PART A
Answer ALL questions.

QUESTION 1

a) Given the application program `MawarApp`, answer the following questions:

```
public class MawarApp{
    public static void main(String[] args){


      Queue aaa  =  new Queue();
      aaa.enqueue(60);
      aaa.enqueue(24);
      aaa.enqueue(35);
      aaa.enqueue(38);
      aaa.enqueue(45);


      int r = 3;
      int m = (int)aaa.dequeue();
      int n = (int)aaa.dequeue();

      System.out.println("Value of m " + m);
      System.out.println("Value of n " + n);


      //***Line AA

      while (r != 0)
      {
            if(r<m)
            {
                  r--;
                  m = (int)aaa.dequeue()%20;
            }

            aaa.enqueue(m);
      }

      System.out.println(aaa.front() + " is at the front");
    }
}
```


i) Trace the program and show the content of `aaa` by drawing a diagram with label front and rear at the `//***Line AA`. Show the value of `m` and `n`.

(5 marks)

ii) Trace the program and show all the output of the program.

(5 marks)

b) Afifi Coffee Shop manages customers' orders through a computerized queueing system. The following are the `Order` and `Queue` ADTs of the queuing system.

```
public class Order
{
      private String customerName;
      private char flavour;            //'H' - hazelnut or
                                       //'L' - latte
      private int quantity;

      /*
            Definition of methods including constructors,
            mutators, accessors and toString()
      */
}

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


Assume some data have been stored in a `Queue` object named `coffeeOrderQ`. Answer the following questions:

i) Explain why Queue data structure can be used in the ordering system. Suggest other **TWO** examples of situations that suitable for queue data structure.

(5 marks)

ii) Write a Java program segment to move all the orders from `coffeeOrderQ` into **TWO** separate queues namely `hazelnutQ` and `latteQ` according to the flavours respectively.

(5 marks)

iii) Write program segment to compute and display the total amount of sales for latte coffee where the price of latte is RM4.90 each. (Note: use a temporary queue to store the information to avoid data loss.)

(5 marks)