Name: Sanket Banate
Roll No: 64
Batch: A4
PRN: 202301040044

Q. Implement any real-time application by using abstract classes, interfaces, and exception handling, also create user-defined exceptions.

```
import java.util.Scanner;
// Custom exception for Aadhaar already registered
class AadhaarAlreadyRegisteredException extends Exception {
public AadhaarAlreadyRegisteredException(String message) {
super(message);
}
}
// Custom exception for Aadhaar not found
class AadhaarNotFoundException extends Exception {
public AadhaarNotFoundException(String message) {
super(message);
}
}
// Interface for Aadhaar operations
interface IAadhaarService {
void registerAadhaar(Aadhaar aadhaar) throws AadhaarAlreadyRegisteredException;
void updateAadhaar(String aadhaarNumber, Aadhaar updatedAadhaar) throws
AadhaarNotFoundException;
Aadhaar getAadhaarDetails(String aadhaarNumber) throws AadhaarNotFoundException;
void deleteAadhaar(String aadhaarNumber) throws AadhaarNotFoundException;}
// Aadhaar class representing the Aadhaar details
class Aadhaar {
private String name;
private String aadhaarNumber;
private int age;
private String address;
public Aadhaar(String name, String aadhaarNumber, int age, String address) {
this.name = name;
this.aadhaarNumber = aadhaarNumber;
this.age = age;
this.address = address;
}
// Getters and Setters
public String getName() {
```

```
return name;
}
public String getAadhaarNumber() {
return aadhaarNumber;}
public int getAge() {
return age;
}
public String getAddress() {
return address;
}
public void setName(String name) {
this.name = name;
}
public void setAge(int age) {
this.age = age;
}
public void setAddress(String address) {
this.address = address;
}@Override
public String toString() {
return "Aadhaar Details:\n" +
"Name: " + name +
"\nAadhaar Number: " + aadhaarNumber +
"\nAge: " + age +
"\nAddress: " + address;
}
}
// Aadhaar Service Implementation
class AadhaarServiceImpl implements IAadhaarService {
private Aadhaar[] aadhaarDb;
private int count;
public AadhaarServiceImpl() {
aadhaarDb = new Aadhaar[100]; // Fixed size array
count = 0;
}
@Override
public void registerAadhaar(Aadhaar aadhaar) throws AadhaarAlreadyRegisteredException {
for (int i = 0; i < count; i++) {
if (aadhaarDb[i].getAadhaarNumber().equals(aadhaar.getAadhaarNumber())) {throw new
AadhaarAlreadyRegisteredException("Aadhaar Number " +
aadhaar.getAadhaarNumber() + " is already registered.");
}
}
```

```
aadhaarDb[count++] = aadhaar;
System.out.println("Aadhaar registered successfully.");
}
@Override
public void updateAadhaar(String aadhaarNumber, Aadhaar updatedAadhaar) throws
AadhaarNotFoundException {
for (int i = 0; i < count; i++) {
if (aadhaarDb[i].getAadhaarNumber().equals(aadhaarNumber)) {
aadhaarDb[i] = updatedAadhaar;
System.out.println("Aadhaar updated successfully.");
return;
}
}
throw new AadhaarNotFoundException("Aadhaar Number " + aadhaarNumber + " not found.");
}
@Override
public Aadhaar getAadhaarDetails(String aadhaarNumber) throws AadhaarNotFoundException {
for (int i = 0; i < count; i++) {
if (aadhaarDb[i].getAadhaarNumber().equals(aadhaarNumber)) {
return aadhaarDb[i];
}
}
throw new AadhaarNotFoundException("Aadhaar Number " + aadhaarNumber + " not found.");
}
@Overridepublic void deleteAadhaar(String aadhaarNumber) throws AadhaarNotFoundException
{
for (int i = 0; i < count; i++) {
if (aadhaarDb[i].getAadhaarNumber().equals(aadhaarNumber)) {
// Shift remaining elements to the left
for (int j = i; j < count - 1; j++) {
aadhaarDb[j] = aadhaarDb[j + 1];
}
aadhaarDb[--count] = null; // Clear the last element
System.out.println("Aadhaar deleted successfully.");
return;
}
}
throw new AadhaarNotFoundException("Aadhaar Number " + aadhaarNumber + " not found.");
}
// Method for performing operations in a loop
public void performOperation() {
Scanner scanner = new Scanner(System.in);
while (true) {
```

```
System.out.println("\n--- Aadhaar Management System ---
");
System.out.println("1. Register Aadhaar");
System.out.println("2. Update Aadhaar");
System.out.println("3. Get Aadhaar Details");
System.out.println("4. Delete Aadhaar");
System.out.println("5. Exit");
System.out.print("Enter your choice: ");
int choice = scanner.nextInt();
scanner.nextLine(); // consume newline
switch (choice) {
case 1:try {
System.out.print("Enter Name: ");
String name = scanner.nextLine();
System.out.print("Enter Aadhaar Number: ");
String aadhaarNumber = scanner.nextLine();
System.out.print("Enter Age: ");
int age = scanner.nextInt();
scanner.nextLine(); // consume newline
System.out.print("Enter Address: ");
String address = scanner.nextLine();
Aadhaar aadhaar = new Aadhaar(name, aadhaarNumber, age, address);
registerAadhaar(aadhaar);
} catch (AadhaarAlreadyRegisteredException e) {
System.out.println(e.getMessage());
}
break;
case 2:
try {
System.out.print("Enter Aadhaar Number to update: ");
String updateAadhaarNumber = scanner.nextLine();
System.out.print("Enter New Name: ");
String newName = scanner.nextLine();
System.out.print("Enter New Age: ");
int newAge = scanner.nextInt();
scanner.nextLine(); // consume newline
System.out.print("Enter New Address: ");
String newAddress = scanner.nextLine();Aadhaar updatedAadhaar = new Aadhaar(newName,
updateAadhaarNumber, newAge,
newAddress);
updateAadhaar(updateAadhaarNumber, updatedAadhaar);
} catch (AadhaarNotFoundException e) {
System.out.println(e.getMessage());
```

```
}
break;
case 3:
try {
System.out.print("Enter Aadhaar Number to fetch details: ");
String fetchAadhaarNumber = scanner.nextLine();
Aadhaar aadhaarDetails = getAadhaarDetails(fetchAadhaarNumber);
System.out.println(aadhaarDetails);
} catch (AadhaarNotFoundException e) {
System.out.println(e.getMessage());
}
break;
case 4:
try {
System.out.print("Enter Aadhaar Number to delete: ");
String deleteAadhaarNumber = scanner.nextLine();
deleteAadhaar(deleteAadhaarNumber);
} catch (AadhaarNotFoundException e) {
System.out.println(e.getMessage());
}
break;
case 5:
System.out.println("Exiting... Thank you!");
scanner.close();
return;default:
System.out.println("Invalid choice. Please try again."); } }}}
// Main class to run the application
public class AadhaarManagementSystem {
public static void main(String[] args) {
AadhaarServiceImpl aadhaarService = new AadhaarServiceImpl();
aadhaarService.performOperation();
```

Output:

```
--- Aadhaar Management System ---
1. Register Aadhaar
2. Update Aadhaar
3. Get Aadhaar Details
4. Delete Aadhaar
5. Exit
Enter your choice: 1
Enter Name: John Doe
Enter Aadhaar Number: 1234-5678-9012
Enter Age: 30
Enter Address: 123 Main St
Aadhaar registered successfully.

Enter your choice: 1
Enter Name: Jane Smith
Enter Aadhaar Number: 1234-5678-9012
Enter Age: 25
Enter Address: 456 Elm St
Aadhaar Number 1234-5678-9012 is already registered.

Enter your choice: 2
Enter Aadhaar Number to update: 9999-8888-7777
Enter New Name: Updated Name
Enter New Age: 35
Enter New Address: New Address
Aadhaar Number 9999-8888-7777 not found.

Enter your choice: 3
Enter Aadhaar Number to fetch details: 8888-7777-6666
Aadhaar Number 8888-7777-6666 not found.

Enter your choice: 4
Enter Aadhaar Number to delete: 7777-6666-5555
Aadhaar Number 7777-6666-5555 not found.
```