

Answer ALL questions.

QUESTION 1

a) Given the following Friends and Queue ADTs.

```

public class Friends
{
    //attributes: name and year of birth
    public Friends()
    public Friends(String n, int y)
    public String getName()
    public int getYear()
    public String toString()
}

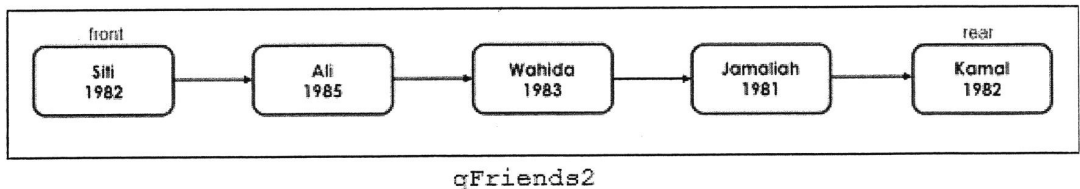
public class Queue
{
    public Queue() {...}
    public void enqueue(Object) {...}
    public Object dequeue(){...}
    public boolean isEmpty () {...}
}
    
```

The following is the sequence of input data for the name and year of birth (separated by a space):

Siti 1982, Ali 1985, Abu 1990, Wahida 1983, Jamaliah 1981, Hassan 1980, Zaidi 2001, Kamal 1982, Liana 2004, Mahmud 1993, Iskandar 1979

Assume all inputs above have been inserted into a queue called qFriends.

i) Write a program segment to copy some data based on year of birth criteria, from qFriends into another queue named qFriends2, whereas all the data in qFriends remain unchanged and stay in the original sequence. The logical view of qFriends2 after the execution is shown below:



(5 marks)

- ii) Kamal has just left Malaysia for Australia and his details need to be removed from `qFriends2`. Write a program segment to perform the task. The rest of the Friends data remains in `qFriends2`.

(5 marks)

- b) Nusa Jaya Electrical Sdn. Bhd. (NJE) is a company that provides a variety of high-quality electrical products with the lowest price from many popular brands. One of the overwhelming demands is Robot Vacuum. If Robot Vacuum's stock is not available, the customer needs to order the Robot Vacuum whereby the order is managed based on a first come first served basis. To help NJE in managing the orders, a computerised queuing system using RobotVacuum has been developed. Given are RobotVacuum and Queue ADTs.

```
public class RobotVacuum
{
    private String brand;// eg.: Dreamech, Roborock, iRobot & etc.
    private String model;// eg.: Dreamech D10 Plus, Roborock S7,
                                iRobot Roomba i3 & etc.

    private int serialNumber;
    private double price;

    /*Definition of the other methods including normal constructor,
    mutators, accessors, processors and printers*/
}

public class Queue
{
    public Queue() {...}
    public void enqueue(Object) {...}
    public Object dequeue(){...}
    public boolean isEmpty () {...}
}
```

Queue data structure concept is applied in many ways in our daily life. For example, in customer service centres to manage customer inquiries.

- i) List and briefly explain **TWO (2)** examples of implementation of queue data structure in computer systems or application.

(5 marks)

- ii) Assume some data have been stored in a queue named `qRobotVacuum`. Write a Java program segment to move all **Roborock S7** robot vacuums into another queue named `qRobS7` and all **Dreamech D10 Plus** robot vacuums into another queue named `qDreamPlus`.

(5 marks)

iii) NJE is offering discounts to its customers. The discount rates are shown in the table below:

Price	Discount Rate
< RM2500	5%
RM2500 - RM4500	7%
>RM4500	10%

Write a Java program segment to calculate and display the price for each **Dreamtech D10 Plus** robot vacuums before and after discount based on the following format:

Serial Num.	Price Before Discount (RM)	Price After Discount (RM)
xxx	xxx	xxx

(5 marks)

