Welcome to the

Java Course

Module 2 – Day 03

Content of the course

- Functions and procedures
- Arrays and lists
- Search and sorting algorithms
- Data structures
- Computational complexity

Project Students - Step 7

Modify the program:

- To store the students in a List instead of all together in one String.
- Allow the user to search for a student by name

Project Students - Step 7

```
How many students do you want to register? 3
>>> Student 1 <<<
Enter first name: Ana
Enter last name: Gaggero
Enter birthday (day of month): 22
Enter birth month: 10
Enter birth year: 1982
Enter course registered: Java
>>> Student 2 <<<
Enter first name: Valerie
Enter last name: Muller
Enter birthday (day of month): 12
...
```

Project Students - Step 7

```
...
>>> Student 3 <<<
Enter first name: Tom
Enter last name: Grass
Enter birthday (day of month): 7
Enter birth month: 1
Enter birth year: 1980
Enter course registered: Java
```

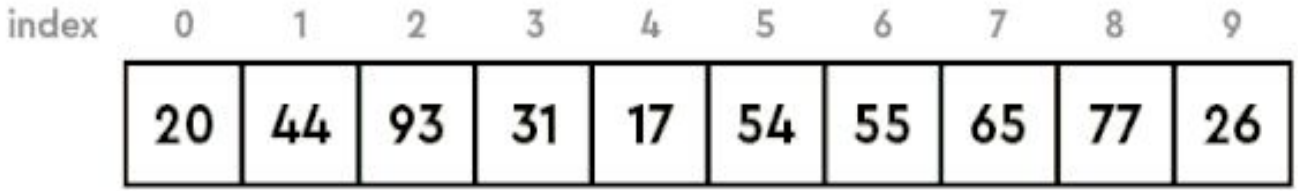
Project Students - Step 7

```
Do you want to (a) see the list of students or (b) search for one
student? a

List of students:
Ana Gaggero born the 22 of October 1982. Registered to Java
Valerie Muller born the 12 of April 1990. Registered to Python
Tom Grass born the 7 of January 1980. Registered to Java

Do you want to (a) see the list of students or (b) search for one
student? b
Enter the student name: Tom Grass

Student:
Tom Grass born the 7 of January 1980. Registered to Java
```

Review

Bubble sort

1. We start from the beginning of the list and compare each pair of adjacent elements.
2. If the elements are in the wrong order (i.e., the current element is greater than the next one), we swap them.
3. We repeat this process until no more swaps are needed, which means the list is sorted.



Selection sort

1. We select an item that by default is considered the smallest in the list
2. We compare it to the others. If there is a smaller item among them, we select it as the new smallest one and swap it with the previous one.

Insertion sort

1. Select the smallest list item. To make it easier let's assume the very first item is the smallest.
2. We sort through all the remaining items and compare them to the selected one. If a smaller item is found, we put it at the top of the list, and move the other items one position forward.

We repeat these steps until the list is sorted.

Let’s START DAY 03

Streams

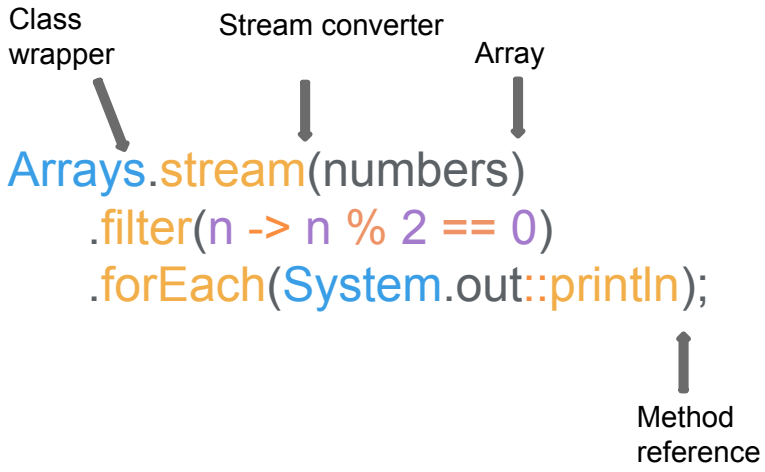
For complex data processing tasks such as

- Filtering
- Mapping
- Sorting

```
// Streams with arrays
 Integer[] numbers = {1, 2, 3, 4, 5, 6};
 Arrays.stream(numbers).filter(n -> n % 2 == 0).forEach(System.out::println);

 // Streams with Lists
 ArrayList<String> list = new ArrayList<>(Arrays.asList("java", "streams", "are", "cool"));
 list.stream().map(String::toUpperCase).forEach(System.out::println);
```

Streams on arrays

```
// Streams with arrays
Integer[] numbers = {1, 2, 3, 4, 5, 6};
```



Streams on Lists, **deep dive**

```
// Streams with arrays
ArrayList<Integer> numbers = new ArrayList<>(Arrays.asList(1,2,3,4,5,6));
```

List

Stream converter

```
numbers.stream()
        .filter(n -> n % 2 == 0)
        .forEach(n -> System.out.println(n));
```

Now YOUR TURN !

Let’s do the exercises

Project Students - Step 8

Modify the program:

- To allow adding and deleting students

Project Students - Step 8

```
Options menu:
(a) add a student
(b) remove a student
(c) see the list of students
(d) search for one student
(e) exit
Select an option: a

>>> Student 1 <<<
Enter first name: Ana
Enter last name: Gaggero
Enter birthday (day of month): 22
Enter birth month: 10
Enter birth year: 1982
Enter course registered: Java
Student 1 added.
```

Project Students - Step 8

```
...
Select an option: b
Enter the name of the student to be removed: Tom Grass
Student removed.
```

```
...
Select an option: c
List of students:
Ana Gaggero born the 22 of October 1982. Registered to Java
Valerie Muller born the 12 of April 1990. Registered to Python
```

```
...
Select an option: d
Enter the student name: Tom Grass
Student:
Tom Grass born the 7 of January 1980. Registered to Java
```