Java 9 - 16

What happened the last 7 years

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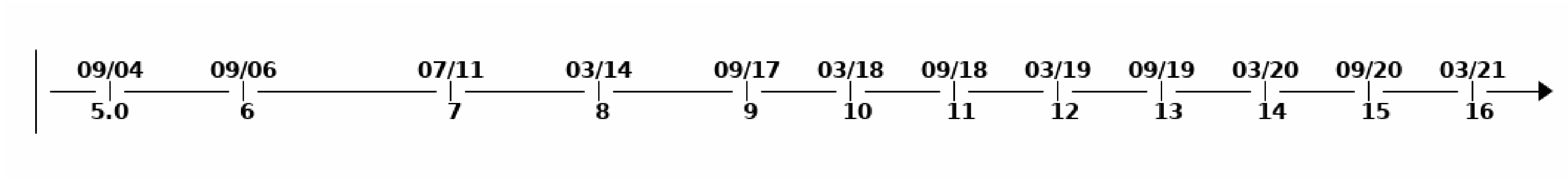
Disclaimer

- Part I (tried to focus on language Features & API)
    - maybe following parts with
        - java "internal" changes (e.g. Garbage Collector, Performance, tooling)
        - deprecations
- no guarantee on completeness

Sources

- OpenJDK
- Marcobehler.com
- .Lost in Coding
- Advanced Web Machinery

Java history



Why Java 8

- rich feature set
    - Stream API (Collections)
    - Lambda Functions & Functional Interfaces
    - Optionals
    - New Date Time API
- changed licensing which lead to confusion (Java Distributions)
- initial problems with commonly used build tools
- is a LTS version

Java 9

OpenJDK 9

Collection factory methods

```
List<String> list = List.of("one", "two", "three");
Set<String> set = Set.of("one", "two", "three");
Map<String, String> map = Map.of("foo", "one", "bar", "two");
```

Streams

- `takeWhile`, `dropWhile`, `iterate` with condition

```
Stream<String> stream =
  Stream.iterate("", s -> s + "s")
        .takeWhile(s -> s.length() < 10);
```

Optionals: ifPresentOrElse()

```
user.ifPresentOrElse(this::displayAccount, this::displayLogin);
```

JShell (Java Playground)

```
% jshell
|  Welcome to JShell -- Version 16.0.1
|  For an introduction type: /help intro

jshell> int x = 10
x ==> 10

jshell> System.out.println(x > 5 ? "big number" : "small number")
big number
```

Exit with

```
jshell> /exit
|  Goodbye
```

(You are welcome ;-))

misc

- TLS1.3 Support
- Java Platform module System
- Flow API (reactive Streams)
- MultiResolutionImage
- Class.getPackageName()

Java 10

OpenJDK 10

Local-variable type Inference: `var`-keyword

```
// Pre-Java 10
String myName = "Volker";

// With Java 10
var myName = "Volker"
```

Java 11

OpenJDK 11

new methods on `String`

- `repeat()`, `isBlank()`, `strip()`, `lines()`

```
"".isBlank();
              // -> true
"Each\nline\ncounts".lines().toList();  // -> Stream of lines
"   we messed ist up  ".strip();         // -> "we messed it up"
"Hello".repeat(3)
          // -> "HelloHelloHello"
```

`var` supported by lambda parameters

```
(var firstName, var lastName) -> firstName + lastName
```

HTTPClient (Preview >= 9)

```Java import java.io.IOException; import java.net.http.HttpClient; import java.net.http.HttpRequest; import java.net.URI; import java.net.http.HttpResponse;

public class HttpClientExample {

```
public static void main(String[] args) throws IOException, InterruptedException {
    HttpClient httpClient = HttpClient.newBuilder().build();

    HttpRequest request =
```

HttpRequest.newBuilder() .uri(URI.create("https://www.google.com/")) .GET() .build();

```
    HttpResponse<String> response =
```

httpClient.send(request, HttpResponse.BodyHandlers.ofString());

```
    System.out.println(response.statusCode());
    System.out.println(response.body());
```
```

```
}
```

}

```
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```

Java 12

OpenJDK 12

new methods on `String`

- `indent()`, `transform()`

CompactNumberFormat class

- formating numbers for a Local
  - US: 1000 -> 1K, 1000000 -> 1M
  - IN: 1000 -> 1 हज़ार, 50000000 -> 5 क
  - DE: 1000 -> 1.000, 1000000 -> 1 Mio

Unicode 11 support

Java 13

OpenJDK 13

Unicode 12.1 support

Java 14

OpenJDK 14

Switch Expression (Preview: 12, 13)

- new (including new `yield` keyword)
    - no fall-through
    - single statement and code block
    - supporting value return (with yield)

```
int numLetters = switch (day) {
    case MONDAY, FRIDAY, SUNDAY -> 6;
    case TUESDAY
   -> 7;
    default      -> {
      String s = day.toString();
      int result = s.length();
      yield result;
    }
};
```

Java 15

OpenJDK 15

Helpfull NullPointerException message

```Java public class NullPointerExample {

```
public static void main(String[] args) {

    System.out.println("NullPointer Exception message:");

    MyClass myClass = null;
    try {
        System.out.println(myClass.myName.length());
    }catch (Exception e){
        e.printStackTrace();
    }

    myClass = new MyClass();
    try {
        System.out.println(myClass.myName.length());
    }catch (Exception e){
        e.printStackTrace();
    }
}

private static class MyClass{
    protected String myName;
```

}
```

```
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* old
<div>
```

NullPointer Exception message: java.lang.NullPointerException: null at de.mubn.java15.NullPointerExample.main(NullPointerExample.java:11) java.lang.NullPointerException: null at de.mubn.java15.NullPointerExample.main(NullPointerExample.java:20)

```
</div><!-- .element style="font-size: 0.8em;" -->

* new
<div>
```

NullPointer Exception message: java.lang.NullPointerException: Cannot read field "myName" because "myClass" is null at de.mubn.java15.NullPointerExample.main(NullPointerExample.java:11) java.lang.NullPointerException: Cannot invoke "String.length()" because "myClass.myName" is null at de.mubn.java15.NullPointerExample.main(NullPointerExample.java:20)

Text Blocks (Preview: 13, 14)

- old

```Java String html = "\n" + " \n" + "

Hello, world

\n" + " \n" + ""; ```

- new

```Java String html = """

Hello, world

"""; ```

# Java 16

*OpenJDK 16*

# Pattern Matching for instanceof

```
if (x instanceOf String s) {
  String a = s;
}
```

Record Type

- immutable data Class
- implicit methods -> avoiding boiler plate code
  - getters, constructor, equals, hashCode, toString

```
record Point(int x, int y){ }

Point myPoint = new Point(10, 15);

myPoint.x();
     // -> 10
System.out.println(myPoint);   // -> "Point[x=10, y=15]"
```

Sealed Classes (still PREVIEW)

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