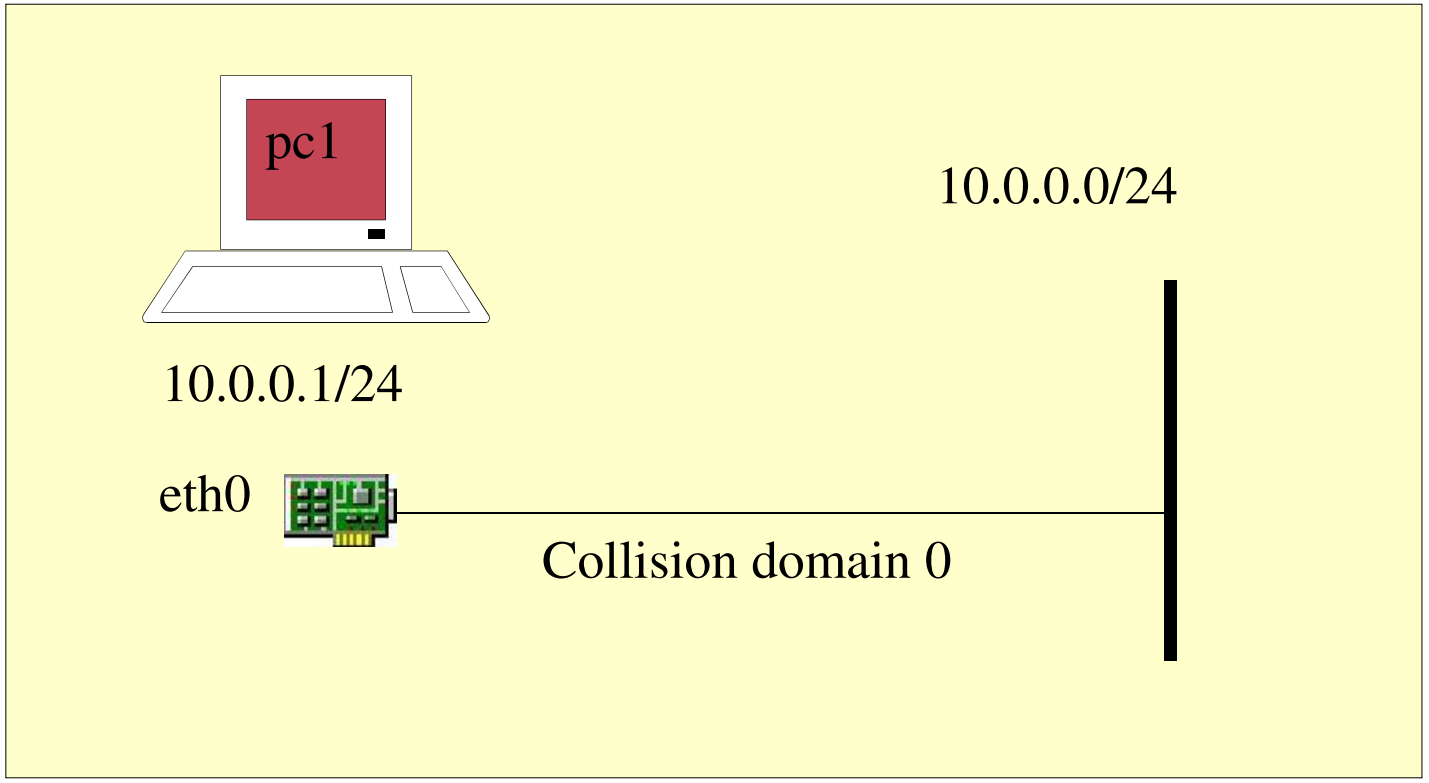
Using NetML
to describe hosts

First example: single.xml
Just one virtual machine



single.xml
Networks and Collision domains

```
<NetML xmlns="http://www.xmlnetwork.org"
       xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
       xsi:schemaLocation="http://www.xmlnetwork.org
                                          netml.xsd">
   <Networks>
      <n id="n-A">
         <networkAddress>11.0.0.32/30</networkAddress>
         <CollisionDomains>
            <c id="C0">
               <iface r_id="r_1" if="eth0"/>
            </c>
         </CollisionDomains>
      </n>
   </Networks>
   ...
```

single.xml
Router configuration

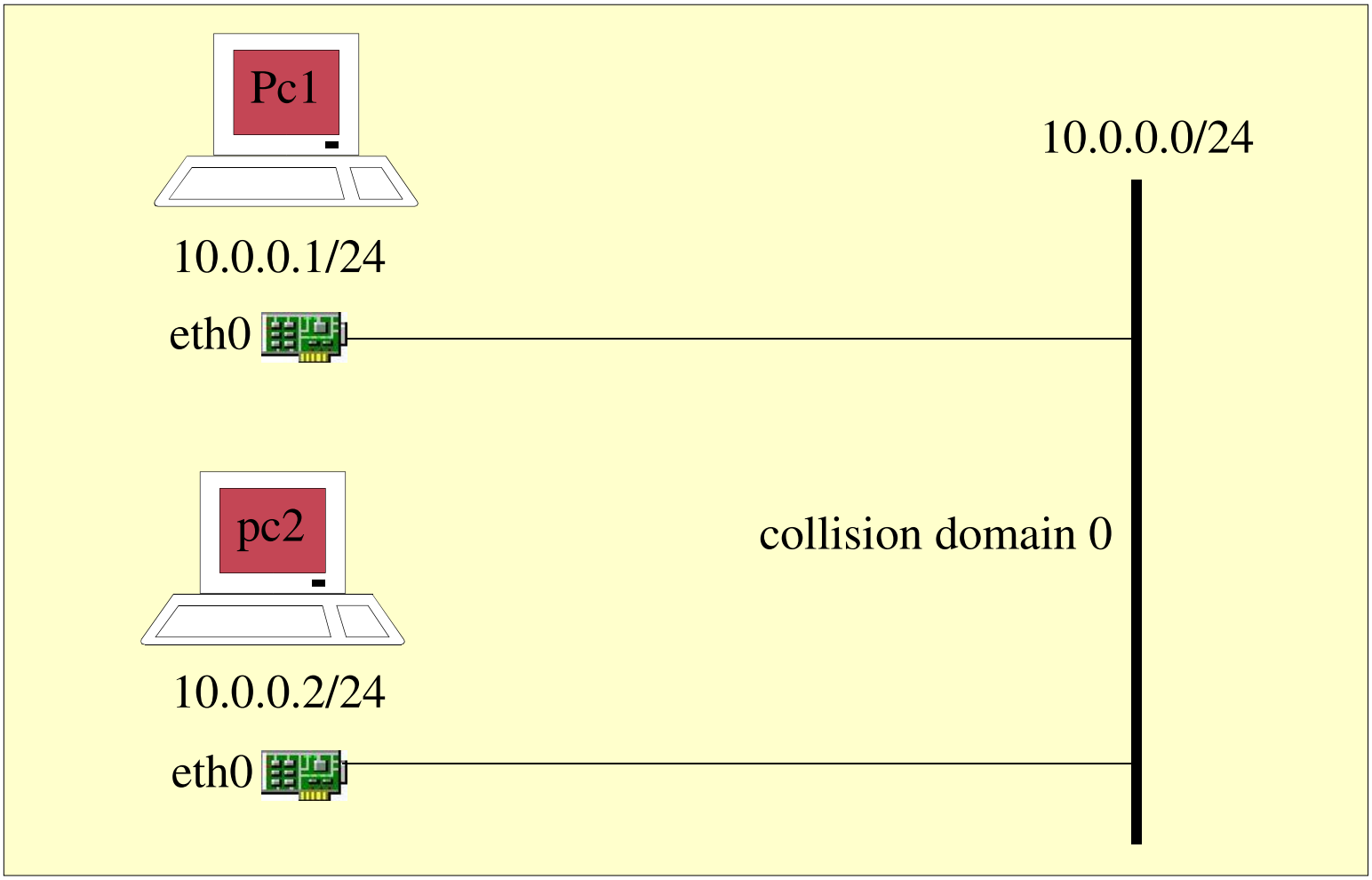
```
...
   <Routers>
      <RouterConf id="r_1" Hostname="pc1">
         <Interface name="eth0">
            <ipAddress>10.0.0.1/24</ipAddress>
         </Interface>
      </RouterConf>
   </Routers>
</NetML>
```

single.xml
Checking routing

```
r_1-pc1:~# ifconfig
eth0      Link encap:Ethernet  HWaddr FE:FD:0A:00:00:01
          inet addr:10.0.0.1  Bcast:10.255.255.255  Mask:255.255.255.0
          inet6 addr: fe80::fcfd:aff:fe00:1/10 Scope:Link
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:3 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:100
          RX bytes:0 (0.0 b)  TX bytes:218 (218.0 b)
          Interrupt:4
...
```

```
R_1-pc1:~# route -n
Kernel IP routing table
Destination     Gateway         Genmask         Flags Metric Ref    Use Iface
10.0.0.0        0.0.0.0         255.255.255.0   U     0      0        0 eth0
```

two-hosts.xml : Two virtual machines connected by a single collision domain



two-hosts.xml
Networks and Collision domains

```
<NetML xmlns="http://www.xmlnetwork.org"
       xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
       xsi:schemaLocation="http://www.xmlnetwork.org
                                              netml.xsd">
   <Networks>
      <n id="n-A">
         <networkAddress>11.0.0.32/30</networkAddress>
         <CollisionDomains>
            <c id="C0">
               <iface r_id="r_1" if="eth0"/>
               <iface r_id="r_2" if="eth0"/>
            </c>
         </CollisionDomains>
      </n>
   </Networks>
   ...
```

two-hosts.xml
Router configuration

```
...
   <Routers>
      <RouterConf id="r_1" Hostname="pc1">
         <Interface name="eth0">
            <ipAddress>10.0.0.1/24</ipAddress>
         </Interface>
      </RouterConf>
      <RouterConf id="r_2" Hostname="pc2">
         <Interface name="eth0">
            <ipAddress>10.0.0.2/24</ipAddress>
         </Interface>
      </RouterConf>
   </Routers>
</NetML>
```

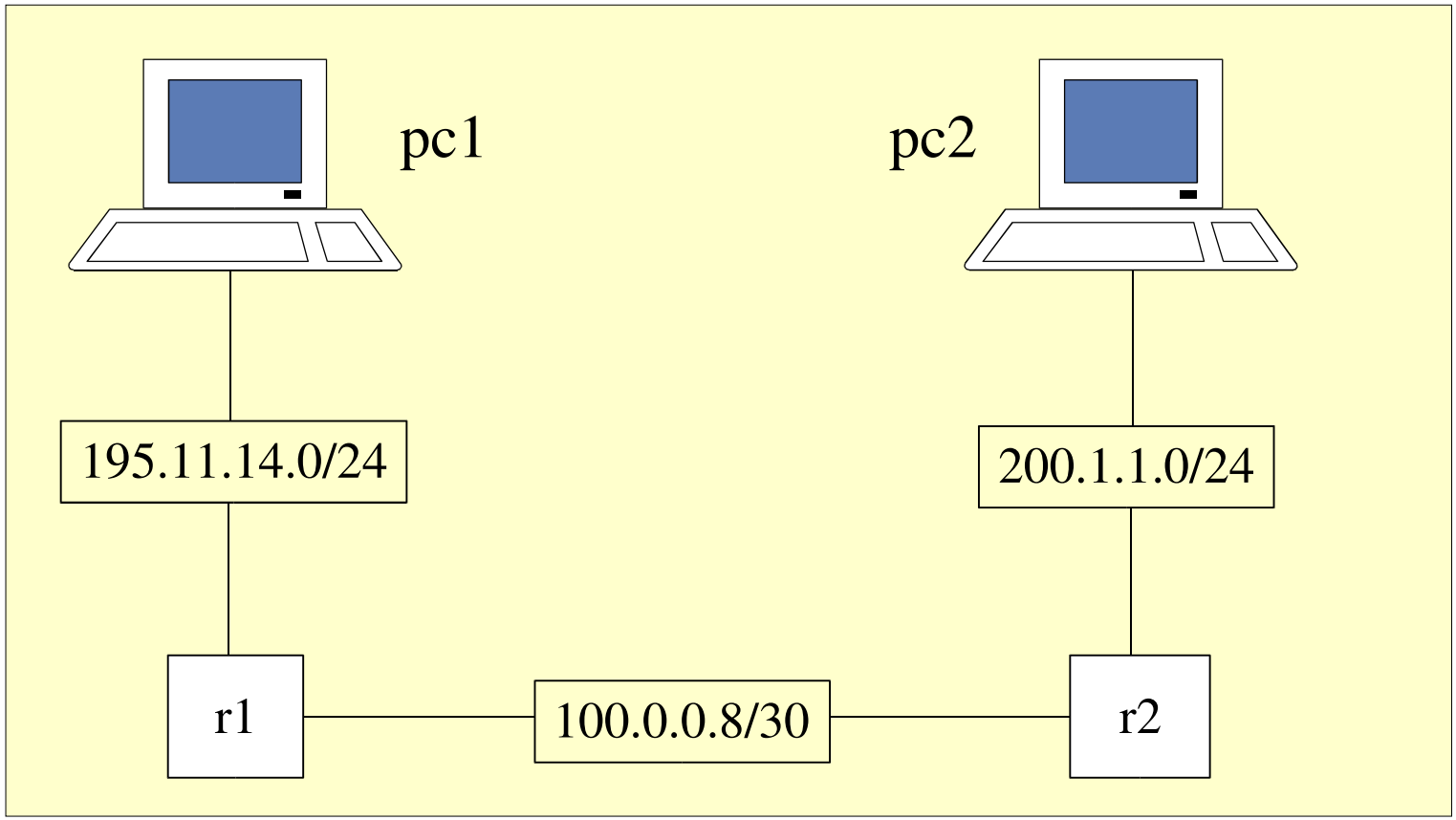
two-hosts.xml
Checking routing

```
r_2-pc2:~# ifconfig
eth0      Link encap:Ethernet  HWaddr FE:FD:0A:00:00:02
          inet addr:10.0.0.2  Bcast:10.255.255.255  Mask:255.255.255.0
          inet6 addr: fe80::fcfd:aff:fe00:2/10 Scope:Link
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:1 errors:0 dropped:0 overruns:0 frame:0
          TX packets:4 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:100
          RX bytes:56 (56.0 b)  TX bytes:288 (288.0 b)
          Interrupt:4
```

