



Unit:
**Designing and Developing Object-Oriented
Computer Programs**

Assignment title:
Fitness Tracker

Spring 2024 – Winter 2024

Important notes

- Please refer to the *Assignment Presentation Requirements* for advice on how to set out your assignment. These can be found on the NCC Education website. Click on 'Policies & Advice' on the main menu and then click on 'Student Support'.
- You must read the NCC Education documents *What is Academic Misconduct? Guidance for Candidates* and *Avoiding Plagiarism and Collusion: Guidance for Candidates* and ensure that you acknowledge all the sources that you use in your work. These documents are available on the NCC Education website. Click on 'Policies & Advice' on the main menu and then click on 'Student Support'.
- You **must** complete the *Statement and Confirmation of Own Work*. The form is available on the NCC Education website. Click on 'Policies & Advice' on the main menu and then click on 'Student Support'.
- Please make a note of the recommended word count. You could lose marks if you write 10% more or less than this.
- You must submit a paper copy and digital copy (on disk or similarly acceptable medium). Media containing viruses, or media that cannot be run directly, will result in a fail grade being awarded for this assessment.
- All electronic media will be checked for plagiarism.

Scenario

With the increasing interest in fitness and healthy lifestyles, there is a demand for innovative software that helps individuals track their fitness activities and progress. In this assignment, you will design and develop fitness-tracking software that provides users with personalised fitness-tracking and goal-setting features.

The software users can create an account with a username and password. The usernames can only contain letters and numbers. The password must be of length TWELVE (12) characters and contain at least ONE (1) lowercase and ONE (1) uppercase letter. The users can set goals, and record and monitor their fitness activities after they successfully log in to the software.

Setting Goals

The users should be able to set personalised fitness goals for **calories**. For example, the user should be able to specify a target of THREE HUNDRED (300) calories to burn.

Recording Activities

Your software should support the recording of SIX (6) different fitness activities, include the TWO (2) activities in Table 1. You will also need to research and select any other FOUR (4) activities of your own preferences. For each activity, you should determine THREE (3) metrics related to those activities.

Activity	Metric 1	Metric 2	Metric 3
Walking	steps	distance	time taken
Swimming	number of laps	time taken	average heart rate

Monitoring Progress

The software should be able to calculate the calories burned based on the THREE (3) metrics provided by the users for each fitness activity. You need to conduct research to find appropriate formulae for this purpose. There is no specific standard formula required as long as the formula uses some or all of the THREE (3) metrics. The software will also calculate the total calories burned and report whether the user's goal has been achieved.

Your software should satisfy the following requirements.

Functional Requirements:

- Users should register and log in. Log-in page for customers. It should appropriately handle the situation when a reasonable number of failed login attempts occur.
- Users should be able to enter THREE (3) predefined metric values for each selected activity for all SIX (6) activities.

- The software should be able to calculate the calories burned based on the provided metrics for each activity.
- The software should calculate the total calories burned.
- Users should be able to set the fitness goal – calories to burn that should be connected to their username so your program can remember this goal for the user.
- The software should report whether the user has achieved the goal.

Non-functional Requirements:

- The program should provide a GUI which facilitates all inputs and outputs in a consistent layout using clearly labelled intuitive controls in an efficient way.
- Usernames and passwords should meet the specified criteria.
- Provide appropriate errors help messages, and guidance for the users.

Task 1 (60 Marks)

- a) You will need to design and implement a program (written in C#) which fulfils/meets all the requirements as outlined above.
(50 marks)
- b) The quality of your program will be assessed in terms of program structure, OOP principles including encapsulation, algorithms using appropriate control structures (loops and selections), and readability including appropriate comments.
(10 marks)

Task 2 (20 Marks)

You will need to develop a test plan and implement it. You should write a FIVE HUNDRED (500) word report about the plan, which should include the test plan, the purpose of each test, together with test scripts*, and the testing results* with full details.

An additional FIVE HUNDRED (500) word discussion should be included to justify how the data was selected and executed.

*There is no word limit for the test scripts and testing results.

The minimum requirements for a pass mark for this task include developing and implementing a test plan including test cases with some possible/invalid inputs for any THREE (3) functions mentioned above to ensure the functions handle the inputs as they should.

Possible exceptions should be considered and tested to make sure they are properly handled.

Task 3 (20 Marks)

You will need to:

Develop a fully detailed class diagram, which should be accompanied by a FIVE HUNDRED (500) word justification of the design of your classes. Note that you are **NOT** allowed to use any tools that automatically build class diagrams.

Submission requirements

Your program must be submitted as a zip file of the full project.

- Your program should be written in **C#**.
- Whatever IDE you use, it should be possible to open and run the project directly from the extracted archive.
- A single document with ONE THOUSAND AND FIVE HUNDRED (1500) words including a test plan, how the data was selected and executed, and justification of your class diagram should be submitted.

Candidate checklist

Please use the following checklist to ensure that your work is ready for submission.

Have you read the NCC Education documents *What is Academic Misconduct? Guidance for Candidates* and *Avoiding Plagiarism and Collusion: Guidance for Candidates* and ensure that you have acknowledged all the sources that you have used in your work.

☐

Have you completed the *Statement and Confirmation of Own Work* form and attached it to your assignment? **You must do this.**

☐

Have you ensured that your work has not gone over or under the recommended word count by more than 10%?

☐

Have you ensured that your work does not contain viruses and can be run directly?

☐