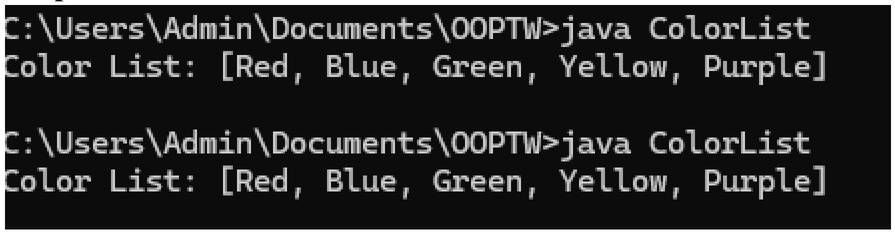
Ex No 5.1 Write a Java program to create a new array list, add some colors and print the collection.

Aim
To write a Java program to create a new array list, add some colors and print the collection.

Algorithm
1. Import Required - Package Import java.util.ArrayList.
2. Create an ArrayList - Declare and initialize an ArrayList<String>.
3. Add Colors to the List - Use add() method to insert color names (e.g., "Red", "Blue", "Green").
4. Print the Collection - Use a loop or System.out.println() to display the colors.
5. End the Program - Ensure the program executes successfully.

Program
```
import java.util.ArrayList;

public class ColorList {
    public static void main(String[] args) {
        // Create an ArrayList to store colors
        ArrayList<String> colors = new ArrayList<>();

        // Add colors to the ArrayList
        colors.add("Red");
        colors.add("Blue");
        colors.add("Green");
        colors.add("Yellow");
        colors.add("Purple");

        // Print the ArrayList
        System.out.println("Color List: " + colors);
    }
}
```

Output

```
C:\Users\Admin\Documents\OOPTW>java ColorList
Color List: [Red, Blue, Green, Yellow, Purple]

C:\Users\Admin\Documents\OOPTW>java ColorList
Color List: [Red, Blue, Green, Yellow, Purple]
```

Result
Thus a java program to create a new array list, add some colors and print the collection has been completed successfully and output is verified.

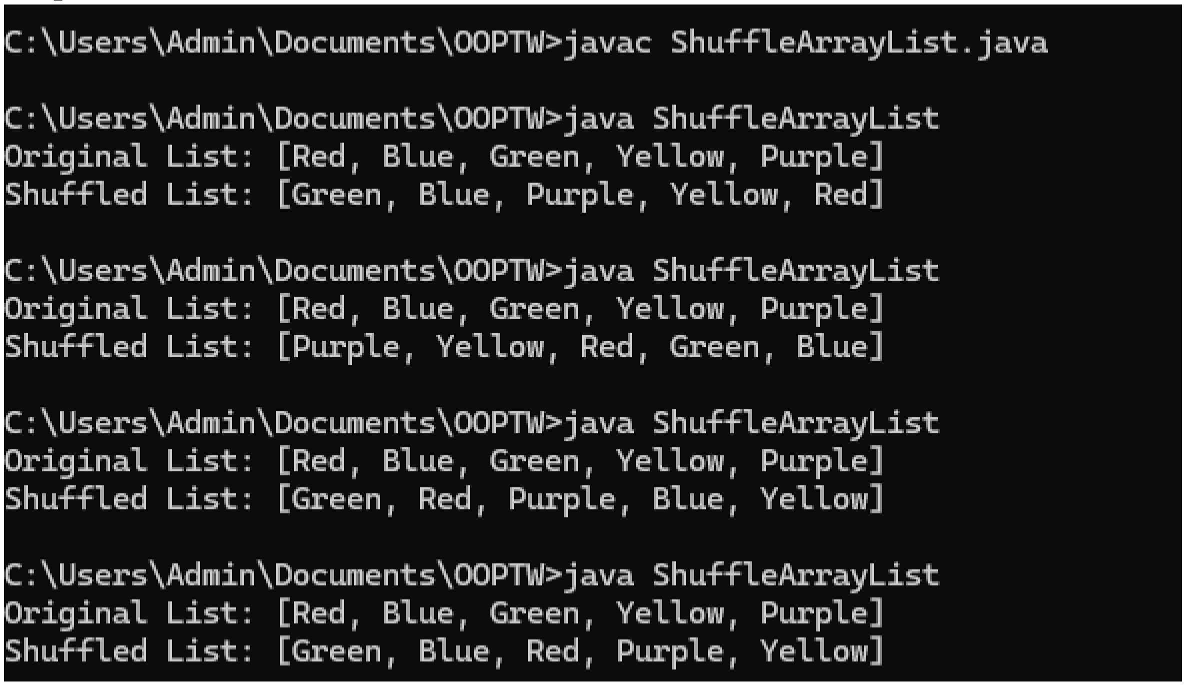
Ex No 5.2 Write a Java program to shuffle elements in array list

