Sequence flow control

Adam Krechowicz

String concatenation

```java
package com.wyklad.control;

public class Concatenation {
  public Concatenation() {
    super();
  }

  public static void main(String[] args) {
    String a = "Hello ";
    String b = "World";
    System.out.println(a.concat(b));
    a.concat(b);
    System.out.println(a);
    System.out.println(a + b);
  }
}
```

String operations

```
package com.wyklad.control;

public class Strings {

  public Strings() {
    super();
  }

  public static void main(String[] args){
    String a = "Hello World";
    System.out.println(a.charAt(2));
    String c1 = "aaa";
    String c2 = "aab";
    System.out.println(c1.compareTo(c2));
    System.out.println(c2.compareTo(c1));
    System.out.println("AAA".compareToIgnoreCase("AAB"));
    System.out.println("Ala ma kota".contains("ma"));
  }

}
```

Operacje na stringach

```java
package com.wyklad.control;

public class Strings {

  public Strings() {
    super();
  }

  public static void main(String[] args){
    System.out.println("Hello World!".substring(5, 9));
    System.out.println("Hello World!".replace("World", "Hell"));
    System.out.println("  Hello World!    ".trim());
    System.out.println("hello world".toUpperCase());
    System.out.println("HELLO WORLD".toLowerCase());
    System.out.println("hello world".length());
  }

}
```

Special characters

\n	new line
\t	tabulator
\'	single quotation
\"	double quotation
\\	backslash

```
    String a = "\tHello\nWorld";
    String b = "\"Hello\" World\\";
```

String formatting

```java
package com.wyklad.control;

public class Format {
  public Format() {
    super();
  }

  public static void main(String[] args) {
    String form = String.format("Hello %d world %s %f", 1, "abc", 1.0f);
    System.out.println(form);
  }
}
```

String formatting

%d	decimal number
%f	floating point number
%n	new line
%05d	decimal number with 5 digits
%+d	+ sign, if positive number
%,d	thousand separator, based on location
%.2f	two digits after the dot

StringBuilder and StringBuffer

```
    StringBuilder sb = new StringBuilder("Hello");
    sb.append("World");
    sb.insert(6," ");
    sb.append(3.14);
    sb.reverse();
    sb.replaceCharAt(5, 'z');
    sb.delete(2,5);
    System.out.println(sb.toString());
```

StringBuffer – wersja wielowątkowa

Regular expressions

```
System.out.println(Pattern.matches("^H[A-Za-z ]*d$", "Hello World"));
Pattern p = Pattern.compile("kot");
Matcher m = p.matcher("Ala ma kota a kot ma Ale");
System.out.println(m.find());
System.out.println(m.replaceAll("pies"));
```

I18n

Texts_pl_PL.properties

```
powitanie=Dzień dobry
```

Texts_en_EN.properties

```
powitanie=Good morning
```

Kod

```java
Locale l = Locale.getDefault();
System.out.println(l.getLanguage());
System.out.println(l.getCountry());
ResourceBundle rb = ResourceBundle.getBundle("Texts");
System.out.println(rb.getString("powitanie"));
Locale.setDefault(new Locale("en", "EN"));
rb = ResourceBundle.getBundle("Teksty");
System.out.println(rb.getString("powitanie"));
```

Character operations

```java
char c = '6';
System.out.println(Character.isLetter(c));
System.out.println(Character.isDigit(c));
System.out.pritnln(Character.isWhitespace(c));
System.out.println(Character.isUpperCase(c));
System.out.println(Character.toUpperCase(c));
System.out.println(Character.isLowerCase(c));
System.out.println(Character.toLowerCase(c));
```

Integer operations

```java
package com.wyklad.control;

public class Integers {
  public Integers() {
    super();
  }

  public static void main(String[] args) {
    System.out.println(Integer.MAX_VALUE);
    System.out.println(Integer.MIN_VALUE);
    System.out.println(Integer.highestOneBit(10));
    System.out.println(Integer.highestOneBit(5));
    System.out.println(Integer.lowestOneBit(5));
    System.out.println(Integer.lowestOneBit(6));
    System.out.println(Integer.signum(5));
    System.out.println(Integer.toBinaryString(123));
    System.out.println(Integer.toHexString(123));
    System.out.println(Integer.toOctalString(123));
  }
}
```

