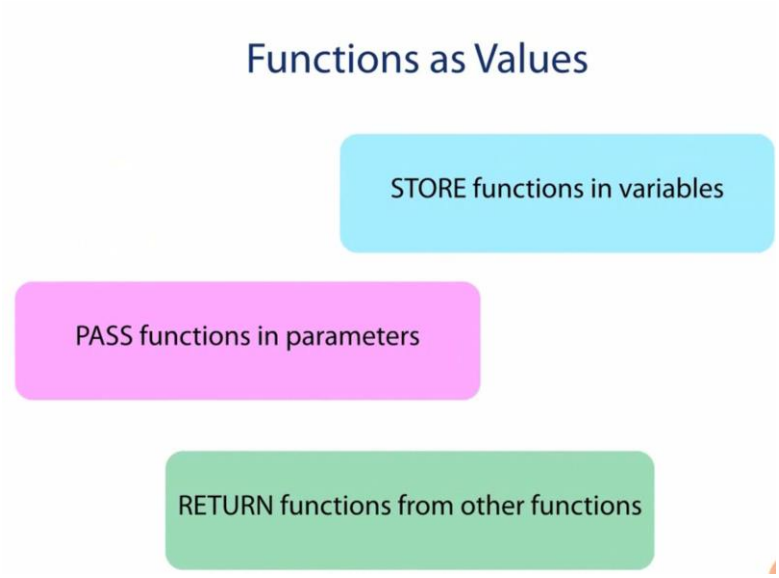
Java Functional Programming



Imperative Programming

Programs are written in a series of instructions that tell the computer what to do (and how).

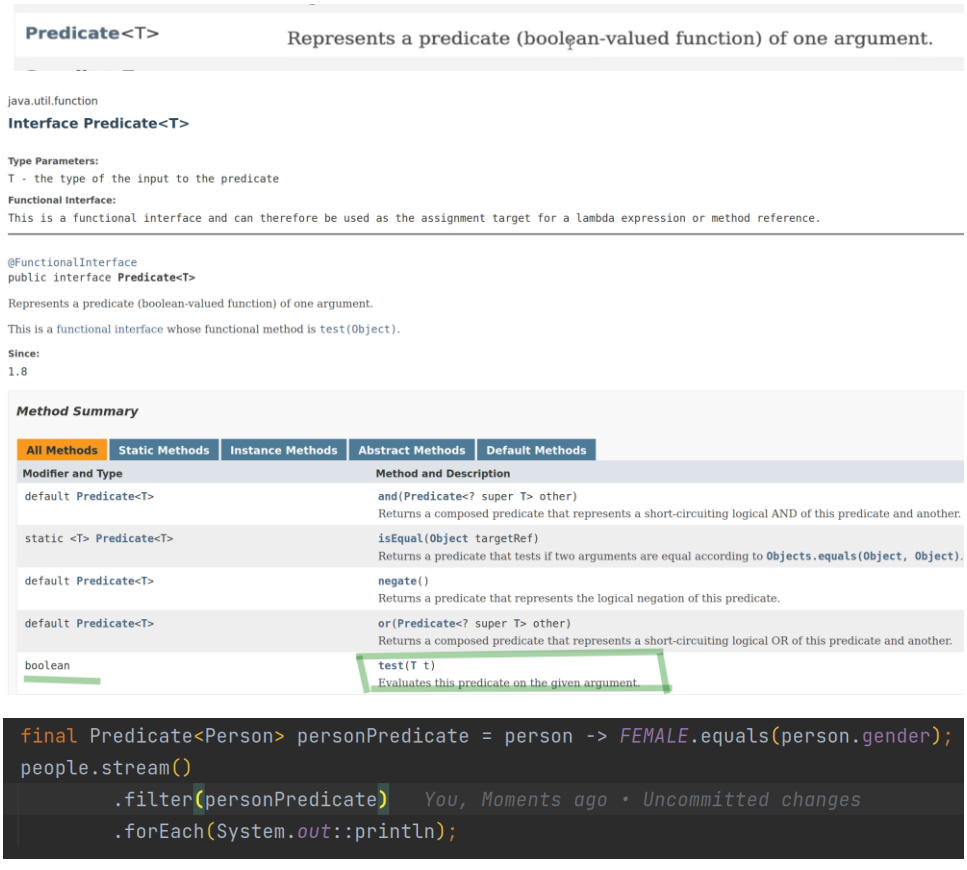
Declarative Programming

A programming paradigm that describes what the program should do, without specifying how it should be done.