Aim
To write a Java program to shuffle elements in array list

Algorithm
1. Import Required Packages - Import java.util.ArrayList and java.util.Collections.
2. Create an ArrayList - Declare and initialize an ArrayList<String>.
3. Add Elements to the List - Use add() method to insert elements (e.g., colors, numbers, etc.).
4. Shuffle the Elements - Use Collections.shuffle() to randomize the order of elements.
5. Print the Shuffled List - Use System.out.println() to display the shuffled elements.
6. End the Program - Ensure the program runs successfully.

Program
```
import java.util.ArrayList;
import java.util.Collections;

public class ShuffleArrayList {
    public static void main(String[] args) {
        // Create an ArrayList and add elements
        ArrayList<String> colors = new ArrayList<>();
        colors.add("Red");
        colors.add("Blue");
        colors.add("Green");
        colors.add("Yellow");
        colors.add("Purple");

        // Print original list
        System.out.println("Original List: " + colors);

        // Shuffle the ArrayList
        Collections.shuffle(colors);

        // Print shuffled list
        System.out.println("Shuffled List: " + colors);
    }
}
```

Output



```
C:\Users\Admin\Documents\OOPTW>javac ShuffleArrayList.java

C:\Users\Admin\Documents\OOPTW>java ShuffleArrayList
Original List: [Red, Blue, Green, Yellow, Purple]
Shuffled List: [Green, Blue, Purple, Yellow, Red]

C:\Users\Admin\Documents\OOPTW>java ShuffleArrayList
Original List: [Red, Blue, Green, Yellow, Purple]
Shuffled List: [Purple, Yellow, Red, Green, Blue]

C:\Users\Admin\Documents\OOPTW>java ShuffleArrayList
Original List: [Red, Blue, Green, Yellow, Purple]
Shuffled List: [Green, Red, Purple, Blue, Yellow]

C:\Users\Admin\Documents\OOPTW>java ShuffleArrayList
Original List: [Red, Blue, Green, Yellow, Purple]
Shuffled List: [Green, Blue, Red, Purple, Yellow]
```

Result

Thus, writing a Java program to shuffle elements in an array list has been completed successfully and output is verified.

