NATIONAL UNIVERSITY OF COMPUTER & EMERGING SCIENCES
ISLAMABAD CAMPUS
CS-1004 Object Oriented Programming
(Spring 2024)
Section (A and B)

Submission Information

Submission Deadline: **29th April (08:00 am)** and **9th May, 2024 (8:00pm)** You are supposed to submit your Project on GOOGLE CLASSROOM (CLASSROOM TAB not lab). Only ".ZIP" files are acceptable. Other formats should be directly given ZERO. Correct and timely submission of the Project is the responsibility of every student, hence no relaxation will be given to anyone. Late Submission policy will be applied as described in course outline.

Tips: For timely completion of the Project, start as early as possible.

Plagiarism: Plagiarism is not allowed. If found plagiarized, you will be awarded zero marks in the project and you will be awarded F grade in course.

Instructions:

Dear students, we will be using auto-grading tools, so failure to submit according to the format below would result in zero marks in the relevant evaluation instrument.

I. Implement separate .cpp and .h files for each class of your project. Use a single main.cpp file to implement all your classes in your driver functions.
II. Combine all your work in one folder. The folder must contain only .cpp, .h and text files (no binaries, no exe files etc.).
III. Run and test your program on a lab machine before submission.
IV. Rename the folder as ROLL-NUM_SECTION (e.g. 23i-0001_A) and compress the folder as a zip file. (e.g. 23i-0001_A.zip). Do not submit .rar file.
V. Submit the .zip file on Google Classroom within the specified deadline.
VI. Submission other than Google classroom (e.g. email etc.) will not be accepted.
VII. The student is solely responsible to check the final zip files for issues like corrupt file, virus in the file, mistakenly exe sent. If we cannot download the file from Google classroom due to any reason it will lead to zero marks in the Project.
VIII. Displayed output should be well mannered and well presented. Use appropriate comments and indentation in your source code.
IX. **Total Marks: 200.**

Learning Objectives:
The AIM of Semester project is to implement Object oriented programming concepts including classes, operator overloading, inheritance, polymorphism, file handling and DMA. We are also expecting you to implement basic concepts of cybersecurity (privacy, confidentiality, integrity and access control) in project. It is compulsory to write comments properly explaining every part of your code in your own words (Roman Urdu preferred); otherwise, no marks will be awarded.

Warning:
- If there is a syntax error in the code, zero marks will be awarded in that part of the Project.
- Your code must be generic and handle all errors and exceptions.

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You have to implement same CDS (Café Digital System) which you have implement in PF course last semester. However, this time you have to implement CDS using OOP concepts to enhance modularity, maintainability, and extensibility. This includes designing classes, establishing relationships between them, and utilizing inheritance and polymorphism effectively. Therefore, read once again the description of project, identify classes and relationship between classes, and make good use of inheritance and polymorphism.

As 23rd batch came to university, there have been more students and staff in Café to accommodate. Due to increasing Workload, Café administration have decided to modernize digitize their system CDS (Café Digital System) and start to maintain their stocks in MS Excel and text files. However, the staff of the Cafe is not much qualified enough to use excel. University administration have decided that Cyber students of 23rd batch will help our cafe with their Semester Project. Therefore, in this project you have to create a Menu driven solution, which would have been very helpful to our Cafe Employee.

Since the cafe employs a large number of staff members, you must create a functional login system (For at least five employees) to prevent unauthorized users from accessing it. You must also create an admin user with the ability to change user credentials and save the system in a text file using file handling.

The complete system works as follows:

<u>Café side working</u>:

- Café administrator login to system and perform following operations
    - ✓ It can see and handle complete details of cafe stock in hand.
    - ✓ If an Item is lower than a threshold value it will generate a notification for appropriate action (you should handle at least 10 items of cafe you can categorized these)
    - ✓ It can order Items which are lower in quantity.
    - ✓ It can search, add, remove, and update any item in the stock.
    - ✓ It can add remove credentials of employees and student/staff(if any)
    - ✓ It can display notifications (any interesting Notifications related Café and café Items, café packages and promotions).
    - ✓ It can also see online/scheduled orders and appropriately responds.
    - ✓ It can see complaints (related food, employee, cleanliness and any others) generated by student/staff and responds accordingly.
    - ✓ It can see bestseller employee.
    - ✓ You can add any other functionality to earn **Bonus**
- Café employees (at leat 5 employees) login to system and do at least following operations.
    - ✓ Take appropriate orders from students/staff and enter it to CDS.

