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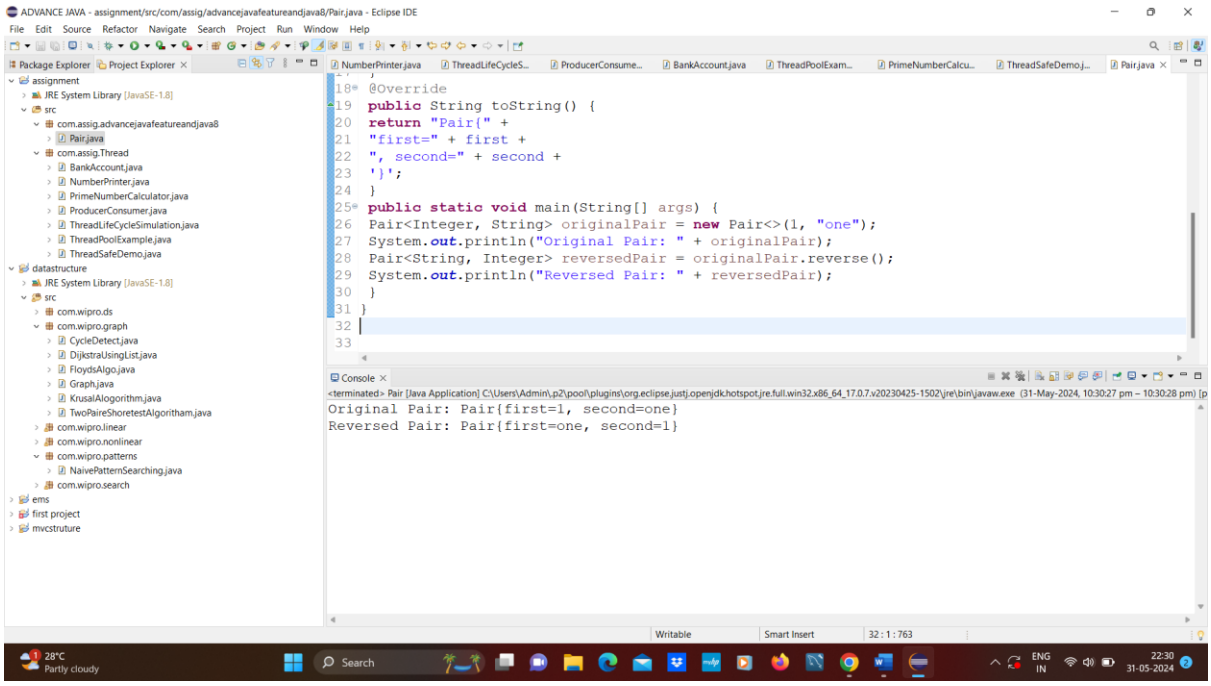
Day19

Task 1: Generics and Type Safety Create a generic Pair class that holds two objects of different types, and write a method to return a reversed version of the pair.

```
package com.assig.advancejavafeatureandjava8;
public class Pair<T, U> {
 private T first;
 private U second;
 public Pair(T first, U second) {
 this.first = first;
 this.second = second;
 }
 public T getFirst() {
 return first;
 }
 public U getSecond() {
 return second;
 }
 public Pair<U, T> reverse() {
 return new Pair<>(second, first);
 }
 @Override
 public String toString() {
 return "Pair{" +
 "first=" + first +
 ", second=" + second +
 '}';
 }
 public static void main(String[] args) {
```

```
Pair<Integer, String> originalPair = new Pair<>(1, "one");

System.out.println("Original Pair: " + originalPair);

Pair<String, Integer> reversedPair = originalPair.reverse();

System.out.println("Reversed Pair: " + reversedPair);

 }

}
```

OUTPUT:



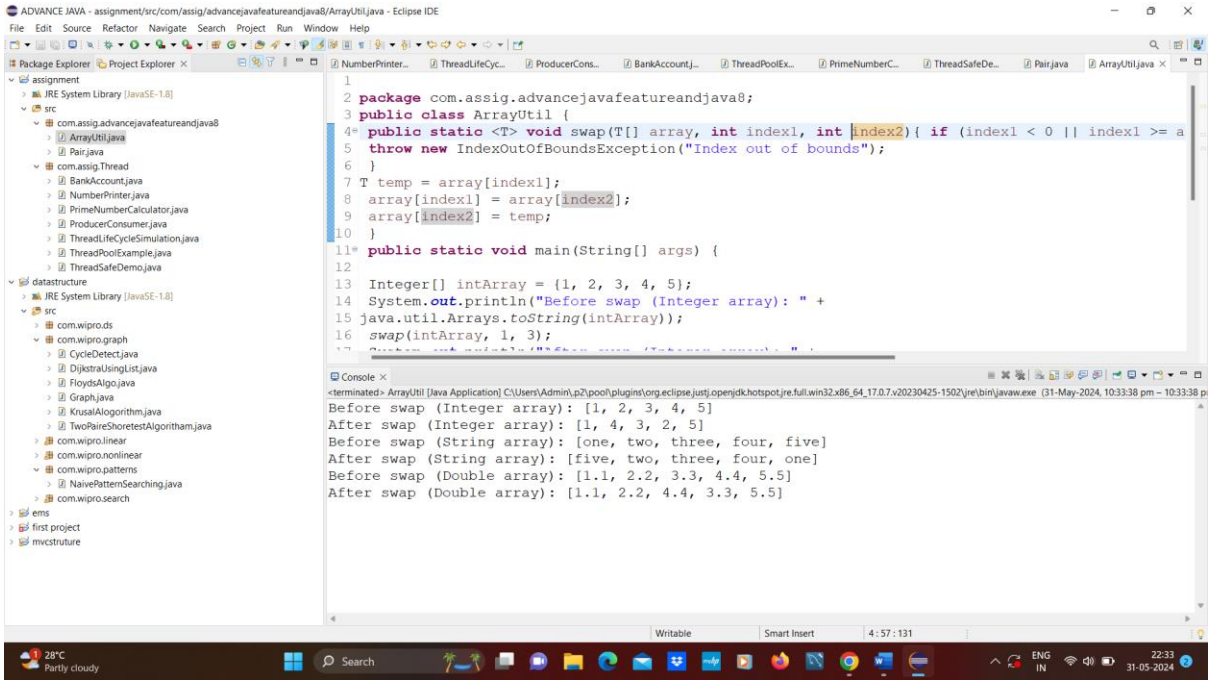
Task 2: Generic Classes and Methods

Implement a generic method that swaps the positions of two elements in an array, regardless of their type, and demonstrate its usage with different object types.

```
package com.assig.advancejavafeatureandjava8;

public class ArrayUtil {

 public static <T> void swap(T[] array, int index1, intindex2){ if (index1 < 0 || index1 >=
array.length || index2<0||index2 >= array.length) {

 throw new IndexOutOfBoundsException("Index out of bounds");

 }

T temp = array[index1];
```

```
 array[index1] = array[index2];
 array[index2] = temp;
 }
 public static void main(String[] args) {

 Integer[] intArray = {1, 2, 3, 4, 5};
 System.out.println("Before swap (Integer array): " +
java.util.Arrays.toString(intArray));
 swap(intArray, 1, 3);
 System.out.println("After swap (Integer array): " +
java.util.Arrays.toString(intArray));

 String[] strArray = {"one", "two", "three", "four", "five"};
 System.out.println("Before swap (String array): " +
java.util.Arrays.toString(strArray));
 swap(strArray, 0, 4);
 System.out.println("After swap (String array): " +
java.util.Arrays.toString(strArray));

 Double[] doubleArray = {1.1, 2.2, 3.3, 4.4, 5.5};
 System.out.println("Before swap (Double array): " +
java.util.Arrays.toString(doubleArray));
 swap(doubleArray, 2, 3);
 System.out.println("After swap (Double array): " +
java.util.Arrays.toString(doubleArray));
 }
}
```

OUTPUT:



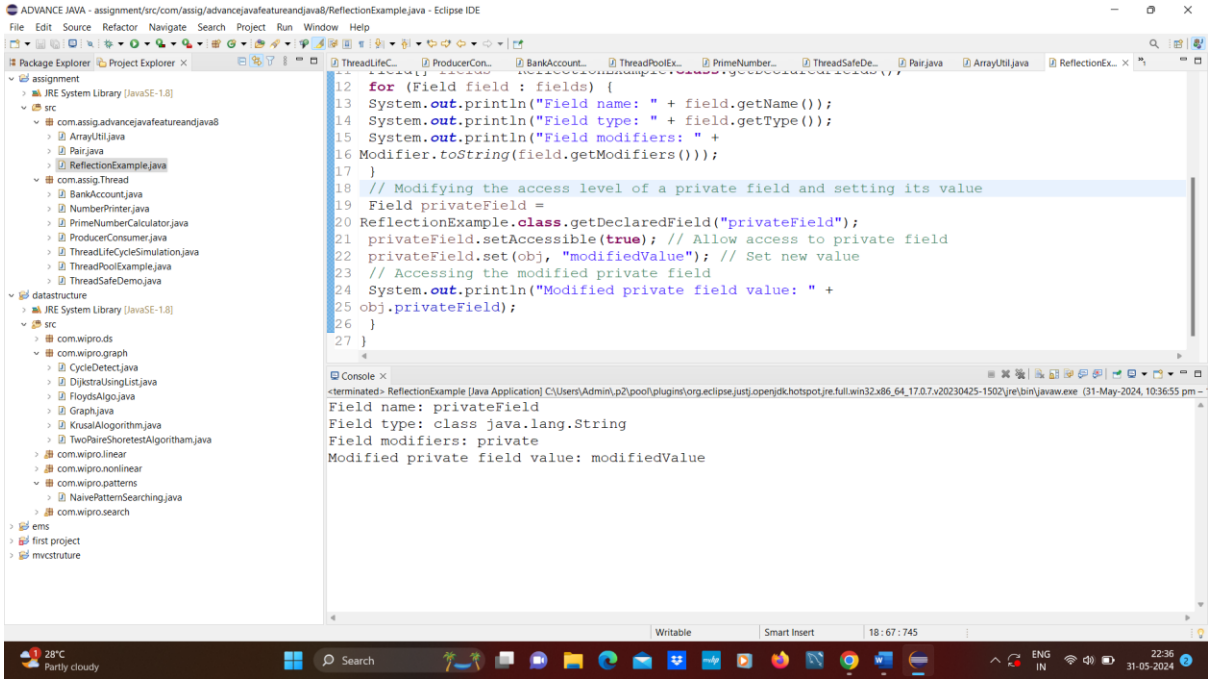
Task 3: Reflection API

Use reflection to inspect a class's methods, fields, and constructors, and modify the access level of a private field, setting its value during runtime

```
package com.assig.advancejavafeatureandjava8;

import java.lang.reflect.Field;

import java.lang.reflect.Modifier;

public class ReflectionExample {

 private String privateField = "initialValue";

 public static void main(String[] args) throws NoSuchFieldException,
IllegalAccessException {

 ReflectionExample obj = new ReflectionExample();

 // Inspecting the class's fields

 Field[] fields = ReflectionExample.class.getDeclaredFields();

 for (Field field : fields) {

 System.out.println("Field name: " + field.getName());

 System.out.println("Field type: " + field.getType());

 System.out.println("Field modifiers: " +
```

```
Modifier.toString(field.getModifiers()));
 }
 // Modifying the access level of a private field and setting its
value
 Field privateField =
ReflectionExample.class.getDeclaredField("privateField");
 privateField.setAccessible(true); // Allow access to private field
 privateField.set(obj, "modifiedValue"); // Set new value
 // Accessing the modified private field
 System.out.println("Modified private field value: " +
obj.privateField);
 }
}
```

OUTPUT:



Task 4: Lambda Expressions Implement a Comparator for a Person class using a lambda expression, and sort a list of Person objects by their age..

