CS1073
FR03B
Assignment #5

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Question I:

```
/**
This class represents a train ticket
@author Daniyal Khan 3765942
*/
 public class TrainTicket {
   /**
   Name of the passenger
   */
   private final String name;
   /**
   Number of checked bags of the passenger
   */
   private int bags;/**
   The trip distance the passenger will be travelling
   */
   private final double distance;

   /**
   Contructs a train ticket object given the name, number of
bags and trip distance of the passenger
   @param name Name of the passenger
   @param bags Number of checked bags
   @param distance Trip distance
   */
   public TrainTicket(String name, int bags, double distance) {
     this.name = name;
     this.bags = bags;
     this.distance = distance;
   }

   /**
   Returns the name of the passenger
   @return Name of the passenger
   */
   public String passengerName() {
     return name;
   }

   /**
   Returns the checked bags of the passenger
   @return Number of checked bags of the passenger
```

```
  */
  public int checkedBags() {
    return bags;
  }

  /**
  Returns trip distance the passenger will be travelling
  @return Trip Distance
  */
  public double tripDistance() {
    return distance;
  }

  /**
  Returns the cost of ticket depending upon the rate
  @param rate Rate of the trip
  @return Cost of the ticket
  */
  public double computeCost(double rate) {
    return rate*distance + bags*45;
  }
}
```

```
/**
This class is a subclass of TrainTicket and represents Business
ticket
@author Daniyal Khan 3765942
*/

public class BusinessTicket extends TrainTicket {
  /**
  If the seat is reclining or not
  */
  private boolean recliningSeat;

  /**
  Contructs a BusinessTicket object given the name, number of
bags, trip distance and if seat is reclining or not
  @param name Name of the passenger
  @param bags Number of checked bags
  @param distance Trip Distance
  @param recliningSeat If the seat reclines or not
  */
  public BusinessTicket(String name, int bags, double distance,
boolean recliningSeat) {
    super(name, bags, distance);
    this.recliningSeat = recliningSeat;
  }

  /**
  Calculates the cost of ticket for Business category
  @param rate Rate of the trip
  @return Total Cost of the ticket
  */
  public double computeCost(double rate) {
    double totalCost = super.computeCost(rate) + 104.50;
    if (recliningSeat) {
      totalCost += 55.75;
    }
    return totalCost;
  }
}
```

```
/**
This class is a subclass of TrainTicket and represents Sleeper
car tickets
@author Daniyal Khan 3765942
*/

public class SleepCarTicket extends TrainTicket {
  /**
  The number of nights passenger will be staying
  */
  private int numNights;

  /**
  Contucts a SleepCarTicket object given the name, number of
bags, distance of trip and number of nights
  @param name Name of the passenger
  @param bags Number of bags
  @param distance Trip Distance
  @param numNights Number of nights
  */
  public SleepCarTicket(String name, int bags, double distance,
int numNights) {
    super(name, bags, distance);
    this.numNights = numNights;
  }

  /**
  Calculates the cost of ticket for Sleep Car category
  @param rate Rate of the trip
  @return Total Cost of the ticket
  */
  public double computeCost(double rate) {
    double totalCost = super.computeCost(rate) + 167;
    totalCost += 95; // cost of first night
    if (numNights > 1) {
      totalCost += (numNights - 1)*80; // cost of every night
excluding first night
    }
    return totalCost;
  }
}
```

```
import java.text.NumberFormat;
/**
This is a driver class for TrainTicket
@author Daniyal Kahan 3765942
*/

public class TicketApp {
  public static void main(String[] args) {
    NumberFormat format = NumberFormat.getCurrencyInstance();
    format.setMaximumFractionDigits(2);
    format.setMinimumFractionDigits(2);

    TrainTicket grace = new TrainTicket("Grace Hopper", 2,
1150);
    TrainTicket joy = new TrainTicket("Joy Buolamwini", 1, 820);
    TrainTicket tim = new TrainTicket("Tim Berners-Lee", 2,
755);
    TrainTicket margaret = new BusinessTicket("Margaret
Hamilton", 0, 690, true);
    TrainTicket barbara = new BusinessTicket("Barbara Liskov",
3, 1402, false);
    TrainTicket shafi = new BusinessTicket("Shafi Goldwasser",
1, 975, true);
    TrainTicket alan = new SleepCarTicket("Alan Turing", 4,
3327, 3);
    TrainTicket lynn = new SleepCarTicket("Lynn Conway", 0,
1766, 1);
    TrainTicket jeannette = new SleepCarTicket("Jeannette Wing",
3, 5003, 4);

    System.out.println("Passenger & Trip Distance\tBags\tCost");

System.out.println("========================\t=====\t========")
;

    System.out.println(grace.passengerName() + " (" +
grace.tripDistance() + "km) " + "\t" + grace.checkedBags() +
"\t" +  format.format(grace.computeCost(1.35)));
    System.out.println(joy.passengerName() + " (" +
joy.tripDistance() + "km) " + "\t" + joy.checkedBags() + "\t" +
format.format(joy.computeCost(0.75)));
    System.out.println(tim.passengerName() + " (" +
tim.tripDistance() + "km) " + "\t" + tim.checkedBags() + "\t" +
format.format(tim.computeCost(1.15)));
```

```
    System.out.println(margaret.passengerName() + " (" +
margaret.tripDistance() + "km) " + "\t" + margaret.checkedBags()
+ "\t" + format.format(margaret.computeCost(1.20)));
    System.out.println(barbara.passengerName() + " (" +
barbara.tripDistance() + "km) " + "\t" + barbara.checkedBags() +
"\t" + format.format(barbara.computeCost(0.95)));
    System.out.println(shafi.passengerName() + " (" +
shafi.tripDistance() + "km) " + "\t" + shafi.checkedBags() +
"\t" + format.format(shafi.computeCost(0.85)));
    System.out.println(alan.passengerName() + " (" +
alan.tripDistance() + "km)  " + "\t" + alan.checkedBags() + "\t"
+ format.format(alan.computeCost(0.85)));
    System.out.println(lynn.passengerName() + " (" +
lynn.tripDistance() + "km)  " + "\t" + lynn.checkedBags() + "\t"
+ format.format(lynn.computeCost(0.65)));
    System.out.println(jeannette.passengerName() + " (" +
jeannette.tripDistance() + "km)" + "\t" +
jeannette.checkedBags() + "\t" +
format.format(jeannette.computeCost(0.65)));


  }
}
```