Functional interfaces

Predicate Interface

In Java, a predicate is a function that takes one or more arguments and returns a boolean value.



Predicate<T> — Represents a predicate (boolean-valued function) of one argument.

java.util.function

Interface Predicate<T>

Type Parameters:
`T` - the type of the input to the predicate

Functional Interface:
This is a functional interface and can therefore be used as the assignment target for a lambda expression or method reference.

```
@FunctionalInterface
public interface Predicate<T>
```

Represents a predicate (boolean-valued function) of one argument.

This is a functional interface whose functional method is `test(Object)`.

Since:
1.8

Method Summary

All Methods | Static Methods | Instance Methods | Abstract Methods | Default Methods

Modifier and Type	Method and Description
default `Predicate<T>`	**`and(Predicate<? super T> other)`** Returns a composed predicate that represents a short-circuiting logical AND of this predicate and another.
static `<T> Predicate<T>`	**`isEqual(Object targetRef)`** Returns a predicate that tests if two arguments are equal according to **`Objects.equals(Object, Object)`**.
default `Predicate<T>`	**`negate()`** Returns a predicate that represents the logical negation of this predicate.
default `Predicate<T>`	**`or(Predicate<? super T> other)`** Returns a composed predicate that represents a short-circuiting logical OR of this predicate and another.
boolean	**`test(T t)`** Evaluates this predicate on the given argument.

```java
final Predicate<Person> personPredicate = person -> FEMALE.equals(person.gender);
people.stream()
        .filter(personPredicate)    You, Moments ago • Uncommitted changes
        .forEach(System.out::println);
```

Fuction Interface

```
@FunctionalInterface
public interface Function<T,R>
```

Represents a function that accepts one argument and produces a result.

This is a functional interface whose functional method is `apply(Object)`.

Since:
1.8

Method Summary

All Methods | Static Methods | Instance Methods | Abstract Methods | Default Methods

Modifier and Type	Method and Description
default `<V> Function<T,V>`	**`andThen(Function<? super R,? extends V> after)`** Returns a composed function that first applies this function to its input, and then applies the `after` function to the result.
`R`	**`apply(T t)`** Applies this function to the given argument.
default `<V> Function<V,R>`	**`compose(Function<? super V,? extends T> before)`** Returns a composed function that first applies the `before` function to its input, and then applies this function to the result.
static `<T> Function<T,T>`	**`identity()`** Returns a function that always returns its input argument.

Method Detail

apply

`R apply(T t)`

Applies this function to the given argument.

Parameters:
`t` - the function argument

Returns:
the function result

```java
public static void main(String[] args) {
    int increment = incrementByOne( number: 0);
    System.out.println(increment);    You, Moments ago • Uncommitted changes

    final Integer incrementByOneLambda = incrementByOneFunction.apply( t: 1);
    System.out.println(incrementByOneLambda);
}

1 usage
static Function<Integer, Integer> incrementByOneFunction = number -> number + 1;
```

Chaining Lambdas (andThen())

The output of a lambda can be used as the input of another lambda.

```java
2 usages
static Function<Integer, Integer> incrementByOneFunction = number -> number + 1;

2 usages
static Function<Integer, Integer> multiplyBy10Function = number -> number * 10;
```

```java
Function<Integer, Integer> addByOneAndThenMultiplyBy10 = incrementByOneFunction.andThen(multiplyBy10Function);
int incrementAndMultiply = addByOneAndThenMultiplyBy10.apply( t: 4);
System.out.println(incrementAndMultiply);
```

Bifunction

```
@FunctionalInterface
public interface BiFunction<T,U,R>
```

Represents a function that accepts two arguments and produces a result. This is the two-arity specialization of `Function`.

This is a functional interface whose functional method is `apply(Object, Object)`.

Since:
1.8

See Also:
`Function`

Method Summary

All Methods | Instance Methods | Abstract Methods | Default Methods

Modifier and Type	Method and Description
`default <V> BiFunction<T,U,V>`	`andThen(Function<? super R,? extends V> after)` Returns a composed function that first applies this function to its input, and then applies the after function to the result.
`R`	`apply(T t, U u)` Applies this function to the given arguments.

```java
static BiFunction<Integer, Integer, Integer> incrementByOneAndMultiplyBiFunction =
        (numberToIncrementByOne, numberToMultiplyBy)
                -> (numberToIncrementByOne + 1) * numberToMultiplyBy;
```

```java
// BiFunction
int incrementAndMultiplyBiFunction = incrementByOneAndMultiplyBiFunction.apply( t: 1,  u: 2);
System.out.println(incrementAndMultiplyBiFunction);
```