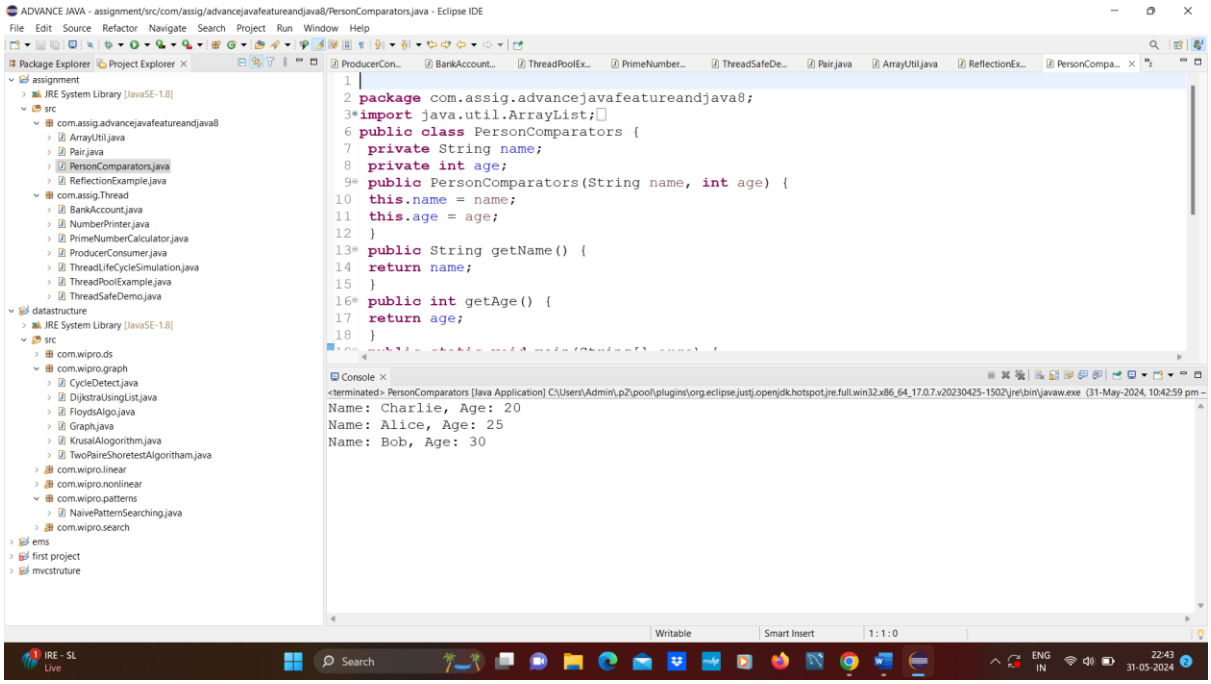
```
package com.assig.advancejavafeatureandjava8;
import java.util.ArrayList;
```

```
import java.util.Comparator;
import java.util.List;
public class PersonComparators {
 private String name;
 private int age;
 public PersonComparators(String name, int age) {
 this.name = name;
 this.age = age;
 }
 public String getName() {
 return name;
 }
 public int getAge() {
 return age;
 }
 public static void main(String[] args) {
 List<PersonComparators> personList = new ArrayList<>();
 personList.add(new PersonComparators("Alice", 25));
 personList.add(new PersonComparators("Bob", 30));
 personList.add(new PersonComparators("Charlie", 20));
 // Sorting the list by age using a lambda expression

personList.sort(Comparator.comparingInt(PersonComparators::getA
ge));
 // Printing the sorted list
 for (PersonComparators person : personList) {
 System.out.println("Name: " + person.getName() + ", Age: " +
person.getAge());
 }
```

}

}

OUTPUT:



Task 5: Functional Interfaces

Create a method that accepts functions as parameters using Predicate, Function, Consumer, and Supplier interfaces to operate on a Person object.

```
package com.assig.advancejavafeatureandjava8;

import java.util.function.Consumer;

import java.util.function.Function;

import java.util.function.Predicate;

import java.util.function.Supplier;

public class Person {

 private String name;

 private int age;

 public Person(String name, int age) {

 this.name = name;

 this.age = age;
```

```
}
public String getName() {
return name;
}
public int getAge() {
return age;
}
public void setName(String name) {
this.name = name;
}
public void setAge(int age) {
this.age = age;
}
public static void processPerson(Person person,
Predicate<Person> predicate,
Function<Person, String> function,
Consumer<String> consumer,
Supplier<Integer> supplier) {
if (predicate.test(person)) {
String result = function.apply(person);
consumer.accept(result);
int newAge = supplier.get();
person.setAge(newAge);
}
}
public static void main(String[] args) {
Person person = new Person("vishakha", 24);
// Example usage of the processPerson method
processPerson(
```

```
 person,
 p -> p.getAge() >= 18, // Predicate to check if person is an
adult
 p -> "Name: " + p.getName() + ", Age: " + p.getAge(), //
Function to get person details as string
 System.out::println, // Consumer to print the person details
 () -> 30 // Supplier to provide a new age for the person
 );
 System.out.println("Updated age: " + person.getAge());
 }
}
```

OUTPUT: