Programming I - Laboratory lessons 2,3

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In Java, all variables must have a specified data type.

- Data types: int (int mynumber $= 7$), boolean (mytrue $=$ false), char (myletter $= 'A'$).
- Arithmetic in JAVA is simple: $+, -, *, /-$dividing, % congruences (checking is some number divisible by another number) and more.
- Boolean operators: $||, \&\&, !$
- Statements: if, if/else, if /else if/else
- Switch: allows us to check equality of a variable or expression with a value that does not need to be a Boolean
- Loops: while, for, do-while.

Strings

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There are two ways to create String object:

- By string literal (ex. String s="string1";)
- By new keyword (ex. String s=new String("string2");)

One of things that we will use is about string is *charAt()*. Here is one example:

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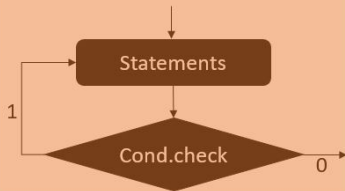one example:

String1: "Welcome to Koper"

- Count number of letter/char "e" in *string1*.

- By using some of predefined methods for manipulation with
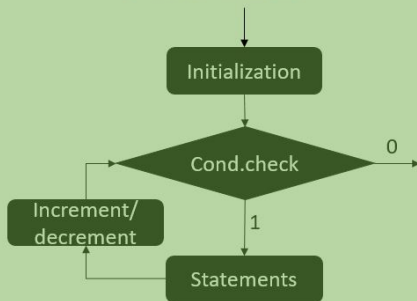 strings, create new string, string2: "We come to Koper."
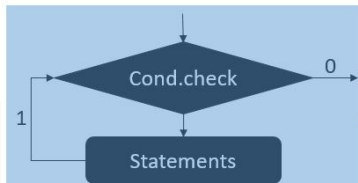
if - then - else statement

Go back to last exercise from lab.work 1 and now add if - statement where condition is given as:

if (sum of two pages is greater then third page of triangle)
$\rightarrow$ *count area of triangle,*
otherwise
$\rightarrow$ *print message with uncorrect sides length of triangle.*

```
if (condition) {
//block of the code to be executed if condition
is TRUE
}
```

```
if (condition) {
//block of the code to be executed if condition is TRUE

}
else{
//block of the code to be executed if condition is FALSE
}
```

IF – THEN – ELSE
Statement

```
if (condition1) {
// block of code to be executed if condition1 is true
}
else if (condition2) {
// block of code to be executed if the condition1 is false and condition2 is true
}
else {
// block of code to be executed if the condition1 is false and condition2 is false
}
```

Exercise 2

Exercise

Implement program that will count if given year is Leap Year

For example, program should return TRUE if the given year is Leap year otherwise FALSE. Some of Leap years are: 2020, 1980 .. and some of them are not, such as: 2100, 1900, 1234 ...

```
function isLeapYear(year)
    if((year%4 is 0)AND(year%100 is not 0))OR(year%400 is 0)
    then TRUE
  else FALSE
```

In computing, the modulo operation (%) returns the remainder or signed remainder of a division, after one number is divided by another (called the modulus of the operation).
Example: $55\%4 = 3$ since $55 = 52 + 3 = 4 \times 13 + 3$.

A_{11}	A_{12}	A_{13}	A_{14}	A_{15}	A_{16}
A_{21}	A_{22}	A_{23}	A_{24}	A_{25}	A_{26}
A_{31}	A_{32}	A_{33}	A_{34}	A_{35}	A_{36}
A_{41}	A_{42}	A_{43}	A_{44}	A_{45}	A_{46}
A_{51}	A_{52}	A_{53}	A_{54}	A_{55}	A_{56}
A_{61}	A_{62}	A_{63}	A_{64}	A_{65}	A_{66}

```
*
* *
* * *
* * * *
* * * * *
* * * * * *
```

$$A_{i\,j}$$

$i - rows$

$j - colums$

```
*                    * * * * * *     * * * * * *                        *
* *                  * * * * *         * * * * *                      * *
* * *                * * * *             * * * *                    * * *
* * * *              * * *                 * * *                  * * * *
* * * * *            * *                     * *                * * * * *
* * * * * *          *                         *             * * * * * *

        A                     B                     C                     D
```

Exercise 4

Exercise

Create program that will count (product, sum, divide, difference) of two numbers - some kind of calculator (you can use double, and have opportunity to product floating point number.) (Hint: Use switch).

Syntax:

```
switch(expression) {
        case x:
            // code block
            break;
        case y:
            // code block
            break;
        default:
            // code block }
```

```
EXAMPLE:

switch(operation) {
        case "sum":
            System.out.print(value);
            break;
        default:
            System.out.print("Wrong value!"); }
```

Exercise 5

Exercise

Implement program that will count Factorial of integer n.

$$n! \overset{DF}{=} n \cdot (n-1) \cdot (n-2) \cdots 3 \cdot 2 \cdot 1, \quad 0! \overset{DF}{=} 1, 1! \overset{DF}{=} 1.$$

Use for-loop and while-loop. Print every step and give a user opportunity to insert number n.

Example:

Insert number n: 5

On step 1 factorial of number 5 is: 1

On step 2 factorial of number 5 is: 2

On step 3 factorial of number 5 is: 6

On step 4 factorial of number 5 is: 24

On step 5 factorial of number 5 is: 120