



**CS-473:
System programming
for
Systems on Chip**

Practical work 1

Getting to know the virtual prototype

Version:
1.0

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1 Objectives

In the scope of this practical work, you will:

1. Learn how to setup the development environment, which includes the toolchain and helper software.
2. Compile two basic applications that were provided as part of the course resources.
3. Complete a simple programming task, compile, and execute it.

2 Setting up the Environment

Please follow the instruction that can be found here.

In case the link does not work:

<https://gecko5education.ti.bfh.ch/courses/cs473.html>

In case of questions, do not hesitate to ask the TA's.

To test that you are completely set-up, compile and execute the programs *helloWorld* and *bouncing-Ball*.

3 Programming Task

Implement the following function in C:

```
1  /**
2   * Converts a given unsigned int number to string for the given base.
3   *
4   * @note requires (1) bufisz > 1 and (2) base > 1.
5   * @note appends NUL character at the end of the output.
6   * @note writes buf[0] = 0 in case of failure.
7   *
8   * @return int 0 in case of overflow or invalid argument, or number of
9   * written characters in case of success. (excluding NUL)
10  */
11 unsigned int utoa(
12     /** number to convert */
13     unsigned int number,
14
15     /** output buffer */
16     char *buf,
17
18     /** size of the output buffer */
19     unsigned int bufisz,
20
21     /** base (also the length of digits) */
22     unsigned int base,
23
24     /** digits in the base */
25     const char *digits
26 );
```

Use the function you implemented to print numbers from 0 to 100 (inclusive) in vigesimal system (i.e., base-20):

```
const char *vigesimal_digits = "0123456789ABCDEFGHIJ";
```

Compile and upload your code.