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COMP1216. Software Modelling and Design (2019-20)

Solution Sheet 3: Object Modelling

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This Problem Class relates to the following train ticket system. You can use Virtual Paradigm to draw the diagrams.

A Train Ticket System

A system must be specified for the automated purchase of train tickets from a ticket distributor. It is possible for the traveller to buy single or return tickets to available destinations, as well as weekly and monthly season tickets. The traveller will interact with the machine to specify ticket type, select destination, select payment mode (cash or credit card). A ticket purchase transaction may fail for various reasons: the distributor is out of change, out of ticket paper, credit card fails to validate, etc.

Question 1. Class Diagrams

Draw a class diagram representing the information related to the traveller's basket (allowing the traveller to buy multiple tickets), tickets, and payment.

- Specify classes, associations and multiplicities.
- Extend the class diagram to include the following information
  - Price of the tickets
  - Origin and destination of the tickets
  - Date(s) of travel for the tickets

– Amount, date, and type of payment

Solution:
A class diagram for the train ticket system is in Figure 1.

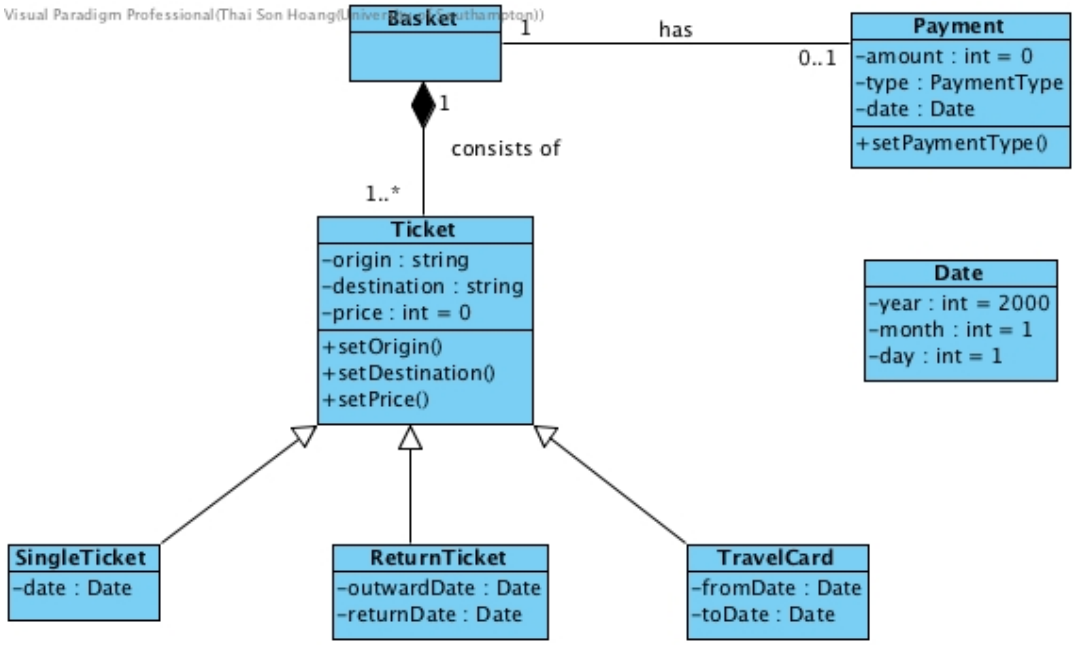

Figure 1: A Class Diagram for Train Ticket System

Note

- We have different ticket type by subclassing `Ticket`. The reason is that each ticket type has different type of "dates". Since we "model" (rather than "implement") the system, it is better to make it clear the meaning for each date.
- The `Date` class does not have any associations. It is used as type for attributes in the `Payment` and various ticket classes.
- We could have another class for `Station` (without associtations) for attributes `origin` and `destination` of the `Ticket` class (instead of `String` as at the moment).