

# **Assignment 2**

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# 1 TicTacToe on a LAN

## a Compilation

- The version of **C++** used is C++17.
- The header files required are

```
<sys/socket.h>
<sys/types.h>
<bits/stdc++.h>
<netinet/in.h>
<arpa/inet.h>
<unistd.h>
<sys/time.h>
<poll.h>
```

All header files are normally available on linux systems.

- The compilation command for gameserver is

```
g++ gameserver.cpp -o gameserver --std=c++17 -pthread
```

- The compilation command for gameclient is

```
g++ gameclient.cpp -o gameclient --std=c++17
```

## b Usage

The server will store the log file in "**log\_file.txt**". The usage of gameserver is **./gameserver [PORT TO RUN SERVER ON]** and the usage of gameclient is **./gameclient [SERVER IP ADDRESS] [SERVER PORT NO]**.

## c References

- Manpages for **select**, **poll**, **setsockopt** functions.
- Referenced concurrency control and threading library of C++ at <https://www.cplusplus.com/reference/>. Specifically, I read about mutexes, threads, atomic types in C++.
- Basic structure of client-server socket programming in C++ as in <https://www.geeksforgeeks.org/socket-programming-cc/>.

# 2 YAPP - Yet Another Ping Program

## a Compilation

- The version of **C++** used is C++17.
- The header files required are

```
<bits/stdc++.h>
<sys/socket.h>
<sys/time.h>
<netinet/ip_icmp.h>
<arpa/inet.h>
<unistd.h>
<poll.h>
```

All header files are normally available on linux systems.

- The compilation command is

```
g++ yapp.cpp -o yapp --std=c++17
```

## b Usage

`./yapp [IPv4 Address in dotted decimal notation = X]` will ping **X** once and produce one of 3 possible outputs

- "Bad hostname"
- "Request timed out or host unreachable"
- "Reply from X RTT = N ms" where N = RTT

## c References

- Manpages for `inet_pton`, `poll`, `gettimeofday` functions.
- Ping's manual pages at <https://man7.org/linux/man-pages/man8/ping.8.html>.
- Read <https://www.geeksforgeeks.org/measure-execution-time-with-high-precision-in-c-c/> to know about struct timeval
- ICMP protocol comments at <http://www.networksorcery.com/enp/rfc/rfc792.txt>.