

# Lab task 1

The objectives of the questions are to:

- assess if students have understood the basic concepts of object-oriented class
- write the class specification, constructor, set and get methods
- write test driver to test the written methods

Examine the following class diagram, additional information and answer the questions that follow:

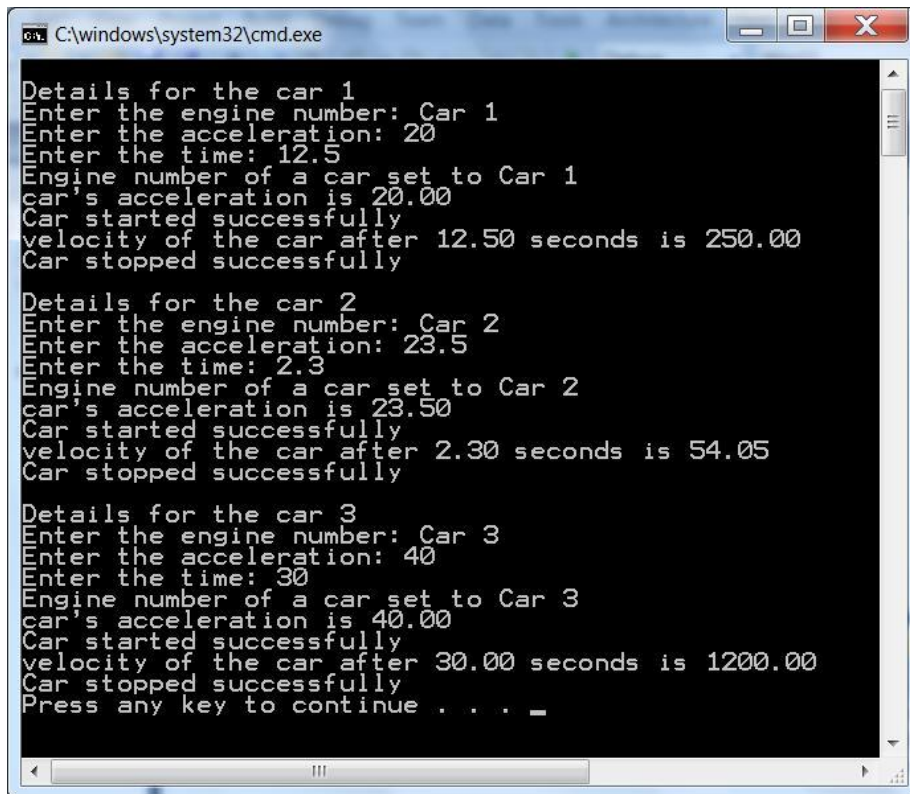
CarSpeed
acceleration:float engine_number:string start: bool
CarSpeed(float = 0, string = "", bool = false) start_car():void stop_car():void set_acceleration(float): void set_engine_number(string): void get_velocity(float): float

## Additional Information:

Method	Remarks
CarSpeed(float = 0, string = "", bool = false);	Constructor with default values. Set the data members, <i>acceleration</i> , <i>engine_number</i> and <i>start</i> accordingly.
start_car():void	Method of the data member, <i>start</i> . Set it to true. Display the message “Car started successfully”.
stop_car():void	Method of the data member, <i>start</i> . Set it to false. Display the message “Car stopped successfully”.
set_acceleration(float): void	Method of <i>acceleration</i> . Set and display the data member, <i>acceleration</i> accordingly.
set_engine_number(string): void	Method of <i>engine_number</i> . Set and display the data member, <i>engine_number</i> accordingly.
get_velocity(float): float	Computes the velocity using the formula: <i>acceleration</i> * <i>time</i> . Prompts the user to enter the value for <i>time</i> . Before the computation of velocity, check that the car has started.
	If car is started, perform the computation.
	Return the velocity.
	If car not started display message "start the car first then retrieve velocity after acceleration". Set the velocity to 0;

- (a) Develop C# code to implement the *CarSpeed* Class specification.
- (b) Develop C# code to implement **ALL** the methods found in the *CarSpeed* class.
- (c) Inspect the sample output, as shown below and write a test driver to test and fulfil the following requirements:

Uses a loop that repeats 3 times to prompt the user to enter the engine number, acceleration and time and use the various Methods to set the engine number, acceleration & time. It further invokes the method to compute and display the respective velocities. The velocity is displayed with **2 decimal places**.



```
C:\windows\system32\cmd.exe

Details for the car 1
Enter the engine number: Car 1
Enter the acceleration: 20
Enter the time: 12.5
Engine number of a car set to Car 1
car's acceleration is 20.00
Car started successfully
velocity of the car after 12.50 seconds is 250.00
Car stopped successfully

Details for the car 2
Enter the engine number: Car 2
Enter the acceleration: 23.5
Enter the time: 2.3
Engine number of a car set to Car 2
car's acceleration is 23.50
Car started successfully
velocity of the car after 2.30 seconds is 54.05
Car stopped successfully

Details for the car 3
Enter the engine number: Car 3
Enter the acceleration: 40
Enter the time: 30
Engine number of a car set to Car 3
car's acceleration is 40.00
Car started successfully
velocity of the car after 30.00 seconds is 1200.00
Car stopped successfully
Press any key to continue . . . _
```