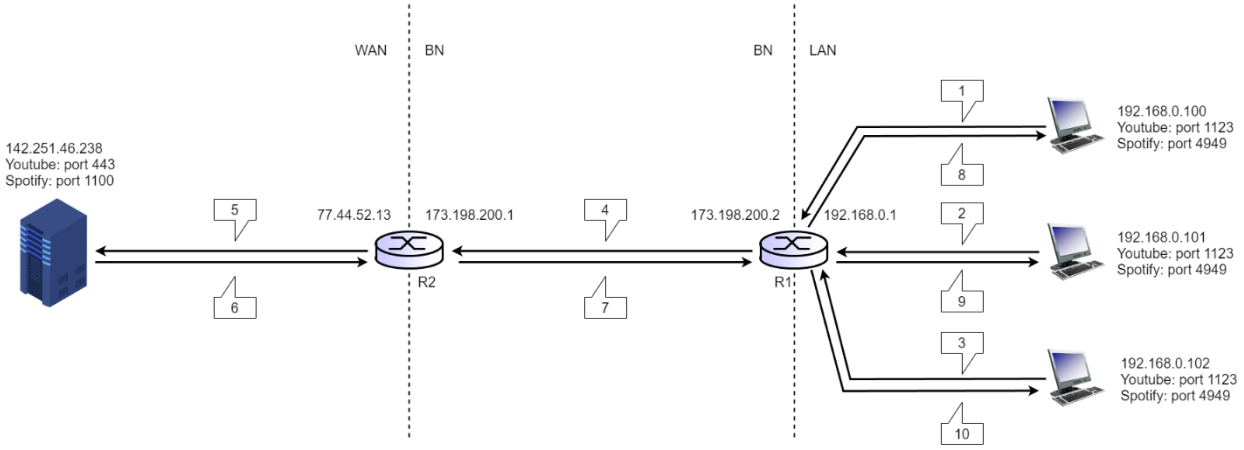

You have 3 clients in a LAN. Each of these computers has two programs running, Youtube and Spotify. The programs use the same ports on the client machines. Both services are being run on the same server. Answer the following questions:
1. Build the NAT tables for routers R1 and R2. You can choose the port numbers for the routers.
2. Give the source and destination IPs and port numbers (sockets), for points 1-10 in the transmission. There are two sockets for each numbered point 1-3 and 8-10, and there are 6 sockets for each numbered point 4-7.
3. How does the server distinguish between the 3 machines? What are the sockets on the server side?

Question 1

NAT Table for R1

External	Internal
173.198.200.2, a	192.168.0.100, 1123
173.198.200.2, b	192.168.0.100, 4949
173.198.200.2, c	192.168.0.101, 1123
173.198.200.2, d	192.168.0.101, 4949
173.198.200.2, e	192.168.0.102, 1123
173.198.200.2, f	192.168.0.102, 4949

NAT Table for R2

External	Internal
77.44.52.13, u	173.198.200.2, a
77.44.52.13, v	173.198.200.2, b
77.44.52.13, w	173.198.200.2, c
77.44.52.13, x	173.198.200.2, d
77.44.52.13, y	173.198.200.2, e
77.44.52.13, z	173.198.200.2, f

Question 2

Point 1
Source: 192.168.0.100, 1123
Destination: 142.251.46.238, 443

Source: 192.168.0.100, 4949
Destination: 142.251.46.238, 1100

Point 2
Source: 192.168.0.101, 1123
Destination: 142.251.46.238, 443

Source: 192.168.0.101, 4949
Destination: 142.251.46.238, 1100

Point 3
Source: 192.168.0.102, 1123
Destination: 142.251.46.238, 443

Source: 192.168.0.102, 4949
Destination: 142.251.46.238, 1100

Point 4
Source: 173.198.200.2, a
Destination: 142.251.46.238, 443

Source: 173.198.200.2, b
Destination: 142.251.46.238, 1100

Source: 173.198.200.2, c
Destination: 142.251.46.238, 443

Source: 173.198.200.2, d
Destination: 142.251.46.238, 1100

Source: 173.198.200.2, e
Destination: 142.251.46.238, 443

Source: 173.198.200.2, f
Destination: 142.251.46.238, 1100

Point 5
Source: 77.44.52.13, u
Destination: 142.251.46.238, 443

Source: 77.44.52.13, v
Destination: 142.251.46.238, 1100

Source: 77.44.52.13, w
Destination: 142.251.46.238, 443

Source: 77.44.52.13, x
Destination: 142.251.46.238, 1100

Source: 77.44.52.13, y
Destination: 142.251.46.238, 443

Source: 77.44.52.13, z
Destination: 142.251.46.238, 1100

Point 6
Source: 142.251.46.238, 443
Destination: 77.44.52.13, u

Source: 142.251.46.238, 1100
Destination: 77.44.52.13, v

Source: 142.251.46.238, 443
Destination: 77.44.52.13, w

Source: 142.251.46.238, 1100
Destination: 77.44.52.13, x

Source: 142.251.46.238, 443
Destination: 77.44.52.13, y

Source: 142.251.46.238, 1100
Destination: 77.44.52.13, z

Point 7
Source: 142.251.46.238, 443
Destination: 173.198.200.2, a

Source: 142.251.46.238, 1100
Destination: 173.198.200.2, b

Source: 142.251.46.238, 443
Destination: 173.198.200.2, c

Source: 142.251.46.238, 1100
Destination: 173.198.200.2, d

Source: 142.251.46.238, 443
Destination: 173.198.200.2, e

Source: 142.251.46.238, 1100
Destination: 173.198.200.2, f

Point 8
Source: 142.251.46.238, 443
Destination: 192.168.0.100, 1123

Source: 142.251.46.238, 1100
Destination: 192.168.0.100, 4949

Point 9
Source: 142.251.46.238, 443
Destination: 192.168.0.101, 1123

Source: 142.251.46.238, 1100
Destination: 192.168.0.101, 4949

Point 10
Source: 142.251.46.238, 443
Destination: 192.168.0.102, 1123

Source: 142.251.46.238, 1100
Destination: 192.168.0.102, 4949

Question 3

The server holds a different socket for each client and for each program. A socket is a 4-tuple of {source IP, source port, destination IP, destination port}. The sockets on the server side are:

{77.44.52.13, u, 142.251.46.238, 443}

{77.44.52.13, v, 142.251.46.238, 1100}

{77.44.52.13, w, 142.251.46.238, 443}

{77.44.52.13, x, 142.251.46.238, 1100}

{77.44.52.13, y, 142.251.46.238, 443}

{77.44.52.13, z, 142.251.46.238, 1100}