Ex No 5.3 Write a Java program to iterate through all elements in a linked list

Aim
To write a Java program to iterate through all elements in a linked list

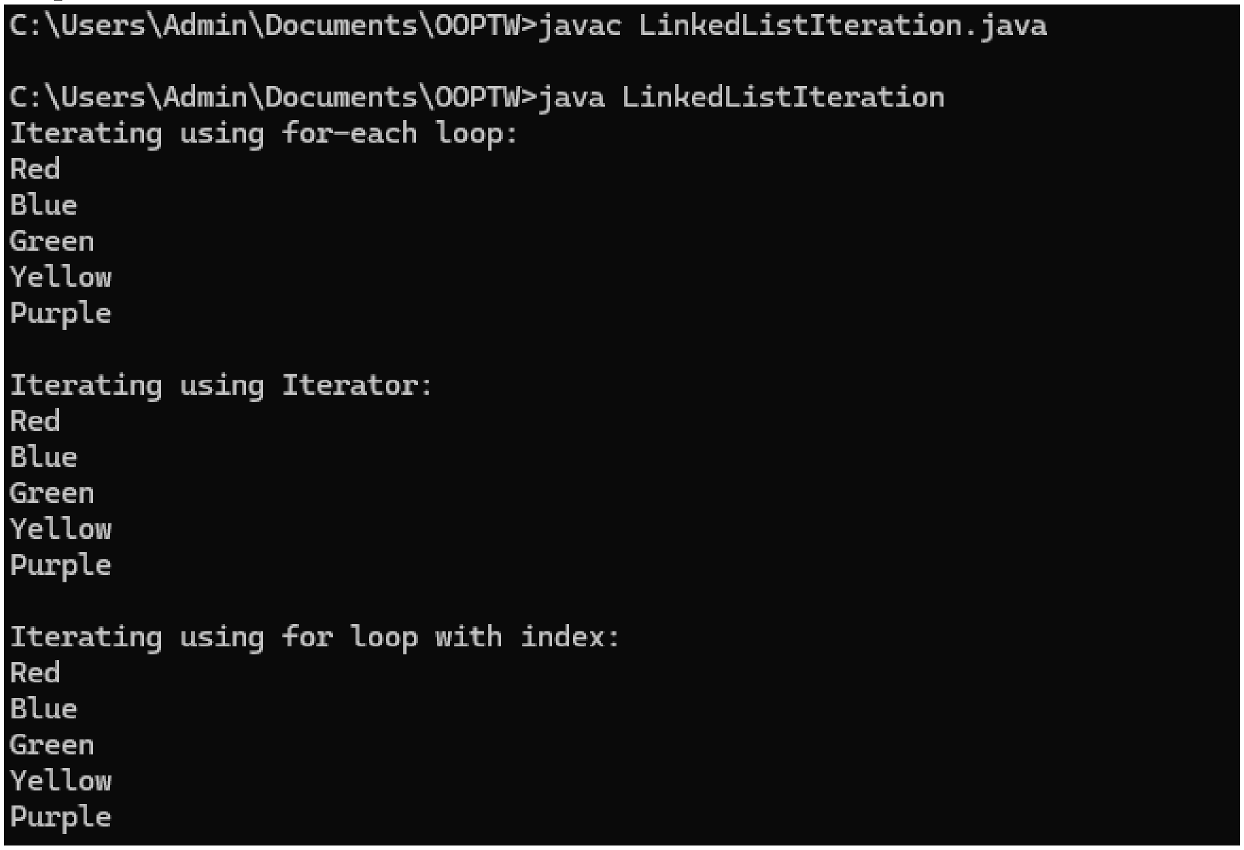
Algorithm

1. Import Required Packages - Import java.util.LinkedList and java.util.Iterator.
2. Create a LinkedList - Declare and initialize a LinkedList<String>.
3. Add Elements to the List - Use add() method to insert elements.
4. Iterate Using a Loop - Use a for-each loop or for loop to access each element.
5. Iterate Using an Iterator - Create an Iterator and use a while loop with hasNext().
6. Print Each Element - Use System.out.println() to display elements.
7. End the Program - Ensure smooth execution.

Program

```
import java.util.LinkedList;
import java.util.Iterator;

public class LinkedListIteration {
    public static void main(String[] args) {
        // Create a LinkedList and add elements
        LinkedList<String> colors = new LinkedList<>();
        colors.add("Red");
        colors.add("Blue");
        colors.add("Green");
        colors.add("Yellow");
        colors.add("Purple");

        // Method 1: Using a for-each loop
        System.out.println("Iterating using for-each loop:");
        for (String color : colors) {
            System.out.println(color);
        }

        // Method 2: Using an Iterator
        System.out.println("\nIterating using Iterator:");
        Iterator<String> iterator = colors.iterator();
        while (iterator.hasNext()) {
            System.out.println(iterator.next());
        }

        // Method 3: Using a for loop with get(index)
        System.out.println("\nIterating using for loop with index:");
        for (int i = 0; i < colors.size(); i++) {
            System.out.println(colors.get(i));
        }
    }
}
```

Output



```
C:\Users\Admin\Documents\OOPTW>javac LinkedListIteration.java

C:\Users\Admin\Documents\OOPTW>java LinkedListIteration
Iterating using for-each loop:
Red
Blue
Green
Yellow
Purple

Iterating using Iterator:
Red
Blue
Green
Yellow
Purple

Iterating using for loop with index:
Red
Blue
Green
Yellow
Purple
```

Result

Thus, writing a Java program to iterate through all elements in a linked list has been completed successfully and output is verified.

Ex No 5.4 Write a Java program to create an ArrayList of Student (id,name,dept,age) objects and search for particular Student objects based on id number.

Aim

To write a Java program to create an ArrayList of Student (id,name,dept,age) objects and search for particular Student objects based on id number.

Algorithm

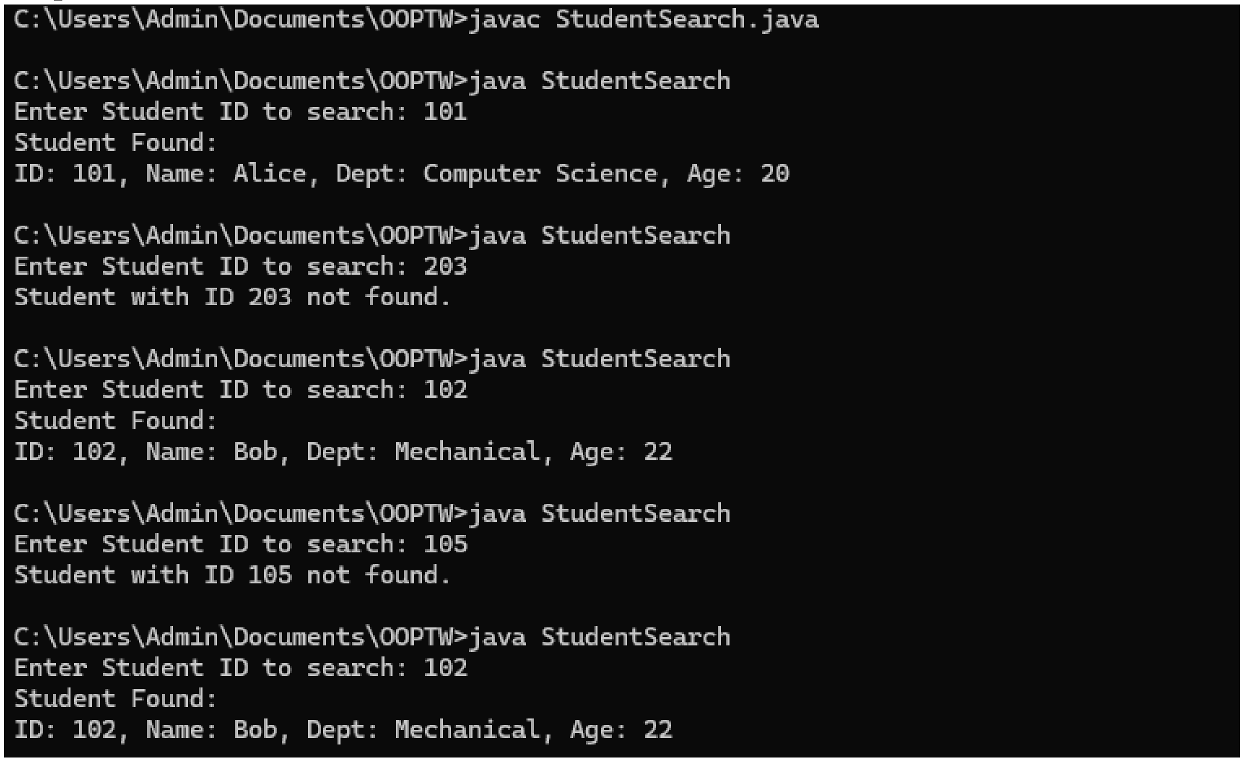
1. Import Required Packages - Import java.util.ArrayList.
2. Define a Student Class - Create a class with attributes: id, name, dept, and age. Define a constructor to initialize the attributes.
3. Create an ArrayList of Student Objects - Declare and initialize ArrayList<Student>.
4. Add Student Objects to the List - Use add() method to insert multiple student records.
5. Search for a Student by ID - Use a loop (for or for-each) to iterate through the list.
6. Compare each student's id with the given ID.
7. Print the Student Details if Found If a match is found, display student details using System.out.println().
8. Handle Case When Student is Not Found - Print a message if no matching student is found.
9. End the Program - Ensure smooth execution.

Program

```
import java.util.ArrayList;
import java.util.Scanner;

// Student class
class Student {
   int id;
   String name;
   String department;
   int age;

   // Constructor
   public Student(int id, String name, String department, int age) {
      this.id = id;
      this.name = name;
      this.department = department;
      this.age = age;
   }

   // Display student details
   public void display() {
      System.out.println("ID: " + id + ", Name: " + name + ", Dept: " + department + ", Age: " +
age);
   }
}
```

```
public class StudentSearch {
    public static void main(String[] args) {
        // Create an ArrayList of Student objects
        ArrayList<Student> students = new ArrayList<>();

        // Adding Student objects
        students.add(new Student(101, "Alice", "Computer Science", 20));
        students.add(new Student(102, "Bob", "Mechanical", 22));
        students.add(new Student(103, "Charlie", "Electrical", 21));
        students.add(new Student(104, "David", "Civil", 23));

        // User input for searching
        Scanner scanner = new Scanner(System.in);
        System.out.print("Enter Student ID to search: ");
        int searchId = scanner.nextInt();
        scanner.close();

        // Search for the student
        boolean found = false;
        for (Student student : students) {
            if (student.id == searchId) {
                System.out.println("Student Found:");
                student.display();
                found = true;
                break;
            }
        }

        if (!found) {
            System.out.println("Student with ID " + searchId + " not found.");
        }
    }
}
```

