Sabaragamuwa University of Sri Lanka

Department of Physical Science and Technology

Assignment 02

PST31227 – Object Oriented Analysis and Design

Meter-cab System

Meter-cab is a small taxi company operating in Balangoda. *Meter-cab* owns 25 taxis, which it rents out driver on an annual basis. Each vehicle is effectively rented out to three drivers to cover three 8-hour shifts in a day; therefore, there are 75 taxi drivers contracted to *meter-cab* service at any given time. *Meter-cab* is a profitable company because it has built up a good reputation locally, and there is always a waiting list of drivers who want to apply to rent a vehicle.

Each driver pays an annual rental fee in advance to *Meter-cab* giving them use of a vehicle for 8 hours a day every day of the year. In addition to the annual rental, *Meter-cab* takes 5% of the money a driver earns every week. *Meter-cab* is responsible for taxing, insuring and maintaining the vehicles. If a vehicle is due for a service or needs to be repaired, *Meter-cab* contacts a garage and arranges it. *Meter-cab* keeps an account of the repair and service costs for each vehicle.

At the end of each shift, drivers give the money they have earned to *Meter-cab*. If they needed to refuel the vehicle they also submit an expense claim at the end of the shift. At the end of every week, *Meter-cab* calculates the amount awing to each driver based on the money earned from fares, the expense claims and the deduction of 5%. The drivers are then paid.

1. Read the given description for *Meter-cab* system to answer the following questions.
    i) Identify the actors of the system
    ii) Organize all the use cases and draw the use case diagram. Apply “include” and “extend” relartionships.

2. Consider the following extra information about the *Meter-Cab* system described in the given case study and answer the following questions.

   "In addition to drivers who rent taxis, *Meter-cab* plans to employ taxi owners who will be using their own taxis. The driver name, telephone number and address will be stored about each driver. For driver who rent taxis, the annual rental fee also stored. An object of class vehicle consists of a chassis and an engine"

   i) List the set of classes that are suitable for the given system

   ii) Explain the following relationships between classes using examples from the *Meter-cab* system to illustrate your answer:

      a. Association

      b. Aggregation or composition

      c. Generalization

   iii) Using the guidelines of generalization of conceptual classes, identify possible a conceptual class and state the reason for your answer. Illustrate the answer using a suitable diagram.

   iv) Draw a class diagram suitable for domain modelling stage for *Meter-cab* system.

3. Consider the following extra information about the *Meter-Cab* system described in the given case study and answer the following questions.

Once a driver assigned a vehicle, they embark on daily operations, covering three 8-hour shifts in a day. Throughout each shift, drivers collect fares from passengers. At the end of their shift, drivers submit the money earned to *Meter-cab*. If refueling is required during the shift, drivers also submit expense claims, providing receipts for verification.

On a weekly basis, Meter-cab undertakes accounting procedures. The company calculates the amount owed to each driver, considering the money earned from fares, deducting the agreed-upon 5%, and factoring in any approved expense claims. Subsequently, Meter-cab processes payments to the drivers, compensating them for their services.

i. Identify the actors who interact with this system

ii. Draw the sequence diagram for above case

Submit on or before 14th July 2024