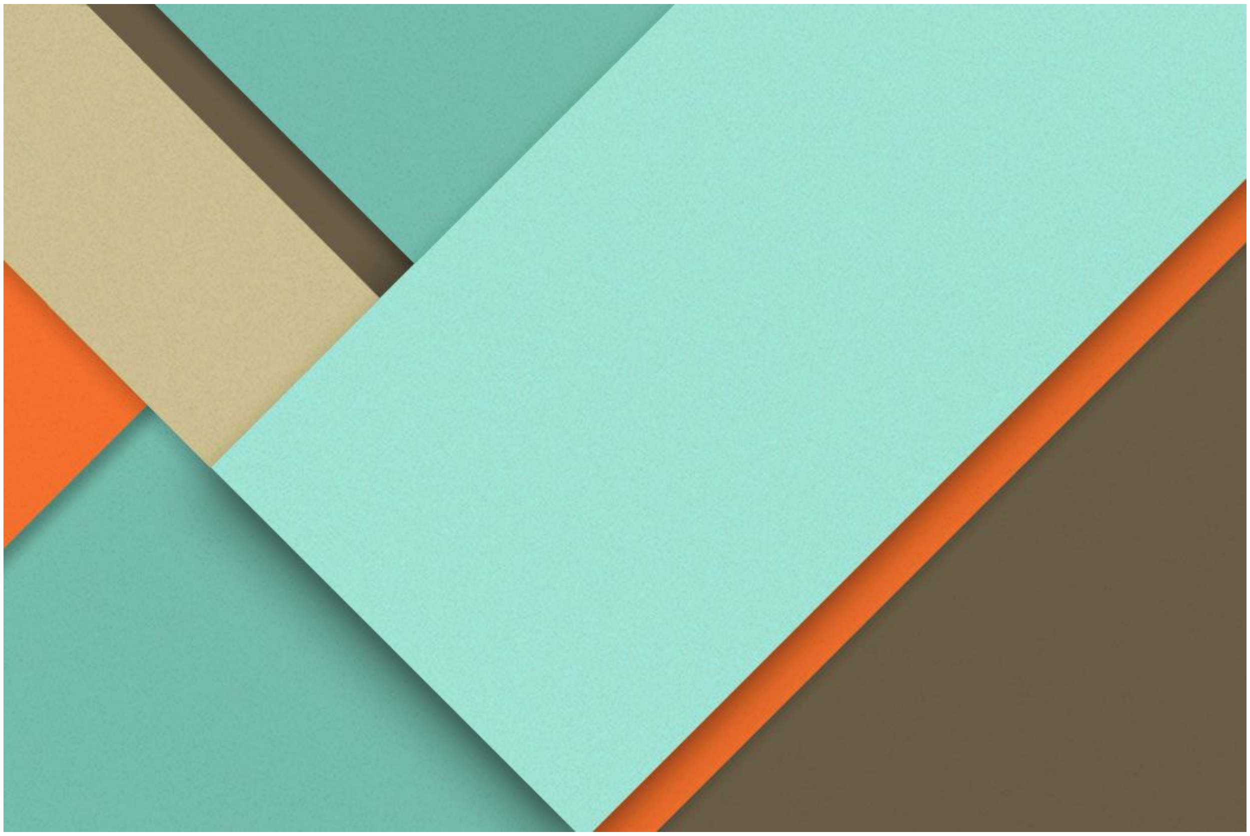

Lab Assignment 1 (Networking Lab)

25.07.2019

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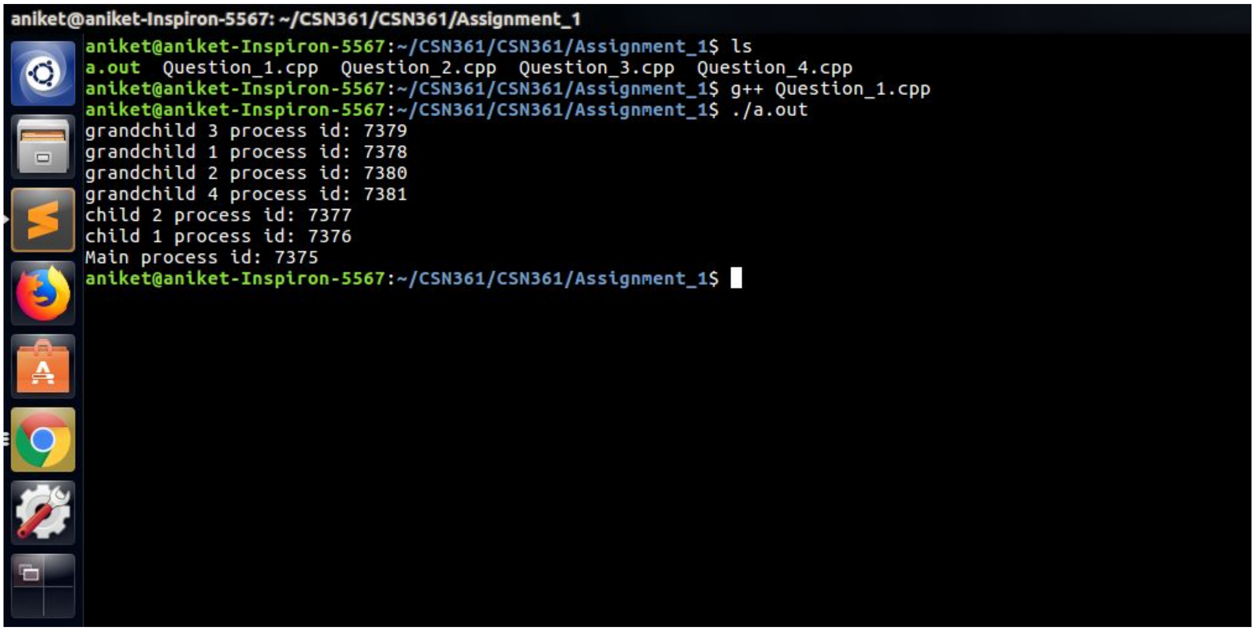
CSE IIIrd year

Problem Statements :

Q1 - 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.



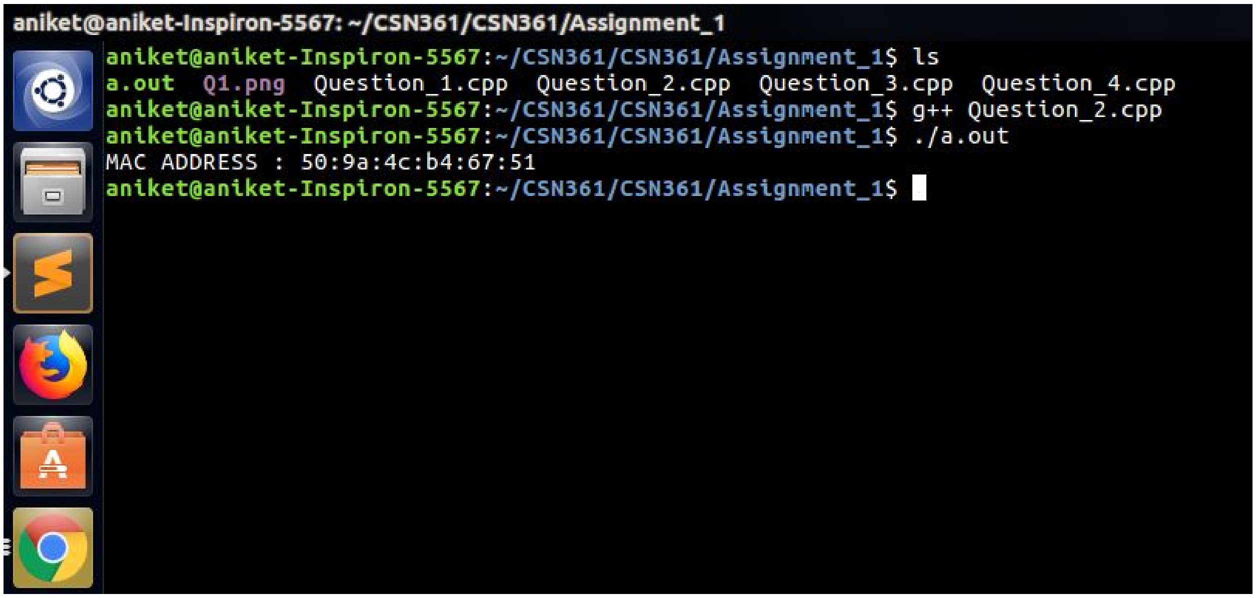
aniket@aniket-Inspiron-5567: ~/CSN361/CSN361/Assignment_1

```
aniket@aniket-Inspiron-5567:~/CSN361/CSN361/Assignment_1$ ls
a.out  Question_1.cpp  Question_2.cpp  Question_3.cpp  Question_4.cpp
aniket@aniket-Inspiron-5567:~/CSN361/CSN361/Assignment_1$ g++ Question_1.cpp
aniket@aniket-Inspiron-5567:~/CSN361/CSN361/Assignment_1$ ./a.out
grandchild 3 process id: 7379
grandchild 1 process id: 7378
grandchild 2 process id: 7380
grandchild 4 process id: 7381
child 2 process id: 7377
child 1 process id: 7376
Main process id: 7375
aniket@aniket-Inspiron-5567:~/CSN361/CSN361/Assignment_1$ 
```

```
#include<bits/stdc++.h>
#include <sys/types.h>
#include <unistd.h>
using namespace std;
int main()
{
        for(int i=0;i<2;++i)
        {
                if(fork()==0)
                {
                        for(int j=0;j<2;++j)
                        {
```

```
                if(fork()==0)
                {
                    cout<<"grandchild "<<i*2+(j+1)<<" process id: "<<getpid()<<"\n";
                    exit(0);
                }
            }
            sleep(1);
            cout<<"child "<<(i+1)<<" process id: "<<getpid()<<"\n";
            exit(0);
        }
    }
    sleep(2);
    cout<<"Main process id: "<<getpid()<<"\n";
}
```

Q2 - Write a C++ program to print MAC address of your computer.



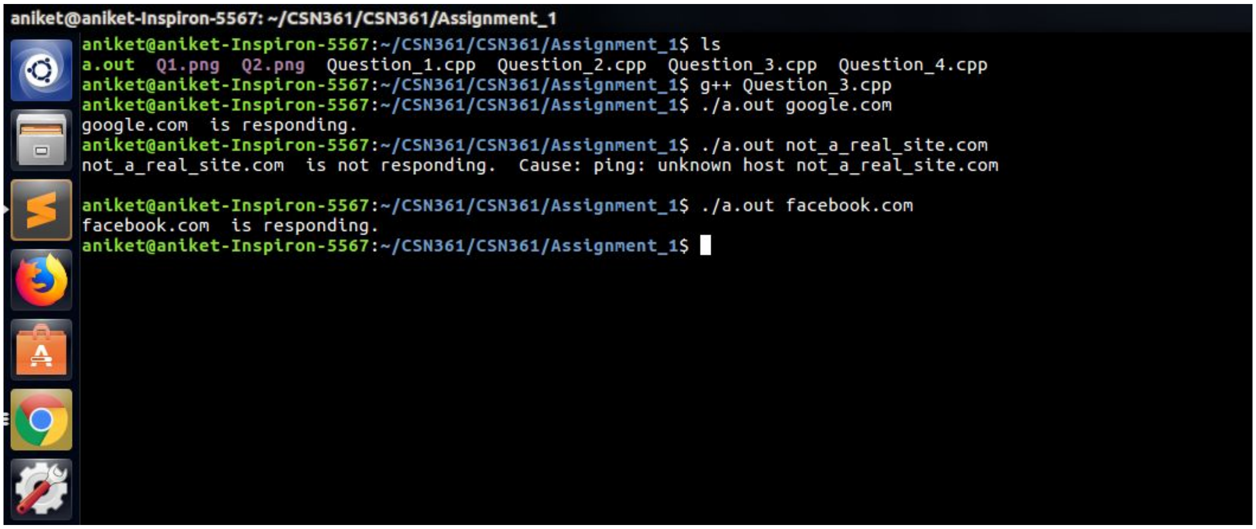
aniket@aniket-Inspiron-5567: ~/CSN361/CSN361/Assignment_1

```
aniket@aniket-Inspiron-5567:~/CSN361/CSN361/Assignment_1$ ls
a.out  Q1.png  Question_1.cpp  Question_2.cpp  Question_3.cpp  Question_4.cpp
aniket@aniket-Inspiron-5567:~/CSN361/CSN361/Assignment_1$ g++ Question_2.cpp
aniket@aniket-Inspiron-5567:~/CSN361/CSN361/Assignment_1$ ./a.out
MAC ADDRESS : 50:9a:4c:b4:67:51
aniket@aniket-Inspiron-5567:~/CSN361/CSN361/Assignment_1$ 
```

```
#include <sys/ioctl.h>
```

```
#include <net/if.h>
#include <unistd.h>
#include <netinet/in.h>
#include <string.h>
#include <bits/stdc++.h>
using namespace std;
int main()
{
    struct ifreq ifr;
    struct ifconf ifc;
    char buf[1024];
    int success = 0;

    int sock = socket(AF_INET, SOCK_DGRAM, IPPROTO_IP);
    if (sock == -1) { /* handle error*/ };

    ifc.ifc_len = sizeof(buf);
    ifc.ifc_buf = buf;
    if (ioctl(sock, SIOCGIFCONF, &ifc) == -1) { /* handle error */ }

    struct ifreq* it = ifc.ifc_req;
    const struct ifreq* const end = it + (ifc.ifc_len / sizeof(struct ifreq));

    for (; it != end; ++it) {
        strcpy(ifr.ifr_name, it->ifr_name);
        if (ioctl(sock, SIOCGIFFLAGS, &ifr) == 0) {
            if (! (ifr.ifr_flags & IFF_LOOPBACK)) { // don't count loopback
                if (ioctl(sock, SIOCGIFHWADDR, &ifr) == 0) {
                    success = 1;
                    break;
                }
            }
        }
        else { /* handle error */ }
    }

    unsigned char mac_address[6];

    if (success) memcpy(mac_address, ifr.ifr_hwaddr.sa_data, 6);
    printf("MAC ADDRESS : %0x:%0x:%0x:%0x:%0x:%0x\n",mac_address[0],mac_address[1],mac_address[2],mac_address[3],mac_address[4],mac_address[5] );
}
```

Q3 - Write your own version of ping program in C++ language.

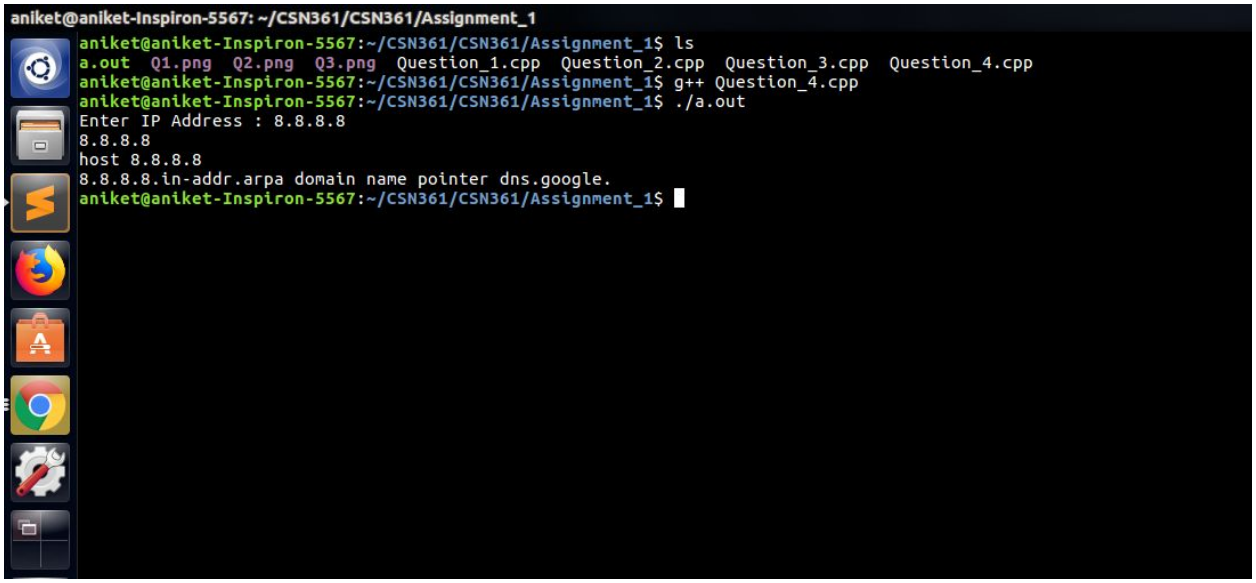


```
aniket@aniket-Inspiron-5567: ~/CSN361/CSN361/Assignment_1
aniket@aniket-Inspiron-5567:~/CSN361/CSN361/Assignment_1$ ls
a.out  Q1.png  Q2.png  Question_1.cpp  Question_2.cpp  Question_3.cpp  Question_4.cpp
aniket@aniket-Inspiron-5567:~/CSN361/CSN361/Assignment_1$ g++ Question_3.cpp
aniket@aniket-Inspiron-5567:~/CSN361/CSN361/Assignment_1$ ./a.out google.com
google.com  is responding.
aniket@aniket-Inspiron-5567:~/CSN361/CSN361/Assignment_1$ ./a.out not_a_real_site.com
not_a_real_site.com  is not responding.  Cause: ping: unknown host not_a_real_site.com

aniket@aniket-Inspiron-5567:~/CSN361/CSN361/Assignment_1$ ./a.out facebook.com
facebook.com  is responding.
aniket@aniket-Inspiron-5567:~/CSN361/CSN361/Assignment_1$ 
```

```
#include <cstdio>
#include <iostream>
#include <sstream>
#include <string>

template <typename TP>
TP str2num( std::string const& value ){
  std::stringstream sin;
  sin << value;
  TP output;
  sin >> output;
  return output;
}

template <typename TP>
std::string num2str( TP const& value ){
  std::stringstream sin;
  sin << value;
  return sin.str();
}
int Execute_Command( const std::string&  command,
                     std::string&        output,
                     const std::string&  mode = "r")
{
  std::stringstream sout;
  FILE *in;
  char buff[512];
  if(!(in = popen(command.c_str(), mode.c_str()))){
    return 1;
  }
  while(fgets(buff, sizeof(buff), in)!=NULL){
    sout << buff;
  }
  int exit_code = pclose(in);
  output = sout.str();
  return exit_code;
}
bool Ping( const std::string& address,
           const int&         max_attempts,
          std::string&       details )
{
    std::string command = "ping -c " + num2str(max_attempts) + " " + address + " 2>&1";
    std::string output;
    int code = Execute_Command( command, details );

    return (code == 0);
}

int main( int argc, char* argv[] )
{
    if( argc < 2 ){
        std::cerr << "usage: " << argv[0] << " <address> <max-attempts = 3>" << std::endl;
        return 1;
    }
    std::string host = argv[1];
    int max_attempts = 1;
    if( argc > 2 ){
        max_attempts = str2num<int>(argv[2]);
    }
    if( max_attempts < 1 ){
        std::cerr << "max-attempts must be > 0" << std::endl;
        return 1;
    }
    std::string details;
    bool result = Ping( host, max_attempts, details );
    std::cout << host << " ";
    if( result == true ){
        std::cout << " is responding." << std::endl;
    }
    else{
        std::cout << " is not responding.  Cause: " << details << std::endl;
    }
```

```
  return 0;
}
```

Q4 - Write a C++ program in the UNIX system to find the host name from IP address.



```
aniket@aniket-Inspiron-5567: ~/CSN361/CSN361/Assignment_1
aniket@aniket-Inspiron-5567:~/CSN361/CSN361/Assignment_1$ ls
a.out  Q1.png  Q2.png  Q3.png  Question_1.cpp  Question_2.cpp  Question_3.cpp  Question_4.cpp
aniket@aniket-Inspiron-5567:~/CSN361/CSN361/Assignment_1$ g++ Question_4.cpp
aniket@aniket-Inspiron-5567:~/CSN361/CSN361/Assignment_1$ ./a.out
Enter IP Address : 8.8.8.8
8.8.8.8
host 8.8.8.8
8.8.8.8.in-addr.arpa domain name pointer dns.google.
aniket@aniket-Inspiron-5567:~/CSN361/CSN361/Assignment_1$ 
```

```
#include<bits/stdc++.h>
using namespace std;

void host_from_ip(char c[100]){
	char cm[50]={'h','o','s','t',' '};
	char qu[50]={};
	strcpy(qu,strcat(cm,c));
	cout<<qu<<endl;
	system(qu);
}
int main(void)
{
    char c[100];
    cout<<"Enter IP Address : ";
    cin>>c;
    cout<<c<<endl;
    host_from_ip(c);
    return 0;
}
```