Output:

```
Passenger & Trip Distance     Bags      Cost
=========================     ======    =========
Grace Hopper (1150.0km)       2         $1,642.50
Joy Buolamwini (820.0km)      1         $660.00
Tim Berners-Lee (755.0km)     2         $958.25
Margaret Hamilton (690.0km)   0         $988.25
Barbara Liskov (1402.0km)     3         $1,571.40
Shafi Goldwasser (975.0km)    1         $1,034.00
Alan Turing (3327.0km)        4         $3,429.95
Lynn Conway (1766.0km)        0         $1,409.90
Jeannette Wing (5003.0km)     3         $3,888.95
```

Question II:

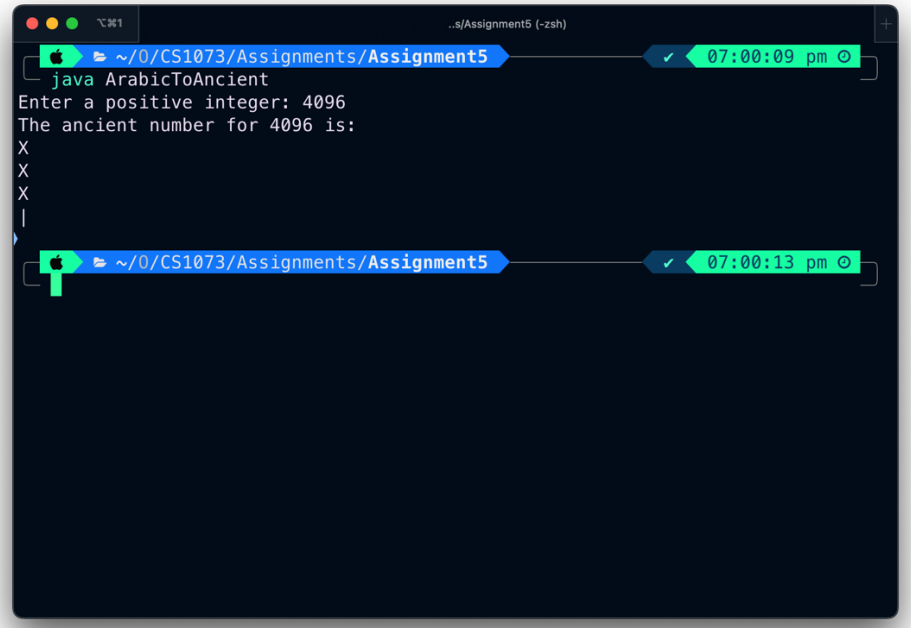
```
import java.util.Scanner;
/**
This class converts integers to ancient letters
@author Daniyal Khan 3765942
*/

public class ArabicToAncient {
  public static void main(String[] args) {
    Scanner scan = new Scanner(System.in);

    System.out.print("Enter a positive integer: ");
    int input = scan.nextInt();
    scan.nextLine();

    System.out.println("The ancient number for " + input + " is:
");
    while (input != 0) {
      int remainderValue = input % 16;
      if (remainderValue == 0) {
        System.out.print("X");
      }
      if (remainderValue >= 4) {
        while(remainderValue >=4) {
          System.out.print("M");
          remainderValue -= 4;
        }
      }
      if (remainderValue < 4) {
        while (remainderValue > 0) {
          System.out.print("|");
          remainderValue--;
      }
      System.out.println();
      }
      input /= 16;
    }
  }
}
```

Output:


..s/Assignment5 (~zsh)
~/O/CS1073/Assignments/Assignment5
07:00:09 pm
java ArabicToAncient
Enter a positive integer: 4096
The ancient number for 4096 is:
X
X
X
|
~/O/CS1073/Assignments/Assignment5
07:00:13 pm


..s/Assignment5 (~zsh)
~/O/CS1073/Assignments/Assignment5
07:00:38 pm
java ArabicToAncient
Enter a positive integer: 729
The ancient number for 729 is:
MM|
MMM|
||
~/O/CS1073/Assignments/Assignment5
5s
07:00:50 pm


⌥⌘1
..s/Assignment5 (-zsh)
~/O/CS1073/Assignments/Assignment5
07:00:57 pm
java ArabicToAncient
Enter a positive integer: 271
The ancient number for 271 is:
MMM|||
X
|
~/O/CS1073/Assignments/Assignment5
5s
07:01:03 pm