Complex Engineering Activity

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Subject: Object-oriented program

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Project name:

University Management system using C++

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Introduction:

What is OOP?

Object-oriented programming (OOP) is a computer programming model that organizes software design around data, or objects, rather than functions and logic. An object can be defined as a data field that has unique attributes and behavior.

OOP focuses on the objects that developers want to manipulate rather than the logic required to manipulate them. This approach to programming is well-suited for programs that are large, complex and actively updated or maintained. This includes programs for manufacturing and design, as well as mobile applications; for example, OOP can be used for manufacturing system simulation software.

Classes

A class in C++ is **the building block that leads to Object-Oriented programming**. It is a user-defined data type, which holds its own data members and member functions, which can be accessed and used by creating an instance of that class. A C++ class is like a blueprint for an object.

Data members: Data members include members that are declared with any of the fundamental types, as well as other types, including pointer, reference, array types, bit fields, and user-defined types.

Member functions: Member functions are operators and functions that are declared as members of a class. Member functions do not include operators and functions declared with the friend specifier. These are called friends of a class. You can declare a member function as static ; this is called a static member function.

Inheritance:

Inheritance is **a mechanism in which one class acquires the property of another class**. For example, a child inherits the traits of his/her parents. With inheritance, we can reuse the fields and methods of the existing class. Hence, inheritance facilitates Reusability and is an important concept of OOPs.

Switch:

A switch statement **allows a variable to be tested for equality against a list of values**. Each value is called a case, and the variable being switched on is checked for each case.

If else if:

The if/else statement **executes a block of code if a specified condition is true**. If the condition is false, another block of code can be executed. The if/else statement is a part of JavaScript's "Conditional" Statements, which are used to perform different actions based on different conditions.

File handling:

File handling in C++ is **a mechanism to store the output of a program in a file and help perform various operations on it**. Files help store these data permanently on a storage device. The term "Data" is commonly referred to as known facts or information.

About University Management System:

In University, a large amount of data is processed and the results are used in running an organization. The University management system maintains the list of university and their different streams along with the examination and result department. There are menus and sub menus in the output of the project which has given this project an organized look.

To maintain the record of university, students, examination and result, the university management department prepares the record for each department, showing the total number of colleges and students. It also keeps track of any modification necessary related to students and colleges, and produces regular reports for the organization giving the total information required.

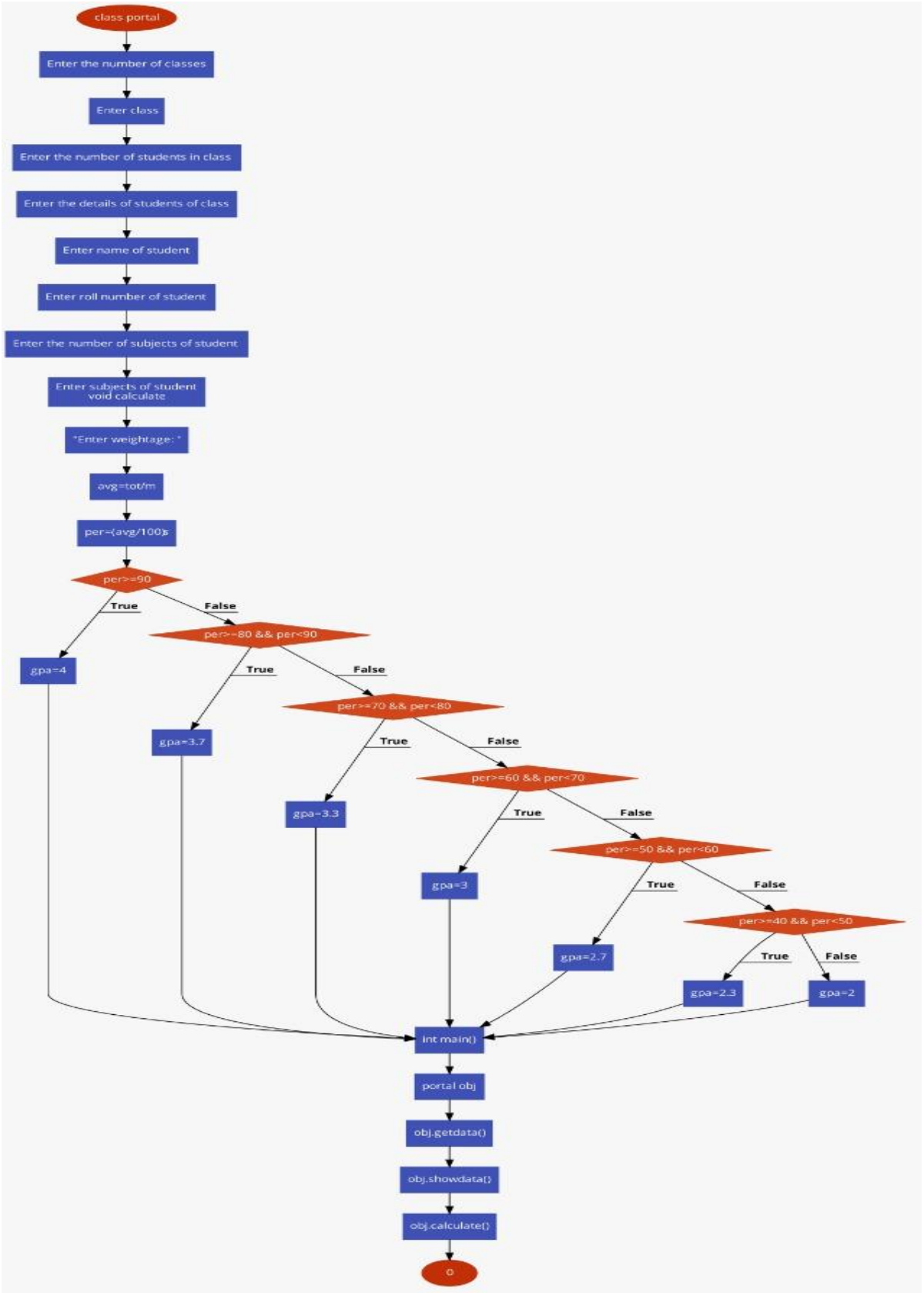
The university data file of this university management system project contains the following:

