# Hands-On for CPP

# Vehicle Service Station

## Aim

* To develop a console-based application for a vehicle service station / garage.
* To provide various services to customers, prepare bills and track business by service station.

## Technologies used

* CPP Programming:
  + Class & Objects, Inheritance & Polymorphism, Composition / Association / Aggregation
  + STL

## Duration

* Console Based Implementation: 60 Hours

## Description

* Vehicle service station provide following services to customer:
  + Maintenance/Repairing:
    - Customer can ask to repair one or more areas e.g. dash board, brake system, etc.
    - Each repairing may need to change few parts e.g. dash board repairing may need to change speedo-meter cable, dash board dial, few indicators on dash board, etc.
    - For each repairing some labor charges might be applicable other than pricing of replaced spare parts.
    - Maintenance can also contain just fitting/tightening few screws, oiling of some parts for better performance; but not replacing any spare part. In this case only labor charges are applicable.
  + Engine/Gear Oil change:
    - Occasionally customer may ask or service engineer may advice to change engine and/or gear oil for better performance. Example, Servo4T, Castrol, etc. The engine oil is packaged in quantity of 900ml/1000ml (or any other quantity) for a fixed price.
    - Other than engine oil few fuel additives can be added for smoother performance of the vehicle. These additives are added into fuel tank. Like engine oil they are also sold in fixed quantity and fixed price.
    - As service station get reasonable margin in selling these oil packs, no separate charges are taken from customer for changing oil.
* For each servicing request from customer for a vehicle may including repairing of multiple parts and/or changing engine oil and/or adding additives.
* A bill is prepared for each service request separately.
  + The detailed bill should print following details:
    - Service station Name.
    - Customer Name and Vehicle Details for which services were provided.
    - Maintainance Charges i.e. Labour charges.
    - Each spare part costing
    - Oil/Additive price
    - Bill Amount + 18% = Final Bill
* Service station keeps track of repeating customers and their vehicles (brought for servicing). Also, it maintains details of all previous bills (of all customers).
* The minimum information for any vehicle is its manufacturer, model and vehicle number (on number plate). Note that customer may have more than one vehicle.
* Also, customer information should be maintained like his/her name, address, mobile number and vehicles. For sake of simplicity customers are identified by their mobile.
* Service station should maintain daily billing details, so that at any time current cash collection can be calculated.
* All customer details should be loaded from file when application starts.
* All customer vehicle details should be loaded from file as per requirement.
* New Customer and New vehicle data to be added in file after taking the input.
* Daily bills should be stored to file when application terminate.
* As console application starts a menu appears for service station manager:
  + New Customer
    - Input customer details and store it for future reference.
  + New Servicing Request (for Existing Customer)
    - Choose customer from existing list of customers.
    - Display his/her vehicle details.
    - Choose vehicle from the list or input details of new vehicle and store it for future reference.
    - Process service request i.e. provide maintenance, repairing and/or oil change services as per need.
    - Prepare bill and display it.
    - Get bill payment from customer and show balance.
  + Today's Business (Cash)
    - Compute total cash from list of all bills (paid amount) of today and display it.

* **Notes:**
  + Service station should maintain list of customers.
  + Service station should maintain list of bills.
  + Customer should contain vector of vehicles.
  + Each repairing/maintenance will store list of replaced spare parts.
  + Details of multiple services provided (during single service request) should be maintained as List.
  + store and load customer details in file.
  + store and load vehicle details in file.
  + Use multiple files and appropriate design patterns