

Übungen zur Vorlesung
Einführung in das Programmieren für TM

Serie 2

Aufgabe 2.1. Write a function `scalarproduct` that computes the scalar product $w = \mathbf{u} \cdot \mathbf{v} := ax + by + cz$ of two given vectors $\mathbf{u} = (a, b, c)^T$ and $\mathbf{v} = (x, y, z)^T$. Furthermore, write a main program which reads in the parameters a, b, c, x, y, z and prints out the result. Save your source code as `scalarproduct.c` into the directory `serie02`.

Aufgabe 2.2. Write a function `dabs` that computes the modulus $|x|$ of a given number $x \in \mathbb{R}$. Moreover, write a main program that computes x and prints out $|x|$. The mathematical library `libm.so` must not be used. Save your source code as `dabs.c` into the directory `serie02`.

Aufgabe 2.3. Write a function `member` that computes for given $n \in \mathbb{N}$ the member $a_n := (-1)^n/n$ of the series $(a_n)_{n \in \mathbb{N}}$. Moreover, write a main program that reads in n and prints out a_n . Save your source code as `member.c` into the directory `serie02`.

Aufgabe 2.4. Write a function `evenorodd` which takes a number $n \in \mathbb{N}$ as input and returns the value 1 if n is even or 0 if n is odd. Write a main program which reads in the value n from the keyboard and prints on the monitor if n is even or odd.

Aufgabe 2.5. Write a `void`-function `date` computes for a given number $z \in \mathbb{N}$ the corresponding date. The date can be obtained from z under consideration of the formatting `DDMMYYYY`. Hence, $z = 10102014$ is the 10th October 2014. Note that leading zeros will not be stored, e.g., the first of October 2014 is represented by $z = 1102014$ (5 digits). Moreover, write main program that reads in z and calls the function. Save your source code as `date.c` into the directory `serie02`.

Aufgabe 2.6. Write a function `max` that returns the maximum of two given values $x, y \in \mathbb{R}$. Moreover, write a main program that reads in x, y and prints out the maximum of these numbers. Save your source code as `max.c` into the directory `serie02`.

Aufgabe 2.7. The company A1 offers you a mobile-phone call rate of 0.29 € per minute. Write a program that reads in a credit $g \in \mathbb{R}$ and prints out how long (in minutes) you can phone. Save your source code as `a1.c` into the directory `serie02`.

Aufgabe 2.8. What is *Type-Casting*? Which types do exist? What is the output of the following code lines? Explain why!

```
#include <stdio.h>

main() {
    int x = 1;
    int y = 5;

    double erg1 = x / y;
    double erg2 = (double) x / y;
    double erg3 = 1. / 5;
    int erg4 = (double) x / y;

    printf("erg1 = %f\n", erg1);
    printf("erg2 = %f\n", erg2);
    printf("erg3 = %f\n", erg3);
    printf("erg4 = %d\n", erg4);
}
```