

National University
Of Computer and Emerging Sciences

Project Report

Submitted to

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Object Oriented Programming

Introduction

This project aims to develop a student management system that facilitates the efficient management of student information and related tasks. The objectives of the project include creating a system for storing student records, managing enrollment, tracking academic progress, conducting quizzes, and generating reports. The project will focus on the core functionalities of student information management, such as registration, enrollment, course management, and grading.

The student management system is designed to provide a centralized platform for administrators and teachers to manage student-related information, including enrollment, grading, attendance, and reports.

The system includes different features for teachers and students. Students have the option to view registered courses, drop or register in a course, view attendance, view results, and attempt a quiz.

Teachers can see enrolled students, create attendance, and create quiz.

Classes Used

- User
- Student
- Teacher
- Date
- Attendance
- Course
- Time
- Question
- Question Bank
- Quiz Attempt
- Quiz
- File Handling

Key Classes

The key classes in the system include User, Student, Course, Teacher, Quiz, and Attendance, each representing different entities and functionalities within the system.

Aggregation

Aggregation represents a "has-a" relationship, where one class contains references to other classes.

An example of aggregation in our system is the relationship between the Course and Student classes, where a Course has a collection of Enrolled Students. Now if there are no students the course can still exist, thus it is an aggregation.

Association

Association represents a relationship between classes, indicating that they are connected or interact with each other. For instance, the Teacher class and the Course class have an association, as a teacher can teach multiple Courses.

Composition

A composition is a strong form of aggregation, where the lifetime of the contained object is controlled by the container object. Attendance class has a composition relationship with course class as attendance

cannot exist without the existence of a course. Similarly, quiz and question bank classes have a composition relationship with question class. Different questions combine to form a question bank, whereas some random questions from a question bank combine to form a quiz. Also, the quiz has a composition relation with the Course class as there can't be a quiz if there is no class.

