**Work case 3**

2. **network address translation (NAT)** - Connection type assigned to each virtual machine by default. Meets the minimum requirements for working on the Internet and does not require initial configuration.

NAT connects the guest OS to the external network, isolating it from direct connections from the outside.

NAT imitates a connection to a router. The router is the Virtualbox network module, which processes outgoing packets and forwards them to the host system, in the same way incoming traffic is processed. A router is created between each virtual machine and the host system. Through this separation, the virtual machine becomes protected from contacts with other machines and intrusions from the external network.

The virtual machine receives its network address from the built-in DHCP server. The machine is assigned an address in the range 10.0.X.0/24, where "X" is the interface address given by the formula +2. So "X" will be 2 if there is only one active NAT interface. The guest operating system will be assigned the address 10.0.2.15, the network gateway will be assigned the address 10.0.2.2, the name server (DNS) will be assigned 10.0.2.3.

**Network Bridge** emulates a card connected directly to the network. The adapter is connected to a distribution device within the network, after which the machine receives a standard ip-address from its range and another "computer" appears in the network.

All connections between the virtual machine and the external network are made through the host computer's physical network card. If you have several network cards, then you can choose the card that will serve the connection. This is done on the Name tab, which appears if Network Bridge is selected as the connection type.

**Virtual host adapter** - the mode creates a network between the host system and the virtual machine, bypassing the physical network card. A software network interface appears on the computer, which serves to exchange data between virtual machines and the host system. Virtual machines can connect to each other and the host system as if connected through a switch. As with internal network mode, the virtual machine is not provided with a physical interface, so the machines cannot communicate with the external network.

The VirtualBox Host-Only Network device appears on the host system. It has its own subnet 192.168.56.0 and a gateway address - 192.168.56.1. The device connects the subnet and the host system without direct access to the external network.

**Internal network** - The connection type simulates a closed network, accessible only to the machines included in it. The network is completely closed to the host system and other external devices.

An internal network is similar to network bridge mode. As in bridge mode, a machine can communicate with other machines on its network, but cannot access outside of it. Since none of the machines has direct access to the physical network adapter of the host system, the network is completely closed, inside and out. The network itself is created automatically when you select this type of connection. The mode has no additional settings, the user can only change the network name.

An example of using an internal network is the Whonix system, which consists of two virtual machines. One machine acts as a gateway to the TOR network, the second machine is the working system. The working system connects to the gateway through the internal network, which in turn sends all traffic to TOR.

4. The exchange of information can be organized thanks to the virtual host adapter. A software network interface appears on the computer, which serves to exchange data between virtual machines and the host system. The virtual machine is not provided with a physical interface, so the machines cannot communicate with the external network.

The VirtualBox Host-Only Network device appears on the host system. It has its own subnet and connects the subnet and the host system without access to an external network.