Operating Systems 2016/17
Tutorial-Assignment 0

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You will find introductory slides to the C programming language in the lecture's ILIAS course along the regular course materials.

Question 0.1: C Basics

a. What basic data types are available in the C programming language?

b. How can you find out which size a type has?

c. What is the difference between local and global variables?

Question 0.2: Hello World

For programming assignments, we provide templates that you have to extend with functionality according to the respective question. You can download the templates for programming assignments from ILIAS.

a. Acquire the template *p1* for this programming question from ILIAS and unpack it. What are header files typically used for? Look how this is done in the programming assignment template.

b. Implement the function `greet` in *greet.c*. It takes an integer argument but does not provide a return value. The function shall print *Hello World!* as often as specified by the integer argument, each in a separate line. In addition, the printed lines shall be prefixed with a consecutive line counter (starting at 1). Compile the provided template with `make`.

Question 0.3: Pointers and Structs

a. Explain the concept of pointers. What do the `&` and `*` operators do when working with pointers?

b. What are the types of the following variables. Why can this code formatting be misleading? `int* a, b;`

c. Consider an array of `int`s in memory. How can you use the following pointers to access the fourth element? Both point at the beginning of the array.

```
int *ip;
void *vp;
```

d. Acquire the template *p2* for this programming question from ILIAS and unpack it. Implement the function `countchr` in *countchr.c*. It returns the number of occurrences of a character in an ASCII string, both supplied by the caller. The string is represented as a pointer to a contiguous sequence of `char`s in memory. The string is terminated with a null (0) character.

e. What is a *struct* in C? What can it be used for?