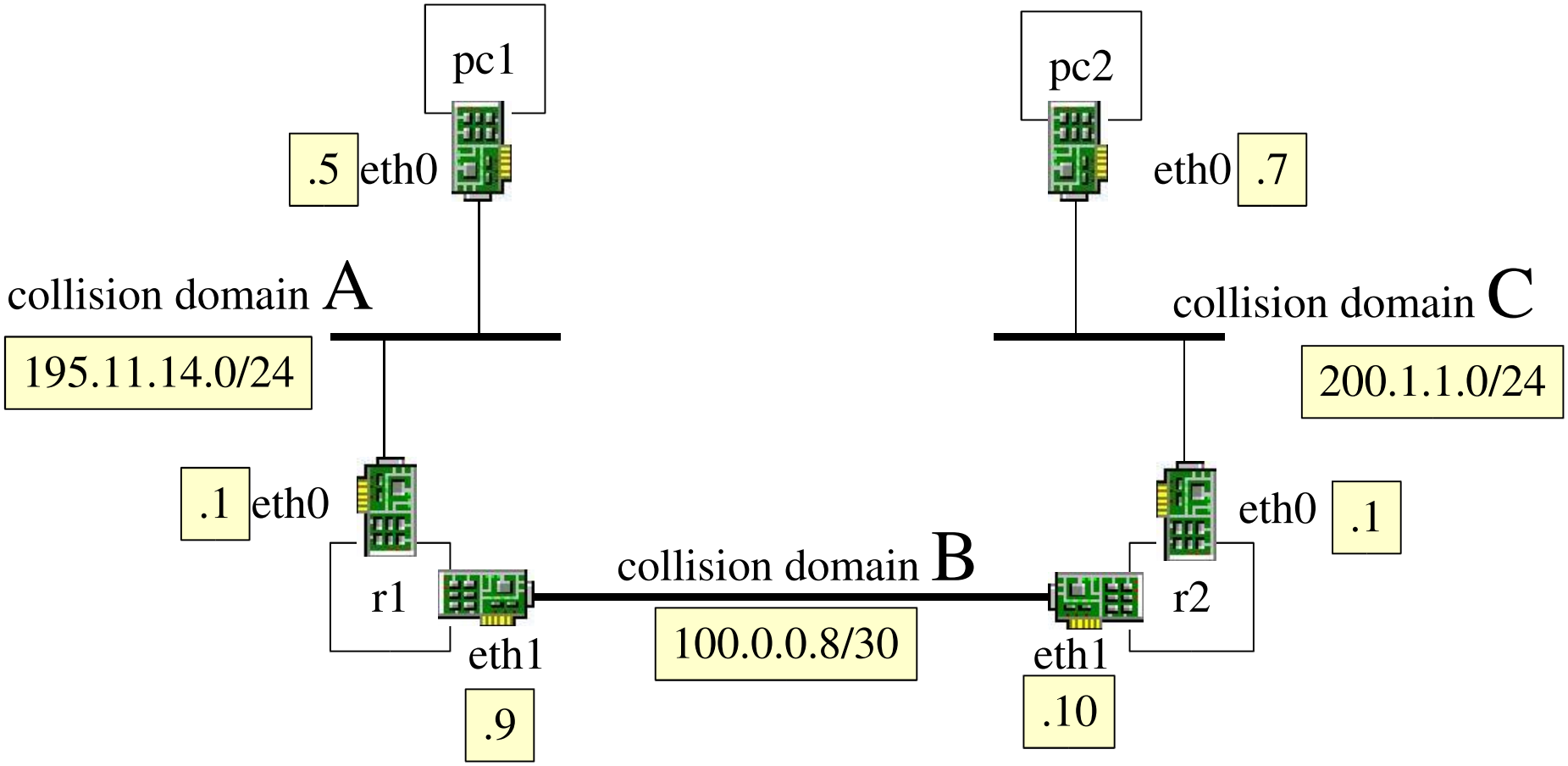
```
r_2-pc2:~# ping 10.0.0.1
PING 10.0.0.1 (10.0.0.1): 56 data bytes
64 bytes from 10.0.0.1: icmp_seq=0 ttl=255 time=1.0 ms
64 bytes from 10.0.0.1: icmp_seq=1 ttl=255 time=0.5 ms

--- 10.0.0.1 ping statistics ---
2 packets transmitted, 2 packets received, 0% packet loss
round-trip min/avg/max = 0.5/0.7/1.0 ms
```