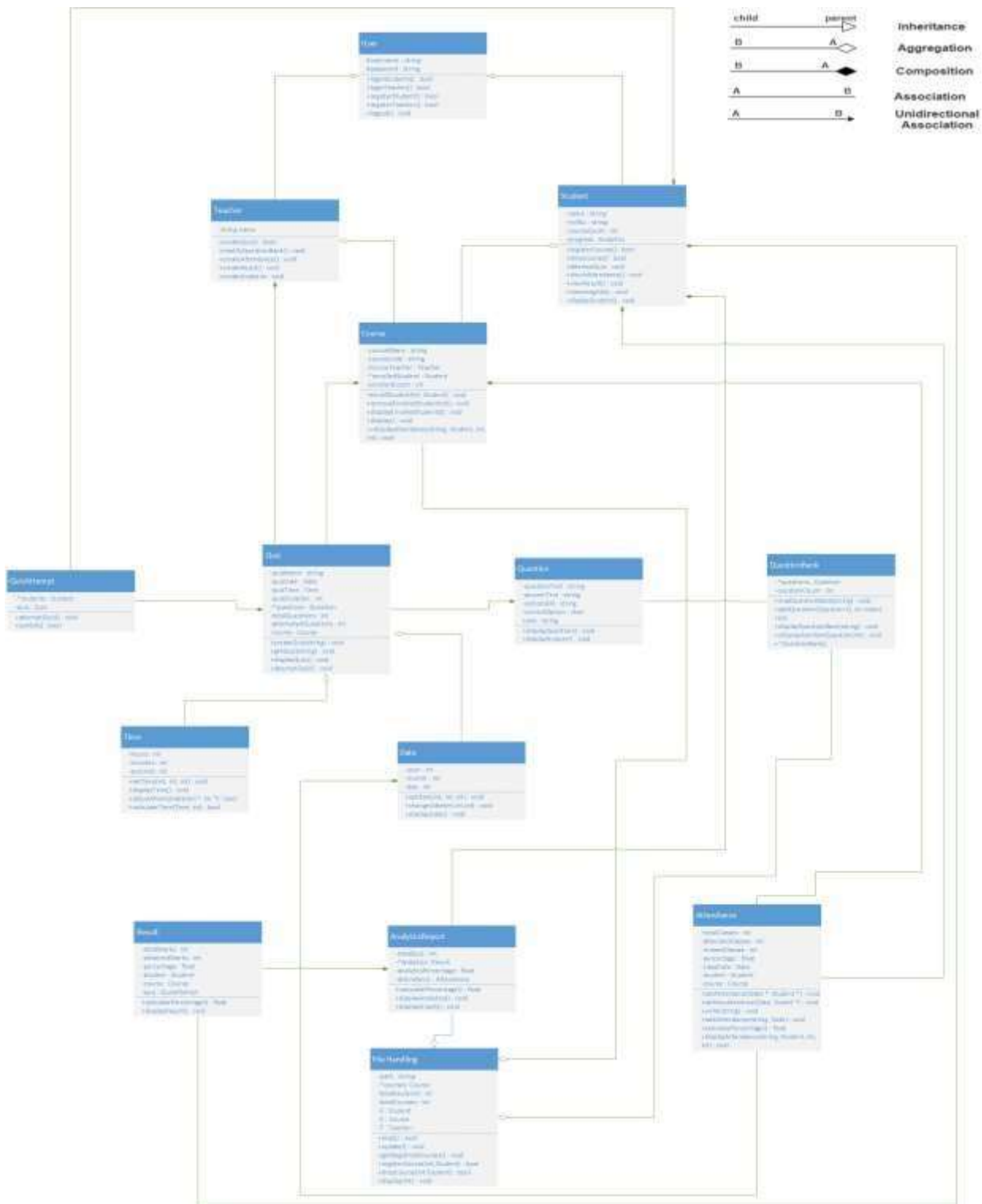
Inheritance

inheritance allows a class to inherit attributes and behaviors from another class. In our system, the Student class and Teacher class can inherit common attributes and behaviors from a base class called User. The data members such as username, password and serial number are inherited to child classes.

Programming Language and Tools Used

- C++ • MS Visio • MS Visual Studio

UML Class Diagram



Working

Login/Register

1. First the user will get an option either to log in or register as a user.

```
----- Menu -----  
  
1. Login  
2. Register  
3. Quit  
Choice: █
```

- Whether the user selects login or register, on the next page they will see the option that whether they are student or teacher.

```
----- Login As -----  
  
1.Student  
2.Teacher  
Choice: █
```

- On the next page the user will be asked to enter a username and password.
For Students, the username will be their names (in lower case) combined with a dot and the password will be their username combined with their roll number combined using a dot. For Teachers, the username will be their names (in lower case) combined with a dot and the password will be their username combined with their course sr# (as appear in the data.csv file) combined using a dot.
The program will compare them with the credentials.csv file and will check if they match or not. Then it will login.

```
----- Login -----  
  
Enter Username: abbas.raza  
Enter Password: abbas.raza.20I0622█  
  
----- Login -----  
  
Enter Username: adil.majeed  
Enter Password: adil.majeed.2█
```

4. For Students, the following page will appear on the screen. On this page, all the functionalities are performed.
- When students register/drops a course, the program copies the content of data.csv to a temp.csv file, then it converts the registration status (0/1) and then renames temp.csv to data.csv.
 - Attendance is stored in a courseName_attendance.csv file. The program reads the attendance and calculates total attendance, missed classes and percentage.
 - After attempting a quiz the student will be able to view the result of that quiz.

```
----- Menu -----  
  
A. Display Registered Courses.  
B. Register New Course  
C. Drop a Course  
D. Display Attendance  
E. Attempt Quiz  
F. Display Result of Quiz  
G. Display Analytics Report  
H. Logout  
I. Quit  
  
Choice: █
```

5. For teachers, the menu is as under

```
----- Menu -----  
  
A. Display Registered Students.  
B. Create Attendance  
C. Add new Attendance  
D. Display Question Bank  
E. Create Quiz  
F. Display Quiz  
G. Logout  
H. Quit  
  
Choice: █
```

- The program will go through the data.csv file and will get a list of all the registered students in that specific course.
- Teacher will have the option to create an attendance sheet named courseName_attendance.csv for the first-ever class. After that, the teacher will just add new attendance to the existing attendance sheet.
- The program will read the quizbank.txt file and will display all the questions in the question bank.

- d. In create quiz option, an algorithm will pick some random questions from the question bank and will store them in filename.txt which is the quiz file. The teacher can view that filename.txt (Quiz) using the display quiz option.
- 6. A student or teacher can also register using the register option from the menu. The program will store their username and password in the credentials.csv file.
- 7. The program is filled with do while loops and wont stop until user wants it to.

