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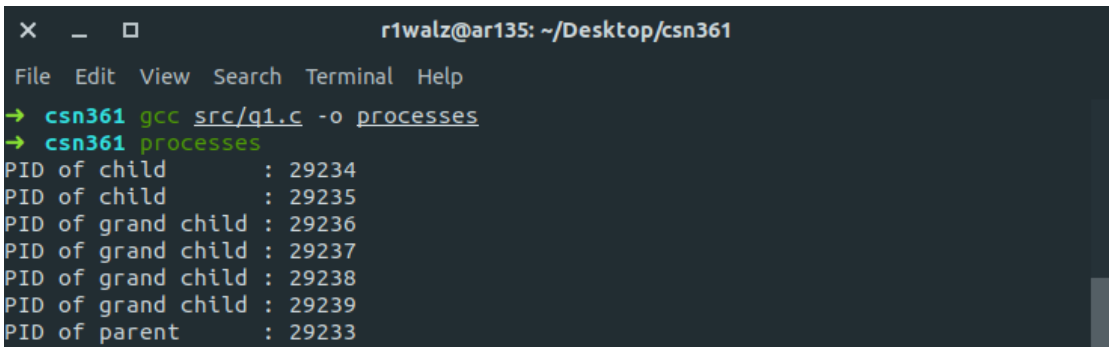
Lab Assignment 1

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

Problem Statement 1

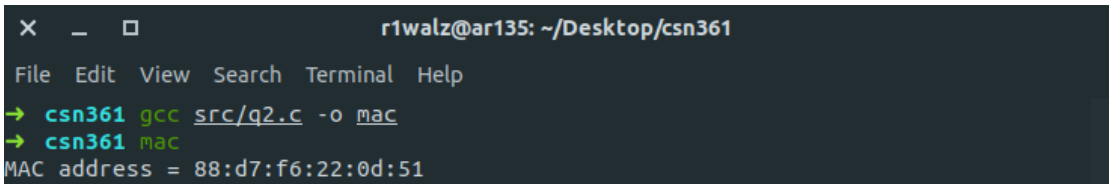
Q: *Write a C program in the UNIX system that creates two children and four grandchildren (two for each child). The program should then print the process-IDs of the two children, the four grandchildren and the parent in this order.*



The program does not make use of any special data structures, but it has some wrapper functions to provide better help messages in case of failure.

Problem Statement 2

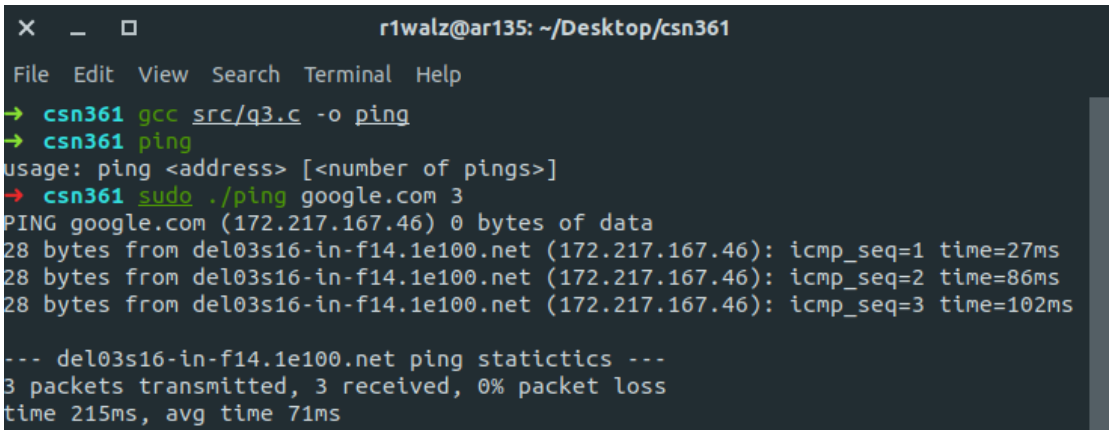
Q: *Write a C program to print the MAC address of your computer.*



The program has two structs (ifreq and ifconf) to keep track of hardware information. As for the algorithm, we are iterating through all the network devices to get the MAC address of the eth interface.

Problem Statement 3

Q: *Write your own version of ping program in C language.*



The program in a bare minimum implementation of the ping command. The program define / use the following data structures:

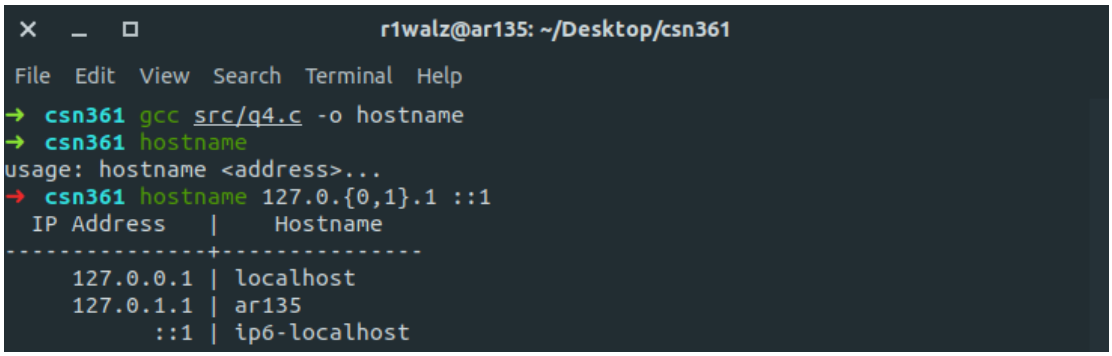
```
1. struct {
    uint8_t type;
    uint8_t code;
    uint16_t chksum;
    uint32_t data;
  } icmp_hdr_t: structure describing the icmp packet that will be echoed to the ping
information.
2. struct addrinfo: structure describes address information for use with TCP/IP
3. struct sockaddr_in / sockaddr: structures describing Internet / Generic socket address
```

Algorithm:

The program first changes the provided address to its numeric equivalent and then starts sending packets until interrupted (through Ctrl + C). The program then prints the statictical information about how many packets were sent / received / lost, total time, average time, etc.

Problem Statement 4

Q: *Write a C program to find the host name from IP address.*



The program uses struct addrinfo to describe the resolved address information. We are iterating through each address provided through the CLI, resolving hostname and printing them.