- ✓ Search Items.
- ✓ Generate a digital transaction after delivering order to students/staff.
- ✓ It can also see online/scheduled orders and appropriately responds.
- ✓ You can add any other functionality to earn **Bonus**

Students and staff side working:

- Students and staff can visit café employee or enters through CDS and do at least following operations
  - ✓ Search and Orders their food.
  - ✓ Give complaints through CDS
  - ✓ Search Items through CDS
  - ✓ Give and schedule orders through CDS.
  - ✓ See Notifications through CDS
  - ✓ You can add any other functionality to earn **Bonus**

Implementation Perspective:

> C++ concepts to use : OOP concepts including classes, inheritance, polymorphism and File Handling

We have to save the Stocks of Items in The CDS.

Stocks have these attributes
- ● Name
- ● Quantity
- ● Price per Item
- ● Total Price (Price per item * Quantity)

So we have these attributes of the items, you have to Store these things and keep record of them, you have to Implement the Functionality of excel in it. Therefore, you have to implement a Search function, which would search the items with respect to their Name, Quantity or Price per Item. You also have to implement a Sort function that can sort the items in ascending and descending order with respect to their Name, Price or Quantity.

> C++ concepts to use : Strings (character arrays)e, loops, Arrays (for sorting search "Bubble Sort")

After every day passes, the quantities of items would (randomly/order by staff and student) decrease in range of (say 0-15), so if an item quantity drops lower or equal to a threshold (say 15), You have to Mark it in Red. And show it on the top of The list, And give the Administrator an

option that if he wants to Purchase more quantity of the item, if he says yes, then Show him price of per item, and ask how much items he want to add in stock and add it. (Make sure the items do not Exceed the 1000 limit).
If he does not add the stock, the quantity would eventually hit zero and Mark the item Yellow.

C++ concepts to use : Functions, Loops, Arrays (For colors see the attached document)

Now To help the Café Employees, you have implemented the ability to calculate the Average and Sum of the quantity and Total price. In addition, alongside this you would keep track of the Sales of the Day, and you would calculate it by calculating the decreased amount and comparing it with the previous amount and then calculating it for every item in stock.

C++ concepts to use : classes , Loops, Arithmetics, Arrays,File Handling

Now, you have to Save All your work in a Text file, so Next time a student/staff, employee or admin logins, he can see the updated stocks and perform functions. In addition, the changes should be made for all users of the system. Therefore, for Filing you have to Make separate files for Stocks and Credentials

C++ concepts to use : Classes, Loops, File Handling

This project offers an excellent opportunity to apply your Excel skills (through file handling) practically while aiding Cafe in improving its stock management system. Aim to create a user-friendly interface that simplifies the cafe's operations.

Functionalities to Implement (Highlights):

Login System and Admin Access:

- Create a secure login system to restrict unauthorized access to the stock management system.
- Develop an admin user role capable of changing user (employee plus student/staff) credentials.
- Save user credentials in a separate file using file handling.
- Handle notifications using files.

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Stock Attributes and Handling:

- Store stock items with attributes such as Name, Quantity, Price per Item, and Total Price (derived from Price per Item * Quantity).
- Implement functions to search for items based on Name, Quantity, or Price per Item.
- Create sorting functions to arrange items in ascending/descending order by Name, Price, or Quantity using techniques like Bubble Sort.

Dynamic Stock Management:
- Simulate daily random decreases (0-10) or when Items will be purchased in item quantities (stocks).
- Mark items in red when their quantity drops to threshold (15 or lower), indicating low stock.
- Prompt users to purchase more quantities for low-stock items.
- Display the price per item and allow users to specify the quantity to add (up to a limit of 1000).
- Mark items in yellow as their quantity depletes to zero if no additional stock is added.

Statistical Analysis and Sales Tracking:
- Implement functions to calculate the Average and Sum of Quantity and Total Price for available stocks.
- Track daily sales by comparing decreased amounts with previous quantities for each stock item.
- Show high and low sold items.
- Show best seller employee.

Data Persistence:
- Save all stock-related information in a text file to ensure updated stocks are available for subsequent logins by users or the super admin (administrator).
- Separate files should be used for storing stocks and user credentials using file handling.
- You can use any number of files for your implementation.

Modules:
- Use Modular approach and make appropriate classes and implement relationship between classes in your work.
- Do not hesitate to read files in Arrays through appropriate functions from classes

- Use Dynamic memory allocation (Dynamic arrays) where required

Deliverables:

1) Class diagram/ Domain model: Paper based (29th April, 2024 08:00am)
2) Final project (Compiler based full working code) [9th May, 2024 10:00pm]