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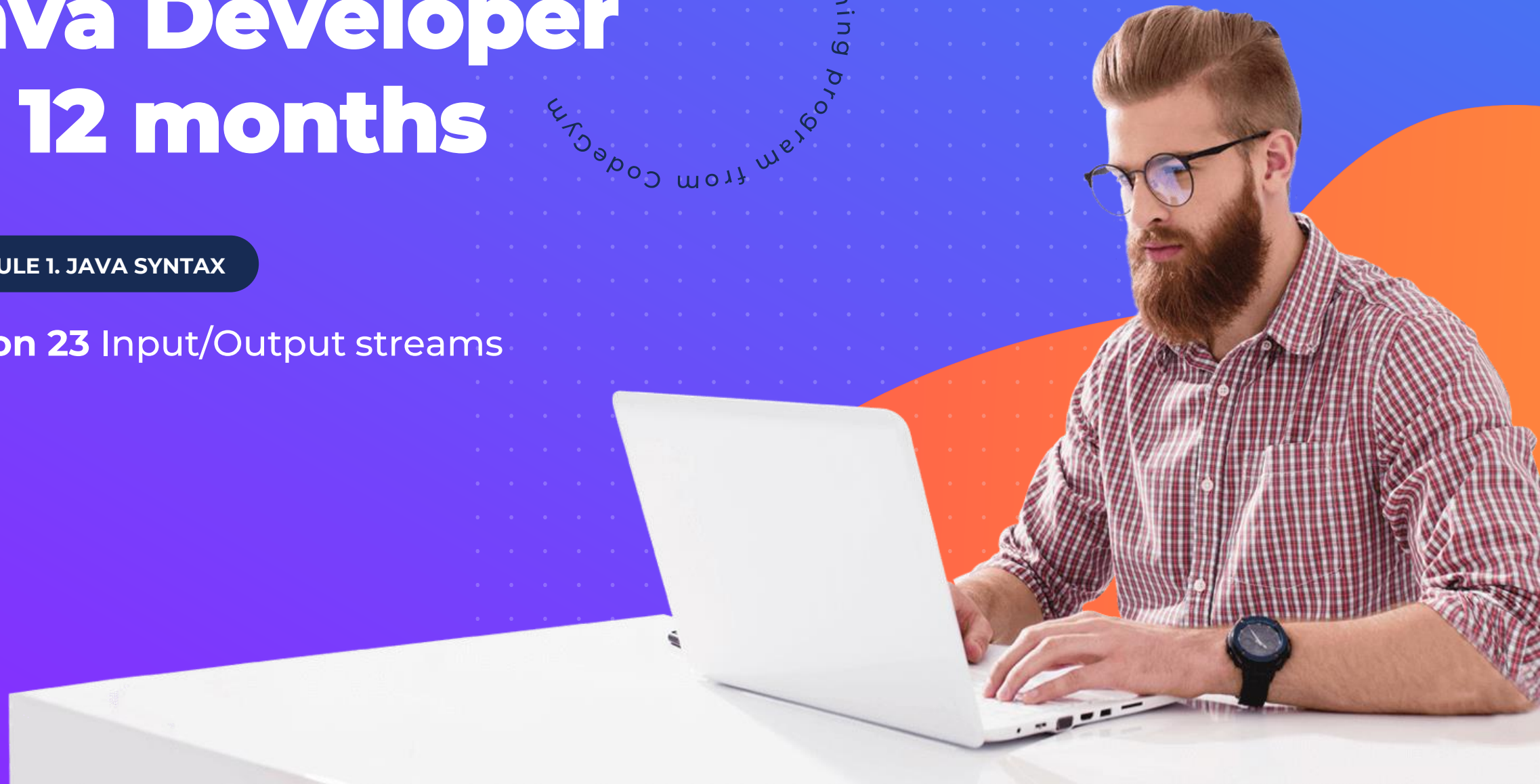
Java Developer in 12 months

Mentor-supported training program from CodeGym

MODULE 1. JAVA SYNTAX

Lesson 23 Input/Output streams



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Lesson plan

- Streams for data input
- Chained streams
- Output streams
- BufferedWriter

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Streams for data input

In programming, the term "stream" is used to described the process of data exchange. It refers specifically to the flow of data.

Streams are a versatile tool. They allow the program to receive data from anywhere (incoming streams) and send data anywhere (outgoing streams).