Integer -> String conversion

```java
package com.wyklad.control;

public class ConvertInt {
  public ConvertInt() {
    super();
  }

  public static void main(String[] args) {
    System.out.println(123);
    String a = String.valueOf(123);
    System.out.println(a);
    String b = ""+123;
    System.out.println(b);
    System.out.println(Integer.toString(4));
  }
}
```

String -> integer conversion

```java
package com.wyklad.control;

public class ConvertStrings {
  public ConvertStrings() {
    super();
  }

  public static void main(String[] args) {
    int a = Integer.parseInt("123");
    System.out.println(a);
    //a = Integer.parseInt("Hello World");
    a = Integer.valueOf("123");
    System.out.println(a);
  }
}
```

String splitting

```
String text = "Ala ma kota a kot ma Ale";
for(String s: text.split(" ")){
  System.out.println(s);
}
```

Dates

```java
public static void main(String[] args) {
  Date d = new Date();
  System.out.println(d);
  System.out.println(d.getTime());
  d.setTime(System.currentTimeMillis());
  System.out.println(d);
}
```

Dates

```
SimpleDateFormat sdf = new SimpleDateFormat("yyyy-MM-dd");
SimpleDateFormat sdf1 = new SimpleDateFormat("hh:mm:ss");
System.out.println(sdf.format(d));
System.out.println(sdf1.format(d));
```

Math

```
    System.out.println(Math.E);
    System.out.println(Math.PI);
    System.out.println(Math.abs(-1));
    System.out.println(Math.sqrt(9));
    System.out.println(Math.pow(2,5));
    System.out.println(Math.random());
```

Math

```
    System.out.println(Math.sin(Math.toRadians(60))));
    System.out.println(Math.cos(Math.toRadians(60)));
    System.out.println(Math.tan(Math.toRadians(60)));
    System.out.println(Math.asin(Math.toRadians(60)));
    System.out.println(Math.acos(Math.toRadians(60)));
    System.out.println(Math.atan(Math.toRadians(60)));
    System.out.println(Math.sinh(Math.toRadians(60)));
```

Math

```
    System.out.println(Math.ceil(4.5));
    System.out.println(Math.floor(4.5));
    System.out.println(Math.round(4.5));
    System.out.println(Math.signum(-3));
    System.out.println(Math.min(-1, 5));
    System.out.println(Math.max(-1, 5));
```

Operators priorities

1. from left to right rule
2. a++
3. ++a
4. * / %
5. + -
6. &
7. |
8. &&
9. ||

Type of a result

```
    byte b;
    short s;
    int i;
    long l;
    float f;

    i*i;
    l*i;
    f*b;
    b*b; //!
```

if Instruction

```java
if (1 == 1)
  System.out.println("Condition satisfied");
else
  System.out.println("Otherwise");
```

Comparison operations

comparison	==
comparison	equals()
inequality	!=
inequality	!equals()
greater than	>
greater that or equal	>=
lesser than	<
lesser than or equal	<=

Comparison operators – examples

```java
if (s == t){
  System.out.println("OK");
} else {
  System.out.println("No");
}
if (s.equals(t))
  System.out.println("OK");
if (1 > 10)
  System.out.println("OK");
if (1 <= 10)
  System.out.println("OK");
if (!(s == t))
  System.out.println("OK");
```

Logical operations

Conditions

There is only one condition!

NOT	!
AND	&&
OR	||

Logical operations – examples

```
    if (s == t && a.equals(b))
      System.out.println("OK");
    if (s == t || !a.equals(b)){
      System.out.println("OK");
    }
```

Lazy checking

Lazy checking

If a condition can not influence the result it will not be evaluated

```
if (s == t && a == b)
  System.out.println("OK");
if (s == t || a == b)
  System.out.println("OK");
```

