

## **Development of Cholesterol Calculator Websites: Investigation on Food Cholesterol in Malaysia Using Web-Based Calculator**

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**Abstract:** This study aims to create a cholesterol calculator website to guide people calculate their cholesterol based on dietary intake. By applying the programming tools required in website development such as Firebase, HTML, CSS, and JS. The cholesterol data has been collected from particular food in Malaysia, the collected data then used to construct a website database by using JSON afterward. We ensure the cholesterol calculator website's performance and function are well before publishing it to the public on the internet. Lastly, we will discuss the result based on the website performance and observe a user's eating pattern through their food cholesterol data save on the website. From the result, we found that the meat and proteins food category contains the highest cholesterol level and coexist with good cholesterol High-Density Lipoprotein (HDL) and bad cholesterol Low-Density Lipoprotein (LDL). Since, increasing food cholesterol levels will cause changes in the proportion of HDL and LDL in dietary intake. Therefore, people should control their eating habits and avoiding unhealthy food.

**Keywords:** Cholesterol, Eating Pattern, Website, Programming Tools, Database

### **1. Introduction**

Nowadays, young adults who seem to be healthy and have no weight problem may be at risk from heart disease or stroke. According to the World Health Organization (WHO) report in 2017 stated that approximately 30,600 people in Malaysia reported deaths due to cardiovascular disease [1]. The main reason Malaysians are easily developing cardiovascular disease due to the high cholesterol level present in dietary intake and unhealthy eating patterns [2]. Since that, many online calorie calculators were produced to assist people in calculating their daily calorie intake. Unfortunately, we found that there is less website for calculating a person's cholesterol intake which is very important. Therefore, this study aim to create a cholesterol calculator website to guide people calculate their cholesterol from dietary

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intake. In this research, we are developing a website with a food cholesterol intake calculator and constructing a database of cholesterol concentration from food in Malaysia.

## 2. Methodology

In order to create a functional cholesterol calculator website, a web development tools has been used such as HTML, CSS, JS, Firebase, and JSON. Hence, there are four steps to develop a cholesterol calculator website, which are as below:

- i. Register Web Hosting in Firebase.
- ii. Create a cholesterol calculator web by using Frontend Development Languages.
- iii. Construct the food cholesterol database in the form of JSON.
- iv. Deploy the cholesterol calculator website to the public.

The explanation and detail of each stated step above will be further discussed in Section 2.1 until 2.4 follow the sequence.

### 2.1 Web Hosting in Firebase

Firebase is a powerful website development tool with various useful functions and services. Web hosting is one of the services provided by Firebase. Therefore, the first step in developing a website is to register web hosting in Firebase.com. Web hosting is a service to provide "space" on the internet, allowing us to upload a required media file and information into a website and publish it to the public [3].

### 2.2 Frontend Development Languages

Frontend Development Languages is an essential programming component in website development, such as Hypertext Markup Language (HTML), Cascading Style Sheets (CSS), and JavaScript (JS). Therefore, we need to learn and apply the above three web development programming languages.

#### 2.2.1 Hypertext Markup Language (HTML)

HTML is a tool responsible for creating web content and constructing the fundamental core structure of a website. HTML includes a series of tags which can connect the various type of internet resource into a logical whole documents format on the network. The HTML tags element commonly used in cholesterol calculators websites are shown below [4].

- "<div>"  
The <div> tag know as a division or a section in an HTML document and can be used as a container for storing any tag element of HTML.
- "<img>"  
The <img> tag is a short form of "image" and displays an image in an HTML document. The <img> tag is a space for storing and display the image.
- "<p>" and "<h1> to <h6>"  
The <h1> to <h6> tags stand for "heading" and the number is represented as the text sizing. Every word includes in <h1> tag will be getting solid and bigger. The <p> tag stands for "paragraph" and used in display the article. The word in <p> tag will be displaying smaller size.
- "<input>"  
The <input> tag is an input field that allows the user to enter text and use it in the searching bar of the web cholesterol calculator.

- "<button>"  
The <button> tag is a clickable button in HTML document. Every button in the cholesterol calculator web is displayed by using the <button> tag. The <button> tag will be performing some specific task and function whenever the user clicks on it.

### 2.2.2 Cascading Style Sheets (CSS)

CSS is the web programming language used to style and decorate the HTML document tag element. We can use the CSS design, style and decorate the website's content, such as layout, colours, fonts, etc. CSS describes how HTML elements should be displayed on the screen layout. The CSS is an individual programming sheet file which creates separate from the HTML document. The programming sheet file of the file saves as css format and import to HTML document whenever the need to use. The syntax of CSS contains a selector and a declaration block [5].