They are divided into two types:

- Incoming stream (Input): is used to receive data
- Output stream (Output): is used to send data

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Byte streams and character streams

Bytes (and arrays of bytes) can be written to an **OutputStream**, and you can read bytes (and arrays of bytes) from an InputStream object.

The Reader class is an analogue of the InputStream class, but its **read()** method reads characters – char, not bytes.

The Writer class is an analogue of the OutputStream class, but with one difference: it works with characters (char) instead of bytes.

If we compare these four classes, we get the following picture:

Bytes (byte)	Characters (char)	
Reading data	InputStream	Reader
Writing data	OutputStream	Writer

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InputStream

Some methods from the InputStream class and all of its descendant classes

Methods	Description
int read()	Reads one byte from the stream
int read(byte[] buffer)	Reads the array of bytes from the stream
byte[] readAllBytes()	Reads all bytes from the stream
long skip(long n)	Skips n bytes in the stream (reads and throws out)
int available()	Checks how many bytes are left in the stream
void close()	Closes the stream

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InputStreamReader

The **InputStreamReader** class has the same methods as the Reader class, and they work in exactly the same way.

The main difference between the **InputStreamReader** and, for example, **FileReader** classes is where they read data from.

FileReader reads data from a file and **InputStreamReader** reads data from an **InputStream**.

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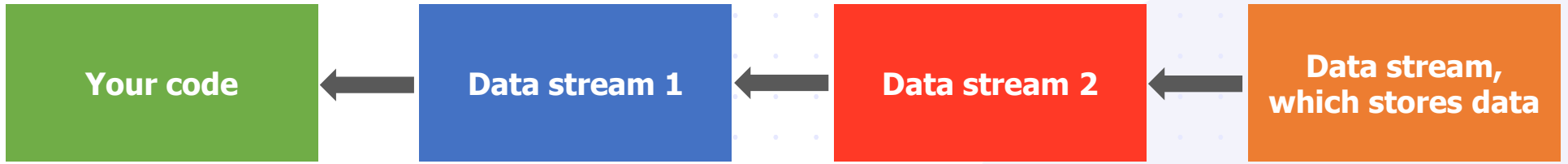
Chains of streams

Another interesting feature of streams is the ability to combine multiple streams into chains.

A stream can read data not only from the data source that stores it, but from another thread.



Reading from the console

An interesting fact: the Scanner class is nothing more than an incoming intermediate data stream that reads them from the System.in stream (which is also a data stream).

Here are two ways to read a line from the console:

Scanner class	BufferedReader and InputStreamReader classes
InputStream stream = System.*in*; Scanner console = new Scanner(stream); String line = console.nextLine();	InputStream stream = System.*in*; InputStreamReader reader = new InputStreamReader(stream); BufferedReader buff = new BufferedReader(reader); String line = buff.readLine();

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BufferedReader

The BufferedReader class, is a class that inherits from Reader and allows you to read characters.

However, the most interesting thing is that you also need to pass a stream to it as a data source, from which it can read characters - a stream that inherits from the Reader class.

Unlike the InputStreamReader, the BufferedReader class doesn't convert bytes to characters: it doesn't convert anything at all. BufferedReader buffers data.

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OutputStream

Some methods from the OutputStream class and all of its descendant classes

Methods	Description
void write(int b)	Writes one byte (not int) to stream.
void write(byte[] buffer)	Writes a byte array to stream
void write(byte[] buffer, off, len)	Writes part of a byte array to stream
void flush()	Writes to stream all of the data, which is available in the buffer
void close()	Closes the stream

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Writer

Some methods from the Writer class and all of its descendant classes:

Methods	Description
void write(int b)	Writes one character (not int) to stream.
void write(char[] buffer)	Writes an array of characters to the stream
void write(char[] buffer, off, len)	Writes part of a character array to the stream
void write(String str)	Writes a string to a stream
void write(String str, off, len)	Writes part of a string to the stream
void flush()	Writes to the stream all the data that is stored in the buffer
void close()	Closes the stream

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BufferedWriter

The BufferedWriter class in Java writes text to a character output stream by buffering the written characters to ensure efficient writing of characters, arrays (characters), and strings.

The BufferedWriter class has the following constructors:

```
BufferedWriter(Writer out)
BufferedWriter(Writer out, int size)
```

It takes the output stream to which it should write, as a parameter.
The size parameter specifies the size of the buffer.

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Homework

MODULE 1. JAVA SYNTAX

Complete Level 24

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Answers to questions

MODULE 1. JAVA SYNTAX