**This is the course project**

**Assignment**

To design and develop the chosen software application. The project is performed by the assigned groups of students.

**Due date**

December 10, 2:59 pm Pacific Time

**Deliverables**

1) A completed software application

2) A written system definition, requirements and design document

3) PowerPoint presentation about the system definition, requirements, design

**Project defense**

1) PowerPoint presentation by R&D teams (about 10-15 minutes).

2) System live demo

3) All team members should deliver part of the presentation and and part of the demo

4) All students must be present in class during the project defenses. Students absent in the presentation and demo will fail and not be graded for the project.

**Project Grading Points:**

4 points - assignment is complete

3 points - assignment is mostly complete

2 points - assignment is half complete

1 point - assignment is less than half complete

0 points - not done or not submitted

# Suggested project topics (optional – You may suggest your own topic):

1. Cognitive reaction testing - hard – UI, visualization, statistics
2. Impact of mobile phones on the human system – hard – DB, visualization, statistics
3. Strategy Planning (Sweet spot analysis) – hard – US, sorting, visualization
4. HTML parser – moderate – UI, file reading, formatting
5. 2D spatial transformation – moderate – coordinate system transformation
6. 3D spatial transformation – hard – coordinate system transformation (Euler transformation)
7. Medical diagnostics and treatment plan – easy – it is not an actual ML project.
8. Finding prime numbers from all numbers in the range from 0 through any assigned number – moderate – math algorithms of prime numbers.
9. File encoding-decoding – easy – Apply primer to text
10. Evolution simulation – hard – statistics, simulation, random numbers

# Submission

1. Written report that includes the purpose problem statement, vision, functional specification, and system design
2. PowerPoint presentation
3. Source code.

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| **Team 2** | | **Topic:** | | | | | |
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| **Team 3** | | **Topic: ActiveLog** | | | | | |
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| 1 | Li Wei Wang  wang.liwei@northeastern.edu | |  |  | 2 | Chi-Yao Hsiao  hsiao.chiy@northeastern.edu |  |
| 3 | Zehui Bao  bao.zeh@northeastern.edu | |  |  | 4 | Leiying Hu  hu.leiy@northeastern.edu |  |

**Problem the Project is Solving:**

In modern society, many individuals struggle with unhealthy eating habits, often ***lacking an accurate understanding of their diet***, such as the intake of calories, proteins, and other nutrients. Without proper tools, it is difficult for users to ***quantify their nutritional intake*** and make informed adjustments to meet personal health goals. This lack of nutritional insight can hinder efforts to lose weight, maintain health, or improve fitness.  
  
**Vision for the Solution:**

This project aims to provide a user-friendly platform that helps individuals monitor their calorie intake and weight progress using simple, well-established methods. We are **not** trying to provide professional dietary advice but rather ***utilize the Basal Metabolic Rate (BMR) formula***, which is a scientifically recognized method to estimate daily calorie needs based on a person’s age, gender, height, and weight.

*BMR formula:*

*For Men: BMR = 88.362 + (13.397 × weight/kg) + (4.799 × height/cm) - (5.677 × age in years)*

*For Women: BMR = 447.593 + (9.247 × weight/kg) + (3.098 × height/cm) - (4.330 × age in years)*

***(Source: Mifflin, M.D., & St Jeor, G.E. (1990). A new predictive equation for resting energy expenditure in healthy individuals. American Journal of Clinical Nutrition.)***

The system uses this formula to calculate users’ ***daily calorie requirements and automatically adjusts recommendations*** based on weight changes. If a user’s weight increases or decreases, or if their diet exceeds the recommended intake, the system will ***send them timely notifications***. These notifications will guide users toward their goal by suggesting simple changes, such as adjusting their calorie intake or exercise habits.

The app is designed to track progress in ***a non-intrusive manner***, using automated prompts to remind users to update their weight and food logs. Our focus is on helping users stay aware of their progress by giving them useful, data-driven feedback without requiring professional nutrition advice.

**Main Functionality of the Project:**

1. User Registration & Profile Setup:

* Input: Users enter their basic information (age, height, weight, target weight, and current exercise habits).
* Output: The system calculates their Basal Metabolic Rate (BMR) and recommends daily calorie intake based on personal goals (e.g., weight loss or maintenance).

1. Daily Food Intake Tracking:

* Input: Users log daily meals, including food names, portions, and calories (supported by barcode scanning and database searches).
* Output: The system tracks daily calorie intake and provides feedback on nutrition, suggesting foods that fit the user’s goals.

1. Exercise Activity Tracking:

* Input: Users input daily physical activities, including type, duration, and intensity (integrates smart device support for automatic tracking).
* Output: The system calculates calories burned and compares them to the user’s daily goal, displaying how much more activity may be needed.

1. Automated Recommendations:

The system dynamically adjusts diet and exercise suggestions based on users' progress toward their goals. For example, if a user wants to lose 20 pounds in 10 weeks, the system will suggest weekly calorie adjustments and provide motivational prompts.

1. Data Management & Sharing:

* The platform preloads a database of common foods and exercises, including their nutritional values.
* Users can share their data with others, view progress charts, and allow the system to track long-term health trends.

1. Notifications and Motivation:

The system sends periodic prompts to update body weight and progress.

Motivational notifications are delivered when users hit milestones, and the app provides feedback for further encouragement, including animated feedback and emojis to enhance the user experience.

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| **Team 4 “Code Queens”** | | | **Topic:** | | | | |
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