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Computerphysik
Vorlesung — Programmiertechniken 1

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Website: http://www.thp.uni-koeln.de/trebst/Lectures/2019-CompPhys.shtml
(http://www.thp.uni-koeln.de/trebst/Lectures/2019-CompPhys.shtml)

0. Hello World

Wir beginnen mit einem sogenannten **Hello world** Programm in Julia, d.h. ein Programm,
welches die einfach Ausgabe "Hello world!" erzeugt.

In [1]:
```julia
println("Hello World!")
```

```
Hello World!
```

In [2]:
```julia
println("Hello again!")
```

```
Hello again!
```

Ein **wichtiger** Kommentar zum Abschluss dieses ersten Blocks!

1. Variablen

In [6]:
```julia
a = 4711
```

Out[6]: 4711

In [7]:
```julia
a
```

Out[7]: 4711

In [8]:
```
b=a
```
Out[8]: 4711

In [9]:
```
b
```
Out[9]: 4711

In [10]:
```
a+b
```
Out[10]: 9422

In [11]:
```
a=a+14
```
Out[11]: 4725

In [12]:
```
a
```
Out[12]: 4725

In [13]:
```
b
```
Out[13]: 4711

In [14]:
```
println("Der Wert von a ist: a = ",a,"!")
```
Der Wert von a ist: a = 4725!

In [16]:
```
println("Die Hälfte von b ist b/2 = ",b/2,".")
```
Die Hälfte von b ist b/2 = 2355.5.

In [17]:
```
b
```
Out[17]: 4711

In [20]:
```
-a
```
Out[20]: -4725

Floating Point Numbers

In [18]:
```
1.0
```
Out[18]: 1.0

In [19]: `2.3`

Out[19]: 2.3

In [21]: `24978649856.746`

Out[21]: 2.4978649856746e10

In [22]: `1.0/3.0`

Out[22]: 0.333333333333333

In [23]: `4.`

Out[23]: 4.0

In [24]: `.25`

Out[24]: 0.25

In [25]: `2e2`

Out[25]: 200.0

In [26]: `2.5e-3`

Out[26]: 0.0025

In [27]: `1.5/0.23`

Out[27]: 6.521739130434782

In [28]: `1/0`

Out[28]: Inf

In [29]: `round(1.53)`

Out[29]: 2.0

In [30]: `round(1.49)`

Out[30]: 1.0

```
In [31]: round(1.5)
```

Out[31]: 2.0

```
In [32]: trunc(1.4778365)
```

Out[32]: 1.0

```
In [33]: abs(-1.756)
```

Out[33]: 1.756

```
In [35]: round(1.449*10)/10
```

Out[35]: 1.4

```
In [36]: round(2.5)
```

Out[36]: 2.0

```
In [37]: round(3.5)
```

Out[37]: 4.0

```
In [38]: round(4.5)
```

Out[38]: 4.0

```
In [39]: round(102.5)
```

Out[39]: 102.0

```
In [40]: round(103.5)
```

Out[40]: 104.0

```
In [41]: sign(-1.75)
```

Out[41]: -1.0

```
In [42]: sign(2.3)
```

Out[42]: 1.0

Elementare Rechenfunktionen

```
In [43]: sqrt(2)
```

Out[43]: 1.4142135623730951

```
In [44]: cbrt(8)
```

Out[44]: 2.0

```
In [45]: log(10)
```

Out[45]: 2.302585092994046

```
In [46]: exp(1)
```

Out[46]: 2.718281828459045

```
In [47]: pi
```

Out[47]: π = 3.1415926535897...

```
In [48]: π
```

Out[48]: π = 3.1415926535897...

```
In [49]: α = π/2
```

Out[49]: 1.5707963267948966

```
In [50]: sin(α)
```

Out[50]: 1.0

```
In [57]: sin(2.0*π)
```

Out[57]: -2.4492935982947064e-16

```
In [60]: cos(-π)
```

Out[60]: -1.0

Rationale Zahlen / Brüche

```
In [61]: 1/3
```

Out[61]: 0.3333333333333333

```
In [62]: 1//3
```

```
Out[62]: 1//3
```

```
In [63]: 1//3+1//3
```

```
Out[63]: 2//3
```

```
In [64]: 1//3+1//6
```

```
Out[64]: 1//2
```

Strings

```
In [65]: s = "Hello World!"
```

```
Out[65]: "Hello World!"
```

```
In [66]: println("Meine erste Ausgabe ist: ",s)

        Meine erste Ausgabe ist: Hello World!
```

```
In [73]: x=25
```

```
Out[73]: 25
```

```
In [69]: x=x+2
```

```
Out[69]: 27
```

```
In [70]: x=1.3454782
```

```
Out[70]: 1.3454782
```

```
In [71]: x="Hallo"
```

```
Out[71]: "Hallo"
```

```
In [74]: x=x+2
```

```
Out[74]: 27
```

2. Schleifen

for-Schleifen

```
In [84]:   for i in 1:10
               println(i)
           end
```

```
1
2
3
4
5
6
7
8
9
10
```

```
In [80]:   for i in 5:3:12
               println(i)
           end
```

```
5
8
11
```

```
In [83]:   for j in 12:-1:6
               println(j)
           end
```

```
12
11
10
9
8
7
6
```

```
In [85]:   i=1
```

```
Out[85]:   1
```

while-Schleifen

In [98]:
```
i=1;
while i<1050
    println(i)
    global i = i*2
end
```

```
1
2
4
8
16
32
64
128
256
512
1024
```

In [101]:
```
i=2;
while i>1.0001
    println(i)
    global i = sqrt(i)
end
```

```
2
1.4142135623730951
1.189207115002721
1.0905077326652577
1.0442737824274138
1.0218971486541166
1.0108892860517005
1.0054299011128027
1.0027112750502025
1.0013547198921082
1.0006771306930664
1.0003385080526823
1.0001692397053021
```

In [ ]: