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Experiment No.	4B

AIM:	Program on Polymorphism: Arrays/Strings/ Array of Objects/ objects as parameter
Program 1	
PROBLEM STATEMENT :	Create a class called ShoppingCart to represent the following scenario: In a mall, a conveyor belts holds “c” carts at a time. Each cart may contain variable number of items, items which are either Perishable or Non-perishable category items. Create a 3D array named as cart which stores the cost of items purchased. Hint: Use Ragged/Jagged Arrays For c=3, find out: a) Total cost of each cart. b) Find out all perishable items sold (on 3 carts). c) Find out the costliest non-perishable item sold.

PROGRAM:	import java.util.*;
	
	class cart
	{
	int[][][] data=new int [3][2][];
	int [] no_of_items = new int[3];
	cart()
	{
	Scanner sc = new Scanner(System.in);
	System.out.println("1 stands for a perisible item , 2 is non perisible");
	
	for(int k =0 ; k<3;k++)
	{
	System.out.println("Enter number of items in cart"+(k+1));
	no_of_items[k]=sc.nextInt();
	data[k][0] = new int[no_of_items[k]];

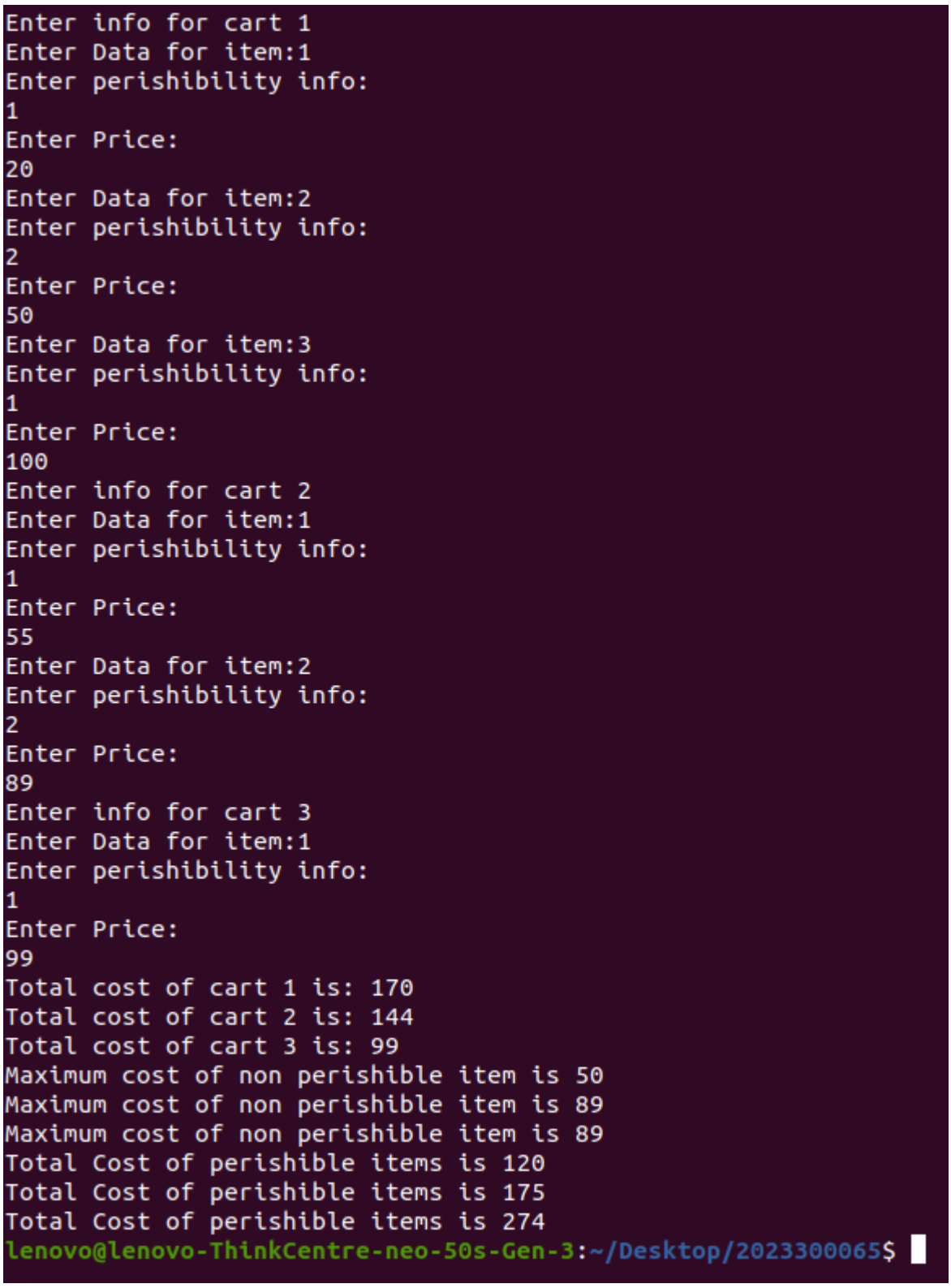
```
    data[k][1] = new int[no_of_items[k]];
    }

    for (int j = 0; j < 3; j++) {

    System.out.println("Enter info for cart "+(j+1));
    for (int i = 0; i < no_of_items[j]; i++)
    {
      System.out.println("Enter Data for item:"+(i+1));
      System.out.println("Enter perishibility info:");
      data[j][0][i]=sc.nextInt();

      if (data[j][0][i]==0)
      {
       System.out.println("invalid Input");
       System.exit(0);
      }

      System.out.println("Enter Price: ");
      data[j][1][i]=sc.nextInt();
    }
}

    sc.close();
}

void tot_cost()
{
    int tot_cost=0;
    for (int j = 0; j < 3; j++) {
        tot_cost=0;
    for (int i = 0; i < no_of_items[j]; i++) {
        tot_cost+=data[j][1][i];
    }
    System.out.printf("Total cost of cart %d is: %d \n",(j+1),tot_cost);
   }
}

void cost_of_perish()
{
```

```
        int cost_of_perish=0;
        for (int j = 0; j < 3; j++) {


        for (int i = 0; i < no_of_items[j]; i++)
        {
          if (data[j][0][i]==1)
          {
            cost_of_perish+=data[j][1][i];
          }
        }
        System.out.printf("Total Cost of perishible items is %d \n",cost_of_perish);
       }
    }

    void max_non_perish()
    {
        int max_non_perish=0;

        for (int j = 0; j < 3; j++)
        {

        for (int i = 0; i < no_of_items[j]; i++)
        {
            if (data[j][1][i]>max_non_perish && data[j][0][i]==2)
            // if data is of non perishible type and value is > than previous non perish
one then new max = value
            {
              max_non_perish=data[j][1][i];
            }


        }
        System.out.printf("Maximum cost of non perishible item is %d
\n",max_non_perish);
       }
    }

}

public class ShoppingCart {
```

	public static void main(String[] args) {
	cart c1 = new cart();
	
	c1.tot_cost();
	c1.max_non_perish();
	c1.cost_of_perish();
	}
	}

RESULT:	

```
lenovo@lenovo-ThinkCentre-neo-50s-Gen-3:~/Desktop/2023300065$ javac ShoppingCart.java
lenovo@lenovo-ThinkCentre-neo-50s-Gen-3:~/Desktop/2023300065$ java ShoppingCart
1 stands for a perisible item , 2 is non perisible
Enter number of items in cart1
3
Enter number of items in cart2
2
Enter number of items in cart3
1
Enter info for cart 1
Enter Data for item:1
Enter perishibility info:
1
Enter Price:
20
Enter Data for item:2
Enter perishibility info:
2
Enter Price:
50
Enter Data for item:3
Enter perishibility info:
1
Enter Price:
100
Enter info for cart 2
Enter Data for item:1
Enter perishibility info:
1
Enter Price:
55
Enter Data for item:2
Enter perishibility info:
2
Enter Price:
89
Enter info for cart 3
Enter Data for item:1
Enter perishibility info:
1
Enter Price:
```


Enter info for cart 1
Enter Data for item:1
Enter perishibility info:
1
Enter Price:
20
Enter Data for item:2
Enter perishibility info:
2
Enter Price:
50
Enter Data for item:3
Enter perishibility info:
1
Enter Price:
100
Enter info for cart 2
Enter Data for item:1
Enter perishibility info:
1
Enter Price:
55
Enter Data for item:2
Enter perishibility info:
2
Enter Price:
89
Enter info for cart 3
Enter Data for item:1
Enter perishibility info:
1
Enter Price:
99
Total cost of cart 1 is: 170
Total cost of cart 2 is: 144
Total cost of cart 3 is: 99
Maximum cost of non perishible item is 50
Maximum cost of non perishible item is 89
Maximum cost of non perishible item is 89
Total Cost of perishible items is 120
Total Cost of perishible items is 175
Total Cost of perishible items is 274
lenovo@lenovo-ThinkCentre-neo-50s-Gen-3:~/Desktop/2023300065$

