

Welcome to our second part "Communication and Visualisation" (was: Automotive Sensors) 27.2.25

Plans:

- C style programming of internet (BSD-sockets)
 - HTML and CSS to create web pages
 - How to generate web pages dynamically?
 - with perl
 - your own idea
 - Storing data, generating plots
 - XML → database
 - JSON
- } run your own web server.

⇒ Assignments to get a "passed". Lots of exercises.

1. Classical c-style programming of TCP/IP:
 - "BSD-sockets" all other systems
 - "Winsocks" Windows systems

server

```
bind(s, ...)  
listen(s, ...)  
s1 = accept(s, ...)
```

client

```
WSAStartup(...)  
s = socket(...)
```

```
connect(s, ...)
```

```
write(s/s1, ...)  
send(s/s1, ...)  
read(s/s1, ...)  
recv(s/s1, ...)
```

```
close(s/s1), closesocket(s/s1)
```

```
WSAShutdown(...)
```

First assignment:

Please modify the C(++) example program available on Ilias to download any file from a webserver.

Our program only works with plain http, no https, and only without proxy)
The file should have the same name as on the server.

Hint: Check with an image file if you correctly got the empty line separating the header parameters from the file data.

Please upload a small report explaining the changes to the program, also include screenshot(s).

You also can use the wireshark program to check for the exchanged messages.

It only will work with http protocol. So you have to find a http server.
It also is not capable of using a proxy.

Best idea to test: Download a graphics file and then try to display the file.

General assignment submission rules:

Please send an email with all required information/document/source/...

Give your name and the names of others of your group

(nevertheless each person needs a separate individual submission.

Groups may vary with different assignments

For total "passed" ALL single assignments need to "pass".

Recommendation for C/C++ programming: "CLion" by JetBrains

It is licensed, but you get a free student license in seconds with your university email address.

Best is to install JetBrains toolbox and use this to get CLion.

See JetBrains.com

Wireshark might also help and show the data.

```

Connecting...
Connected to test.sensin.eu...
Command sent to server:
GET /HKA_EIT_Logo_Gesamt.png HTTP/1.1
Host: test.sensin.eu:80

----Result----
HTTP/1.1 200 OK
Date: Thu, 27 Feb 2025 14:19:23 GMT
Server: Apache
Upgrade: h2
Connection: Upgrade
Last-Modified: Sun, 16 Oct 2022 14:16:47 GMT
ETag: "c227-5eb27825df1c0"
Accept-Ranges: bytes
Content-Length: 49703
Content-Type: image/png
PNG
CÜXt000*00M00~x00300;c000M00Kx0_000000000gET00v00wM000
000Ä{Y0@~000H w 0E,c000xT000gdr<U0J z0Y05000000`g0p00000U00000-R00M00
00<+0J{0%00J{0$00(00000d|0@E0000009j05000b0T00x0800000[=A00|0E0:09T0700000X0h0000
Dp0; 虞00n00K0N?@Y0H[[0-/-0
00F00m0a0000Z0i
00@2!0E
L00+ 000070a0?r-0:0}000
00>0x0m 00g*=k0010vw& ; 0T;j0I000\0D_W}0\q0y=0000q000/0ZU0000000/0w0)500=0b6 000q=00X>"00i&0e00|U00[?0t01
000@0)000B0t0B0@00~+0z000/<000燈B00270g007000:00n0
0004T0w0_0'%"000EC0001V 00#0:ry00屋a02F5}00600000v00600s000,00m0012tF200J0 &0001000DDDD00 0i/P00A0i0!008xW01000|0U00000[007000
DONE!
Process finished with exit code 0

```

empty line!

Optional extension for those who already are finished:

- Write a group room chat program, that is two programs:
- a client connecting to the server at some predefined port
 - * asks the users for text and sends the text to the server.
 - * parallely (multitasking) it receives messages from the server and displays
 - a server that handles multiple clients. Multitasking, one task per client

