

Celem zadania była implementacja klasy generycznej Triple <T1, T2, T3> wraz z pewnymi określonymi warunkami. Mój program składa się z 3 plików źródłowych: Main.java, Triple.java , ReverseTripleComparator.java i implementuje wszystkie warunki postawione w treści zadania.

## Kod Programu

### Main.java

```
1 import java.util.ArrayList;
2 import java.util.Collections;
3 import java.util.List;
4
5 public class Main {
6     public static void main(String[] args) {
7         Triple<Integer, String, Double> triple1 = new Triple<>( first: 50, second: "B", third: 7.5);
8         Triple<Integer, String, Double> triple2 = new Triple<>( first: 7, second: "B", third: 7.5);
9         Triple<Integer, String, Double> triple3 = new Triple<>( first: 1, second: "R", third: 14.5);
10        Triple<Integer, String, Double> triple4 = new Triple<>( first: 13, second: "S", third: 3.5);
11        Triple<Integer, String, Double> triple5 = new Triple<>( first: 77, second: "W", third: 1.5);
12        Triple<Integer, String, Double> triple6 = new Triple<>( first: 32, second: "F", third: 20.5);
13        Triple<Integer, String, Double> triple7 = new Triple<>( first: 49, second: "G", third: 5.5);
14        Triple<Integer, String, Double> triple8 = new Triple<>( first: 77, second: "W", third: 1.5);
15        Triple<Integer, String, Double> triple9 = new Triple<>( first: 41, second: "I", third: 101.5);
16        Triple<Integer, String, Double> triple10 = new Triple<>( first: 92, second: "H", third: 33.5);
17
18        System.out.println("Triple1: " + triple1);
19        System.out.println("Triple2: " + triple2);
20        System.out.println("Triple3: " + triple3);
21        System.out.println("Triple4: " + triple4);
22        System.out.println("Triple5: " + triple5);
23        System.out.println("Triple6: " + triple6);
24        System.out.println("Triple7: " + triple7);
25        System.out.println("Triple8: " + triple8);
26        System.out.println("Triple9: " + triple9);
27        System.out.println("Triple10: " + triple10);
28
29        System.out.println("\nIs triple5 equal to triple8 as an object?");
30
31        System.out.println(triple5.equals(triple8)); // true
32    }
33 }
```

```
30
31     System.out.println(triple5.equals(triple8)); // true
32
33     System.out.println("Is triple1 equal to triple2 as an object?");
34     System.out.println(triple1.equals(triple2)); // false
35
36     System.out.println("Is triple5 equal to triple10 as an object?");
37     System.out.println(triple5.equals(triple10)); // false
38
39     System.out.println("Is triple3 equal to triple3 as an object?");
40     System.out.println(triple3.equals(triple3)); // true
41
42     List<Triple<Integer, String, Double>> list = new ArrayList<>();
43     list.add(triple1);
44     list.add(triple2);
45     list.add(triple3);
46     list.add(triple4);
47     list.add(triple5);
48     list.add(triple6);
49     list.add(triple7);
50     list.add(triple8);
51     list.add(triple9);
52     list.add(triple10);
53
54     Collections.sort(list);
55     System.out.println("\nComparable");
56
57     for (Triple<Integer, String, Double> t : list) {
58         System.out.println(t);
59     }
60
61     System.out.println("\nComparable");
```

```
40      System.out.println(triple3.equals(triple3)); // true
41
42      List<Triple<Integer, String, Double>> list = new ArrayList<>();
43      list.add(triple1);
44      list.add(triple2);
45      list.add(triple3);
46      list.add(triple4);
47      list.add(triple5);
48      list.add(triple6);
49      list.add(triple7);
50      list.add(triple8);
51      list.add(triple9);
52      list.add(triple10);
53
54      Collections.sort(list);
55      System.out.println("\nComparable");
56
57      for (Triple<Integer, String, Double> t : list) {
58          System.out.println(t);
59      }
60
61      System.out.println("\nComparator");
62
63      Collections.sort(list, new ReverseTripleComparator<>());
64
65      for (Triple<Integer, String, Double> t : list) {
66          System.out.println(t);
67      }
68  }
69  }
70
71
```

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## Triple.java

```
1  import java.util.*;
2  public class Triple<T1 extends Comparable<T1>, T2 extends Comparable<T2>, T3 extends Comparable<T3>>
3      implements Comparable<Triple<T1, T2, T3>> {
4      private T1 first;
5      private T2 second;
6      private T3 third;
7
8      public Triple(T1 first, T2 second, T3 third) {
9          this.first = first;
10         this.second = second;
11         this.third = third;
12     }
13
14     public T1 getFirst() { return first; } // biblioteka lombok
15
16     public T2 getSecond() { return second; } // biblioteka lombok
17
18     public T3 getThird() { return third; } // biblioteka lombok
19
20     @Override
21     public boolean equals(Object o) {
22         if (this == o) return true;
23         if (o == null || getClass() != o.getClass()) return false;
24         Triple<? ? ?> triple = (Triple<? ? ?>) o;
25     }
26 }
```

```
18 public T2 getSecond() { return second; } // biblioteka lombok
21
22 2 usages
23 public T3 getThird() { return third; } // biblioteka lombok
25
26 @Override
27 public boolean equals(Object o) {
28     if (this == o) return true;
29     if (o == null || getClass() != o.getClass()) return false;
30     Triple<?, ?, ?> triple = (Triple<?, ?, ?>) o;
31     return first.equals(triple.first) &&
32         second.equals(triple.second) &&
33         third.equals(triple.third);
34 }
35
36 @Override
37 public int hashCode() { return Objects.hash(first, second, third); }
40
41 @Override
42 public int compareTo(Triple<T1, T2, T3> o) {
43     if (this.first.compareTo(o.first) != 0) {
44         return this.first.compareTo(o.first);
45     } else if (this.second.compareTo(o.second) != 0) {
46         return this.second.compareTo(o.second);
47     } else {
48         return this.third.compareTo(o.third);
49     }
50 }
51
52 @Override
53 public String toString() { return "Triple<" + first + ", " + second + ", " + third + ">"; }
56 }
```

## ReverseTripleComparator.java

```
1 import java.util.Comparator;
2
3 1 usage
4 public class ReverseTripleComparator<T1 extends Comparable<T1>, T2 extends Comparable<T2>, T3 extends Comparable<T3>>
5     implements Comparator<Triple<T1, T2, T3>> {
6
7     @Override
8     public int compare(Triple<T1, T2, T3> o1, Triple<T1, T2, T3> o2) {
9         if (o1.getFirst().compareTo(o2.getFirst()) != 0) {
10             return o2.getFirst().compareTo(o1.getFirst());
11         } else if (o1.getSecond().compareTo(o2.getSecond()) != 0) {
12             return o2.getSecond().compareTo(o1.getSecond());
13         } else {
14             return o2.getThird().compareTo(o1.getThird());
15         }
16     }
17 }
18
```

## Działanie programu w konsoli

```
"C:\Program Files\Java\jdk-19\bin\java.exe" "-javaagent:C:\Program Files\JetBrains\IntelliJ
```

```
Triple1: Triple<50, B, 7.5>
```

```
Triple2: Triple<7, B, 7.5>
```

```
Triple3: Triple<1, R, 14.5>
```

```
Triple4: Triple<13, S, 3.5>
```

```
Triple5: Triple<77, W, 1.5>
```

```
Triple6: Triple<32, F, 20.5>
```

```
Triple7: Triple<49, G, 5.5>
```

```
Triple8: Triple<77, W, 1.5>
```

```
Triple9: Triple<41, I, 101.5>
```

```
Triple10: Triple<92, H, 33.5>
```

```
Is triple5 equal to triple8 as an object?
```

```
true
```

```
Is triple1 equal to triple2 as an object?
```

```
false
```

```
Is triple5 equal to triple10 as an object?
```

```
false
```

```
Is triple3 equal to triple3 as an object?
```

```
true
```

```
Comparable
```

```
Triple<1, R, 14.5>
```

```
Triple<7, B, 7.5>
```

```
Triple<13, S, 3.5>
```

```
Triple<32, F, 20.5>
```

```
Triple<41, I, 101.5>
```

```
Triple<49, G, 5.5>
```

```
Triple<50, B, 7.5>
```

```
Triple<77, W, 1.5>
```

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completed successfully in 3 sec, 167 ms (moments ago)

```
↑ false
↓ Is triple3 equal to triple3 as an object?
true
⇄
⇅ Comparable
Triple<1, R, 14.5>
Triple<7, B, 7.5>
Triple<13, S, 3.5>
Triple<32, F, 20.5>
Triple<41, I, 101.5>
Triple<49, G, 5.5>
Triple<50, B, 7.5>
Triple<77, W, 1.5>
Triple<77, W, 1.5>
Triple<92, H, 33.5>

Comparator
Triple<92, H, 33.5>
Triple<77, W, 1.5>
Triple<77, W, 1.5>
Triple<50, B, 7.5>
Triple<49, G, 5.5>
Triple<41, I, 101.5>
Triple<32, F, 20.5>
Triple<13, S, 3.5>
Triple<7, B, 7.5>
Triple<1, R, 14.5>

Process finished with exit code 0
```

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uild completed successfully in 3 sec, 167 ms (a minute ago)

Running the programme via a terminal

```
PS C:\Users\Maciek\Desktop\lab2\zad1> javac Main.java
PS C:\Users\Maciek\Desktop\lab2\zad1> java Main
```

```
Triple1: Triple<50, B, 7.5>
Triple2: Triple<7, B, 7.5>
Triple3: Triple<1, R, 14.5>
Triple4: Triple<13, S, 3.5>
Triple5: Triple<77, W, 1.5>
Triple6: Triple<32, F, 20.5>
Triple7: Triple<49, G, 5.5>
Triple8: Triple<77, W, 1.5>
Triple9: Triple<41, I, 101.5>
Triple10: Triple<92, H, 33.5>
```

```
Is triple5 equal to triple8 as an object?
true
Is triple1 equal to triple2 as an object?
false
Is triple5 equal to triple10 as an object?
false
Is triple3 equal to triple3 as an object?
true
```

Structure  
Bookmarks

```
Comparable
Triple<1, R, 14.5>
Triple<7, B, 7.5>
Triple<13, S, 3.5>
Triple<32, F, 20.5>
Triple<41, I, 101.5>
```

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Terminal: Local x + v

false

Is triple5 equal to triple10 as an object?

false

Is triple3 equal to triple3 as an object?

true

Comparable

Triple<1, R, 14.5>

Triple<7, B, 7.5>

Triple<13, S, 3.5>

Triple<32, F, 20.5>

Triple<41, I, 101.5>

Triple<49, G, 5.5>

Triple<50, B, 7.5>

Triple<77, W, 1.5>

Triple<77, W, 1.5>

Triple<92, H, 33.5>

Comparator

Triple<92, H, 33.5>

Triple<77, W, 1.5>

Triple<77, W, 1.5>

Triple<50, B, 7.5>

Triple<49, G, 5.5>

Triple<41, I, 101.5>

Triple<32, F, 20.5>

Triple<13, S, 3.5>

Triple<7, B, 7.5>

Triple<1, R, 14.5>

PS C:\Users\Maciek\Desktop\lab2\zad1>

Version Control

Run

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