

Excercise Sheet 4

Warmup (optional): Let the following code fragments run and explain the results:

a)

```
int var = 6;
var /= 2;
```

b)

What value does var have after the execution?

```
float x = 2.0F, y = 0.0F;
x *= y = 5.0F;
```

c)

Does the compiler throw an error? If not, which values do x and y get assigned?

```
int i = 1, j = 1, expr;
expr = i > j || ++i && j--;
printf("i = %d, j = %d, expr = %d\n", i, j, expr);
```

What values are printed out? In particular, modify the condition in two versions, to be logically true in one and logically false in the other version. Determine what the *data type* and *value* that the Boolean condition evaluates to in case of being true and false.

Exercise 4.1. Consider the following declarations and answer the questions below by trying out the effects:

```
int a = 3, b = 4;
double x;
int myFunc(unsigned long z){ return -(z+1); }
```

What values will the variables have after their assignments:

- a) `x = a/b;`
- b) `x = (double)a/b;`
- c) `x = (double)(a/b);`
- d) `x = a/(double)b;`
- e) `x = myFunc(0.8);`
- f) `int i = myFunc(-1);`
- g) `unsigned int ui = myFunc(0);`

Exercise 4.2. Write a program to run the following lines of code, with your own choice for a value to initialize `k` with:

```
1 unsigned int s = 0, n = /* choose some value here */;
2 for(k = n; k != 0; k >>= 1) s += (k&1);
```

- Let the program run and interpret its output. What does it compute?
- How many iterations does the `for` loop take, depending on `n`?
- Modify the program to use a signed `int`. Does the result change? Why (not)?
- Change the `unsigned int s` into `float s`, and implement a sign-change by flipping the according sign bit in the IEEE representation of a `float`, displayed in the following figure:

