

Java New Feature Overview

From Java 8 to Java 11 to Java 17

CF, 21.03.2021

Process: JEP

Java Enhancement Proposal

- JEP 0: Index
 - <http://openjdk.java.net/jeps/0>
 - Nice list to check many changes.
- Java 11-17: JEP 325, 334, 338 - 398
- Mark Reinhold

Java Support Roadmap

LTS vs MTS

- LTS: Long Term Support (Java 8, Java 11, Java 17)
 - Java 8: 03.2014 - 03.2022, extended support: 12.2030.
 - Java 11: 09.2018 - 09.2023, extended support: 09.2026
 - Java 17: 09.2021 - 09.2026, extended support: 09.2029
- MTS: Medium Term Support (9-10, 12-16)
- New Features appear in MTS versions as “preview”.
- <https://www.oracle.com/java/technologies/java-se-support-roadmap.html>

JDK

OracleJDK versus OpenJDK

- Oracle: Commercial use requires License
- OpenJDK: OpenSource, no support.
- Azul: Fast VM.

Java 8

Java 8

References

- <http://openjdk.java.net/jeps/0>
- <https://www.baeldung.com/java-11-new-features>

Java 8

- Reminder for some features of Java 8
- `try-with-resource` **and** `AutoCloseable`
 - <https://docs.oracle.com/javase/tutorial/essential/exceptions/tryResourceClose.html>
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Java 11

Java 11

References

- <http://openjdk.java.net/jeps/0>
- <https://www.baeldung.com/java-11-new-features>

Java 11

- String methods
 - `isBlank`, `strip`, `stripLeading`, `stripTrailing`, `repeat`.
- File methods (`java.nio.Files`)
 - `readString` and `writeString` as static methods to `Files`.
- Conversion between List and Array:
 - `List<String> stringList = Arrays.asList("a", "b", "c")`
 - `String[] array = stringList.toArray(String[]::new)`

Java 11

Local Variable Syntax for Lambda Expressions

- Local Variable Syntax: You may use the word `var` and the type is inferred.
- Type Inference

```
var str = "Java 11";  
var list = new ArrayList<String>();
```

- Local Variable Syntax may be used in Lambda expressions

```
(var a, var b) -> a + b
```

- May be used to specify an annotation within a Lambda expression

Java 11

Local Variable Syntax for Lambda Expressions

- May be used to specify an annotation within a Lambda expression

```
@Nonnull var x = new Foo();
```

or

```
(@Nonnull var x, @Nullable var y) -> x.process(y)
```

Execution: Implementing against an Interface

```
Shape shape = new Circle();  
shape.rotate(-90);
```

Java 11

Nest-Based Access Control

- <http://openjdk.java.net/jeps/181>
- <https://www.baeldung.com/java-nest-based-access-control>
- The change affects the internal way of calling private methods within an “nest” (outer class hosting inner classes) and adds functionality for reflection (getNestHost, getNestMember)
- See code example.

Java 12

Java 12

- Teeing Collector for Java Streams

```
Collector<T, ?, R> teeing(  
    Collector<? super T, ?, R1> downstream1,  
    Collector<? super T, ?, R2> downstream2,  
    BiFunction<? super R1, ? super R2, R> merger)
```

Usage:

```
@Test  
public void givenSetOfNumbers_thenCalculateAverage() {  
    double mean = Stream.of(1, 2, 3, 4, 5)  
        .collect(Collectors.teeing(Collectors.summingDouble(i -> i),  
            Collectors.counting(), (sum, count) -> sum / count));  
    assertEquals(3.0, mean);  
}
```


Java 12

- Switch Expressions (JEP 354) (will be continued in Java 13)
- See below.

Java 13

Java 13

References

- <http://openjdk.java.net/jeps/0>
-

Java 13

Switch Expressions (JEP 354) / Keyword yield

- There is a new keyword: yield
- The switch statement can be considered as a function that returns a value.
- Instead of return, yield is used.

Java 13

Text Blocks

- Improve the inline creation of String that newline and double quote (“).
- Useful for inline creation of JSON.
- Maybe useful in specifying input data for Unit Tests.

Java 14

Java 14

References

- <https://www.baeldung.com/java-14-new-features>
-

Java 14

instanceOf Pattern Matching (JEP 305) (PREVIEW)

- Automatically casts an object inside an `if(object instanceof ...) { }` block to the respective type. Simplifies syntax. Still explicit (compare this with Kotlin).
- Instead of

```
if(shape instanceof Circle) {  
    Circle circle = (Circle)shape;  
}
```

- write

```
if(shape instanceof Circle circle) {  
}
```


Java 14

record (JEP 359) (PREVIEW)

- Records are specifically to streamline the definition of POJOs / DTO.

```
public record User(int id, String password) { };
```

- Defines a class with fields id and password with
 - getters, toString(), equals(), hashCode()
- See [code example](#).

Java 15

Java 15

Sealed Class (JEP 360, 397)

- Will be continued in Java 16.

Java 16

Java 16

References

- <https://www.techgeeknext.com/java/java16-features>
- <https://www.infoworld.com/article/3569150/jdk-16-the-new-features-in-java-16.html>
- <https://docs.oracle.com/en/java/javase/16/language/java-language-changes.html>
-

Java 16

Sealed Class (JEP 360, 397)

- Fine grained control over inheritance.
- A class A can specify explicitly which outer classes are allowed to use
`extends A`

```
public sealed class Shape permits Circle, Square, Rectangle {  
  
}
```

- Classes extending the sealed class need to be in the same module/package.

Java 16

Sealed Class (JEP 360, 397)

- <https://docs.oracle.com/en/java/javase/16/language/sealed-classes-and-interfaces.html>
- <https://cr.openjdk.java.net/~briangoetz/amber/datum.html>

Java 17

Java 17

- <https://www.techgeeknext.com/java/java17-features>
-

Outlook (beyond 17)

Outlook

- JEP 402: Unify the Basic Primitives with Objects (Preview)
 - <http://openjdk.java.net/jeps/402>
- JEP 169: Value Objects
 - <http://openjdk.java.net/jeps/169>

Draft: Concise Method Bodies

- <http://openjdk.java.net/jeps/8209434>
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