arena on its main campus. This sports arena will supply various state-of-the-art and high-performance facilities, like basketball courts, a health and fitness facility, and fitness studios etc.

This project will focus on designing a web application to facilitate the management of the arena and to also help support the promotion of health and fitness to the public. The arena will be open to all CIT students, staff, as well as the general public. For the purposes of this project, we will make the simplifying assumption that the arena will be supervised by a single manager and that, of the several clubs operating daily in the arena, each club is operated and run by one trainer only.

2 Requirements

This web application should meet the following requirements:

- All users are required to first register for membership, supplying the following information: name, gender, age, weight, height, contact details (home address, email, phone number), status (student, staff, neither), type of membership (one-year or open-ended), user name, password.

- All members must access the system with a valid username and password. No more than three unsuccessful login attempts should be permitted.

- All members can review and update their profile, and can reset their password. All members need to change their password every three months. The system should remind the users to update their password before its expiry date and notify the users that they have successfully changed their password after updating it.

- The system should display all clubs scheduled daily. All members can search for a club by its name, operating date, or its trainer. Members can sort all clubs by the estimated number of calories that are burned off by that type of physical activity.

- When a member reviews the information of a club, the system should display its associated image, its maximum size, the operating hours, the allotted facility (or studio), the personal trainer, the duration of training, and the estimated average calories burned off in that type of physical activity.

- All trainers can either book or cancel facilities (including studios and places) for their training classes. They can search for the availability of facilities by their id, name, or location.

- All members can either book or cancel their training in the club. They also can search through their bookings by either booking date or the name of the club.

- All members can self-manage their fitness training plan with a personal fitness log. The system will keep track of all members' BMR (Basal Metabolic Rate) values before and after their daily training. According to these values, members can arrange the type of fitness training or club activities to be taken on daily. The fitness log should also include a meal plan to calculate the total calories needing to be burned off. One of the most accurate methods of estimating your BMR is the Harris-Benedict formula:

Adult male: $66 + (6.3 \times$ body weight in lbs.$) + (12.9 \times$ height in inches$) - (6.8 \times$ age in years$) =$ BMR

Adult female: $655 + (4.3 \times$ weight in lbs.$) + (4.7 \times$ height in inches$) - (4.7 \times$ age in years$) =$ BMR

To determine your total daily calorie needs, multiply your BMR by the appropriate activity factor, as follows:

  - If you are sedentary (little or no exercise): Calorie-Calculation = BMR $\times$ 1.2
  - If you are lightly active (light exercise/sports 1-3 days/week): Calorie-Calculation = BMR $\times$ 1.375
  - If you are moderately active (moderate exercise/sports 3-5 days/week): Calorie-Calculation = BMR $\times$ 1.55
  - If you are very active (hard exercise/sports 6-7 days a week): Calorie-Calculation = BMR $\times$ 1.725
  - If you are extra active (very hard exercise/sports & physical job or 2x training): Calorie-Calculation = BMR $\times$ 1.9

An example for calculating the total calorie needs is shown as below: If you are sedentary, multiply your BMR (1745) by 1.2 = 2094. This is the total number of calories you need in order to maintain your current weight.

- All members can make an appointment with individual trainers to seek some professional advice before joining particular clubs. All members can search and cancel their appointments.

- The system should automatically generate confirmation messages for all bookings and appointments.

- Your website should meet the following criteria:

  - secure and responsive
  - RESTful
  - cross-browser
  - interactive and dynamic

- high accessibility and high (re)usability

  - maintainable and scalable

- Your website should adopt a good design pattern and adhere to a good layout (like, Z/F layout etc).

- Everyone can share the outcome of their fitness training through social networks.

- For this project, there will be no need to use a backend database to hold all data — you can tentatively store all data within a JavaScript array or in a JSON file.

3   Tasks

- Choose a front-end framework using a shadow DOM to build this web application [40%]

- Choose a front-end framework using a real DOM to build this web application [35%]

- Write a maximum 4 pages reflective essay to compare the frameworks you chosen to complete in the second task. You are required to use this web application as a case study to make comprehensive comparisons between these frameworks. The justifications of your choices must be clearly elucidated. The template is available in Canvas. No marks will be rewarded if the template is not used for this task. Marks will be deducted if the whole essay is totally informal.[25%]

4   Technologies

- **CSS3 Sprites** (**FlexBox, Media Query**)

- **HTML5/6**

- **Bootstrap**

- **JavaScript** (**IIFE**)

- jQuery and Ajax

- Sass/LESS

5   Submission

Submit the source code of the sports arena through Canvas. You need to give a quick presentation on your final products built with two different frameworks. Marks will not be rewarded without presentation. The whole website must be deployed.