Computer science 2

Summer semester 2021

Prof. Dr. T. Grust, B. Dietrich, C. Duta, D. Hirn, T. Fischer

Exercise sheet 1 (April 28, 2021)

Submission by: Wednesday, May 5th, 2021, 2 p.m.

Relevant videos up to and including: Computer Science 2 - Chapter 2 - Video # 12

https://tinyurl.com/Informatik2-SS2021

Exercise 1: [5 points] (Submission: arg-eval-order.c0)

```
Write a C0 program whose output in the terminal (see the functions in the conio library)

you can clearly see that the arguments of 1.42 and 3 in a function cell f (energy 2) in the Help

Order et 1, e 2, e 3 are evaluated. The function is supposed to be any function with three parameters be.
```

Exercise 2: [15 points] (Sulmission: printbitsfit.c0)

Write a function interminals by (int x) which, similar to the function void printoits (int x) from the preceding reading, which outputs bits of x in the terminal using printchar (...). The function should output all Suppress preceding 0 bits. The return value of the function specifies the number of characters that the Representation of x in heterminal. The function printbits fint((...)) has a side effect, and a return value.

Build in at least three function calls to printbits fit (...) in your main () function , which the functionality make the function clear.

Note: Uses the function **bool** is_bit_set (**int** x, **int** n) known from the lecture.

Examples: Here are some example calls for printbitsfit (...):

```
-> printbitsfit (0); printchar (\n');

1 (int)

0

(void)

-> printbitsfit (42); printchar (\n');

6 (int)

101010

(void)

-> printbitsfit (5249); printchar (\n');

13 (int)

1010010000001

(void)
```

Exercise 3: [7 points] (Submission: bitwidth.c0)

Write a function int bitwidth () . This function determines how many bits the language C0 uses internally Representation of values of the type int is used (currently the function should therefore return the result 32).

Writes the function assuming that the number of bits for the type int will change in the future could.

Build your main () function so that when you run the compiled program, the return value is output by bitwidth () on the terminal.

Note: Use the bit operators that we got to know in the lecture. One implementation of the form return 32; is worth exactly 0 points.

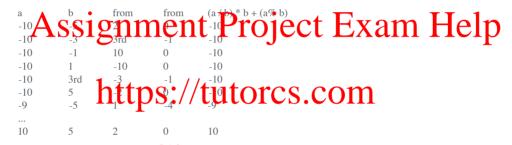
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Exercise 4: [7 points] (Submission: table.c0)

Write a C0 program that outputs a table on the terminal for each combination of values $a \in \{-10, -9, -8, ..., 0, ..., 8, 9, 10\}$ and $b \in \{-5, -3, -1, 1, 3, 5\}$ the following five Entries contains:

```
a b from from (a/b)*b+(a\%b)
```

Here you can see an excerpt from the table that the program should output:



Note: The output of available sing right at () t') between he dutie if Gine elps with the formatting of the table.

Exercise 5: [6 points] (Submission: huh.txt)

When searching in old folders on your computer you will find a C0 program, the following uncomfortable-defined function:

```
1 int huh ( int x ) {
2 int c = 0;
3rd
4th while (x! = 0) {
5 c = c + 1;
6th x = x & x - 1;
7th }
8th
9 return c;
10 }
```

- 1. [3 points] Applies huh to a series of arguments to build a guess what the Function. Briefly explain your assumption in your own words. (max. 280 characters) and saves this in the plain text file huh.txt.
- 2. [3 points] Warning: tricky part of the task! Explains how and why in detail and as precisely as possible huh works at all. Add this explanation to the file huh.txt.

Note: In your explanation, pay particular attention to line 6 in the code.