Lazy checking

```java
public class Lazy {
  public boolean warunekA(){
    System.out.println("Wyliczanie warunku A");
    return false;
  }
  public boolean warunekB(){
    System.out.println("Wyliczanie warunku B");
    return true;
  }
  public static void main(String[] args) {
    Lazy lazy = new Lazy();
    if (lazy.warunekA() && lazy.warunekB())
      System.out.println("OK");
    if (lazy.warunekB() && lazy.warunekA())
      System.out.println("OK");
    if (lazy.warunekA() || lazy.warunekB())
      System.out.println("OK");
    if (lazy.warunekB() || lazy.warunekA())
      System.out.println("OK");
  }
}
```

Tri-argument operator

```java
package com.wyklad.control;

public class Argument3 {

  public boolean check(int a){
    return a > 10 ? true : false ;
  }

  public Argument3() {
    super();
  }

  public static void main(String[] args) {
    Argument3 argument3 = new Argument3();
    System.out.println(argument3.check(11));
    System.out.println(argument3.check(9));
  }

}
```

Switch

```
int cond = 5;
switch (cond) {
case 1:
  System.out.println("a = 1");
  break;
case 2:
  System.out.println("a = 2");
  break;
case 5:
  System.out.println("a = 5");
  break;
}
```

break instruction

```
switch (cond){
case 1:
  System.out.println("a = 1");
case 2:
  System.out.println("a = 1 lub 2");
  break;
case 5:
  System.out.println("a = 5");
  //break;
}
```

default instruction

```java
switch (cond) {
case 1:
  System.out.println("a = 1");
  break;
case 2:
  System.out.println("a = 2");
  break;
case 5:
  System.out.println("a = 5");
  break;
default :
  System.out.println("Nie wiem :(");
  break;
}
```

while loop

while

Executed when the condition is satisfied

```java
int c = 0;
while (c < 10){
  System.out.println(c++);
}
```

while

Condition is evaluated before loop execution

```java
int c = 10;
while (c < 10){
  System.out.println(c++);
}
```

do..while loop

do..while

Executed when the condition is satisfied

```
c = 0;
do
  System.out.println(c++);
while (c < 10);
```

do..while

Condition is evaluated after loop execution

```
c = 10;
do
  System.out.println(c++);
while (c < 10);
```

for loop

```
for (int i = 0; i < 10; i++){
  System.out.println(i);
}
```

Unconventional for loops

```java
for (int i = 0;
     i < 10;
     System.out.println(i++));
```

```java
for (int i = 0, j = 10; j-i > 5 && i < 10; i++){
  System.out.println("Hello");
}
```

```java
for (float f = 0; f < 1.0f; f+=0.01f)
  System.out.println(f);
```

```java
for (;;) {
  System.out.println("uuuu");
}
```

foreach loop

```
int [] tab = {1,2,3,4,5};
for(int i: tab)
  System.out.println(i);
```

continue instruction

```
for (int i = 0; i < 10; i++){
  System.out.println("Start");
  if (i % 2 == 0) continue;
  System.out.println("Stop");
}
```

break instruction

```java
for (int i = 0; i < 10; i++){
   if (i == 3)
      break;
  System.out.println("loop");
}
```

Continue with label

```
start:
for (int i = 0; i < 3; i++){
  for (int j = 0; j < 3; j++){
    if (j == 1) continue start;
    System.out.println(i + " " + j);
  }
}
```

Break with label

```
start:
for (int i = 0; i < 3; i++){
  for (int j = 0; j < 3; j++){
    if (j == 1) break start;
    System.out.println(i + " " + j);
  }
}
```

Implicit casting

```
    int i = 5;
    long l = i;
    System.out.println(l);
```

Explicit casting

```
long l = 90000000000L;
int  i = (int)l;
System.out.println(i);
```

Object comparison

```
String a = "Ala ma kota";
String b = "Ala ma quada";
if (a == b)
  System.out.println("The same");
if (a.equals("Ala ma kota"))
  System.out.println("OK");
```

Object comparison

```java
String c = new String("Hello World");
String d = new String("Hello World");
if (c == d)
  System.out.println("references: The same");
if (c.equals(d))
  System.out.println("equals(): The same");
if (c.hashCode() == d.hashCode())
  System.out.println("hashCode(): The same");
```

Object comparison

```java
if (c == d)
  System.out.println("The same");
else if (c.hashCode() == d.hashCode())
  if (c.equals(d))
    System.out.println("The same");
```