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| **Programming II**  Diploma in IT / DS / CSF  Year 1 (2023/24) Semester 2 | Week 4 |
| **2 hours** |
| **Practical 4 : Writing Your Own Classes** | |

**Objectives**

At the end of this practical, the students should be able to:

* write their own classes
* use their own classes

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| **IMPORTANT**   * Create a folder, **week04.** * Create a new Console App (.NET Core) project, **Snnnnnnnn\_CashCardApp**, in the **Week04** folder created above *(note:* ***Snnnnnnnn*** *is your Student Number)*. * At the end of the session, copy the folder **Week04** folder (which contains all your work) Brightspace. |

**CashCardApp Application**

1. The class element diagram for **CashCard** class is given below. Implement the **CashCard** class in the CashCardApp.

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| **CashCard** |
| -id:string  -balance:double |
| +CashCard()  +CashCard(string,double)  +TopUp(double)  +Deduct(double):bool  +ToString():string |

Note:

**TopUp(double)** tops up a given amount to the cash card. No value is returned.

**Deduct(double)** deducts a given amount from the cash card if there is sufficient amount. The method returns true if deduction is successful, false otherwise.

1. Add the following to the **Program.cs**
2. Create a **List<CashCard>** named **cardList** for storing **CashCard** objects.
3. Write a method **InitCardList()** to create 5 **CashCard** objects with the information given below and add them to **cardList**.

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| **id**  **balance** | 001  25 | 002  25 | 003  30 | 004  30 | 005  50 |

Hint: The method signature should be

void InitCardList(List<CashCard> cardList)

1. Call the **InitCardList()**.
2. Display the id and balance of all the **CashCard** objects.
3. Write a method **Search()** with the method signature given below to search and return the cash card in the list that has the given id. The method returns null if the given id is not found in the list.

CashCard? Search(List<CashCard> cardList, string id)

1. Perform the following:
   * Prompt user for an id that he wishes to search.
   * Call the **Search()** method to search for the cash card.
   * If the card is found,
     + display the balance of the card
     + prompt user for the amount that he wishes to deduct
     + display the status of deduction as well as the card balance
   * If the card is not found,
     + display a message to indicate that

**FareCalculation Application (Advanced)**

1. Create a new Console App Project **Snnnnnnnn\_FareCalculatorApp** in Visual Studio (where **Snnnnnnnn** is your **student number**).
2. Implement the classes shown below.

**BusStop class**

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| **BusStop** |
| -distance:double  -code:string  -road:string  -description:string |
| +BusStop(double,string,string,string)  +ToString():string |

**Fare class**

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| **Fare** |
| -upToDistance:double  -amount:int |
| +Fare(double,int)  +ToString():string |

As in Practical 3, the distance-based fare calculation is available in the “distance-based-fare.csv” file provided.

Based on the route details of bus service 174 that is available in the “bus\_174.csv” file provided, write an **object-oriented program** to do the following:

- displays the route details,

- prompts user to enter the boarding bus stop and alighting bus stop,

- calculate and display the distance travelled and the corresponding fare.

You may use appropriate generic collection classes to store the BusStop and Fare data. Justification for choice of generic collection classes are to be written as comments in your program.

A sample run of the program is shown below. The input value is underlined.

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| Distance (km) Bus Stop Code Road Bus Stop Description  0 22009 Jurong West Ctrl 3 Boon Lay Int  0.6 21361 Jln Boon Lay Blk 695  0.9 21399 Boon Lay Ave Opp River Valley High Sch  1.3 21421 Boon Lay Ave Blk 176  1.7 21241 Boon Lay Ave Opp Blk 213  1.8 21161 Corporation Rd Opp Jurong JC  . . . . .  . . . . .  27.5 06029 Outram Rd Outram Pk Stn  28.1 10011 New Bridge Rd Bef Neil Rd  28.4 10041 Kg Bahru Rd Bef Kampong Bahru Ter  29 10499 Spooner Rd Kampong Bahru Ter  Enter boarding bus stop: **42159**  Enter alighting bus stop: **10499**  Distance travelled: 18.2 km  Fare to pay: $1.65 |

**Plagiarism Warning:**

**If a student is found to have submitted work not done by him/her, he/she will not be awarded any marks for this practical. Disciplinary action may also be taken.**

**Similar action will be taken for student who allows other student(s) to copy his/her work.**