1. **Details of university information**: In this section, the project keeps the record of university id, university name, university location, university running the stream and the degree the university is running, and maintains the information in university.dat file.
2. **Details of Student information**: In this section, the university management system keeps the record of student id, student name, student address, father's name, contact number, degree stream, std code, and others relevant data.

The project is developed using the class concepts of C++ programming language, and a number of user defined header files are used as well. Many data functions can be found in the project through which any one can know about any student or college by providing the respective student or university number.

Teacher Portal:

Flowchart:


class portal
Enter the number of classes
Enter class
Enter the number of students in class
Enter the details of students of class
Enter name of student
Enter roll number of student
Enter the number of subjects of student
Enter subjects of student
void calculate
"Enter weightage: "
avg=tot/m
per=(avg/100)*
per>=90
True
False
gpa=4
per>=80 && per<90
True
False
gpa=3.7
per>=70 && per<80
True
False
gpa=3.3
per>=60 && per<70
True
False
gpa=3
per>=50 && per<60
True
False
gpa=2.7
per>=40 && per<50
True
False
gpa=2.3
gpa=2
int main()
portal obj
obj.getdata()
obj.showdata()
obj.calculate()
0

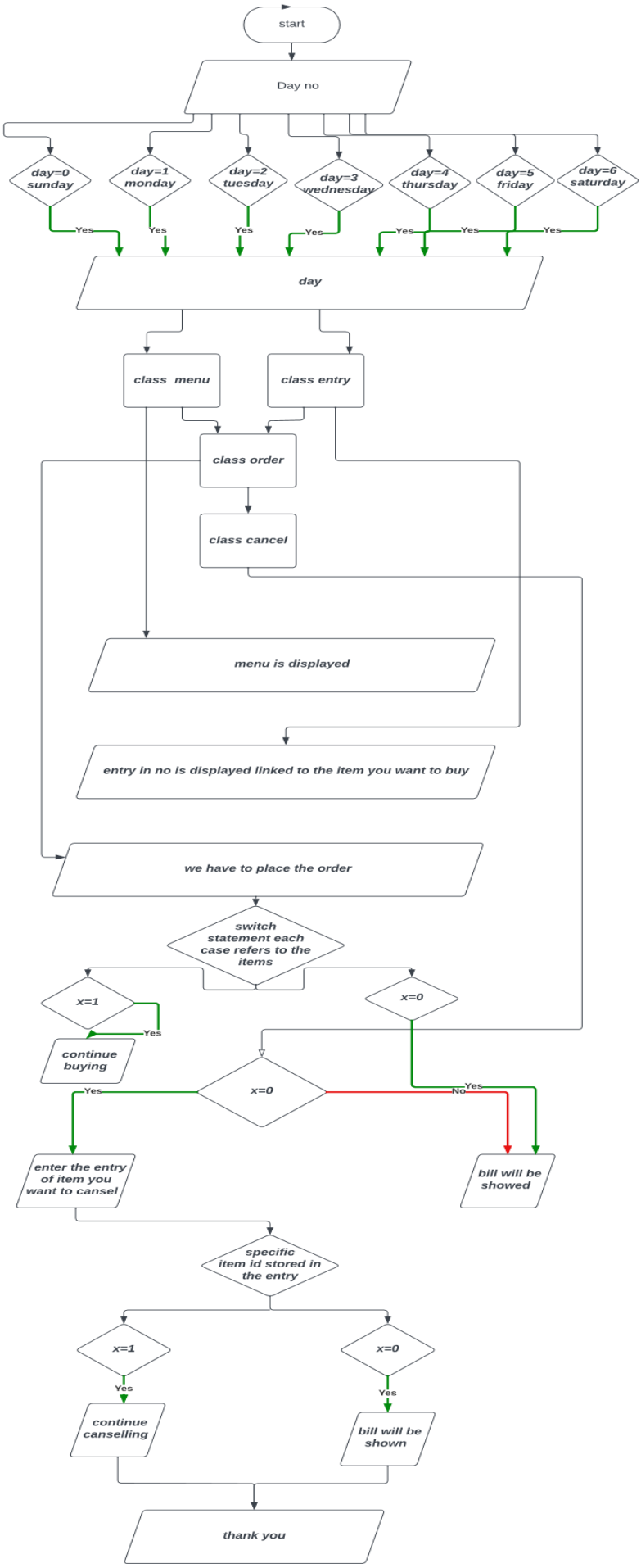
Explanation:

1. Class: Portal
2. Member function:
    a. Getdata.
    b. Showdata.
    c. Calculate.
3. 3.For loop
4. 4.If and else if statement

Firstly I made a class with name portal than in public area I made a member function getdata which is use to get data from user as there are more than 1 classes and sections in university so I use for loop for differentiation of all sections and we get data about student like name, Roll number, subjects of student and subject name. Than I made another member function which is use to show this all data about student at the end on the other member function calculate, we get the marks of every subject and calculate the average of student and then give GPA accordingly for this purpose I use if and else if statement. And at the end in main function I call all the functions.

CAFETERIA:

Flowchart:


start
Day no
day=0 sunday
day=1 monday
day=2 tuesday
day=3 wednesday
day=4 thursday
day=5 friday
day=6 saturday
Yes
day
class menu
class entry
class order
class cancel
menu is displayed
entry in no is displayed linked to the item you want to buy
we have to place the order
switch statement each case refers to the items
x=1
x=0
continue buying
No
enter the entry of item you want to cansel
bill will be showed
specific item id stored in the entry
continue canselling
bill will be shown
thank you

Explanation:

- C time library.
- Classes are used

  Menu

  Entry

  Order

  Cansel

- switch statement is used.
- If else if statement is used.
- Arrays are used.
- Inheritance is used.

Normal c++ program program cannot show the current date and time so c time library is used which shows us the present time and date and day of the week (in numbers).

C time library:

tm is the structure we use following commands which show different outputs

All the values are stored in the structure

int tm_sec;

seconds of minutes from 0 to 61

int tm_min;

minutes of hour from 0 to 59

int tm_hour;

hours of day from 0 to 24

int tm_mday;

day of month from 1 to 31

int tm_mon;

month of year from 0 to 11

int tm_year;

year since 1900

int tm_wday;

days since sunday

Like 0 means Sunday, 1 means Monday and so on .

int tm_yday;

days since January 1st

Classes

4 classes are created of name

Menu.

Entry.

Order.

Cancel.

In menu class we declare the price of the items and 8 items are available every day.

In entry class entry is shown on which we have to buy the item

Inheritance:

In this program multilevel inheritance is used .Order class is derived from class menu and entry and then cancel class is derived from order class.

Array:

In array we store the no of items buyed and the item entry which mean which item we buy in both the classes same method this method is used to avoid the process of more cancellation items and same items that we buyed .

But we have to take into account the order in which we buyed.

Switch:

Switch statement is used in order and cancel class . Switch statement is used to select the order in every case different items are stored and for bill(finish order) press 0 and continue to buy items press 1.

