Heaven's Light is Our Guide
Rajshahi University of Engineering & Technology
Department of Computer Science & Engineering

# Assignment (based on CSE 1203)
# 2022 Series

***Instructions:***

i) *It an individual assignment*
ii) *Write Code in C++*
iii) *Submit it before the last class of this semester*
iv) *Ensure that all work is original.*
v) *Naming the File: Use a clear and descriptive filename, such as Assignment_<Roll>_CSE1204.cpp/java*
vi) *Submit your assignment in printed form as well as in Google classroom*
vii) *Cover Page: Include your name, student ID, course title, assignment title, and submission date.*

**Background Scenario:**

The toll plazas in Bangladesh are an integral part of the country's transportation infrastructure, primarily found on major highways and bridges. They are designed to collect fees from vehicles using these roads and structures to fund maintenance and development. Notable examples include the toll plazas on the Dhaka-Chattogram Highway, Lalonshah Bridge, Megna Bridge and the Padma Bridge. These toll systems help in managing traffic flow and generating revenue for ongoing infrastructure projects. In recent years, there have been efforts to modernize toll collection, including introducing electronic toll collection (ETC) systems to improve efficiency and reduce congestion.



# Problem Statement:

**Write a C++ menu program to automate the toll management system of a newly established bridge in Bangladesh. Assume for the simplicity consider three types of vehicles namely as Bus, Truck and Car.**

**Information for the Assignment**

a) **Design C++ classes as follows**

| Class Name | Data Members | Toll Price in Tk | |
|---|---|---|---|
| Vehicle | Reg_No, Date, Time, Operator_ID | | |
| Bus | Seats | 500 | |
| Truck | Weight, Height | 400 | |
| Car | Owner | 150 | |

- Reg_No: Registration plate number of vehicle
- Date: Date when a vehicle passing the bridge
- Time: Time when a vehicle passing the bridge
- ID: ID of the operator
- Seats: No of seats for vehicle
- Weight: Weight of the loaded truck (Max. 2000 Kg)
- Height: Height of the loaded truck  (Max. 15')
- Owner: Name of the owner

b) **Methods:**
  - getInput(): an overridden method to take toll  for each vehicle from keyboard.
  - tollCalculate(): an overridden method to calculate toll for each vehicle
  - searchVehicle(): searches a particular vehicle
  - searchDateToDate(): search vehicle between two dates

- searchOperator: search vehicle data for specific operator
- tollStatistics(): calculate statistics on daily-basis
- tollSettings(): set/change the toll values

c) **Other Data Members and Methods**: Declare data members and methods if necessary.

d) **Menu**: When the program runs login menu comes at first. It asks for login or registration. If login successful then Toll Plaza Menu appears. The functionality of each menu item is given as follows

| Menu Item | Functionality |
|-----------|---------------|
| Bus | Input toll for Bus |
| Truck | Input toll for Truck |
| Car | Input toll for Car |
| Search | Search for specific vehicle or between date to date or for specific operator |
| Statistics | Shows the toll statistics on daily basis |
| Settings | Set/Change the toll for the vechiles |

**The login look like :**

```
* Toll Plaza: Operator *

 1.  Login
 2.  Register
 3.  Exit
     Enter Your Option:
```

```
******* Toll Plaza Menu ******

   1. Bus
   2. Truck
   3. Car
   4. Search
   5. Statistics
   6. Toll Settings (admin)
   7. Save and Logout
      Enter Your Option (1-7):_
```

```
*** Toll Plaza: Search ***

   1. Vehicle
   2. Date to Date
   3. Operator
   4. Back
Enter Your Option (1-4):_
```

**e. Few Snapshots**:

    1.  Register a new operator

```
Enter your option(1-3):2 Username: kamal <enter>
Password: *****<enter>
Reconfirm Password: *****
Registration is Successful
Press any key go to main menu.....
```

    2.  Login Form

```
Enter your option(1-3):1
Enter username: kamal
Enter password: *****
Login is Successful
```

    3.  Toll for Bus

```
Enter your option(1-7):1
Enter Bus Registration No: KA2023DHA
Enter Amount (Tk. 500): 1000
Return Amount: 500
Toll Collection is Successful
Press any key go to main menu.....
```

    4.  Search a Car

```
Enter your option(1-7):4
Enter your option(1-4):1
Enter Vehicle Registration No: KA2023DHA

Date        Time      Amount   Operator
24/5/2024   14:05     150      Kamal
27/8/2024   10:25     150      Arman

Press any key go to main menu.....
```

    5.  Search Date to Date

```
Enter your option(1-7):4
Enter your option(1-4):2
Enter Start Date: 01/01/2024
Enter End Date: 30/8/2024

Date          Time      Vehicle   Amount   Operator
01/01/2024    00:05     Car       150      Kamal
01/01/2024    00:06     Bus       500      Kamal
01/01/2024    00:07     Bus       500      Kamal
01/01/2024    00:09     Truck     400      Kamal
```

```
01/01/2024  00:10    Truck     400      Kamal
01/01/2024  00:13    Bus       150      Kamal
……
Press any key go to main menu.....
```

6. Statistics

```
Enter your option(1-7):5
Enter Date:20/09/2024

Vehicle   Number Amount
Bus        435    217500
Track      352    140800
Car        258     38700
Total Amount:     397000

Press any key go to main menu.....
```

7. Settings

```
Enter your option(1-7):6
Enter Admin username: admin
Enter Admin password: *****
Enter Toll for Bus: 550
Enter Toll for Track: 400
Enter Toll for Car: 180

Toll Change is Successful
Press any key go to main menu.....
```

**Table: (Sample message)**

|   | Message to be Displayed |
|---|---|
| 1 | Operator already exists |
| 2 | Operator NOT exists |
| 3 | Vehicle NOT Found |
| 4 | Invalid Username |
| 5 | Invalid Password |
| 6 | Invalid Date |
| 7 | Invalid Option |
| 8 | …… |

**************** Best of Luck ********************