National University of Computer and Emerging Sciences

Lab Manual 08
Object Oriented Programming – CL1004

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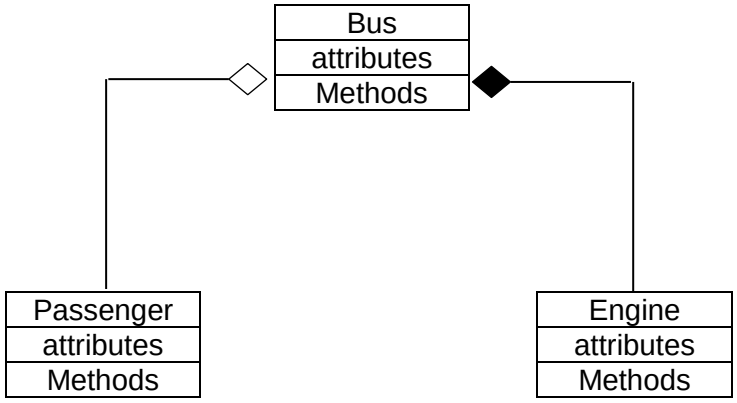
Lab Manual 08– Aggregation and Composition

Important Note:

- **You may find the syntax to accomplish these exercises from lecture demo.**
- **Add Necessary Comments in you code to justify your logic.**
- **Comment exercise number or statement at the start of your code**
- **Save each exercise in .cpp file with your roll no, ex and lab number e.g.**
- **22LXXXX_EX01_Lab01.cpp**
- **Place all of your exercises in a folder a Zip it (Do not create .rar file) with roll no and lab no. e.g. 22LXXX_Lab01.zip**
- **Make sure that the interface of your program is user friendly i.e. properly display information.**
- **Properly follow the coding standards.**

1. Exercise: Consider the following class diagram:



The Relation between bus and passenger is Aggregation and the relation between bus and Engine is Composition.

Now your task is to implement the Bus, Passenger and Engine Classes Keeping in Mind the above relationship. **Figure out and add Necessary Attributes in the bus class to implement this relationship** along with following attributes and method.

1. Class Bus:

Attribute:

string BusNo
int SeatingCapacity
int SeatsReservedSofar
int numPassengers
attribute to implement aggregation
attribute to implement Composition

Methods/Operations/Getters/Setters:

Default Constructor
Parameterized Constructor (it will initialize all the attributes of bus with given values)
int GetSeatingCapacity()
void SetSeatingCapacity(int bCap)
string GetBusNo()
void SetBusNo(string bNo)
void ReserveSeat(Passenger p)
int getNumPassengers()
void DisplayInfo()

2. Class passenger:

Attribute:
string Name
char Gender

Methods/Operations/Getters/Setters:
void SetPassengerName(string name)
String GetPassengerName()
void char SetGender(char gender)
char GetGender()

3. Class Engine:

Attribute:
string type (eg. diesel, gasoline, electric)
int horsepower

Methods/Operations/Getters/Setters:
Engine(string type, int horsepower)
string getType()
int getHorsepower()

- Your main() should allow the user to enter complete information of bus and its engine while creating and information of passenger while adding a passenger in bus.
- It should give option (yes/no) to add more passenger if capacity of bus allows.
- After adding the last passenger (i.e. when adding a passenger makes buss full) or "No" is selected as option, it should display the complete summary about bus and all passenger in bus as shown in output below.

Sample Output:

```
Enter bus number: ABE234
Enter seating capacity of bus: 3
Enter engine type: Diesel
Enter engine horsepower: 700
-----Bus Created Successfully-----
------Add Passengers in the Bus------

Enter passenger name: Ali
Enter passenger gender (M/F): M
-----Seat reserved for Ali-----

Add another passenger? (Y/N): Y
Enter passenger name: Ayesha
Enter passenger gender (M/F): F
-----Seat reserved for Ayesha-----

Add another passenger? (Y/N): Y
Enter passenger name: Mohsin
Enter passenger gender (M/F): M
-----Seat reserved for Mohsin-----

All seats are reserved!
-----Bus Information-----
Bus No: ABE234
Seating Capacity: 3
Seats Reserved So Far: 3
Passengers:
1. Ali
2. Ayesha
3. Mohsin
Engine Type: Diesel
Engine Horsepower: 700
```