The CSS selector directly points to the HTML tag element that we need to style such as <div>, <input>, <p>, etc. There are two types of CSS selectors we used in the cholesterol calculator web is element selector and class selector. The element selector points to HTML tag elements based on the tag name. The class selector points to HTML tag elements with a specific class name defined in the tag attribute. To select elements with a specific class name, write a period (.) character, followed by the class name.

The declaration block contains one or more declarations separated by semicolons. Each declaration includes a CSS property name and a value, separated by a colon. Multiple CSS declarations are separated with semicolons, and curly braces surround declaration blocks.

### 2.2.3 JavaScript (JS)

In order to create a functional cholesterol calculator, we need to build up the system of the calculation, logic syntax and create a database of food cholesterol level data by using a JS programming language [6].

We use JS programming language to create various useful functions and systems in web cholesterol calculator. Such as food searching function, calculate food cholesterol level function, add food into list function, a user authentication function, save user record function, user dietary intake chart function, etc. All functions mentioned above are developed by JS programming, and each function has a specific task need to perform. Each function contains a large amount of JS coding and its logic syntax to perform the task correctly. The functions of the cholesterol calculator website will be further discussed in the Result and Discussion of Section 3.

### 2.3 JSON Database

We collect food cholesterol data from internet resources and medical reports based on food type in Malaysia. The collected food data includes food name, food cholesterol level, food serving portion, food pictures. After the food data was completing collect, the data will be store in JavaScript Object Notation (JSON). JSON is a database and acts as the storage of food data. JSON is also a text format that is easy for humans and machines to read and write the data into a JavaScript sheet [7].

The format of JSON is all the food data must be stored in one "data" array variable and surrounded by square brackets "[ ]". Inside the array variable include multiple curly braces "{ }" and separated by ",". Each curly braces represent one food data and contain ID number, food name, food image, food portion, food cholesterol level, and food type. Whenever the public visits the web cholesterol calculator, the JS will read the food data from the JSON database, and HTML will display all the food data in the form of a food card on the website.

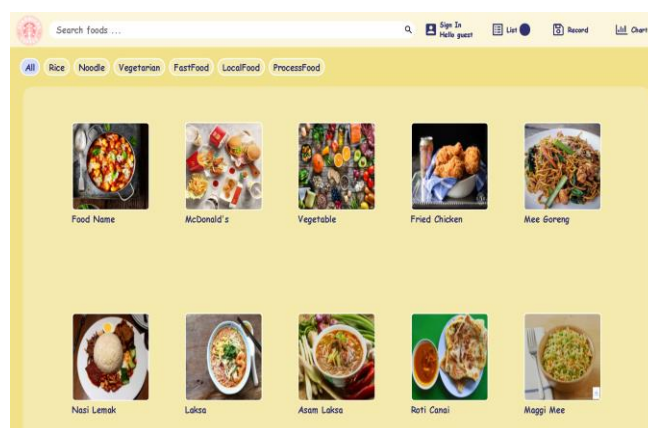
### 2.4 Web Deploying

Lastly, we published the cholesterol calculator web to the public after completing all front-end web development procedures and finish collecting food cholesterol data. The action of publishing the

website to the online internet is known as “deploying”. We can deploy the website into registered Firebase Hosting by using a single command. The command is “firebase deploy” and need to type in the command window of the front-end web development editor. The website link will be provided by the command window once completing the deployment process. The website link is the path to visit the cholesterol calculator web, and we can publish this link to the public to let more people know about our website. Therefore, this is the way and step for us to publish the website on the internet.

### 3. Results and Discussions

#### 3.1 Results



**Figure 1: Cholesterol Calculator Websites**

This study apply the Firebase and Frontend Development Languages to develop the cholesterol calculator website. The cholesterol calculator website shown above in Figure 1 contains the main component and functions as below.

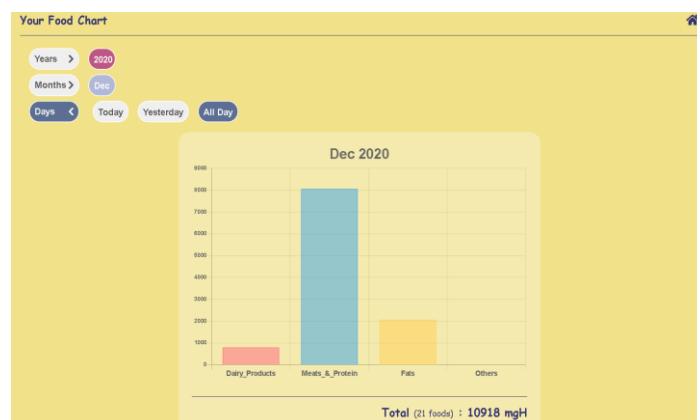
1. Food Card Page  
User can choose their desired food and add into the list page even adjusting the required food serving size portion.
2. Authentication Page  
Users can sign-up and sign-in the account on the website to add and save food data into their account. Once the user successfully sign-in the account and they will be able to access the list page, record page, and chart page.
3. List Page  
Food list page will be shown all the food cholesterol data added by the user and calculated the total amount of food cholesterol level.
4. Record Page  
Record page will display the food data saved by users and classified food data according to its cholesterol level into 3 categories which are low, moderate, high cholesterol food.
5. Chart Page  
Chart page uses the food cholesterol level data to plot the bar chart according to food category and help the user to visualise their cholesterol dietary intake amount.
6. Search Function  
Perform food searching function to help the user find their desired food.
7. Filter Food Category Function  
Perform filter function to categorized the food data according to its type.

```
const data = [
  {
    id: "1",
    name: "milk (non-fat)",
    image: "https://cf.shopee.ph/file/f17e2fa380a5e57230db6219b73456d0",
    gram: 1,
    mgH: 4,
    unit: "cup",
    type: ["Dairy_Products"],
  },
  {
    id: "2",
    name: "milk (low-fat)",
    image: "https://www.nestleprofessional.ph/sites/g/files/gfb291/f/styles/prc",
    gram: 1,
    mgH: 10,
    unit: "cup",
    type: ["Dairy_Products"],
  },
  {
    id: "3",
    name: "milk (whole)",
    image: "https://i5.walmartimages.com/asr/3592de4c-2d2d-4285-afb-f0508775b",
    gram: 1,
    mgH: 33,
    unit: "cup",
    type: ["Dairy_Products"],
  },
]
```

**Figure 2: JSON Database**

In addition, we have been successfully constructing the website database by using the JSON format. The JSON database shown in Figure 2 consists of 90 food data, and each food is classified into the different food categories such as dairy products, meat and protein, fats and others. The JSON database includes food data information such as food name, food cholesterol level, food serving portion, and food pictures. The food data will be displayed as food cards on the website interface whenever visitors access to website. The food category data is also displayed as foods category button to help users filter their desired food type. All the food data are collected from the Food Data Central in the U.S. Department of Agriculture. Food Data Central is an integrated data system that provides expanded nutrient profile data and links to related agricultural and experimental research. Since the Food Data Central is hosted by the National Agricultural Library [8], which means the credibility of Food Data Central is high and more reliable compared with other resources on the internet. Therefore, we choose the Food Data Central as our research food data in cholesterol calculator website. The collected food data are stored in the cholesterol calculator website JSON database. The database consists of 90 food data and classified into four main food categories such as dairy products, meat and protein, fats and others, each category consist of 35, 30, 15, and 10 food data respectively. The collected food data include information such as food name, food cholesterol level, food serving portion, and food pictures.

### 3.2 Discussions



**Figure 3: User Food Chart in 7 Days**

Figure 3 shows a food chart result of a user using cholesterol calculator website in 7 days of December. We asked user to assist us recorded their 7-day dietary intake by using the cholesterol calculator website. User can select their desire food and adjust the required amount of food portion that has been eating. Each food that has been recorded by a user contain the corresponding cholesterol, and

functional program of the website will sum up all the cholesterol level from food eaten by the user every day. After that, the chart page of the website will display all the user food record as a bar chart and categorized food cholesterol level according to food category.

From the result of the user food chart in 7 days, we found that the meat and proteins food category contains the highest cholesterol level. The food source in dietary intake coexists with High-density lipoprotein (HDL) and Low-density lipoprotein (LDL). HDL is the good cholesterol required in the human body, whereas LDL is the bad cholesterol that needs to be kept in check. Increasing food cholesterol levels will cause changes in the proportion of HDL and LDL in dietary intake. The proportion of HDL will increase, and LDL will decrease whenever the user eats healthy food such as olive oil, beans, whole grains, nuts, high-fibre fruit and others. Conversely, the proportion of HDL will decrease, and LDL will increase whenever the user eats processed and high oily food such as cream cheese, fried chicken, ice cream and others.

In conclusion, the cholesterol level from user dietary intake is considered high. The user should be more cautious about their dietary intake and try to control by eating healthy food and avoiding unhealthy food.

#### 4. Conclusion

In conclusion, we have successfully developed a website with a food cholesterol intake calculator and construct a database of cholesterol concentration from food in Malaysia. We hope that the cholesterol calculator website can guide more people know the right amount of food cholesterol in dietary and having a healthy eating pattern in order to reduce the risk of getting cardiovascular disease in future.

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