static-routing.xml
High level description



static-routing.xml
A deeper sight



static-routing.xml
Network A and its collision domain

```
<NetML xmlns="http://www.xmlnetwork.org"
       xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
       xsi:schemaLocation="http://www.xmlnetwork.org
                                          netml.xsd">
   <Networks>
      <n id="n-A">
         <networkAddress>195.11.14.0/24</networkAddress>
         <CollisionDomains>
            <c id="A">
               <iface r_id="r_pc1" if="eth0"/>
               <iface r_id="r_1" if="eth0"/>
            </c>
         </CollisionDomains>
      </n>
      ...
```

static-routing.xml
Router with 2 interfaces and a static route

```
...
   <RouterConf id="r_1" Hostname="r1">
      <Interface name="eth0">
         <ipAddress>195.11.14.1/24</ipAddress>
      </Interface>
      <Interface name="eth1">
         <ipAddress>100.0.0.9/30</ipAddress>
      </Interface>
      <StaticRoutes>
         <route>
            <destination>200.1.1.0/24</destination>
            <nexthop>100.0.0.10</nexthop>
         </route>
      </StaticRoutes>
   </RouterConf>
   ...
```

static-routing.xml
Host with a default route

```
...
   <RouterConf id="r_pc1" Hostname="pc1" >
      <Interface name="eth0">
         <ipAddress>195.11.14.5/24</ipAddress>
      </Interface>
      <StaticRoutes>
         <route>
            <destination>default</destination>
            <nexthop>195.11.14.1</nexthop>
         </route>
      </StaticRoutes>
   </RouterConf>
   ...
```

static-routing.xml
Checking routing

```
r_pc1-pc1:~# route -n
Kernel IP routing table
Destination     Gateway         Genmask         Flags Metric Ref    Use Iface
195.11.14.0     0.0.0.0         255.255.255.0   U     0      0        0 eth0
0.0.0.0         195.11.14.1     0.0.0.0         UG    0      0        0 eth0
```

```
r_1-r1:~# route -n
route -n
Kernel IP routing table
Destination     Gateway         Genmask         Flags Metric Ref    Use Iface
100.0.0.8       0.0.0.0         255.255.255.252 U     0      0        0 eth1
200.1.1.0       100.0.0.10      255.255.255.0   UG    0      0        0 eth1
195.11.14.0     0.0.0.0         255.255.255.0   U     0      0        0 eth0
```

```
R_pc1-pc1:~# traceroute -n 200.1.1.7
traceroute to 200.1.1.7 (200.1.1.7), 64 hops max, 40 byte packets
 1  195.11.14.1  1 ms  0 ms  0 ms
 2  100.0.0.10  1 ms  1 ms  1 ms
 3  200.1.1.7  1 ms  1 ms  1 ms
```