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## Lab Assignment 2

This assignment aims to make us familiar with the hardware and software aspects of computer networking and extracting information related to computer networking using C/C++ programs.

### Problem Statement 1

*Q: Write a socket program in C to connect two nodes on a network to communicate with each other, where one socket listens on a particular port at an IP, while other socket reaches out to the other to form a connection.*

```
rtwalz@ar135: ~/Desktop/csn361/assignment_2/csn361
File Edit View Search Terminal Help
→ csn361 gcc src/q1_server.c -o server
→ csn361 ./server
usage: server <address> <port>
→ csn361 ./server 0.0.0.0 8080
listening on 0.0.0.0 port 8080 ...
connection established!
```

```
rtwalz@ar135: ~/Desktop/csn361/assignment_2/csn361
File Edit View Search Terminal Help
→ csn361 gcc src/q1_client.c -o client
→ csn361 ./client
usage: client <address> <port>
→ csn361 ./client 0.0.0.0 8080
requesting connection from 0.0.0.0 port 8080 ...
connection established!
```

The program implements a bare minimum code to establish a connection between two nodes. Following data structures are used:

1. struct sockaddr\_in: structures describing Internet socket address

No special algorithm is used.

### Problem Statement 2

*Q: Write a C program to demonstrate both Zombie and Orphan process.*

```
rtwalz@ar135: ~/Desktop/csn361/assignment_2/csn361
File Edit View Search Terminal Help
→ csn361 gcc src/q2.c -o processes
→ csn361 ./processes && sleep 0.1 && echo -e '\n--- end ---\n' && ps
I'm the parent!    (14073)
I'm an orphan :(  (14074) My foster parent is systemd (2195)
I'm a zombie! @_@ (14076)

--- end ---

  PID TTY          TIME CMD
  7084 pts/0        00:00:02 zsh
 14074 pts/0        00:00:00 processes
 14076 pts/0        00:00:00 processes <defunct>
 14077 pts/0        00:00:00 ps
```

The program does not use any special data structures. But there are many wrapper functions to help us retrieve required information easily while giving informative error messages in case of failure.

We can clearly see that process (14074) is an orphan process since its parent "died" and is now adopted by systemd (2195). Also process (14076) is a zombie process, can be verified by using ps command which mentions it as <defunct> which is an identifier for zombie processes.