Testing

Teacher

A. Registered Students

```
Course Name: Object Oriented Programming
Course Code: CS 201
21. Manahil Kamran - 22I-1440
22. Meher Amir - 22I-1447
23. Mubashir Iqbal - 22I-1853
24. Muhammad Ahmed - 22I-1861
25. Muhammad Asim - 22I-1868
26. Muhammad Imran - 22I-1901
27. Muhammad Jameel - 22I-1902
28. Muhammad Talal - 22I-1925
29. Muhammad Umar - 22I-1940
30. Muhammad Zaid - 22I-1943
31. Qasim Rizwan - 22I-2006
32. Ruwaid Imran - 22I-2032
33. Saad Khurshid - 22I-2041
34. Saad Mehmood - 22I-2042
35. Salman Ali - 22I-2049
36. Shaheeruddin Shiekh - 22I-2072
37. Wajeeh Ul Hassan - 22I-2847
38. Waleed Nouman - 22I-2987
39. Zimal Alam - 22I-2995
Press any key to continue . . .
```

B. Question Bank

Type: 2efcde9

Question: What is the output of the following code
out << "Hello World" ;

Options:

- A. Hello
- B. World
- C. dabfac4: Hello World
- D. None of the above

Type: b94d27b

Question: Pakistan came into being on 14 Aug 1947

Options:

- A. dabfac4: True
- B. False

Type: 2efcde9

Question: What is the square of -2

Options:

- A. dabfac4: 4
- B. -4
- C. 2
- D. -2

Type: 88f7ace

Question: Write 100 words essay on one of the following:

Options:

- A. 1. Recent successes of Pakistan's cricket team
- B. 2. Role/influence of ChatGPT in the teaching/learning process

Type: 2efcde9

Question: Which of the following operators is used to access the member variables and functions of an object in C++?

C. Create a quiz

```
Enter name of Quiz: OOP QUIZ 1

Set Total Number of questions in Quiz: 5
Quiz created successfully.
```

D. Display Quiz

```
Enter name of Quiz: OOP QUIZ 1
-----
Type: b94d27b

Question: Pakistan came into being on 14 Aug 1947
Options:
  A. True
  B. False

-----
Type: b94d27b

Question: In C++, the size of a character variable is always 1 byte.
Options:
  A. True
  B. False

-----
Type: 2efcde9

Question: Which of the following operators is used to access the member
variables and functions of an object in C++?
Options:
  A. ns:
  B. * (asterisk)
  C. -> (arrow)
  D. . (dot)

-----
Type: 2efcde9

Question: What is the value of a null pointer in C++?
Options:
  A. ns:
  B. 0
  C. 1
  D. -1
```

Student

A. Display Registered Courses

```
Registered Courses:
    CS 101 - Programming Fundamentals
    CS 201 - Object Oriented Programming
    CS 302 - Analysis of Algorithms
    CS 307 - Artificial Intelligence

Press any key to continue . . .
```

B. Register a course

```
Which course do you want to register:

    1. CS 101 Programming Fundamentals
    2. CS 201 Object Oriented Programming
    3. CS 102 Introduction To Computing
    4. CS 301 Data Structures
    5. CS 302 Analysis of Algorithms
    6. SE 301 Software Requirements Engineering
    7. CS 501 Research Methodology
    8. CS 407 Big Data Analytics
    9. CS 307 Artificial Intelligence
   10. CS 601 Deep Learning
   11. CS 409 Digital Image Processing

Choice (Course Number (1-11)): 3
```

```
Registered Courses:
    CS 101 - Programming Fundamentals
    CS 201 - Object Oriented Programming
    CS 102 - Introduction To Computing
    CS 302 - Analysis of Algorithms
    CS 307 - Artificial Intelligence

Press any key to continue . . .
```

C. Display Attendance

```
Course: Object Oriented Programming
Total Classes: 2
Attended Classes: 1
Percentage: 50%
```

```
Course: Artificial Intelligence
Total Classes: 2
Attended Classes: 2
Percentage: 100%
```

D. Attempt Quiz

```
Enter quiz name: OOP QUIZ 1
Quiz start time: 23:32
Quiz end time: 23:42
Quiz is attemptable

-----
Type: b94d27b

Question: Pakistan came into being on 14 Aug 1947
Options:
  A. True
  B. False

Answer: A
-----
Type: b94d27b

Question: In C++, the size of a character variable is always 1 byte.
Options:
Answer: C
-----
Type: 2efcde9

Question: What is the value of a null pointer in C++?
Options:
  A. 0
  B. 1
  C. -1
  D. undefined

Answer: D
-----
Type: 88f7ace

Question: Write 100 words essay on one of the following:
Options:
  A. A. Recent successes of Pakistan's cricket team
  B. B. 2. Role/influence of ChatGPT in the teaching/learning process

Answer: Pakistan Cricket Team has excelled very much under captaincy of Babar Azam
```

E. Display Result

```
Total Questions: 5  
Total Marks: 5  
Obtained Marks: 3
```

Conclusion

This project has improved my coding skills very much. Also it includes all the necessary concepts which are very important.