ANNEX A · IPV6 IN 55 MINUTES

Name: _____ **Group:** _____ **Date:** _____

The two rules. 1) Drop the zeros at the **left** of each group (`0042` → `42`). 2) **One** run of all-zero groups becomes `::`, only once (the longest run; the first if two are equal). An address always has 8 groups of 16 bits.

1 Shorten these addresses

a) `2001:0db8:0000:0000:0000:ff00:0042:8329` _____

b) `fe80:0000:0000:0000:0a00:27ff:fe4e:66a1` _____

c) `2001:0db8:0000:0001:0000:0000:0000:0001` _____

d) `0000:0000:0000:0000:0000:0000:0000:0001` _____

e) ★ `2001:0db8:0000:0000:0001:0000:0000:0001` _____

2 Expand these addresses to 8 groups of 4 digits

a) `2001:db8::1` _____

b) `fd00:5::20` _____

c) `ff02::1` _____

DONE WHEN each answer of task 2 has exactly 8 groups, and expanding your answers of task 1 gives back the original.

3 What kind of address is it?

Starts with	Type	What it is for
`::1`	loopback	the machine itself (like 127.0.0.1)
`fe80:`	link-local	automatic, on every interface; only works on that cable
`2` or `3`	global	public Internet address
`fc` or `fd`	unique local	private, like 10.x.x.x
`ff`	multicast	a group of machines; `ff02::1` = everybody on this cable

`fe80::a8c1:abff:fe92:d27f` _____ `2a04:4e42::644` _____

`fd00:5::20` _____ `ff02::1` _____

The lab. `pc1` and `pc2` are two office PCs behind the router `r1`. The server `srv` is on the other side of the router. Nobody typed an IPv6 address on `pc1`.

4 Start the lab and find your addresses

```
cd ~/lab/office && containerlab deploy -t office.clab.yml
docker exec -it clab-office-pc1 bash
ip -6 addr show dev eth1
```

Link-local: _____ Global: _____

Who gave `pc1` its global address? _____

DONE WHEN you have written two addresses, one starting with `fe80` and one starting with `2001:db8`.

5 Find the way out

```
ip -6 route
```

Default route via: _____ Kind of address: _____

6 Find your neighbours

```
ping -c 2 ff02::1%eth1
ip -6 neigh
```

How many machines answered? _____ Which one is marked `router`? _____

Run the ping again without `%eth1`. What happens, and why? _____

DONE WHEN `ip -6 neigh` shows one line with a MAC address and the word `router`.

7 Cross the router

```
ping -c 2 2001:db8:ffff::10
traceroute -n 2001:db8:ffff::10
dig +short AAAA intranet.tramuntana.internal
```

Hops to the server: _____ First hop: _____ AAAA record: _____

DONE WHEN the ping has 0 % packet loss and `dig` answers with an IPv6 address. Then: `exit` and `containerlab destroy -t office.clab.yml --cleanup`.

8 Stretch, on your group's MikroTik (G = your group number)

```
/ipv6 address add address=fd00:G::1/64 interface=bridge-lan advertise=yes
```

New address on a PC cabled to it (`ip -6 addr`): _____

Exit ticket — alone, no notes. Tick one answer.

1. Which is the correct short form of `2001:0db8:0000:0000:000a:0000:0000:0001`?

- ☐ **A)** `2001:db8::a::1`
- ☐ **B)** `2001:db8::a:0:0:1`
- ☐ **C)** `2001:db8::a:0:0:1:0`
- ☐ **D)** `2001:db8:0:0:a::1:0:0`

2. An address starts with `fe80::`. What is it?

- ☐ **A)** A public address
- ☐ **B)** A private address like 10.x.x.x
- ☐ **C)** A link-local address
- ☐ **D)** A multicast group

3. How does a PC get a global address with SLAAC?

- ☐ **A)** The router announces the prefix; the PC builds the rest
- ☐ **B)** A DHCP server lends it a whole address
- ☐ **C)** The user types it by hand
- ☐ **D)** It copies its IPv4 address

4. `ping fe80::1` fails with an error, but the router is there. What is missing?

- ☐ **A)** A DNS server
- ☐ **B)** The prefix length `/64`
- ☐ **C)** A default gateway
- ☐ **D)** The interface: `fe80::1%eth1`