Output



```
C:\Users\Admin\Documents\OOPTW>javac StudentSearch.java

C:\Users\Admin\Documents\OOPTW>java StudentSearch
Enter Student ID to search: 101
Student Found:
ID: 101, Name: Alice, Dept: Computer Science, Age: 20

C:\Users\Admin\Documents\OOPTW>java StudentSearch
Enter Student ID to search: 203
Student with ID 203 not found.

C:\Users\Admin\Documents\OOPTW>java StudentSearch
Enter Student ID to search: 102
Student Found:
ID: 102, Name: Bob, Dept: Mechanical, Age: 22

C:\Users\Admin\Documents\OOPTW>java StudentSearch
Enter Student ID to search: 105
Student with ID 105 not found.

C:\Users\Admin\Documents\OOPTW>java StudentSearch
Enter Student ID to search: 102
Student Found:
ID: 102, Name: Bob, Dept: Mechanical, Age: 22
```

Result

Thus, writing a Java program to create an ArrayList of Student (id,name,dept,age) objects and search for particular Student objects based on id number. has been completed successfully and output is verified.

Ex No 5.5 Write a Java program to create an ArrayList which will be able to store only char and String but not any other data type.

Aim
To write a Java program to create an ArrayList which will be able to store only char and String but not any other data type.

Algorithm

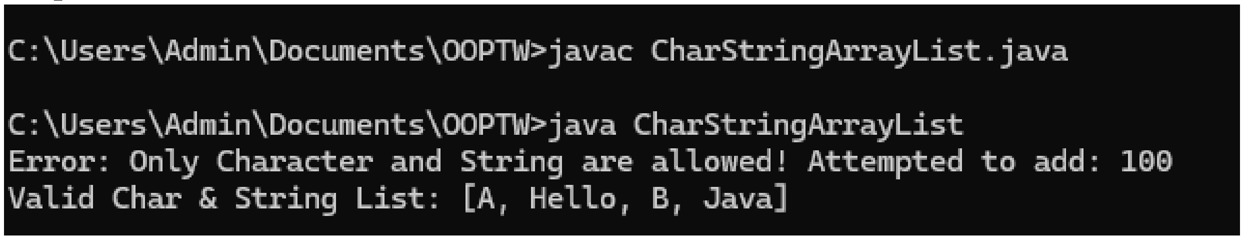
1. Create an ArrayList of Type Character and String - Use ArrayList<Object> to store both Character and String values.
2. Add Only char and String Values - Use instanceof to ensure only Character and String types are added.
3. Iterate and Display Elements
4. Loop through the list and print the stored values.

Program

```
import java.util.ArrayList;

public class CharStringArrayList {
   public static void main(String[] args) {
      // Create an ArrayList that can store only Character and String
      ArrayList<Object> list = new ArrayList<>();

      // Adding elements
      addElement(list, 'A');   // Character
      addElement(list, "Hello"); // String
      addElement(list, 'B');
      addElement(list, "Java");

      // Attempting to add an integer (should not be allowed)
      addElement(list, 100); // This should be rejected

      // Print the valid elements
      System.out.println("Valid Char & String List: " + list);
   }

   // Method to add only Character or String to the ArrayList
   public static void addElement(ArrayList<Object> list, Object element) {
      if (element instanceof Character || element instanceof String) {
         list.add(element);
      } else {
         System.out.println("Error: Only Character and String are allowed! Attempted to add: " +
element);
      }
   }
```

}

Output



```
C:\Users\Admin\Documents\OOPTW>javac CharStringArrayList.java

C:\Users\Admin\Documents\OOPTW>java CharStringArrayList
Error: Only Character and String are allowed! Attempted to add: 100
Valid Char & String List: [A, Hello, B, Java]
```

Result

Thus, writing a Java program to create an ArrayList which will be able to store only char and String but not any other data type. has been completed successfully and output is verified.

Ex No 5.6 Write a Java program using Queue Collection for Cinema Ticket Sale.

Aim
To write a Java program using Queue Collection for Cinema Ticket Sale.

