ALGORITHM & DATA STRUCTURES

Final Project

Introduction

Welcome to the final project!

The final project aims at applying the concepts you have acquired during course to a real-world problem.

You will identify a **real-world problem,** determine and justify the **choice of one or more data structures**, **implement** a solution, **analyze your solution** in term of complexity, and finally **document the process** thoroughly.

Projects will be performed in teams. A team consists of 3 students. Good luck everyone!

Proposal Document Template

The proposal will briefly outline **my problem, plan**, and **approach**. Below is the template with examples to guide you:

Team Members:

- Chhun Nika
- Kon Sotheara
- Mao Sothyda

Project Title:

E-commerce application

Problem Statement:

Describe the problem you aim to solve and its significance.

Shopping in physical stores has many challenges, such as limited access due to distance, fixed opening hours, and difficulties in managing products. Customers often struggle to find what they need and keep track of their purchases, while businesses face problems with tracking sales, managing stock, and offering personalized services. That's why we created an e-commerce application to solve these problems. It will allow users to easily browse, manage, and buy products online. At the same time, it will give administrators simple tools to manage inventory, track sales, and create useful reports for better decision-making.

Expected Outcomes:

Summarize what you aim to achieve.

The e-commerce application will provide:

- A user-friendly platform for customers to browse, add to cart, and purchase products easily.
- Tools for admin to manage products, track inventory, and generate sales and user activity reports.
- Efficient use of linked lists for managing product data and shopping cart information.

Proposed ADT(s):

Identify and justify the choice of ADTs.

- Purchase history of user
- Report for admin (user , sales)
- CRUD operations for admin : add product, check products information, update products information, delete products.

- CRUD operations for user : add product to cart; check products in cart; update amount of product in cart, delete items from cart
- Using Linked list : the Nodes of linked list is used to store products information:

  For admin:
  >> To store products in stock
  >> To check products information
  For users:
  >> To store product in cart

Implementation Plan:

Outline how you will implement the solution.

Define the Data Structures:
- Define the Data Structures:
  >> Product: A class that holds attributes like product ID, name, price, and quantity.
  >> Cart: A class that holds a list of Product objects and methods for
      adding/removing items.
  >> Order: A class that manages order details, including the products purchased,
      total price, and order status.
   >> Admin: A class to manage product inventory and view reports.
- Working with products in the store
   >> Using a binary search tree to store products makes it easier for users to search
       for items in our store.
   >> Using linked list to store the products information and uses linked list to
       perform CRUD operations such add products, read products, update and
       delete products
   >> Writing the purchased product in CSV file to store customers records where it
       can be accessed and print out by admin as a report