



Eidgenössische Technische Hochschule Zürich
Swiss Federal Institute of Technology Zurich

Fall Term 2018



SYSTEMS PROGRAMMING AND COMPUTER ARCHITECTURE

Assignment 2: Introduction to C Programming

Assigned on: **26th Sep 2018**

Due by: **3rd Oct 2018**

Introduction to C Programming

This exercise consists of small C programming problems.

1 Reverse an array

Write a C program that has a function that:

- accepts an array of 32-bit unsigned integers and a length
- reverses the elements of the array in place
- returns void (nothing)

Example for an array of length 4:

5

2

7

5

 \rightarrow

5

7

2

5

2 Box-and-arrow diagram

Use a box-and-arrow diagram for the following program to explain what it prints out:

```
#include <stdio.h>

int foo(int *bar, int **baz)
{
    *bar = 5;
    *(bar+1) = 6;
    *baz = bar+2;
    return *((*baz)+1);
}
```

```

int main(int argc, char **argv)
{
    int arr[4] = {1, 2, 3, 4};
    int *ptr;
    arr[0] = foo(&(arr[0]), &ptr);
    printf("%d %d %d %d %d\n",
        arr[0], arr[1], arr[2], arr[3], *ptr);
    return 0;
}

```

3 Little vs. big endian

Write a C program that prints out whether the computer it is running on is little endian or big endian. (hint: pointer and casts)

4 Function pointers basics

Write a C program that has a function that:

- accepts a function pointer (pointing to a function with an integer return type and a single integer argument) and an additional array of integers and length of the array as arguments
- invokes the pointed-to function with each of the elements in the array as an argument
- overrides the current array element with the return value of the called function

Example: The function `comp` provided as a function pointer along with the array

-1

3

-27

 should yield

0

1

0

.

```

int comp(int a)
{
    if (a <= 0) return 0;
    else return 1;
}

```

Hand In Instructions

Question 2 is a pen-and-paper exercise. Hand it in to your assistant during the exercise session or upload your written or scanned solution. For the rest of the problems, upload your source files to a subfolder named **assignment2** in your SVN folder. Refer to Assignment 1 for instructions on using SVN.