HowToDoInJava

Generic Functional Interfaces in Java

Last Updated: February 26, 2022 By: Lokesh Gupta Java Streams Functional Interface, Generics, Java Stream Basics

Learn to create **generic functional interfaces with and without type restrictions** in Java 8 and later. Note that functional interfaces permit exactly one abstract method. These interfaces are also called **Single Abstract Method interfaces (SAM Interfaces)**.

Table Of Contents

1. Without Type Restrictions
 1.1. Interface Definition
 1.2. Example
2. With Type Restrictions
 2.1. Interface Definition
 2.2. Example
3. Specialized Functional Interfaces

1. Without Type Restrictions

1.1. Interface Definition

A functional interface can be defined that is generic for type X and has a functional method that accepts two arguments of type X and returns a value of type X.

```
@FunctionalInterface
public interface ArgumentsProcessor<X>
{
    X process(X arg1, X arg2);
}
```

This interface can be used for any type i.e. `ArgumentsProcessor<Integer>`, `ArgumentsProcessor<String>` or `ArgumentsProcessor<Employee>`.

1.2. Example

Java example to use generic functional interface with type `Integer`.

```
ArgumentsProcessor<Integer> multiplyProcessor = new ArgumentsProcess
    @Override
    public Integer process(Integer arg1, Integer arg2)
    {
        return arg1 * arg2;
    }
};

System.out.println(multiplyProcessor.process(2,3));     //6
```

Java example to use generic functional interface with type `String`.

```
ArgumentsProcessor<String> appendProcessor = new ArgumentsProcessor<
    @Override
    public String process(String str1, String str2)
    {
        return str1  + " " + str2;
    }
};

System.out.println(appendProcessor.process("Hello", "World !!"));   /
```

2. With Type Restrictions

2.1. Interface Definition

A functional interface can be defined that is **restricted to certain types** using `extends` keyword i.e. `X extends Number`.

```
@FunctionalInterface
public interface ArgumentsProcesso<X extends Number>
{
    X process(X arg1, X arg2);
}
```

This interface can be used for any type i.e. `ArgumentsProcessor<Integer>`, `ArgumentsProcessor<Double>` but not for `ArgumentsProcessor<String>` or `ArgumentsProcessor<Employee>`.

In the above example, the permitted type must extend the `Number` class.

2.2. Example

Java example to use generic functional interface with type `Integer`.

```
ArgumentsProcessor<Double> doubleMultiplier = new ArgumentsProcessor
    @Override
    public Double process(Double arg1, Double arg2)
    {
        return arg1 * arg2;
    }
};
```

```
System.out.println(doubleMultiplier.process(4d, 6d));   //24.0
```

3. Specialized Functional Interfaces

Specialization is accomplished by extending or implementing the generic functional interface of one type. **The resulting interface or class is not generic for that type**.

```
@FunctionalInterface
public interface ArgumentsProcessor<Integer>
{
    Integer process(Integer arg1, Integer arg2);
}


ArgumentsProcessor<Integer> intMultiplier = (i1, i2) -> i1 * i2;

System.out.println(intMultiplier.process(4, 5));    //20
```

Drop me your questions related to **functional interfaces with generics**.

Happy Learning !!

Sourcecode on Github

Was this post helpful?

Let us know if you liked the post. That's the only way we can improve.

Yes

No

Recommended Reading:

1. Functional Interfaces in Java
2. Sealed Classes and Interfaces
3. Java Streams API
4. Creating Streams in Java
5. Primitive Type Streams in Java
6. Java Predicates
7. Java 9 Stream API Improvements
8. Negating a Predicate in Java
9. Java Stream allMatch()
0. Collecting Stream Items into List in Java

2 thoughts on “Generic Functional Interfaces in Java”

yaroslav

December 17, 2021 at 10:29 pm

Hi, can functional-interface to be with “default” implementation?

Reply

Lokesh Gupta

December 17, 2021 at 11:30 pm

No. That's the whole point of having a functional interface i.e. providing the method implementation in the lambda expression.

Reply

Leave a Comment

Name *
Email *
Website

☐ Add me to your newsletter and keep me updated whenever you publish new blog posts

Post Comment

Search …

Two fifths of all older people in the UK say television is their main form of company.
Want to help them get out of the house?
DONATE HERE
SOTHEBY MEWS N5

HowToDoInJava

A blog about Java and related technologies, the best practices, algorithms, and interview questions.

Meta Links

- About Me
- Contact Us
- Privacy policy
- Advertise
- Guest Posts

Blogs

REST API Tutorial