Struna V.R.

Task№1

1. Create virtual machines connection according to figure 1:
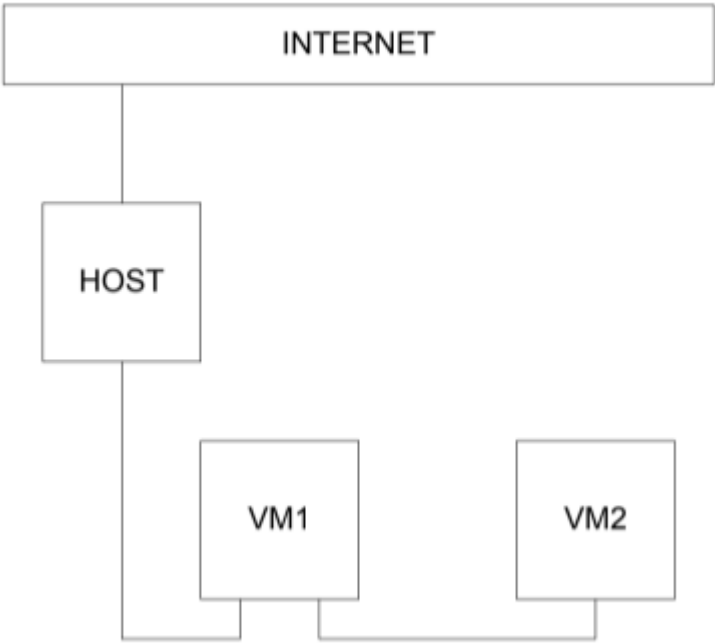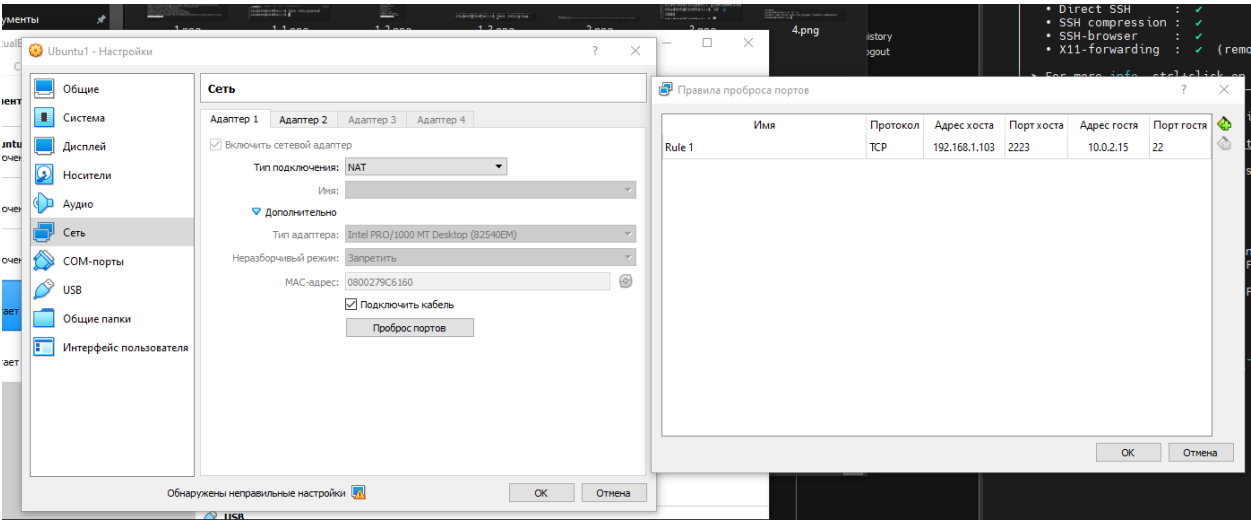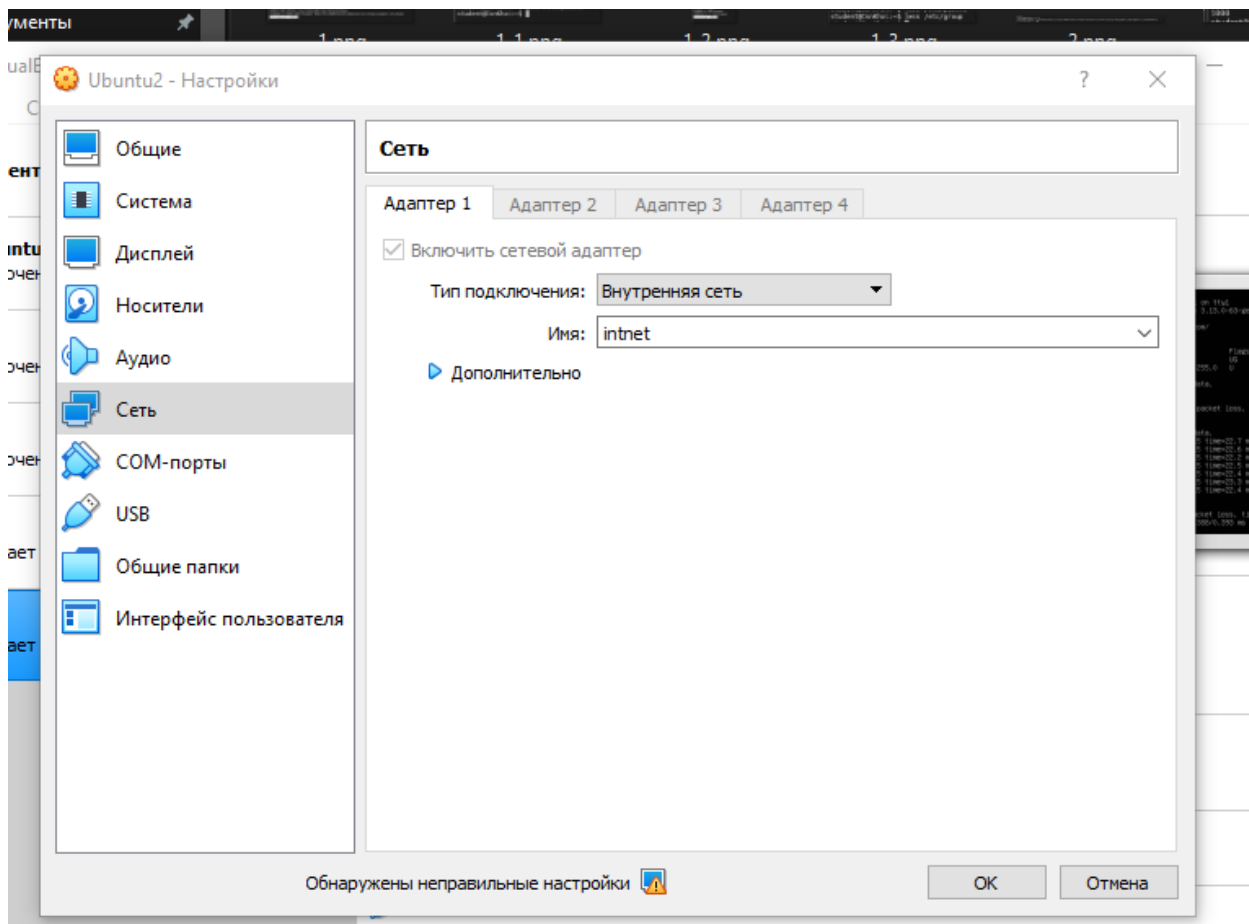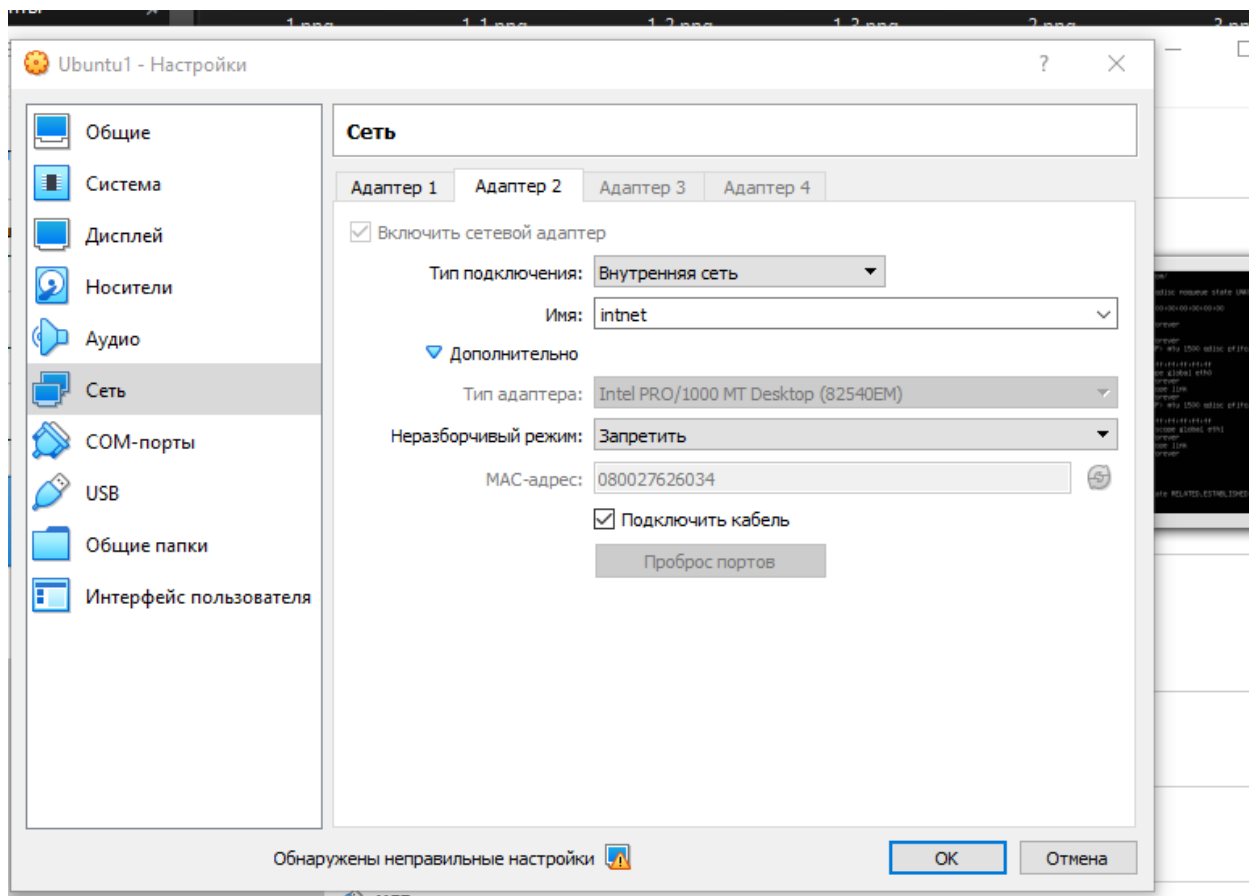

Figure 1 – VMs connection

2. VM2 has one interface (internal), VM1 has 2 interfaces (NAT and internal). Configure all network interfaces in order to make VM2 has an access to the Internet (iptables, forward, masquerade).

Ubuntu1 - Настройки

Сеть

| Адаптер 1 | Адаптер 2 | Адаптер 3 | Адаптер 4 |

☑ Включить сетевой адаптер

Тип подключения: Внутренняя сеть

Имя: intnet

▽ Дополнительно

Тип адаптера: Intel PRO/1000 MT Desktop (82540EM)

Неразборчивый режим: Запретить

MAC-адрес: 080027626034

☑ Подключить кабель

Проброс портов

Обнаружены неправильные настройки ⚠

OK   Отмена

Ubuntu2 - Настройки

Сеть

| Адаптер 1 | Адаптер 2 | Адаптер 3 | Адаптер 4 |

☑ Включить сетевой адаптер

Тип подключения: Внутренняя сеть

Имя: intnet

▷ Дополнительно

Обнаружены неправильные настройки ⚠

OK   Отмена

```
  GNU nano 2.2.6          File: /etc/network/interfaces

# This file describes the network interfaces available on your system
# and how to activate them. For more information, see interfaces(5).

# The loopback network interface
auto lo
iface lo inet loopback

# The primary network interface
auto eth0
iface eth0 inet dhcp

#internal
auto eth1
iface eth1 inet static
address 10.10.10.1
netmask 255.255.255.0
broadcast 10.10.10.255




                              [ Read 18 lines ]
^G Get Help    ^O WriteOut   ^R Read File  ^Y Prev Page  ^K Cut Text   ^C Cur Pos
^X Exit        ^J Justify     ^W Where Is   ^V Next Page  ^U UnCut Text ^T To Spell
```
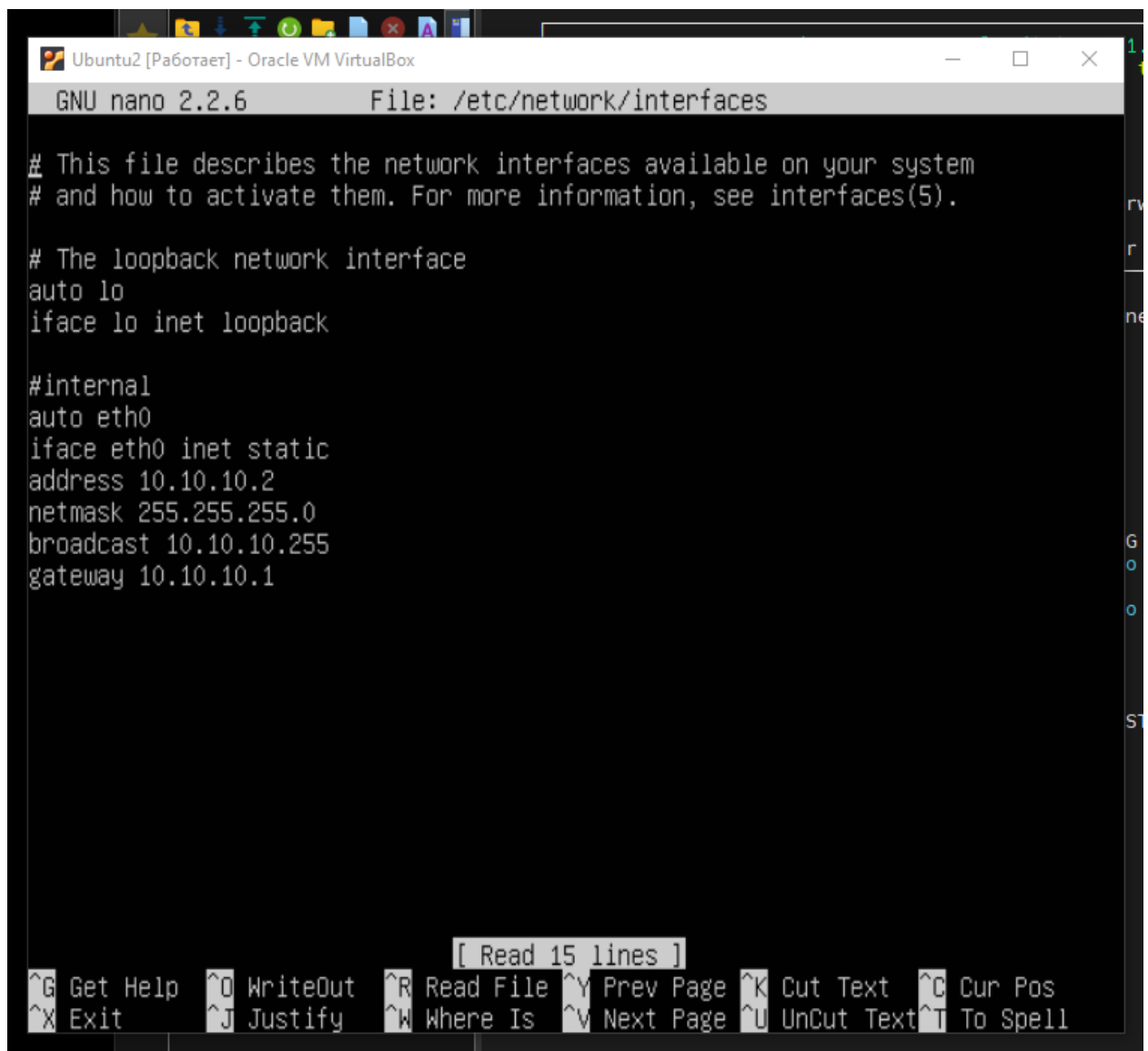
```
GNU nano 2.2.6          File: /etc/network/interfaces

# This file describes the network interfaces available on your system
# and how to activate them. For more information, see interfaces(5).

# The loopback network interface
auto lo
iface lo inet loopback

#internal
auto eth0
iface eth0 inet static
address 10.10.10.2
netmask 255.255.255.0
broadcast 10.10.10.255
gateway 10.10.10.1




                        [ Read 15 lines ]
^G Get Help  ^O WriteOut  ^R Read File ^Y Prev Page ^K Cut Text  ^C Cur Pos
^X Exit      ^J Justify   ^W Where Is  ^V Next Page ^U UnCut Text^T To Spell
```

```
                         netns | l2tp | tcp_metrics | token }
          OPTIONS := { -V[ersion] | -s[tatistics] | -d[etails] | -r[esolve] |
                       -f[amily] { inet | inet6 | ipx | dnet | bridge | link } |
                       -4 | -6 | -I | -D | -B | -0 |
                       -l[oops] { maximum-addr-flush-attempts } |
                       -o[neline] | -t[imestamp] | -b[atch] [filename] |
                       -rc[vbuf] [size]}
student@CsnKhai:~$ ip a
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN group defaul
t
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
    inet 127.0.0.1/8 scope host lo
       valid_lft forever preferred_lft forever
    inet6 ::1/128 scope host
       valid_lft forever preferred_lft forever
2: eth0: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc pfifo_fast state UP gr
oup default qlen 1000
    link/ether 08:00:27:9c:61:60 brd ff:ff:ff:ff:ff:ff
    inet 10.0.2.15/24 brd 10.0.2.255 scope global eth0
       valid_lft forever preferred_lft forever
    inet6 fe80::a00:27ff:fe9c:6160/64 scope link
       valid_lft forever preferred_lft forever
3: eth1: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc pfifo_fast state UP gr
oup default qlen 1000
    link/ether 08:00:27:62:60:34 brd ff:ff:ff:ff:ff:ff
    inet 10.10.10.1/24 brd 10.10.10.255 scope global eth1
       valid_lft forever preferred_lft forever
    inet6 fe80::a00:27ff:fe62:6034/64 scope link
       valid_lft forever preferred_lft forever
student@CsnKhai:~$ _
```

```
gateway 10.10.10.1
```

[Read 15 lines]

```
student@CsnKhai:~$ ip a
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN group defaul
t
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
    inet 127.0.0.1/8 scope host lo
       valid_lft forever preferred_lft forever
    inet6 ::1/128 scope host
       valid_lft forever preferred_lft forever
2: eth0: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc pfifo_fast state UP gr
oup default qlen 1000
    link/ether 08:00:27:36:43:ed brd ff:ff:ff:ff:ff:ff
    inet 10.10.10.2/24 brd 10.10.10.255 scope global eth0
       valid_lft forever preferred_lft forever
    inet6 fe80::a00:27ff:fe36:43ed/64 scope link
       valid_lft forever preferred_lft forever
student@CsnKhai:~$ _
```
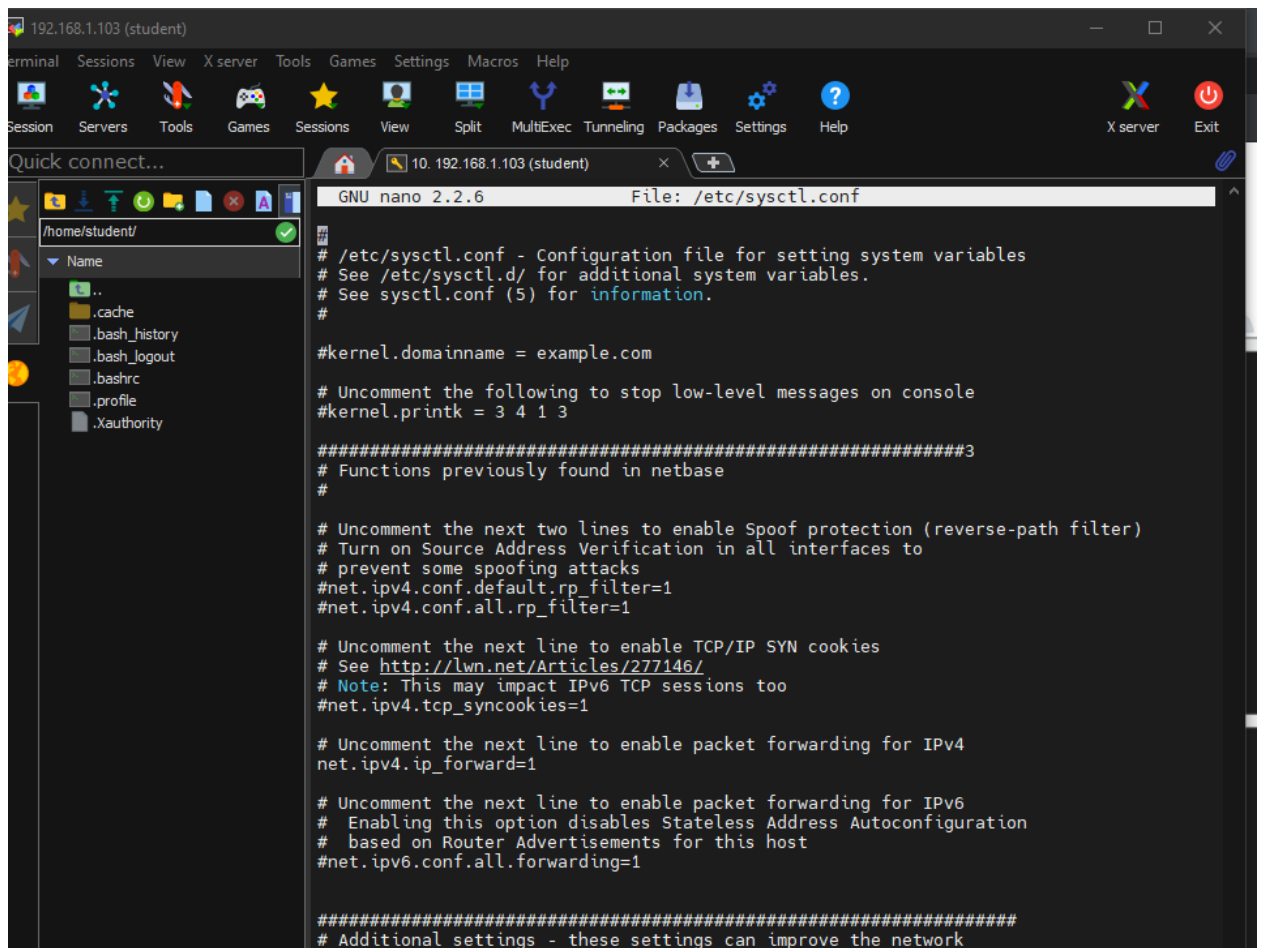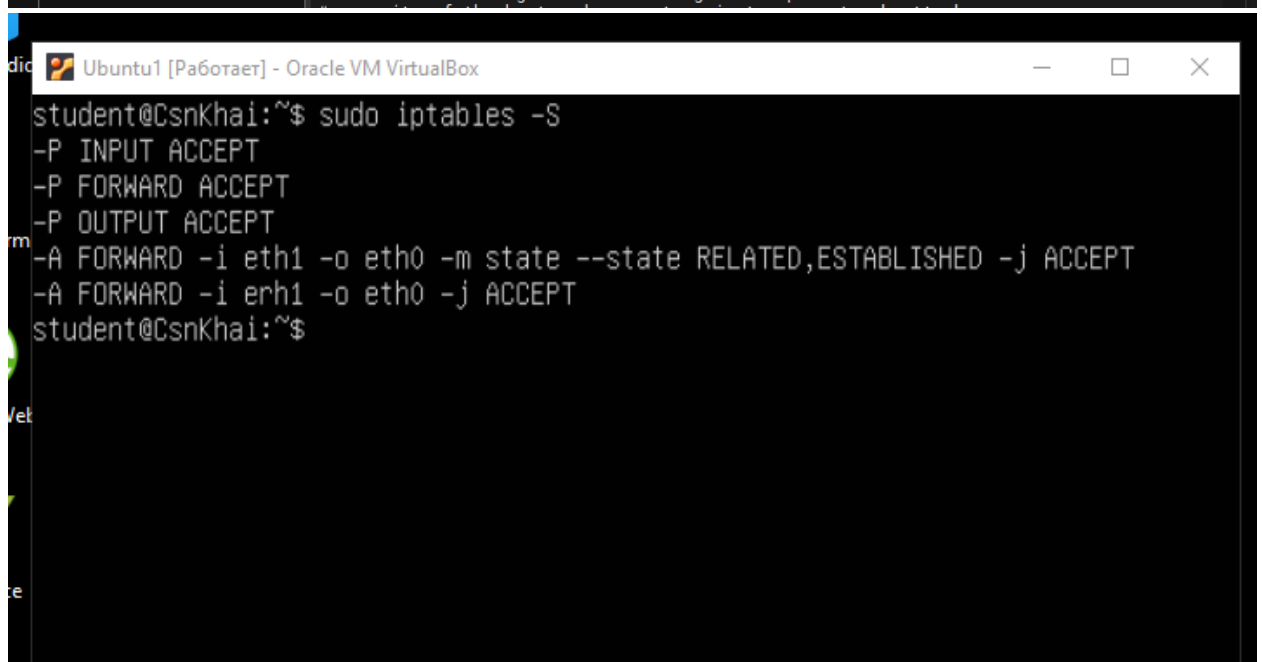
Welcome to Ubuntu 14.04.3 LTS (GNU/Linux 3.13.0-63-generic i686)

 * Documentation: https://help.ubuntu.com/
Last login: Sat Dec 25 14:06:50 2021 from 10.0.2.2
student@CsnKhai:~$ sudo nano /etc/sysctl.conf
[sudo] password for student:
student@CsnKhai:~$ sudo iptables -S
-P INPUT ACCEPT
-P FORWARD ACCEPT
-P OUTPUT ACCEPT
student@CsnKhai:~$ sudo iptables -t nat -A POSTROUTING -o eth0 -j MASQUERADE
student@CsnKhai:~$ sudo iptables -A FORWARD -i eth1 -o eth0 -m state --state RELATED,E
STABLISHED -j ACCEPT
student@CsnKhai:~$ sudo iptables -A FORWARD -i erh1 -o eth0 -j ACCEPT
student@CsnKhai:~$ sudo iptables -S
-P INPUT ACCEPT
-P FORWARD ACCEPT
-P OUTPUT ACCEPT
-A FORWARD -i eth1 -o eth0 -m state --state RELATED,ESTABLISHED -j ACCEPT
-A FORWARD -i erh1 -o eth0 -j ACCEPT
student@CsnKhai:~$ ip a
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN group default
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
    inet 127.0.0.1/8 scope host lo
       valid_lft forever preferred_lft forever
    inet6 ::1/128 scope host
       valid_lft forever preferred_lft forever
2: eth0: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc pfifo_fast state UP group de
fault qlen 1000
    link/ether 08:00:27:9c:61:60 brd ff:ff:ff:ff:ff:ff
    inet 10.0.2.15/24 brd 10.0.2.255 scope global eth0
       valid_lft forever preferred_lft forever
    inet6 fe80::a00:27ff:fe9c:6160/64 scope link
       valid_lft forever preferred_lft forever
3: eth1: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc pfifo_fast state UP group de
fault qlen 1000
    link/ether 08:00:27:62:60:34 brd ff:ff:ff:ff:ff:ff
    inet 10.10.10.1/24 brd 10.10.10.255 scope global eth1
       valid_lft forever preferred_lft forever
    inet6 fe80::a00:27ff:fe62:6034/64 scope link
       valid_lft forever preferred_lft forever
student@CsnKhai:~$

3. Check the route from VM2 to Host.

```
Ubuntu2 [Работает] - Oracle VM VirtualBox                    —  □  ×
student@CsnKhai:~$ ping 8.8.8.8
PING 8.8.8.8 (8.8.8.8) 56(84) bytes of data.
64 bytes from 8.8.8.8: icmp_seq=1 ttl=115 time=22.6 ms
64 bytes from 8.8.8.8: icmp_seq=2 ttl=115 time=21.9 ms
64 bytes from 8.8.8.8: icmp_seq=3 ttl=115 time=22.2 ms
64 bytes from 8.8.8.8: icmp_seq=4 ttl=115 time=22.5 ms
^C
--- 8.8.8.8 ping statistics ---
4 packets transmitted, 4 received, 0% packet loss, time 3005ms
rtt min/avg/max/mdev = 21.934/22.336/22.619/0.320 ms
student@CsnKhai:~$ route
Kernel IP routing table
Destination     Gateway         Genmask         Flags Metric Ref    Use Iface
default         10.10.10.1      0.0.0.0         UG    0      0        0 eth0
10.10.10.0      *               255.255.255.0   U     0      0        0 eth0
student@CsnKhai:~$ traceroute 192.168.1.103
traceroute to 192.168.1.103 (192.168.1.103), 30 hops max, 60 byte packets
 1  10.10.10.1 (10.10.10.1)  0.355 ms  0.338 ms  0.328 ms
 2  10.0.2.2 (10.0.2.2)  1.489 ms  1.480 ms  1.472 ms
 3  10.0.2.2 (10.0.2.2)  2.809 ms  2.597 ms  2.583 ms
student@CsnKhai:~$
```

4. Check the access to the Internet, (just ping, for example, 8.8.8.8).


```
Ubuntu2 [Работает] - Oracle VM VirtualBox                    —  □  ×
student@CsnKhai:~$ ping 8.8.8.8
PING 8.8.8.8 (8.8.8.8) 56(84) bytes of data.
64 bytes from 8.8.8.8: icmp_seq=1 ttl=115 time=22.6 ms
64 bytes from 8.8.8.8: icmp_seq=2 ttl=115 time=21.9 ms
64 bytes from 8.8.8.8: icmp_seq=3 ttl=115 time=22.2 ms
64 bytes from 8.8.8.8: icmp_seq=4 ttl=115 time=22.5 ms
^C
--- 8.8.8.8 ping statistics ---
4 packets transmitted, 4 received, 0% packet loss, time 3005ms
rtt min/avg/max/mdev = 21.934/22.336/22.619/0.320 ms
student@CsnKhai:~$
```

5. Determine, which resource has an IP address 8.8.8.8.

Ubuntu2 [Работает] - Oracle VM VirtualBox

```
GNU nano 2.2.6                    File: /etc/hosts

127.0.0.1         localhost
127.0.1.1         CsnKhai
8.8.8.8           google.com

# The following lines are desirable for IPv6 capable hosts
::1       localhost ip6-localhost ip6-loopback
ff02::1 ip6-allnodes
ff02::2 ip6-allrouters
```

Ubuntu2 [Работает] - Oracle VM VirtualBox   —   □   ×

```
student@CsnKhai:~$ ping google.com
PING google.com (8.8.8.8) 56(84) bytes of data.
64 bytes from google.com (8.8.8.8): icmp_seq=1 ttl=115 time=22.1 ms
64 bytes from google.com (8.8.8.8): icmp_seq=2 ttl=115 time=22.1 ms
64 bytes from google.com (8.8.8.8): icmp_seq=3 ttl=115 time=22.6 ms
```

6. Determine, which IP address belongs to resource epam.com.

```
student@CsnKhai:~$ dig epam.com

; <<>> DiG 9.9.5-3ubuntu0.5-Ubuntu <<>> epam.com
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 27821
;; flags: qr rd ra; QUERY: 1, ANSWER: 1, AUTHORITY: 0, ADDITIONAL: 1

;; OPT PSEUDOSECTION:
; EDNS: version: 0, flags:; udp: 4096
;; QUESTION SECTION:
;epam.com.                      IN      A

;; ANSWER SECTION:
epam.com.               577     IN      A       3.214.134.159

;; Query time: 9 msec
;; SERVER: 192.168.1.1#53(192.168.1.1)
;; WHEN: Sat Dec 25 14:39:55 UTC 2021
;; MSG SIZE  rcvd: 53
```

```
student@CsnKhai:~$ nslookup epam.com
Server:         192.168.1.1
Address:        192.168.1.1#53

Non-authoritative answer:
Name:   epam.com
Address: 3.214.134.159

student@CsnKhai:~$ _
```

7. Determine the default gateway for your HOST and display routing table.

```
student@CsnKhai:~$ route
Kernel IP routing table
Destination     Gateway         Genmask         Flags Metric Ref    Use Iface
default         10.0.2.2        0.0.0.0         UG    0      0        0 eth0
10.0.2.0        *               255.255.255.0   U     0      0        0 eth0
10.10.10.0      *               255.255.255.0   U     0      0        0 eth1
```

```
Ubuntu2 [Работает] - Oracle VM VirtualBox                      —    □    ✕

student@CsnKhai:~$ traceroute 10.0.2.2
traceroute to 10.0.2.2 (10.0.2.2), 30 hops max, 60 byte packets
 1  10.10.10.1 (10.10.10.1)  0.244 ms  0.303 ms  0.294 ms
 2  10.0.2.2 (10.0.2.2)  2.732 ms  2.638 ms  2.624 ms
student@CsnKhai:~$ route
Kernel IP routing table
Destination     Gateway         Genmask         Flags Metric Ref    Use Iface
default         10.10.10.1      0.0.0.0         UG    0      0        0 eth0
10.10.10.0      *               255.255.255.0   U     0      0        0 eth0
student@CsnKhai:~$
```

8. Trace the route to google.com.

```
                                    rtt min/avg/m            °°  Calibri (Осно ▾ 11    ▾

Ubuntu2 [Работает] - Oracle VM VirtualBox

student@CsnKhai:~$ traceroute google.com
traceroute to google.com (8.8.8.8), 30 hops max, 60 byte packets
 1  10.10.10.1 (10.10.10.1)  0.333 ms  0.456 ms  0.451 ms
 2  10.0.2.2 (10.0.2.2)  0.770 ms  0.767 ms  0.780 ms
 3  * * *
 4  * * *
 5  * * *
 6  * * *
 7  * * *
 8  *^C
student@CsnKhai:~$
```

```
Ubuntu2 [Работает] - Oracle VM VirtualBox
student@CsnKhai:~$ traceroute 8.8.8.8
traceroute to 8.8.8.8 (8.8.8.8), 30 hops max, 60 byte packets
 1  10.10.10.1 (10.10.10.1)  0.373 ms  0.356 ms  0.716 ms
 2  10.0.2.2 (10.0.2.2)  0.715 ms  0.710 ms  0.705 ms
 3  * * *
 4  * * *
 5  * * *
 6  * * *
 7  * * *
 8  *^C
student@CsnKhai:~$ _
```