

**Software Engineering and Testing. BSC Year 2, 2024/2025**

**(Assignment 3 - 20%)**

**Assessment 3: Design and Draft Implementation**

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**Declaration**

I hereby certify that this material, which I now submit for assessment on the programme of study leading to the award of Ordinary Degree in Computing in the Institute of Technology Blanchardstown, is entirely my own work except where otherwise stated.

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# Title: FitLab

# *Abstract / Executive Summary (200 Words max)*

FitLab is an e-commerce website that we designed for users to enjoy fitness shopping from the comfort of their own homes. We developed this software using mostly PHP and SQL. Our project focuses on creating a functional user-friendly website that allows them to browse over our products, add items to the shopping cart, and securely complete transactions. This project follows a structured approach, utilizing ERDs, use cases, and class diagrams, to ensure a well-organised system. A key aspect of the implementation of this project involves an organised SQL database system. The database should store all the user’s data, including their account setup to the final steps in their transactions. This document outlines the project’s progress, technical components, our structured design and steps we took to make it possible.

# Project Definition

* Purpose of document

This document is for our group FitLab to present our up-to-date project design and draft implementation. It will cover everything from the visually appealing side to the coded structure behind it all.

* What is the project?

The Project is a PHP and database-based e-commerce user-functional website. The user should be able to wander free on the website, be able to checkout with items and contact if so, please. The coded side of the website should consist of a database that can store the user account and order information in a safe area.

* Functional Specifications
* Users sign up & login - Sign Up/Log In: The system should allow users to register an account with an email and password. Existing users should be able to log in securely.
* Product browsing & search - Customers can view products, filter items, and search for specific products.
* Shopping cart & checkout - Users can add items to the cart, update quantities, and proceed to checkout.
* Shipping & payment - Users must enter shipping details and select a payment method before confirming their purchase.
* Payment Verification: The system should process secure payments and verify transactions before finalizing the order.
* Contact - Users can send inquiries via a contact form
* Main components of the software system
* PHP Strom (PHP)
* MySQL (Database)
* HTML/CSS

# Document Revision

Rev. 1.0, 7/2/2025 – Finishing the Draft Proposal, coming up with the website name, and starting a basic layout with the website. Things are needed on the website and what pages should be included in the header? The topic of the website.

Rev. 2.0, 14/2/2025 – Did a website structure and how it'll look. Looked into the different pages for the website and ideas. Learned php to be included on the website and to get a brief knowledge of it. We decided on all the ideas for the websites and created simple pages like the Home page, navigation section, and product area.

Rev. 3.0, 21/2/2025 – Created the case use diagram. Worked on the CA2 and filled in details for it. Created the Contact Us page for the website with php.

Rev. 4.0, 28/2/2025 – Absent.

Rev. 5.0, 7/3/2025 – Created a simple ERD diagram. Use case spec diagram created. Finished creating the php pages fixing up the website and adding objects to the main pages. The logical and conceptual diagrams finishing up.

Rev. 6.0, 14/3/2025 – Made our own products and adding images to the website. Created simple tables for the database. Trouble getting the database to work due to problems with the phpMyAdmin and linking together so we are behind. We also started creating the classes for the ERD diagram.  Main pages are now complete.

Rev. 7.0, 21/3/2025 – Now finished with the ERD diagrams. Got phpMyAdmin to work on the computer and have managed to add the tables and insert into the tables with four pieces of information. The website is now completed maybe one or two things are not finished it. Continue to do CA3 and fill in the information. We now need to have the database work with the website and be able to read the information when a user interacts with the website.

1. Methodology

OOAD is important for creating modular, reusable, and maintainable systems through creating structured objects. The class diagram explains our system's structure. It includes entities such as User, Order, Shipping and Payment, and Product. Users can place multiple Orders for Products displayed on the site, and each order has a corresponding Shipping & Payment record. The use case diagram explains the user's interaction with the software by describing the user process when using the website, which includes logging in, purchasing items, entering shipping details, etc. It shows the seamless use of our website. The ERD helps with designing our database. Persistent storage, the database stores data that needs to be retained long-term for entities like Users, Orders, and Products. Keeping this data inside our database ensures better security and flexibility. Allowing us to make changes to content on the website without modifying the website’s code, making it more efficient.

1. **Requirements**

4.1 Use Cases

A diagram of a person's diagram

AI-generated content may be incorrect.

4.2 Use Case Specifications

|  |  |
| --- | --- |
| Login | * • The User selects "Sign Up" or "Log In." * • If logging in: * The system prompts the User for their email and password. * The system includes Verify Password to authenticate the user. * If signing up: * The system prompts the User for personal details. * The User submits their information. * The system creates a new account. * • If the password is incorrect, the system extends Display Login Error. * • If successful, the system redirects the user to the Home Page. |
| Products | * The system retrieves and displays product details. * The User can browse and view product information (Includes: View Products and Prices). * The User can add items to the cart (Includes: Add Products to Cart). * The System calculates the total amount in the cart. * The User clicks purchase, and the system redirects to Shipping & Payment. |
| Shipping & Payment | * Shipping form is displayed to the user. * The User must fill in shipping details. * Payment form is displayed to the user. * The User must fill in payment details. * Database stores the order information * System displays order number to the user |
| Orders | * Database stores the users order details. * Database records the date the order is made. |
| Contact form submission | * The User fills out the contact form * Database stores user's contact form details. * Database returns contact details to the system. |

1. **Case Diagrams**

5.1 Conceptual Class Diagram

A diagram of a data flow

Description automatically generated with medium confidence

5.2 Logical Class Diagram

A diagram of a product

Description automatically generated

Creating the class diagram begins with designing and identifying the key entities and all their attributes based on the software systems’ requirements and functions. So, we designed the different classes, keeping it as simplified as possible, and added the attributes. We then designed the relationships between classes using associations, multiplicities, and dependencies. Next, inheritance is applied where needed to model generalization, and aggregation or composition is used to show ownership relationships. And then finally methods are added to represent the software systems’ behaviour, ensuring the diagram is accurate towards the system structure and function ability.

5.3 conceptual ERD

A diagram of a company

Description automatically generated

5.4 Logical ERD

**A diagram of a company

Description automatically generated with medium confidence**

* 1. Physical ERD

A screenshot of a computer

Description automatically generated

The process of creating an ERD starts by looking at and identifying the entities based on the software systems' functionality. We then name the entities and assign primary keys (PK) to each entity created. The entity attributes are then added to store relevant information about that specific entity. After that, relationships between the entities are established, with cardinality defined to show how the entities relate to each other. And after that normalization is used to reduce redundancy and improve efficiency. Finally, we review the diagram so that it accurately represents our software.

# Conclusions

Slowly progressing towards a fully functional e-commerce website with fully functional aspects. We have faced various problems throughout this time but will continue to strive and complete our goal. From the start to now, we managed to stay relatively on plan besides that one roadblock with the implementation of the database, but I believe as our design continues development, we will surpass these inconveniences. Moving forward, FitLab will focus on ensuring seamless user interactions and completing all pending features.