Introd. to Neural Networks   Dr. S. Recksiegel   WS 2022/23

Exercise Sheet 0/1   L. Rickler, E. Eberhard, J. Mayer-Steudte, L. Wicke

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1. **Account**

   While you can do all the exercises on your own computer if you want to, you should be able to use the CIP pool for the tutorials and to easily exchange programs with other students.

   Make sure that you can login to the computers in the CIP pool room. As a physics student, your TUM login (ga12abc) and password will give you access. If you are not a physics student, please send an email to itsupport@ph.tum.de to have your account enabled for the CIP pool.

   You can also remotely login to the CIP pool computers, see below for details.

2. **C**

   Write and compile a simple C program that prints some message on the screen. If you do not have a favourite editor or IDE yet, we recommend that you have a look at the program `geany`. (If geany's output window does not open, make sure you have something like `/usr/bin/xterm -e "/bin/sh %c"` in Preferences → Tools → Terminal.)

   If you have no idea what to write, do the famous "Hello World!":

   ```c
   #include <stdio.h>
   int main() { printf("Hello World!\n"); }
   ```

3. **Python**

   Write and run a simple program in Python.

The following exercises will be discussed on October 26, 2022. You should try to solve them on your own before that date.

If you want to login to a CIP Pool computer from home, you can use Remote Access via edu-VPN. The link to the installation guide can be found here: `https://wiki.tum.de/display/tuphcip/`. A step-by-step guide can be found at the end of this sheet.

Practise your C and Python skills (choose which language to use, but use both at least once):

1. Write a program to output the numbers 1-10, all odd numbers from 1-100, all even numbers from 0-99 and the characters of the alphabet using `for`,`while` and `do-while` loops. Use each loop structure at least once.

2. Write a program to output the numbers 2,3,5,9,15,23,45,82,94,95,97,99. You should use loops, and `if` or `switch`. *Advanced: Use an array to store the numbers you want to print and iterate over the array.*

3. Write a program to calculate the first few digits of PI using an iterative algorithm. Compare your result to the constant `M_PI` of the C math library (hint: `#include<math.h>` and `-lm`). *Try Wikipedia for algorithms.*

4. *Advanced:* Print out the characters of the sentence *"Without fame, he who spends his time on earth leaves only such a mark upon the world as smoke does on air or foam on water."* in alphabetical order *Hint: use qsort()* Try again with the sentence *"The quick brown fox jumps over the lazy dog.".*

Remote Access:

- Go to `https://wiki.tum.de/display/tuphcip/` and open the link "Remote Access". You will have to login in order to view the TUM Wiki.

- Click the link "VPN connection to the MWN network" and find the manual for you OS. Download eduVPN and follow the installation procedure. After a restart, open eduVPN and search for TUM. After logging in with your TUM credentials (abc12de) you should be able to connect.

- Go back to the "Remote Access" page of the CIP-Pool. There, you can find the ssh command "ssh abc12de@ssh.cip.ph.tum.de" (with your TUM credentials) to connect to the virtual host. If you are using Windows, you will have to download an SSH client (e.g. Putty) first. Compare the fingerprints of the keys with the ones on the "Remote Access" page of the CIP Pool.

- If the remote access login was successful, you will be on the gateway computer with the name "cipgate-jammy". **Do not use this machine for numerical simulations, etc.** Instead, connect to another CIP pool computer, e.g. cip2ryzen2 using the command "ssh cip2ryzen2" (You can find a list of workstations at `https://wiki.tum.de/display/tuphcip/Workstations`.)

Since all computers in the CIP-Pool run Linux, it is helpful to learn the basic terminal commands for Linux. An interesting tutorial (with extensive explanations) can be found here: `https://ubuntu.com/tutorials/command-line-for-beginners#1-overview`
Some important commands are

1. cd ("change directory"): move to respective directory. For example, "cd Desktop" or "cd .." (move out of current directory)

2. ls ("list"): list all elements of the current directory

3. mkdir ("make directory"): create directory with specific name, e.g. "mkdir exercise1"

4. touch (create empty file): e.g. "touch exercise1.c" or "touch newfile.txt"

5. cp ("copy file"): copy file from directory 1 to directory2, e.g. "cp directory1/newfile.txt directory2"

6. mv ("move file"): move file from directory1 to directory2, e.g. "move directory1/newfile.txt directory2"

7. rm ("remove"): remove file, e.g. "remove newfile.txt"

8. nano or vi/vim: editing text files. Both work differently and you can find an example tutorial here
`https://www.wikihow.com/Create-and-Edit-Text-File-in-Linux-by-Using-Terminal`.