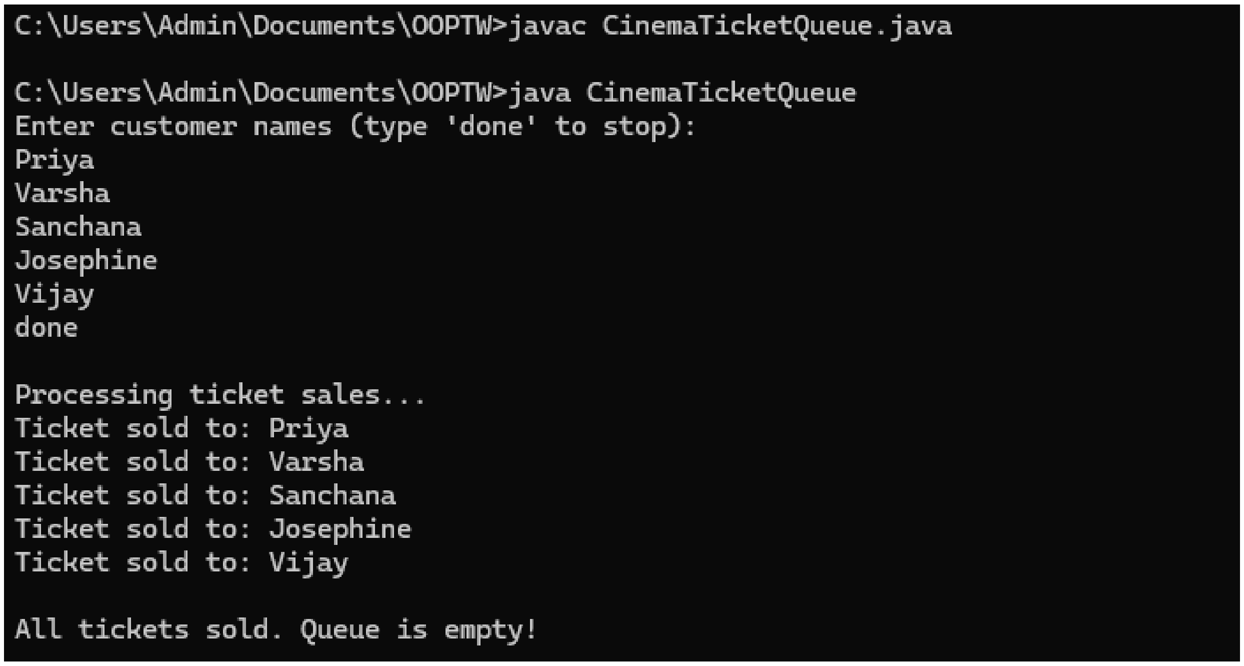
Algorithm

1. Create a Queue for Customers - Use Queue<String> with LinkedList to store customer names in the order they arrive.
2. Process Ticket Sales - Use poll() to remove and serve customers one by one.
3. Display the Queue Status - Print the queue before and after ticket sales to show remaining customers.

Program
```
import java.util.LinkedList;
import java.util.Queue;
import java.util.Scanner;

class CinemaTicketQueue {
  public static void main(String[] args) {
    // Create a Queue for customers
    Queue<String> ticketQueue = new LinkedList<>();
    Scanner scanner = new Scanner(System.in);

    // Adding customers to the queue
    System.out.println("Enter customer names (type 'done' to stop): ");
    while (true) {
      String name = scanner.nextLine();
      if (name.equalsIgnoreCase("done")) break;
      ticketQueue.add(name);
    }

    // Processing ticket sales
    System.out.println("\nProcessing ticket sales...");
    while (!ticketQueue.isEmpty()) {
      String customer = ticketQueue.poll(); // Serve the first customer
      System.out.println("Ticket sold to: " + customer);
    }

    System.out.println("\nAll tickets sold. Queue is empty!");
    scanner.close();
  }
}
```

Output
How It Works:

- Customers enter their names → They are added to the Queue.
- First customer in line gets served first (poll() method).
- Loop continues until all customers are served.



```
C:\Users\Admin\Documents\OOPTW>javac CinemaTicketQueue.java

C:\Users\Admin\Documents\OOPTW>java CinemaTicketQueue
Enter customer names (type 'done' to stop):
Priya
Varsha
Sanchana
Josephine
Vijay
done

Processing ticket sales...
Ticket sold to: Priya
Ticket sold to: Varsha
Ticket sold to: Sanchana
Ticket sold to: Josephine
Ticket sold to: Vijay

All tickets sold. Queue is empty!
```

Result
Thus, writing a Java program using Queue Collection for Cinema Ticket Sale has been completed successfully and output is verified.