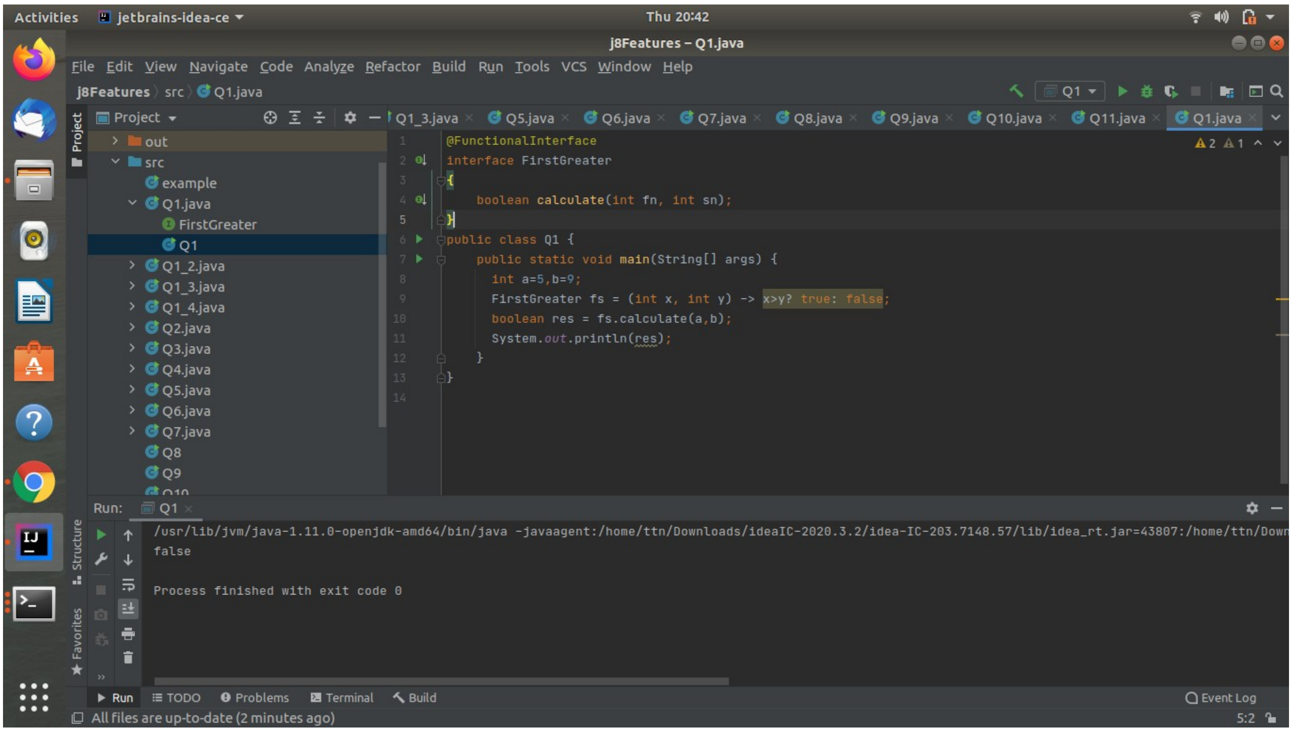
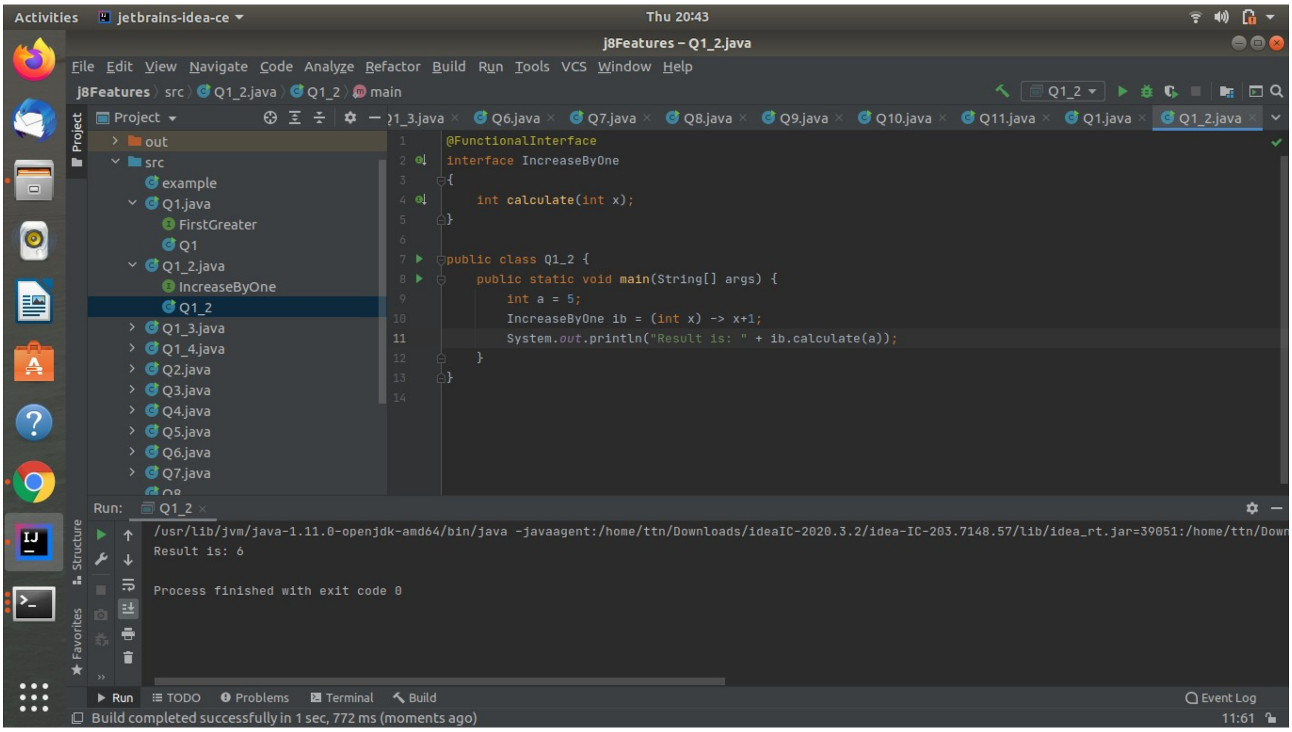
Q1: Write the following a functional interface and implement it using lambda:

- •(1) First number is greater than second number or not Parameter (int ,int) Return boolean
- •(2) Increment the number by 1 and return incremented value   Parameter (int) Return int
- •(3) Concatination of 2 string Parameter (String , String) Return (String)
- •(4) Convert a string to uppercase and return .Parameter (String) Return (String)



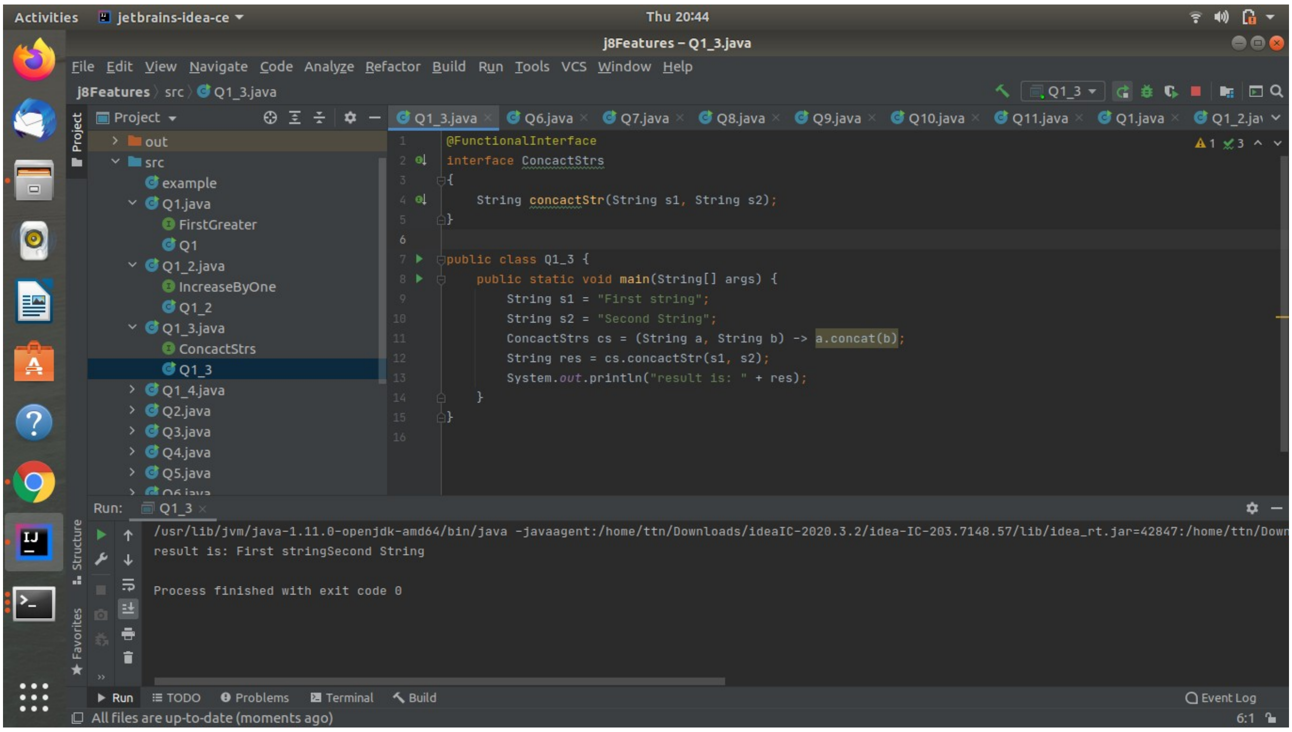
```java
@FunctionalInterface
interface FirstGreater
{
    boolean calculate(int fn, int sn);
}
public class Q1 {
    public static void main(String[] args) {
      int a=5,b=9;
      FirstGreater fs = (int x, int y) -> x>y? true: false;
      boolean res = fs.calculate(a,b);
      System.out.println(res);
    }
}
```

```
/usr/lib/jvm/java-1.11.0-openjdk-amd64/bin/java -javaagent:/home/ttn/Downloads/ideaIC-2020.3.2/idea-IC-203.7148.57/lib/idea_rt.jar=43807:/home/ttn/Down
false

Process finished with exit code 0
```



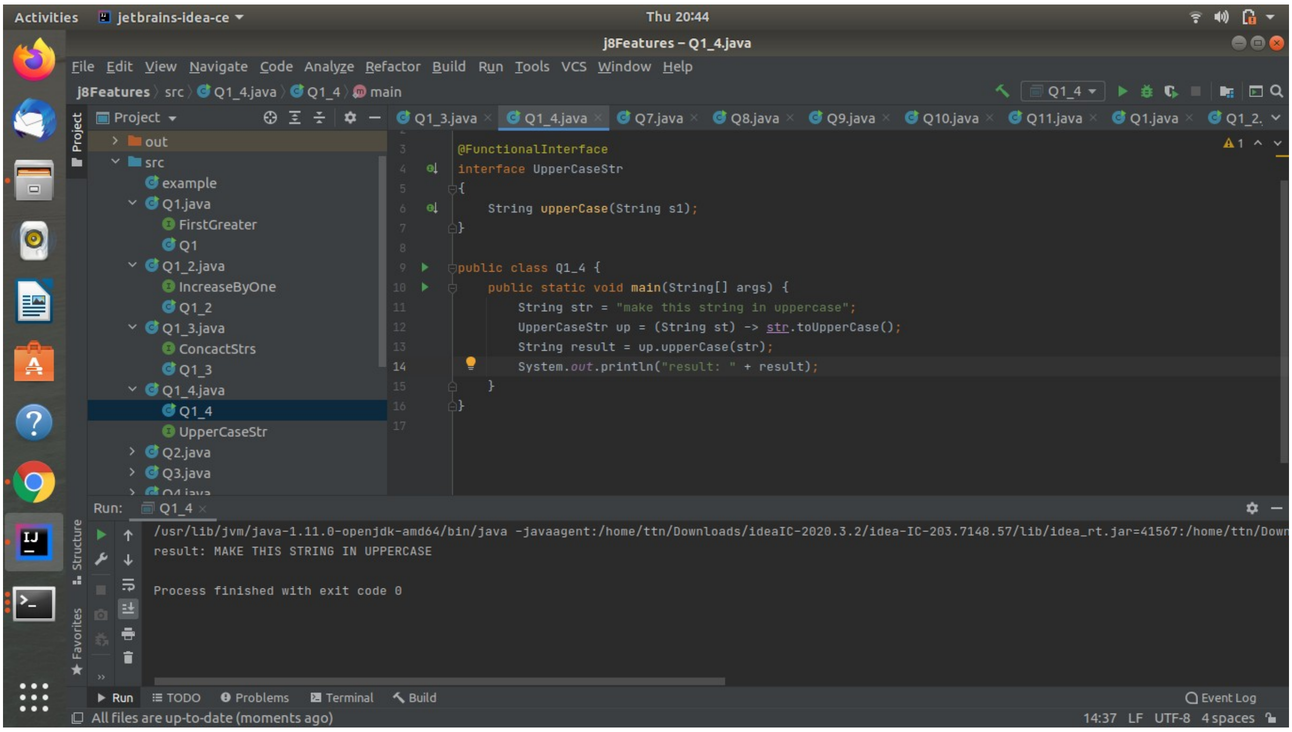
```java
@FunctionalInterface
interface IncreaseByOne
{
    int calculate(int x);
}

public class Q1_2 {
    public static void main(String[] args) {
        int a = 5;
        IncreaseByOne ib = (int x) -> x+1;
        System.out.println("Result is: " + ib.calculate(a));
    }
}
```

```
/usr/lib/jvm/java-1.11.0-openjdk-amd64/bin/java -javaagent:/home/ttn/Downloads/ideaIC-2020.3.2/idea-IC-203.7148.57/lib/idea_rt.jar=39051:/home/ttn/Down
Result is: 6

Process finished with exit code 0
```



```java
@FunctionalInterface
interface ConcactStrs
{
    String concactStr(String s1, String s2);
}

public class Q1_3 {
    public static void main(String[] args) {
        String s1 = "First string";
        String s2 = "Second String";
        ConcactStrs cs = (String a, String b) -> a.concat(b);
        String res = cs.concactStr(s1, s2);
        System.out.println("result is: " + res);
    }
}
```

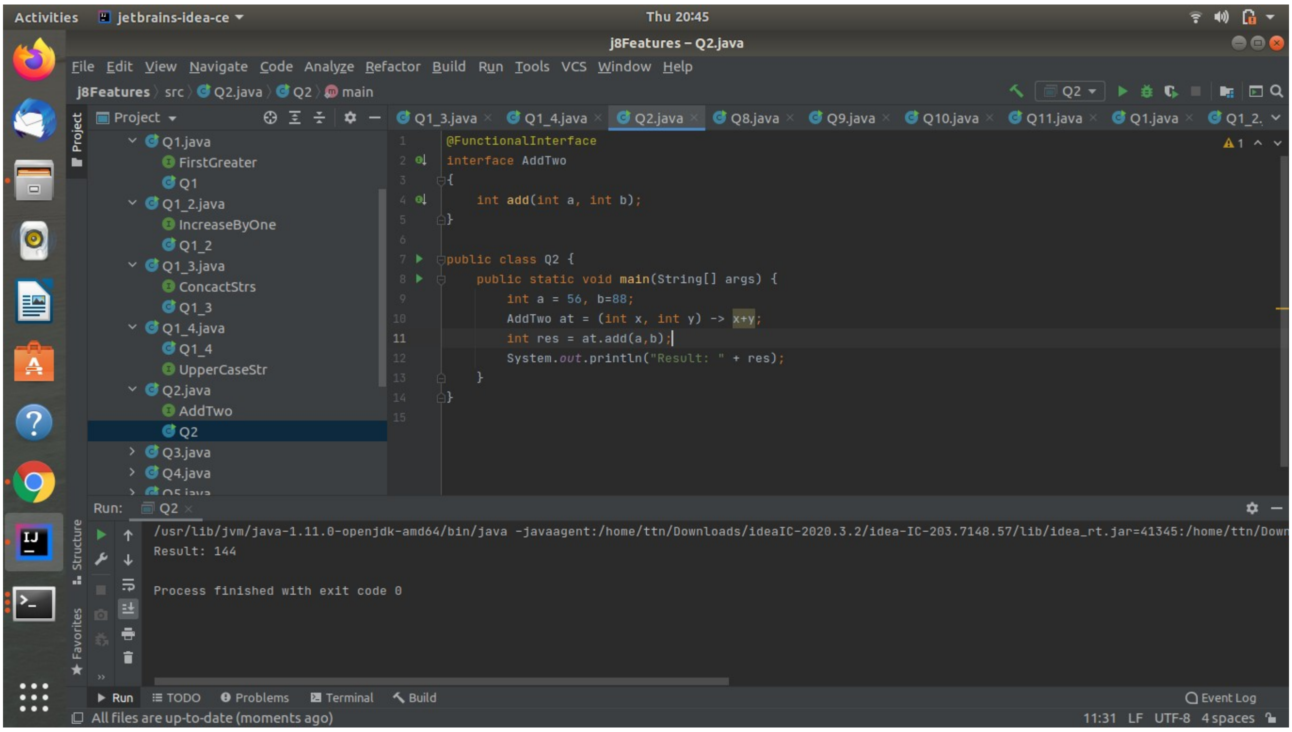
```
/usr/lib/jvm/java-1.11.0-openjdk-amd64/bin/java -javaagent:/home/ttn/Downloads/ideaIC-2020.3.2/idea-IC-203.7148.57/lib/idea_rt.jar=42847:/home/ttn/Down
result is: First stringSecond String

Process finished with exit code 0
```



```java
@FunctionalInterface
interface UpperCaseStr
{
    String upperCase(String s1);
}

public class Q1_4 {
    public static void main(String[] args) {
        String str = "make this string in uppercase";
        UpperCaseStr up = (String st) -> str.toUpperCase();
        String result = up.upperCase(str);
        System.out.println("result: " + result);
    }
}
```

```
/usr/lib/jvm/java-1.11.0-openjdk-amd64/bin/java -javaagent:/home/ttn/Downloads/ideaIC-2020.3.2/idea-IC-203.7148.57/lib/idea_rt.jar=41567:/home/ttn/Down
result: MAKE THIS STRING IN UPPERCASE

Process finished with exit code 0
```

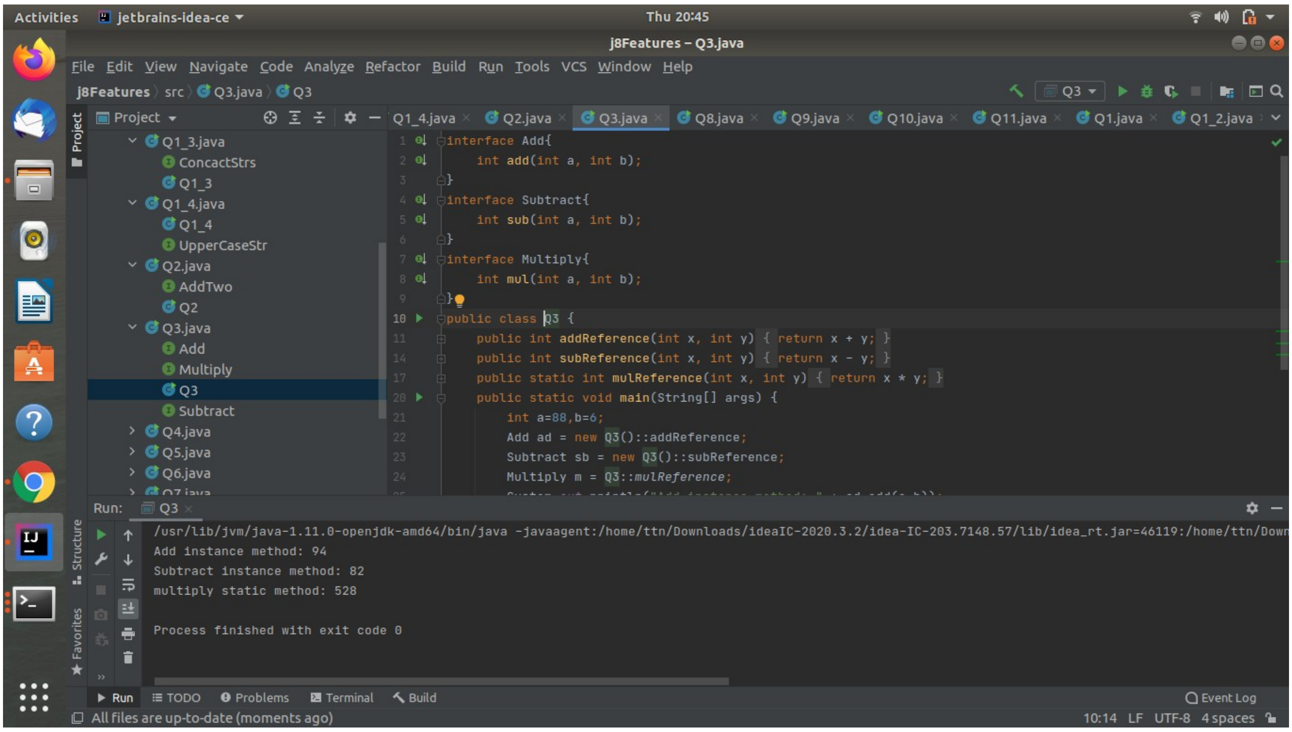
Q2: Create a functional interface whose method takes 2 integers and return one integer.



```java
@FunctionalInterface
interface AddTwo
{
    int add(int a, int b);
}

public class Q2 {
    public static void main(String[] args) {
        int a = 56, b=88;
        AddTwo at = (int x, int y) -> x+y;
        int res = at.add(a,b);
        System.out.println("Result: " + res);
    }
}
```

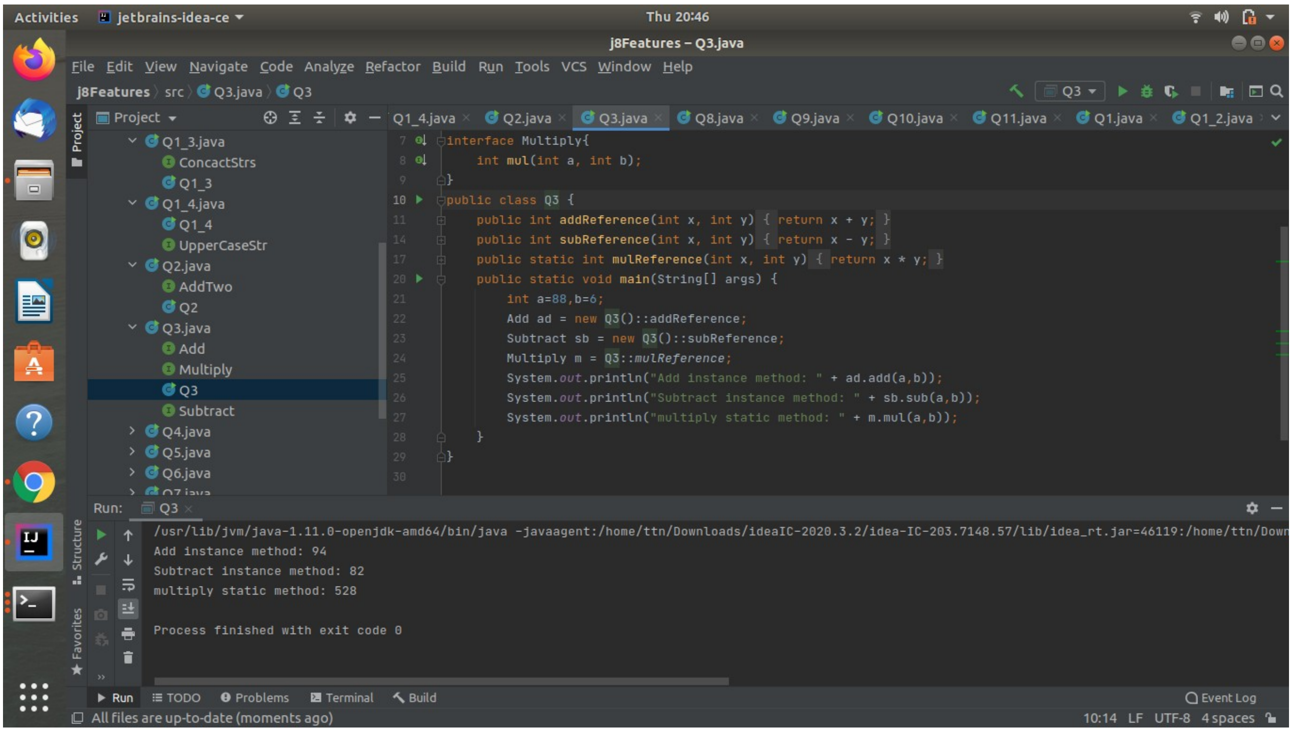
```
/usr/lib/jvm/java-1.11.0-openjdk-amd64/bin/java -javaagent:/home/ttn/Downloads/ideaIC-2020.3.2/idea-IC-203.7148.57/lib/idea_rt.jar=41345:/home/ttn/Down
Result: 144

Process finished with exit code 0
```

Q3Using (instance) Method reference create and apply add and subtract method and using (Static) Method reference create and apply multiplication method for the functional interface created.



```java
interface Add{
    int add(int a, int b);
}
interface Subtract{
    int sub(int a, int b);
}
interface Multiply{
    int mul(int a, int b);
}
public class Q3 {
    public int addReference(int x, int y) { return x + y; }
    public int subReference(int x, int y) { return x - y; }
    public static int mulReference(int x, int y) { return x * y; }
    public static void main(String[] args) {
        int a=88,b=6;
        Add ad = new Q3()::addReference;
        Subtract sb = new Q3()::subReference;
        Multiply m = Q3::mulReference;
```

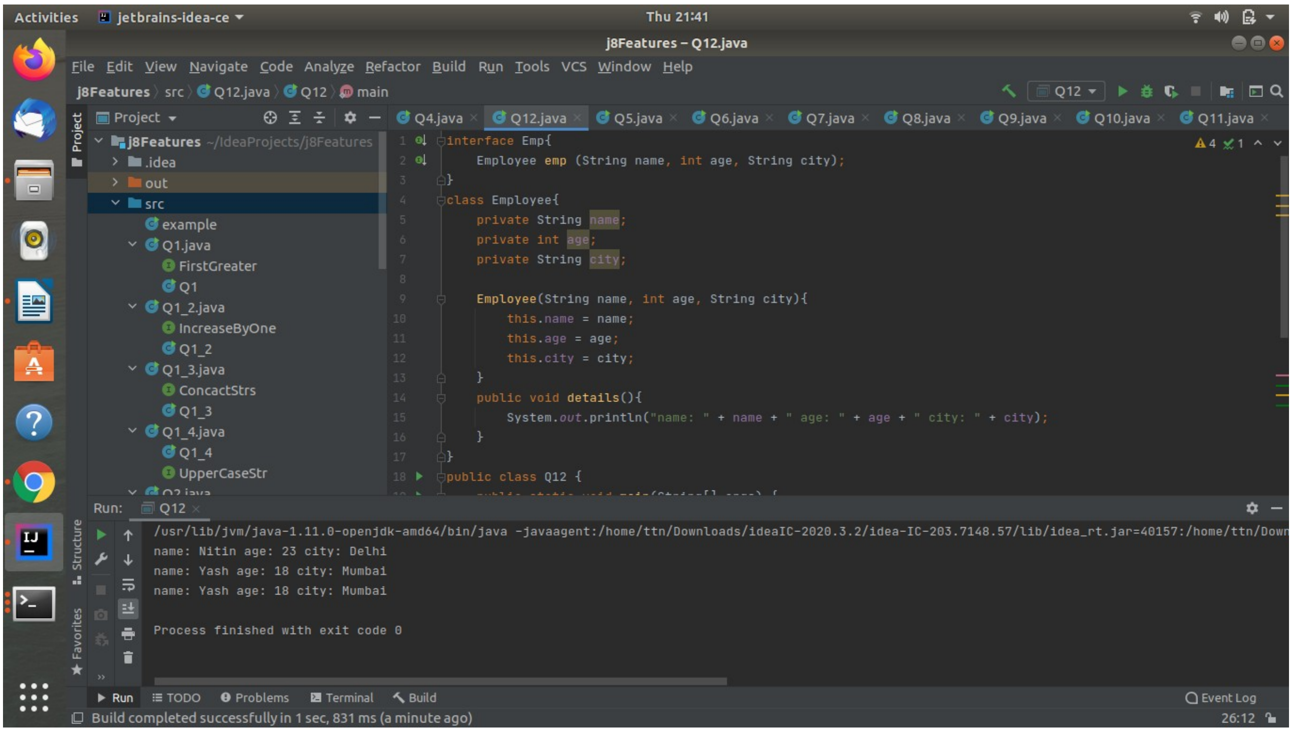
```
/usr/lib/jvm/java-1.11.0-openjdk-amd64/bin/java -javaagent:/home/ttn/Downloads/ideaIC-2020.3.2/idea-IC-203.7148.57/lib/idea_rt.jar=46119:/home/ttn/Down
Add instance method: 94
Subtract instance method: 82
multiply static method: 528

Process finished with exit code 0
```


j8Features – Q3.java
File Edit View Navigate Code Analyze Refactor Build Run Tools VCS Window Help
j8Features src Q3.java Q3
Q1_4.java Q2.java Q3.java Q8.java Q9.java Q10.java Q11.java Q1.java Q1_2.java
Project
Q1_3.java
ConcactStrs
Q1_3
Q1_4.java
Q1_4
UpperCaseStr
Q2.java
AddTwo
Q2
Q3.java
Add
Multiply
Q3
Subtract
Q4.java
Q5.java
Q6.java
Run: Q3
Run TODO Problems Terminal Build Event Log
All files are up-to-date (moments ago)
10:14 LF UTF-8 4 spaces

```java
interface Multiply{
    int mul(int a, int b);
}
public class Q3 {
    public int addReference(int x, int y) { return x + y; }
    public int subReference(int x, int y) { return x - y; }
    public static int mulReference(int x, int y) { return x * y; }
    public static void main(String[] args) {
        int a=88,b=6;
        Add ad = new Q3()::addReference;
        Subtract sb = new Q3()::subReference;
        Multiply m = Q3::mulReference;
        System.out.println("Add instance method: " + ad.add(a,b));
        System.out.println("Subtract instance method: " + sb.sub(a,b));
        System.out.println("multiply static method: " + m.mul(a,b));
    }
}
```

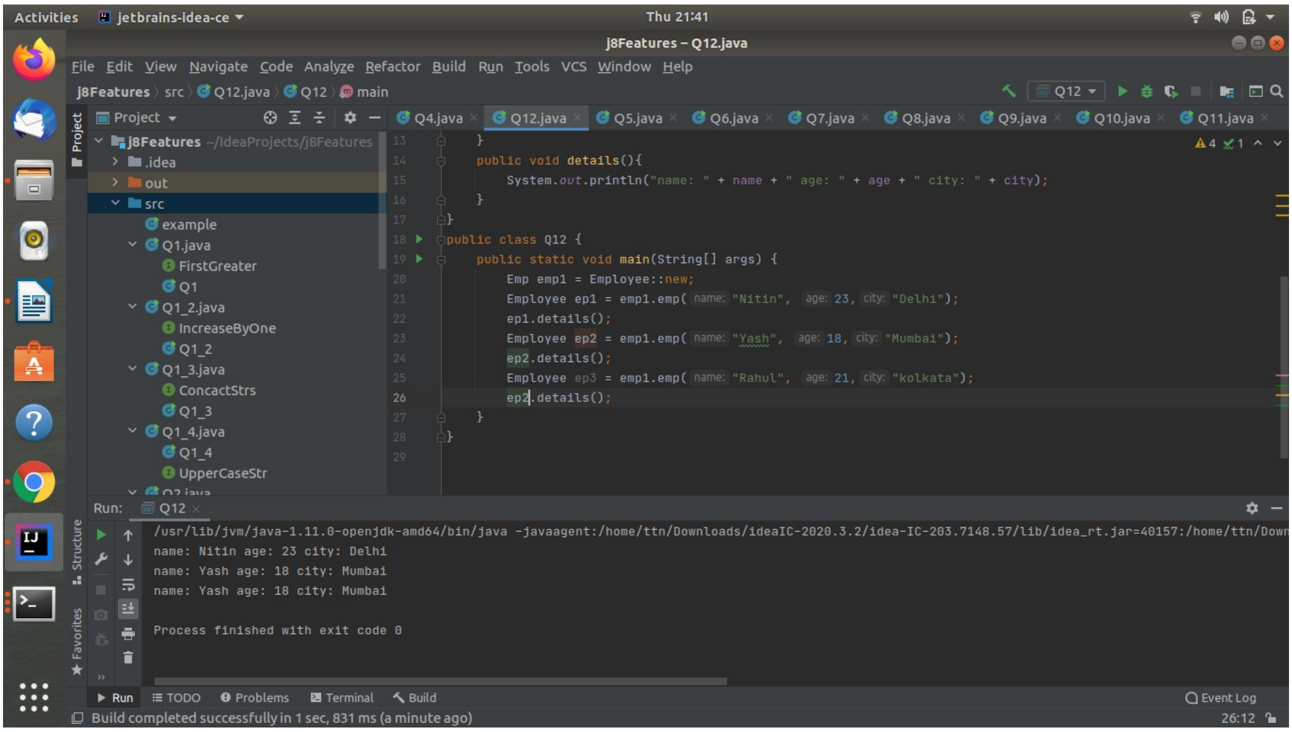
```
/usr/lib/jvm/java-1.11.0-openjdk-amd64/bin/java -javaagent:/home/ttn/Downloads/ideaIC-2020.3.2/idea-IC-203.7148.57/lib/idea_rt.jar=46119:/home/ttn/Down
Add instance method: 94
Subtract instance method: 82
multiply static method: 528

Process finished with exit code 0
```

Q4: Create an Employee Class with instance variables (String) name, (Integer)age, (String)city and get the instance of the Class using constructor reference


j8Features – Q12.java
File Edit View Navigate Code Analyze Refactor Build Run Tools VCS Window Help
j8Features src Q12.java Q12 main
Q4.java Q12.java Q5.java Q6.java Q7.java Q8.java Q9.java Q10.java Q11.java
Project
j8Features ~/IdeaProjects/j8Features
.idea
out
src
example
Q1.java
FirstGreater
Q1
Q1_2.java
IncreaseByOne
Q1_2
Q1_3.java
ConcactStrs
Q1_3
Q1_4.java
Q1_4
UpperCaseStr
Run: Q12
Run TODO Problems Terminal Build Event Log
Build completed successfully in 1 sec, 831 ms (a minute ago)
26:12

```java
interface Emp{
    Employee emp (String name, int age, String city);
}
class Employee{
    private String name;
    private int age;
    private String city;

    Employee(String name, int age, String city){
        this.name = name;
        this.age = age;
        this.city = city;
    }
    public void details(){
        System.out.println("name: " + name + " age: " + age + " city: " + city);
    }
}
public class Q12 {
    public static void main(String[] args) {
```

```
/usr/lib/jvm/java-1.11.0-openjdk-amd64/bin/java -javaagent:/home/ttn/Downloads/ideaIC-2020.3.2/idea-IC-203.7148.57/lib/idea_rt.jar=40157:/home/ttn/Down
name: Nitin age: 23 city: Delhi
name: Yash age: 18 city: Mumbai
name: Yash age: 18 city: Mumbai

Process finished with exit code 0
```



```java
    }
    public void details(){
        System.out.println("name: " + name + " age: " + age + " city: " + city);
    }
}
public class Q12 {
    public static void main(String[] args) {
        Emp emp1 = Employee::new;
        Employee ep1 = emp1.emp( name: "Nitin",  age: 23, city: "Delhi");
        ep1.details();
        Employee ep2 = emp1.emp( name: "Yash",  age: 18, city: "Mumbai");
        ep2.details();
        Employee ep3 = emp1.emp( name: "Rahul",  age: 21, city: "kolkata");
        ep2.details();
    }
}
```

```
/usr/lib/jvm/java-1.11.0-openjdk-amd64/bin/java -javaagent:/home/ttn/Downloads/ideaIC-2020.3.2/idea-IC-203.7148.57/lib/idea_rt.jar=40157:/home/ttn/Down
name: Nitin age: 23 city: Delhi
name: Yash age: 18 city: Mumbai
name: Yash age: 18 city: Mumbai

Process finished with exit code 0
```

Build completed successfully in 1 sec, 831 ms (a minute ago)

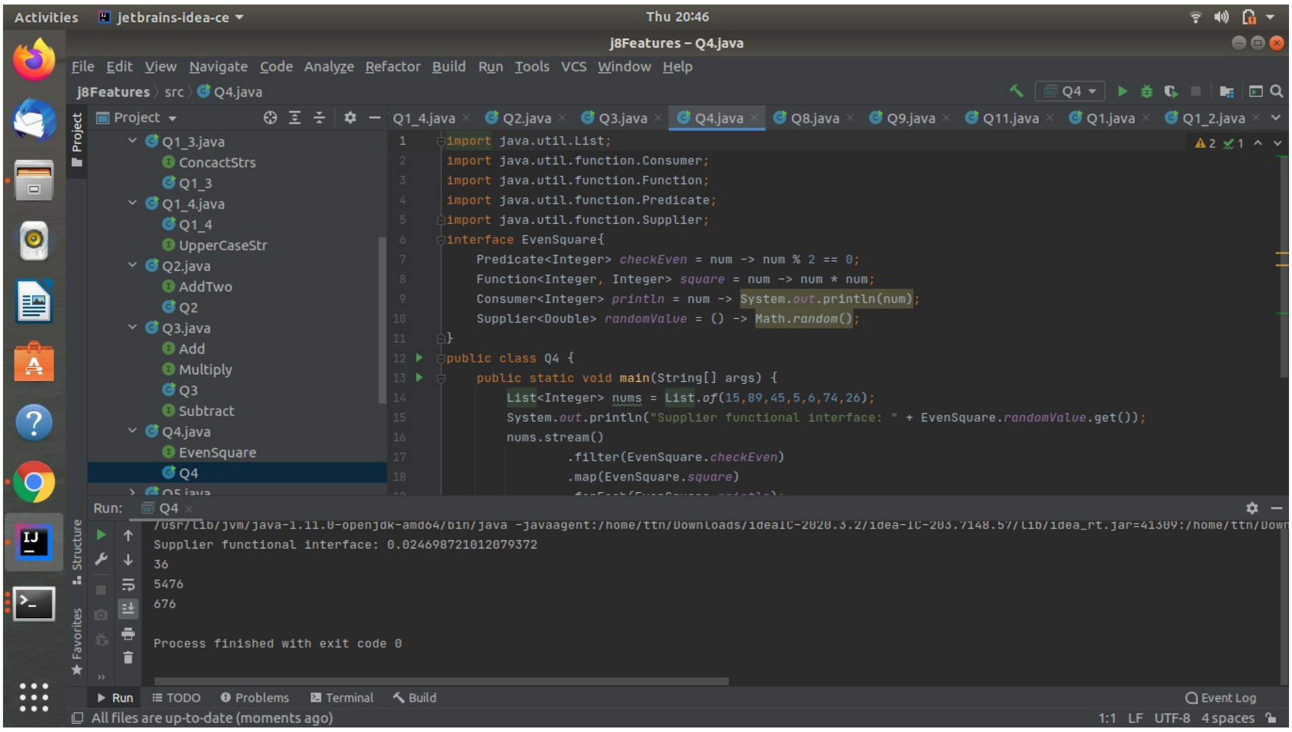
Q5:Implement following functional interfaces from java.util.function using lambdas:

•(1) Consumer

•(2) Supplier

•(3) Predicate

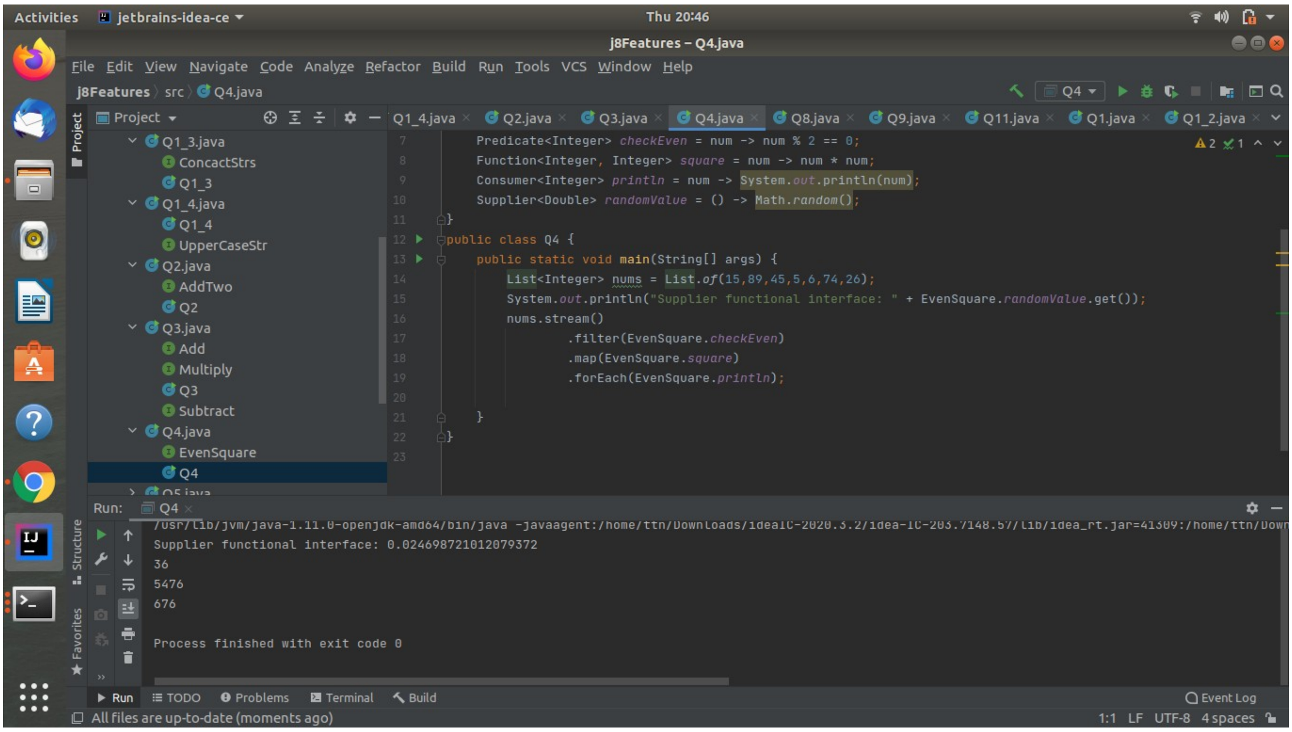
•(4) Function



```java
import java.util.List;
import java.util.function.Consumer;
import java.util.function.Function;
import java.util.function.Predicate;
import java.util.function.Supplier;
interface EvenSquare{
    Predicate<Integer> checkEven = num -> num % 2 == 0;
    Function<Integer, Integer> square = num -> num * num;
    Consumer<Integer> println = num -> System.out.println(num);
    Supplier<Double> randomValue = () -> Math.random();
}
public class Q4 {
    public static void main(String[] args) {
        List<Integer> nums = List.of(15,89,45,5,6,74,26);
        System.out.println("Supplier functional interface: " + EvenSquare.randomValue.get());
        nums.stream()
                .filter(EvenSquare.checkEven)
                .map(EvenSquare.square)
                .forEach(EvenSquare.println);
```

```
/usr/lib/jvm/java-1.11.0-openjdk-amd64/bin/java -javaagent:/home/ttn/Downloads/ideaIC-2020.3.2/idea-IC-203.7148.57/lib/idea_rt.jar=41309:/home/ttn/Down
Supplier functional interface: 0.024698721012079372
36
5476
676

Process finished with exit code 0
```

All files are up-to-date (moments ago)

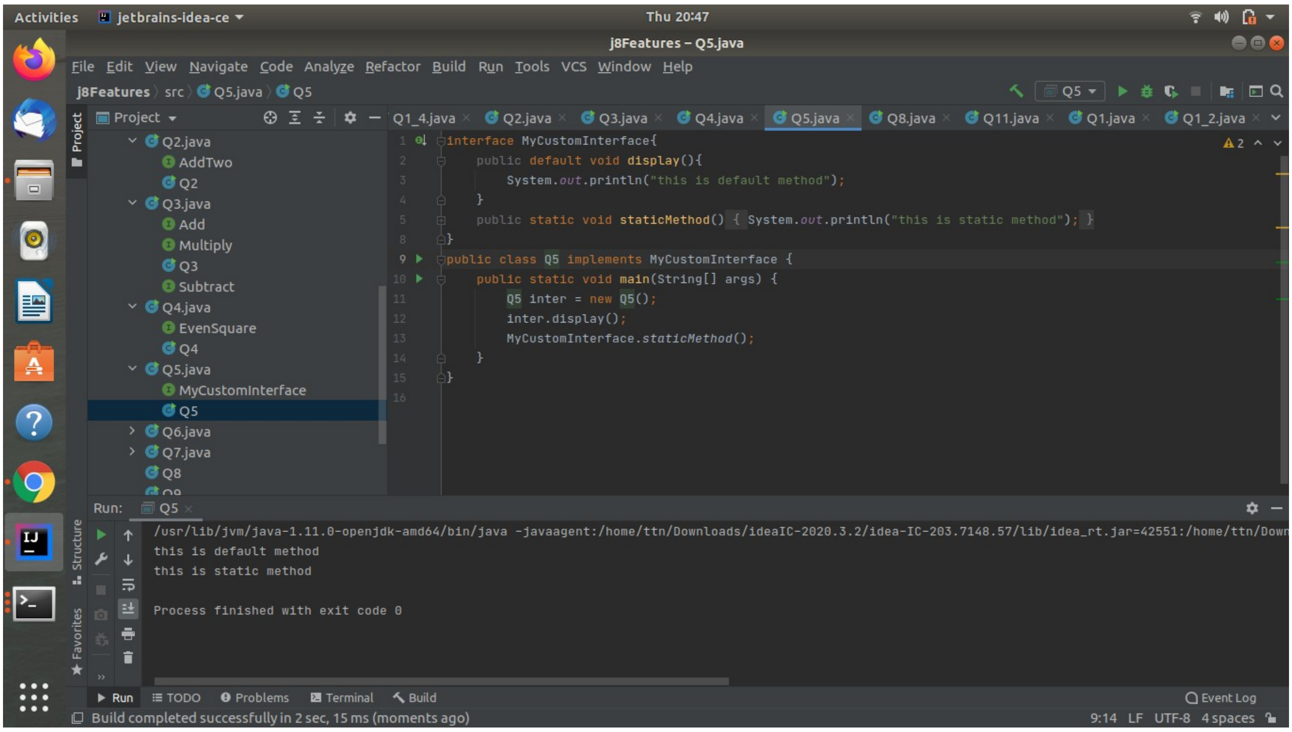


```
    Predicate<Integer> checkEven = num -> num % 2 == 0;
    Function<Integer, Integer> square = num -> num * num;
    Consumer<Integer> println = num -> System.out.println(num);
    Supplier<Double> randomValue = () -> Math.random();
}
public class Q4 {
    public static void main(String[] args) {
        List<Integer> nums = List.of(15,89,45,5,6,74,26);
        System.out.println("Supplier functional interface: " + EvenSquare.randomValue.get());
        nums.stream()
                .filter(EvenSquare.checkEven)
                .map(EvenSquare.square)
                .forEach(EvenSquare.println);

    }
}
```

```
/usr/lib/jvm/java-1.11.0-openjdk-amd64/bin/java -javaagent:/home/ttn/Downloads/ideaIC-2020.3.2/idea-IC-203.7148.57/lib/idea_rt.jar=41309:/home/ttn/Down
Supplier functional interface: 0.024698721012079372
36
5476
676

Process finished with exit code 0
```

All files are up-to-date (moments ago)

Q6: Create and access default and static method of an interface.

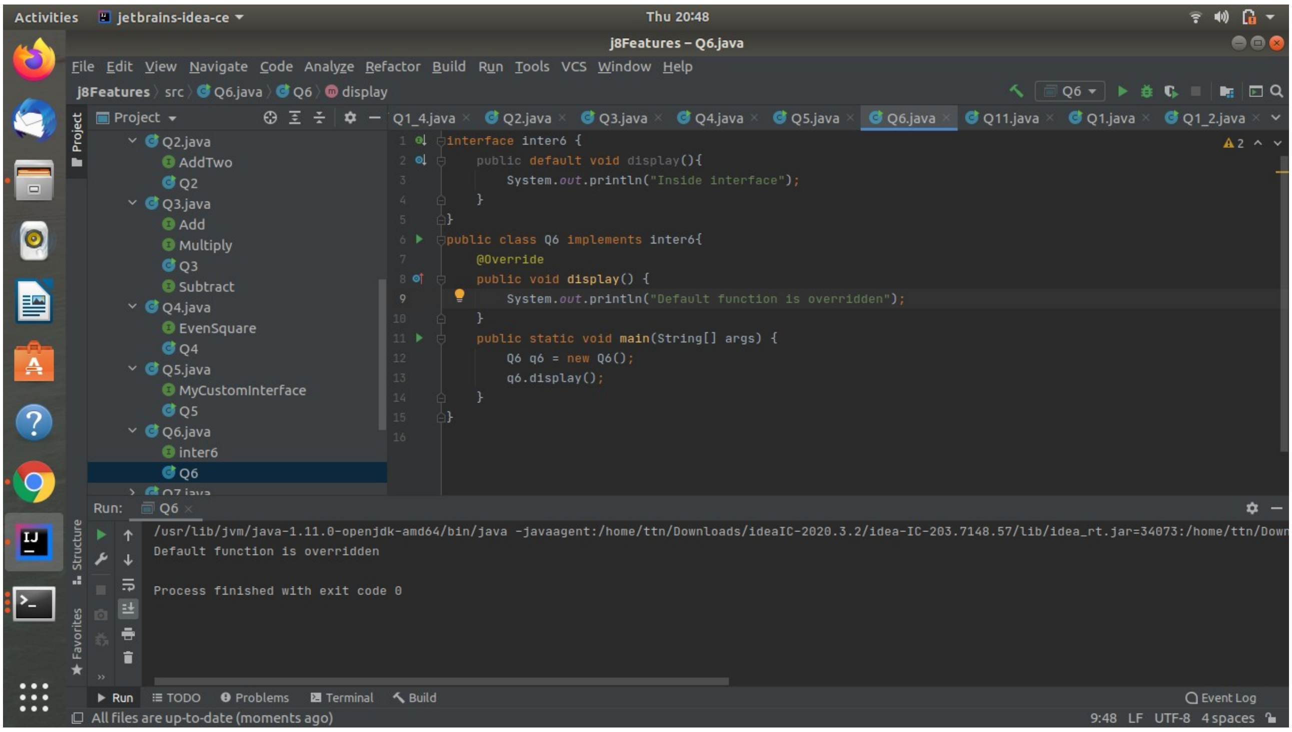


```
interface MyCustomInterface{
    public default void display(){
        System.out.println("this is default method");
    }
    public static void staticMethod() { System.out.println("this is static method"); }
}
public class Q5 implements MyCustomInterface {
    public static void main(String[] args) {
        Q5 inter = new Q5();
        inter.display();
        MyCustomInterface.staticMethod();
    }
}
```

```
/usr/lib/jvm/java-1.11.0-openjdk-amd64/bin/java -javaagent:/home/ttn/Downloads/ideaIC-2020.3.2/idea-IC-203.7148.57/lib/idea_rt.jar=42551:/home/ttn/Down
this is default method
this is static method

Process finished with exit code 0
```

Build completed successfully in 2 sec, 15 ms (moments ago)

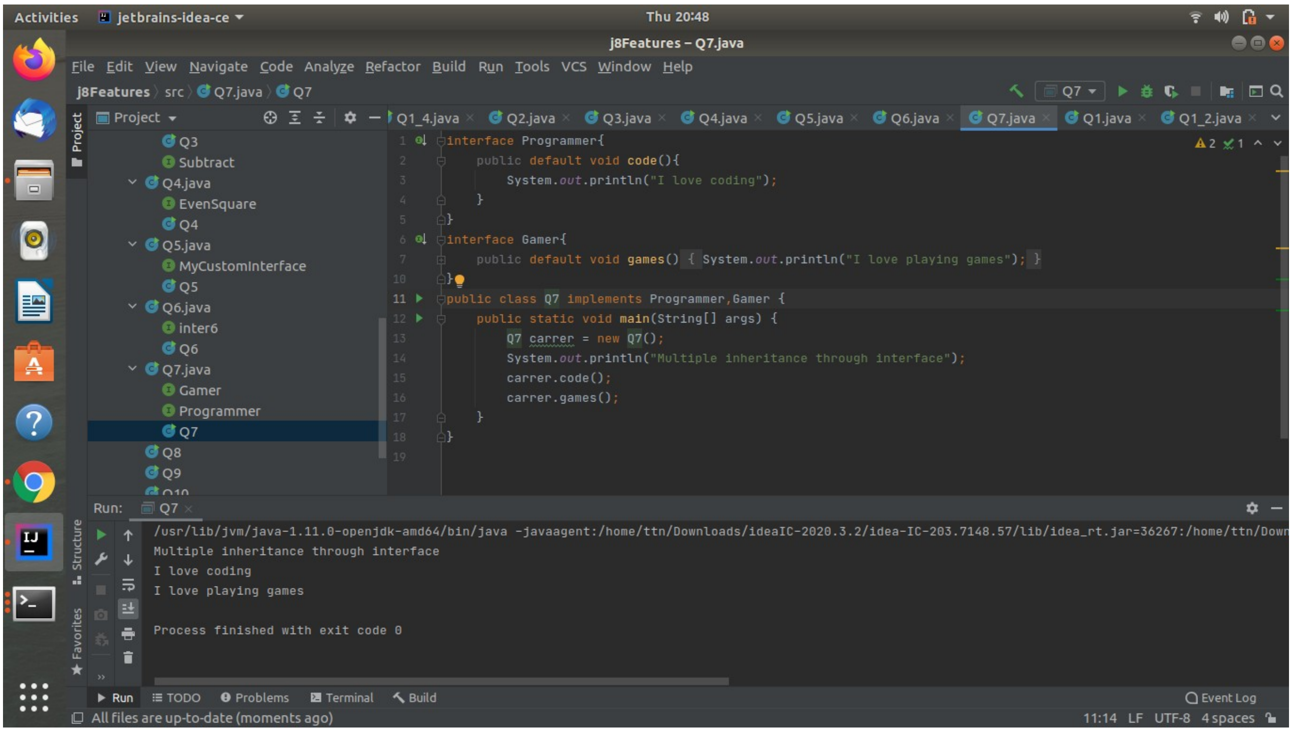
Q7:Override the default method of the interface.



```java
interface inter6 {
    public default void display(){
        System.out.println("Inside interface");
    }
}
public class Q6 implements inter6{
    @Override
    public void display() {
        System.out.println("Default function is overridden");
    }
    public static void main(String[] args) {
        Q6 q6 = new Q6();
        q6.display();
    }
}
```

```
/usr/lib/jvm/java-1.11.0-openjdk-amd64/bin/java -javaagent:/home/ttn/Downloads/ideaIC-2020.3.2/idea-IC-203.7148.57/lib/idea_rt.jar=34073:/home/ttn/Down
Default function is overridden

Process finished with exit code 0
```

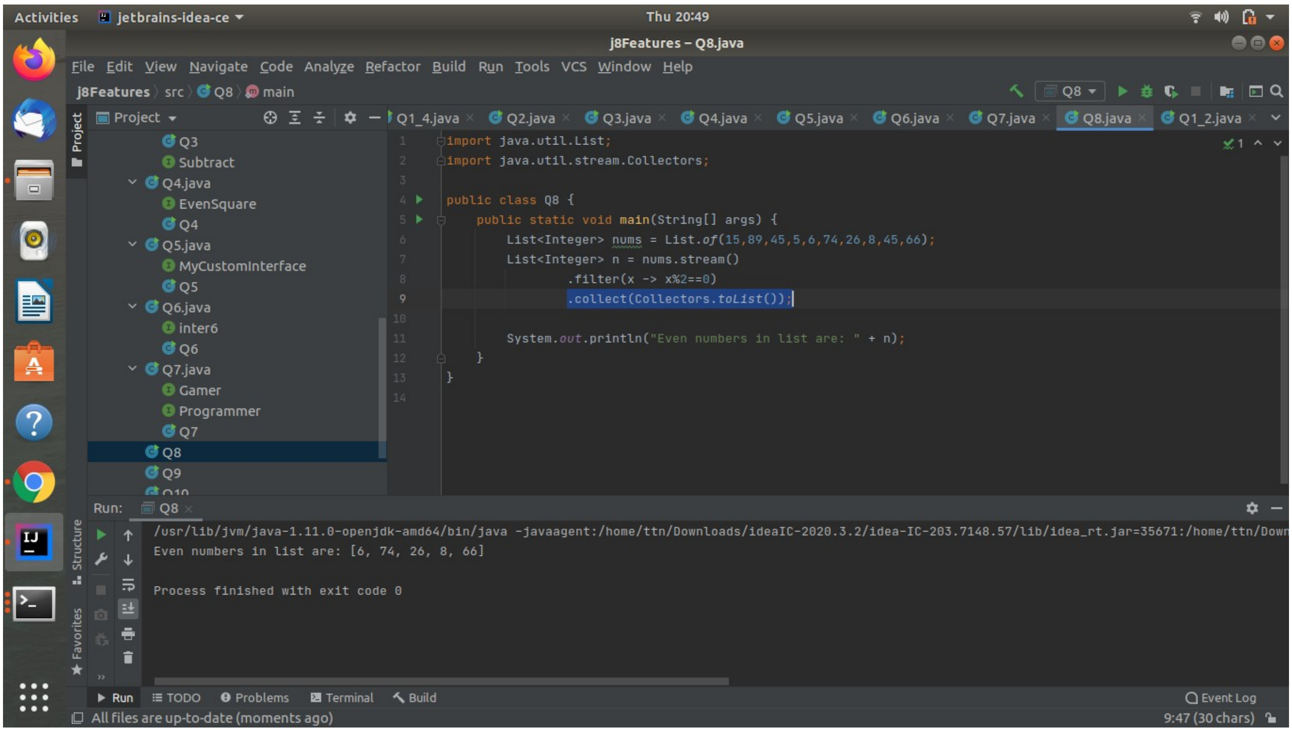
Q8: Implement multiple inheritance with default method inside interface.



```java
interface Programmer{
    public default void code(){
        System.out.println("I love coding");
    }
}
interface Gamer{
    public default void games() { System.out.println("I love playing games"); }
}
public class Q7 implements Programmer,Gamer {
    public static void main(String[] args) {
        Q7 carrer = new Q7();
        System.out.println("Multiple inheritance through interface");
        carrer.code();
        carrer.games();
    }
}
```

```
/usr/lib/jvm/java-1.11.0-openjdk-amd64/bin/java -javaagent:/home/ttn/Downloads/ideaIC-2020.3.2/idea-IC-203.7148.57/lib/idea_rt.jar=36267:/home/ttn/Down
Multiple inheritance through interface
I love coding
I love playing games

Process finished with exit code 0
```

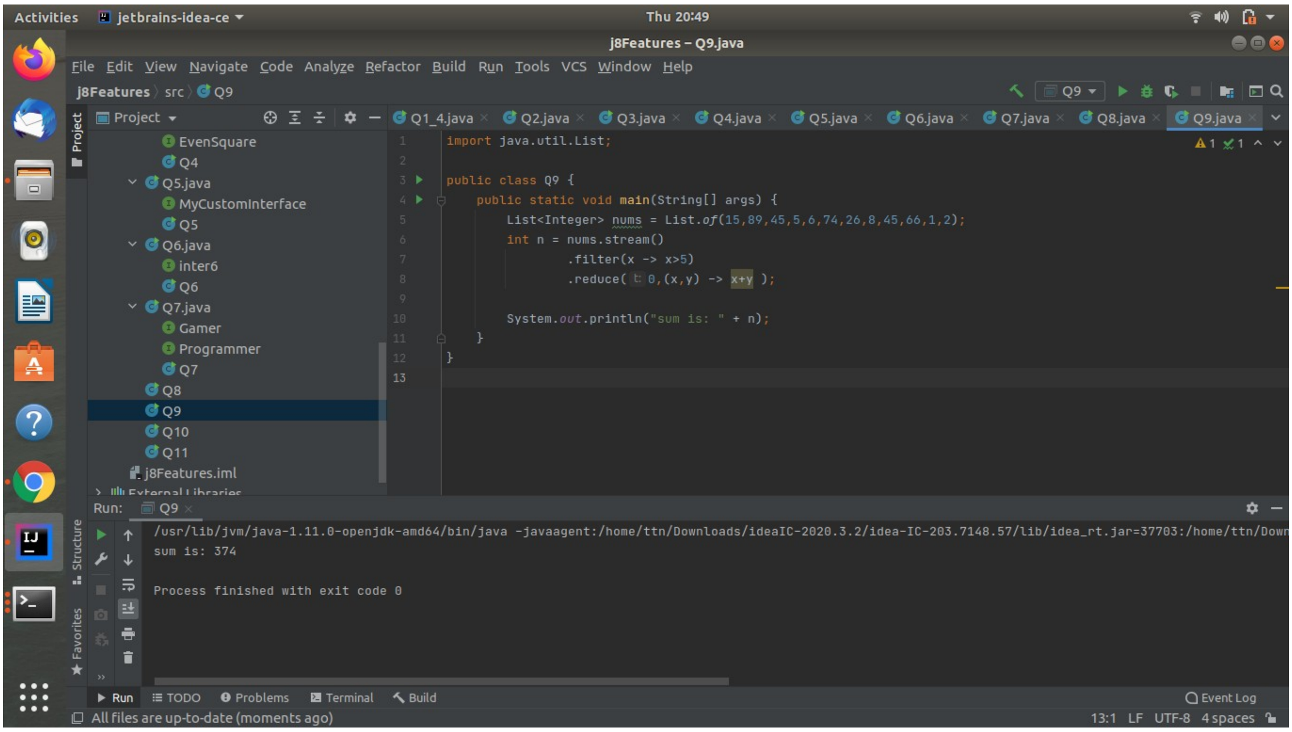
Q9: Collect all the even numbers from an integer list.



```java
import java.util.List;
import java.util.stream.Collectors;

public class Q8 {
    public static void main(String[] args) {
        List<Integer> nums = List.of(15,89,45,5,6,74,26,8,45,66);
        List<Integer> n = nums.stream()
                .filter(x -> x%2==0)
                .collect(Collectors.toList());

        System.out.println("Even numbers in list are: " + n);
    }
}
```

```
/usr/lib/jvm/java-1.11.0-openjdk-amd64/bin/java -javaagent:/home/ttn/Downloads/ideaIC-2020.3.2/idea-IC-203.7148.57/lib/idea_rt.jar=35671:/home/ttn/Down
Even numbers in list are: [6, 74, 26, 8, 66]

Process finished with exit code 0
```

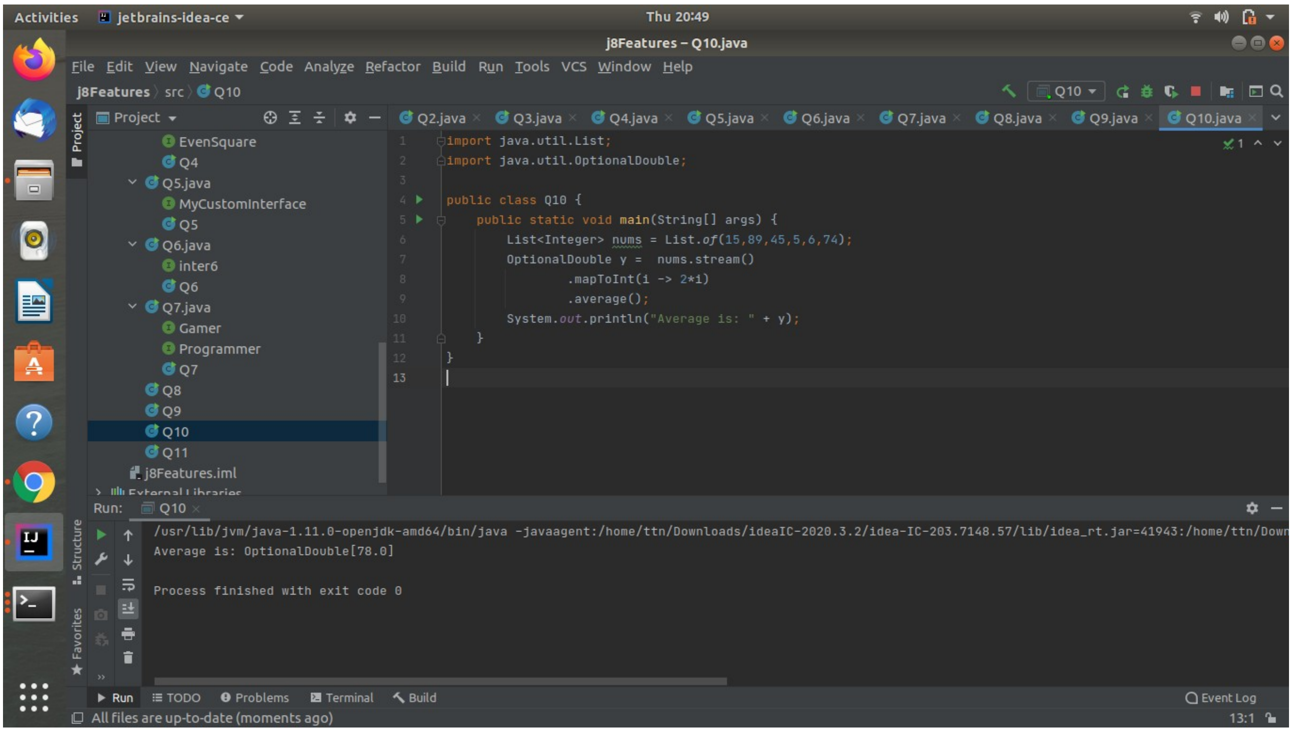
Q10: Sum all the numbers greater than 5 in the integer list.



```java
import java.util.List;

public class Q9 {
    public static void main(String[] args) {
        List<Integer> nums = List.of(15,89,45,5,6,74,26,8,45,66,1,2);
        int n = nums.stream()
                .filter(x -> x>5)
                .reduce( 0,(x,y) -> x+y );

        System.out.println("sum is: " + n);
    }
}
```

```
/usr/lib/jvm/java-1.11.0-openjdk-amd64/bin/java -javaagent:/home/ttn/Downloads/ideaIC-2020.3.2/idea-IC-203.7148.57/lib/idea_rt.jar=37703:/home/ttn/Down
sum is: 374

Process finished with exit code 0
```

Q11: Find average of the number inside integer list after doubling it.

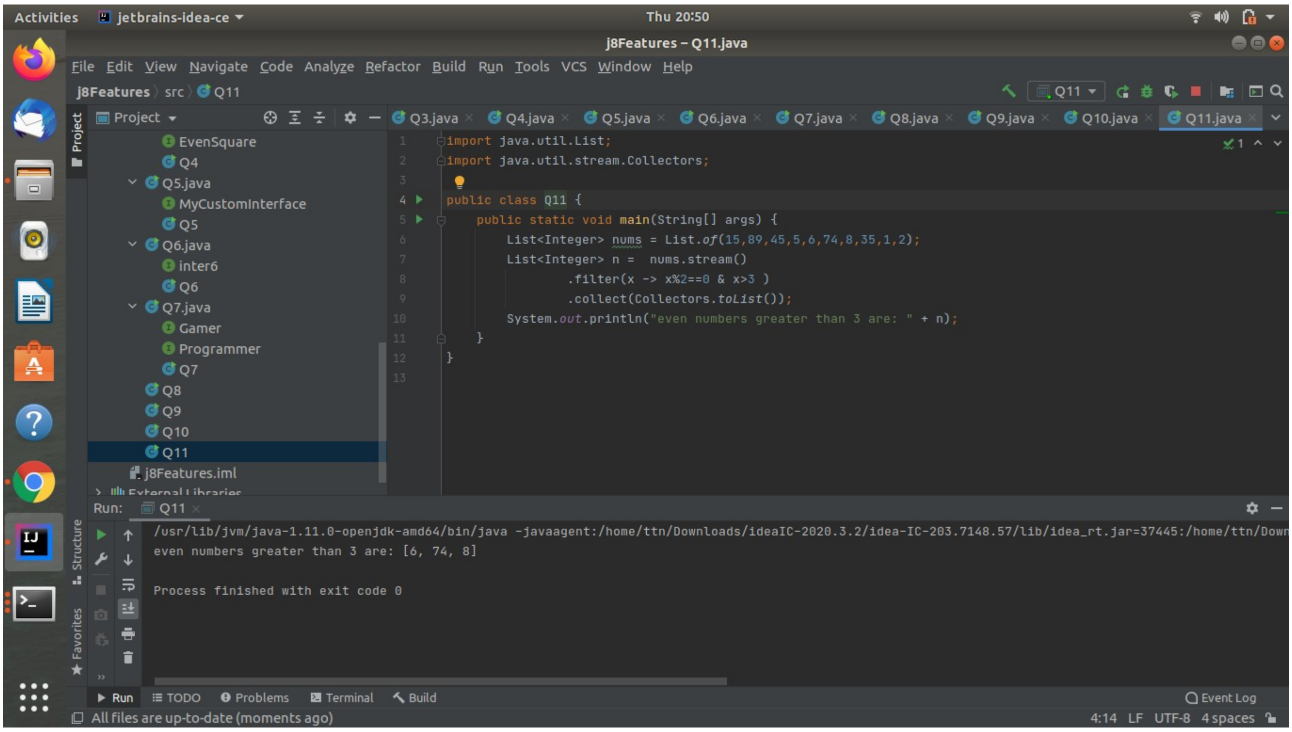


```java
import java.util.List;
import java.util.OptionalDouble;

public class Q10 {
    public static void main(String[] args) {
        List<Integer> nums = List.of(15,89,45,5,6,74);
        OptionalDouble y =  nums.stream()
                .mapToInt(i -> 2*i)
                .average();
        System.out.println("Average is: " + y);
    }
}
```

```
/usr/lib/jvm/java-1.11.0-openjdk-amd64/bin/java -javaagent:/home/ttn/Downloads/ideaIC-2020.3.2/idea-IC-203.7148.57/lib/idea_rt.jar=41943:/home/ttn/Down
Average is: OptionalDouble[78.0]

Process finished with exit code 0
```

Activities
jetbrains-idea-ce
Thu 20:49
j8Features – Q10.java
File Edit View Navigate Code Analyze Refactor Build Run Tools VCS Window Help
j8Features src Q10
Project
EvenSquare
Q4
Q5.java
MyCustomInterface
Q5
Q6.java
inter6
Q6
Q7.java
Gamer
Programmer
Q7
Q8
Q9
Q10
Q11
j8Features.iml
Q2.java Q3.java Q4.java Q5.java Q6.java Q7.java Q8.java Q9.java Q10.java
Run: Q10
Run TODO Problems Terminal Build
Event Log
All files are up-to-date (moments ago)
13:1

Q12: Find the first even number in the integer list which is greater than 3.



```java
import java.util.List;
import java.util.stream.Collectors;

public class Q11 {
    public static void main(String[] args) {
        List<Integer> nums = List.of(15,89,45,5,6,74,8,35,1,2);
        List<Integer> n =  nums.stream()
                .filter(x -> x%2==0 & x>3 )
                .collect(Collectors.toList());
        System.out.println("even numbers greater than 3 are: " + n);
    }
}
```

```
/usr/lib/jvm/java-1.11.0-openjdk-amd64/bin/java -javaagent:/home/ttn/Downloads/ideaIC-2020.3.2/idea-IC-203.7148.57/lib/idea_rt.jar=37445:/home/ttn/Down
even numbers greater than 3 are: [6, 74, 8]

Process finished with exit code 0
```