School of Computing and Mathematical Sciences

Cover Sheet for Coursework 1

Module Code: CO7215 Advanced Web Technologies

Assignment: Windows Platform Desktop Application Development

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**Introduction**

OneHealth is a Desktop Application used to communicate with its users for better health and well-being. Our application is primarily related to health, the fitness of regular human life, and its daily requirement to achieve personal fitness goals. This application is developed to enhance user capabilities in their fitness routine. OneHealth provides inbuilt capabilities to prepare every user for an active and healthy life. This tool is designed to serve as a digital companion for those who are seeking data data-driven approach to their health and fitness.

**Desktop Application Development and Overview**

As the name suggests OneHealth is a desktop application that provides a user-friendly platform to analyse personal goals through different health and fitness calculators. In this application, there are 12 calculators suitable for all types of personalities. OneHealth provides excellent user-friendly capabilities to access various calculators some of which include Weight gain calculator, Maximum heart rate calculator, water Intake calculator, and many more.

OneHealth is a dynamic application as the value changes according to user inputs and requirements. there are several calculations processing in the backend for every calculator that is present in the application. The main objective of OneHealth is to provide a user-friendly application for accurate health and fitness routines in their daily lives. The application provides extensive support by calculating the best and most precise results to achieve for its users.

**Programming Language and Framework**

OneHealth is a Desktop application that is built with a combination of programming languages and frameworks. Majorly, the frontend is developed using Windows forms in Visual Studio providing an outrage and interactive user-friendly design to communicate with its users. The application is a .NET framework Windows framework application. The Backend is developed using C# programming language. C# is a general programming language developed by Microsoft. It is easy to understand as well as a well-known programming language. The choice of these technologies provides ultimate user capabilities and performance. The application provides a holistic approach to all its users. OneHealth has also backend storage of SQL databases where Onehealth (database name) is a database that stores data of user signing and registration.

**Application Logic and Functionality**

OneHealth is a health and fitness calculator desktop application that includes - Ideal Body weight (IBW), Maximum Heart rate (MHR), Weight Gain Calculator (WGC), Weight loss Percentage (WLP), Smoking Cost Calculator (SCC), Waist to Hip ratio (WHR), Water Intake Calculator (WI), Fat Calculator (FC), BMI Calculator, Basal measurement rate Calculator (BMR), Daily Calorie Intake (DCI) and Carbohydrate Calculator (CC). All these 12 Calculators work on the data given by the user and input perceived. Apart from the calculators, there is main screen of the application, the sign-in page, the register page, and also the next page which navigates to all calculators.

All calculators are designed user user-friendly and understandable to anyone visualizing them. Each Calculator has their logic to give the desired output to its users.

The Main page of the application Has mainly two options either the user can sign in or register to be user. The sign-in page is designed based on two parameters given as input by the user during registration which is username and password. The registration page is designed to register to the application by entering the user's name, password, and confirm password of the user. The next page is the navigation page which contains all calculators of the application.

All calculator pages has a link label under every calculator present in them when clicked on them navigates to the desired calculator the user wants and is based on the c# to show every calculator clicked upon. We use the following code for it for example-

WI WI = new WI();

WI.Show();

This code follows to particular water intake calculator page to the user. Here it is creating an object with the name and tells the form to open WI form When clicked on it.

The next part is the Calculator in which the user enters the value as input the value is a parameter to the calculator which it calculates and presents the desired output after the calculation of results.at the beginning, the parameters are converted to double in order to take input from the user. after the calculation of results based on logic the output is converted to a string in order to display it to the user. Below is the example of one of the calculators

double weight = Convert.ToDouble//parameter converted to double datatype

Calculate.ToString("#.#")// the output s represented in this format

When understanding the logic of each calculator, we need to get to every calculator in order to do that-

Ideal Body Weight

To calculate the ideal body weight of any person, two parameters are required age and height of the user. the ideal weight is calculated by

**Formula**- (22 \* (height \* height)) for males

(22 \* (height \* height) - (0.10 \* 0.10)) for females.

Maximum Heart Rate

To calculate Maximum Heart rate of any person, there is only one parameter which is required age of the user. Heart rate of every person varies according to age. The target heart rate is the average heart rate according to the users age which is calculated by different ranges and every range of effectiveness includes a certain level of heart rate.

**MHR** - 220 – Age

**Weight gain calculator**

To calculate weight gain of any person, there are three parameter that is required Current weight, target weight, and number of days of the user. It is calculated by

Target weight – Current weight = weight

No of days \* weight = **Weight gain**

Weight loss Percentage

To calculate weight Loss percentage of any person, there are two parameter that is required Lost weight and, Starting weight of the user. It is calculated by

**Weight loss percentage** = (Lost Weight / Starting Weight) \* 100

Smoking Cost Calculator

To calculate Smoking Cost of any person, two parameters are required days and the number of cigarettes smoked by the user. It is calculated by

**Cost** - (Days \* 10 \* Number of cigarettes) / 20

Waist to Hip ratio

To calculate of Waist to Hip ratio of any person, two parameters is waist and hip circumference of the user. It is calculated by

**Ratio** - waist / hip

Water Intake Calculator

To calculate of Water intake of any person, there are four parameters that is Weight, Age group of the user, activity, and climate of the user. It is calculated by

For every age group there is a certain range of values

**Water intake** – weight \* 0.03(varies from 0.8-2.7 based on the age of the user)

BMI Calculator

To calculate Body mass Index of any person, there are two parameters that is Height and weight of the user. It is calculated by

**BMI** - weight / (height \* height);

Fat Calculator

To calculate the Fat Intake of any person, there are three parameter that is Height, weight and age of the user. It is calculated by

**Fat** - ((1.20 \* BMI) + (0.23 \* age) - 16.2) for males

((1.20 \* BMI) + (0.23 \* age) - 5.4) for females

Basal measurement Rate Calculator

To calculate BMR of any person, there are three parameter that is Height, weight and age of the user. It is calculated by

**BMR**- 66.5 + ((13.75 \* weight) + (5.003 \* height) - (6.75 \* age)) for males

655.1 + ((9.563 \* weight) + (1.850 \* height) - (4.676 \* age)) for females

Daily Calorie Intake

To calculate calorie Intake of any person, there are four parameter that is Activity, Height, weight and age of the user. It is calculated by

**Calories** = BMR \* Type of activity;

Carbohydrate Calculator

To calculate calorie Intake of any person, there are four parameters that is Activity, Height, weight, and age of the user. It is calculated by

**Minimum CarbIntake** = weight \* Range of activity

**Maximum CarbIntake** = weight \* Range of activity

There are several ranges of activity associated with calorie intake

**Testing and Quality Assurance**

A rigorous testing process was employed to ensure the application's reliability and performance. The testing was done after every form was created meaning after every calculator was created. there was need of separate logic to every range of age group or the level of activity the user needs to undergo and there was needing to test different logic and formulas to arrive the exact formula to calculate the desired result for the user. The parameters need to be accepted as separate values and converted to make sure they handle all those logics correctly. The compatibility of collaboration between different calculators was also tested to ensure the application to be error error-free. During the development of one of the calculators, there was a need to connect two of them in such cases the print statement had to be repetitive and there was a need to connect measures that provided exact values.

**Deployment and Distribution**

Visual Studio 2022 (VS) natively supports the deployment for a winforms application. By selecting the compile type to “Release” and running the project in VS, the application is compiled and built into the bin/Release folder of the project directory where it is ready to be shared with everyone for distribution.

**Security and data protection**

The application involves users who are known to get security threats as we build them. So, there are chances of data theft. The main aim of the project is to protect the user data and to secure the data by encrypting it during storing or transmitting the data. Early threat identification in the development of applications can bring better and safer results. OneHealth is an application that certainly takes input from the user and gives output based on user entered values there is no need of high range security in it. To improve security the encryption of data can also be implemented in the application. At the backend, there is SQL where the user sign-in data is stored and registration data is stored. suggests that if there is a requirement of security to the application it is only to the user’s data when they sign up. User authentication ensures that only authorized persons can access application features. Regular updates of software components, frameworks, and libraries by using automated tools can keep an application up to date by making it more efficient for the users.

**Case studies and Examples**

Following are the use cases that have been considered.

Use Case: User wants to know what is the recommended water intake

User is successfully able to know their water intake based on their age, temperature, average body weight. This makes the user aware by letting them know what their water intake should be in order for them to stay healthy.

Use Case: User wants to calculate their Body Mass Index (BMI)

The user can easily select the BMI calculator and by providing height and weight, the application is able to inform the BMI to the user.

As described above, there are many other user scenarios that can be taken into consideration as per the different calculators supported by the application. The user can easily select the calculator of their choice with the help of the simple and intuitive interface of the application.

**Conclusion**

OneHealth desktop application has a user-friendly interface. The application is a .NET framework Windows framework application. The Backend is developed using C# programming language. It has undergone several tests for effective user convenience. The main of this application is to analyze their daily health goals like water intake, height, weight, and maximum heart rate calculators and many fitness calculators. It also uses an SQL database for storing data in the backend while registering. This application may not only calculate according to the user's input but also make sure that users are aware of what they are behind in health and fitness. Thus, OneHealth Provide excellent user-friendly highly scalable, and well-performed application to users’ daily needs for fitness and health.

**Future Trends and Challenges**

As technology keeps increasing, the number of friendly applications may also increase. Hence, it is necessary to build an integrated healthcare app as patients must be able to communicate easily with our health application. Our application may include future developments like Artificial intelligence for better decision-making considering the input data given by the users. OneHealth user application provides all health-related user-friendly calculators. We should consider the enhanced experience application where it is easy for users to improve accessibility and usability for both patients and developers.

Challenges may include data privacy and security as the number of patients may increase entering their sensitive data for the application, it is mandatory for security measures to protect against threats. Developers must include new technology frameworks into the application to make it more data-consistent and time-consuming for the users. User adoption and training of the developers are necessary for the effective use of new technologies in to the developing application which may be challenging sometimes. Developing a healthcare desktop application is not easy the users might think, because it requires a large consumption of cost and resource allocation which is a barrier for smaller healthcare providers.