Program 2

PROBLEM STATEMENT :	A certain chain of hotels needs to maintain details of all hotels it has across India. Each hotel has an ID, location, number of rooms(a 1D array of rooms of 3 types: suite, deluxe, standard) eg, if a hotel has 20 suites, 40 deluxe rooms and 60 standard rooms, this array will be rooms[]={20,40,60} In the main class, create an array of hotels. Include the following methods in the Hotel class: ***static void listHotels(Hotel h[],String location)***--> list hotel details in a given location ***static void listHotels(Hotel h[],int room_type)***-->list Total number of rooms in each hotel of the given room type.

PROGRAM:	public class Hotel {
	private int hotelId;
	private String location;
	private int[] rooms; // Array format: [suites, deluxe, standard]
	
	public Hotel(int hotelId, String location, int[] rooms) {
	this.hotelId = hotelId;
	this.location = location;
	this.rooms = rooms;
	}
	
	public int getHotelId() {
	return hotelId;
	}
	
	public String getLocation() {
	return location;
	}
	
	public int[] getRooms() {
	return rooms;
	}
	
	public static void listHotels(Hotel[] hotels, String location) {
	System.out.println("Hotels in " + location + ":");
	for (Hotel hotel : hotels) {

```
            if (hotel.getLocation().equalsIgnoreCase(location)) {
                System.out.println("Hotel ID: " + hotel.getHotelId() + ", Location: " +
hotel.getLocation() + ", Rooms: " + arrayToString(hotel.getRooms()));
            }
        }
    }

    public static void listHotels(Hotel[] hotels, int roomType) {
        String[] roomTypes = {"Suite", "Deluxe", "Standard"};
        System.out.println("Total number of rooms of type " +
roomTypes[roomType] + " in each hotel:");
        for (Hotel hotel : hotels) {
            System.out.println("Hotel ID: " + hotel.getHotelId() + ", Location: " +
hotel.getLocation() + ", " + roomTypes[roomType] + " rooms: " +
hotel.getRooms()[roomType]);
        }
    }

    private static String arrayToString(int[] array) {
        StringBuilder stringBuilder = new StringBuilder();
        stringBuilder.append("[");
        for (int i = 0; i < array.length; i++) {
            stringBuilder.append(array[i]);
            if (i < array.length - 1) {
                stringBuilder.append(", ");
            }
        }
        stringBuilder.append("]");
        return stringBuilder.toString();
    }

    public static void main(String[] args) {
        // Creating hotels
        Hotel[] hotels = new Hotel[3];
        hotels[0] = new Hotel(1, "Mumbai", new int[]{20, 40, 60});
        hotels[1] = new Hotel(2, "Delhi", new int[]{30, 50, 70});
        hotels[2] = new Hotel(3, "Bangalore", new int[]{25, 45, 65});

        // Listing hotels by location
        Hotel.listHotels(hotels, "Mumbai");
```

```
        // Listing total number of rooms of a certain type in each hotel
        Hotel.listHotels(hotels, 1); // Type 1 represents "Deluxe" rooms
    }
}
```

RESULT:

```
lenovo@lenovo-ThinkCentre-neo-50s-Gen-3:~/Desktop/2023300065$ javac Hotel.java
lenovo@lenovo-ThinkCentre-neo-50s-Gen-3:~/Desktop/2023300065$ java Hotel
Hotels in Mumbai:
Hotel ID: 1, Location: Mumbai, Rooms: [20, 40, 60]
Total number of rooms of type Deluxe in each hotel:
Hotel ID: 1, Location: Mumbai, Deluxe rooms: 40
Hotel ID: 2, Location: Delhi, Deluxe rooms: 50
Hotel ID: 3, Location: Bangalore, Deluxe rooms: 45
lenovo@lenovo-ThinkCentre-neo-50s-Gen-3:~/Desktop/2023300065$
```

CONCLUSION:	I have learnt about arrays, strings, array of Objects, using objects as parameter and use of 1D & 3D arrays.