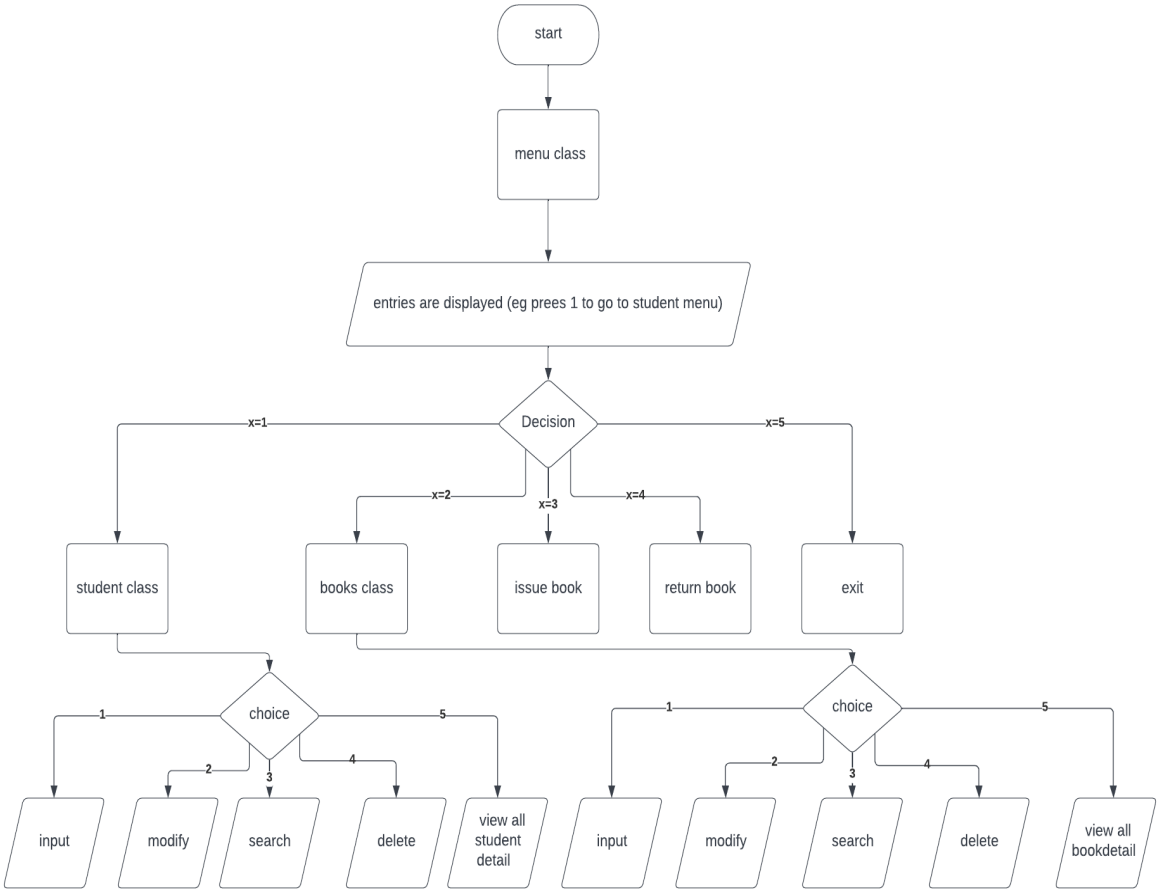
In cancel class switch is used to cancel the item from the buyed item .

If else if:

If else if statement is used when we have to cancel the item or have to show the bill.

Library:

Flowchart:



Explanation:

- First of all i made a class date so that i can store the issued date of the book.
- Now i have rectified the date so it remains in restricted vales as 30 days 12 months year.
- Now in public i created a default constructor and gave values to date month and year.
- Now i have created a function setdate and then overloaded the function.
- Then i created a function showtime.
- Now i created another class menu.
- I declared these 5 functions inside the menu class as main menu,student menu,book menu, issue book and return book.
- Now i defined all these functions outside the class.
- Now i created another class bookdata to save bookdata.
- And declared the variables of this class bookdata.
- Now i created another class student data and declared its variables.
- Now i created another class book and declared its functions.
- Now i have defined the functions outside the class.

- I used file handling and if while loops in defining the functions.
- In int main function i used switch break such that i have choice if its true then it will direct us to the student menu which have further cases.
- And if we use wrong inputs it will gave an error.
- The case 2 is the main book menu we made objet b1 and it have 6 choices in it.
- The case 3 is issue book.
- The case 4 is return book and if we enter wrong input it will give error.

Conclusion:

From we can create a code that can be used for different objects it can shorter the length of code And it can be efficient It can be used in different management systems It is possible that multiple instances of objects co-exist without any interference. It is possible to map the objects in problem domain to those in the program. Message passing techniques is used for communication between objects which makes the interface descriptions with external systems much simpler. The data-centered design approach enables us to capture more details of model in an implementable form. Everything is treated as object in OOP so before applying it we need to have excellent thinking in terms of objects.