

Appendix H

Practice for Chapter 25: Fundamentals of IP Version 6

This appendix provides extra practice problems for two topics discussed in [Chapter 25](#), “[Fundamentals of IP Version 6](#),” of the book. The first problems let you convert from a full 32-digit IPv6 address to its abbreviated form, or to do the reverse. The second set of problems begins with IPv6 addresses and prefix lengths, asking you to determine the IPv6 prefix (subnet).

Address Abbreviating and Expanding Problems

[Chapter 25](#) discusses some reasons why you may need to be able to mentally convert from the full 32-digit IPv6 address to the abbreviated form, or vice versa. The practice problems in this section simply provide more opportunities to practice.

[Table H-1](#) lists some practice problems, with the full 32-digit IPv6 address on the left and the best abbreviation on the right. The table gives you either the expanded or abbreviated address, and you need to supply the opposite value. The answers sit at the end of the appendix, in the section “[Answers to Address Abbreviating and Expanding Problems](#).”

Table H-1 IPv6 Address Abbreviation and Expansion Practice

	Full	Abbreviation
1	2987:BA11:B011:B00A:1000:0001:F001:F003	
2		3100::1010:D00D:D000:D00B:B00D
3	FD00:0001:0001:0001:0200:00FF:FE00:0001	
4		FDDF:8080:880:1001:0:FF:FE01:507
5	32CC:0000:0000:000D:210F:0000:0000:0000	
6		2100:E:E0::E00
7	3A11:CA00:0000:0000:0000:00FF:FECC:000C	
8		3799:9F9F:F000:0:FFFF::1
9	2A2A:0000:0000:0000:0000:0000:0000:2A2A	
10		3194::1:0:0:101
11	2001:0DB8:0000:0000:0001:0000:0002:0100	
12		2001:DB8::10:A000

	Full	Abbreviation
13	3330:0000:0000:0100:0000:0002:0000:0003	
14		FD00::1000:2000:0:1:20
15	FD11:1000:0100:0010:0001:0000:1000:0100	
16		2000::2

Calculating the IPv6 Prefix Problems

Routers take the interface IPv6 address configuration and add a connected IPv6 route to the IPv6 routing table, for the IPv6 prefix (subnet) connected to that interface. This section provides some practice problems so that you can do the same math and predict the prefix value that the router will add to the routing table.

[Table H-2](#) lists practice problems that all use the same prefix length (/64), which is the most common prefix length you see. [Table H-3](#) that follows lists additional practice problems, with prefix lengths other than /64.

Table H-2 Finding the IPv6 Prefix When Using a /64 Prefix Length

	Address (Assume a /64 Prefix Length)	Prefix (Subnet)
1	2987:BA11:B011:B00A:1000:0001:F001:F003	
2	3100:0000:0000:1010:D00D:D000:D00B:B00D	
3	FD00:0001:0001:0001:0200:00FF:FE00:0001	
4	FDDF:8080:0880:1001:0000:00FF:FE01:0507	
5	32CC:0000:0000:000D:210F:0000:0000:0000	
6	2100:000E:00E0:0000:0000:0000:0000:0E00	
7	3A11:CA00:0000:0000:0000:00FF:FECC:000C	
8	3799:9F9F:F000:0000:FFFF:0000:0000:0001	
9	2A2A:0000:0000:0000:0000:0000:0000:2A2A	
10	3194:0000:0000:0000:0001:0000:0000:0101	
11	2001:0DB8:0000:0000:0001:0000:0002:0100	
12	2001:0DB8:0000:0000:0000:0000:0010:A000	
13	3330:0000:0000:0100:0000:0002:0000:0003	
14	FD00:0000:0000:1000:2000:0000:0001:0020	
15	FD11:1000:0100:0010:0001:0000:1000:0100	

Address (Assume a /64 Prefix Length)		Prefix (Subnet)
16	2000:0000:0000:0000:0000:0000:0000:0002	

Table H-3 Finding the IPv6 Prefix Using a Prefix Length Other Than /64

Address		Prefix (Subnet)
1	2987:BA11:B011:B00A:1000:0001:F001:F003 /60	
2	3100:0000:0000:1010:D00D:D000:D00B:B00D /56	
3	FD00:0001:0001:0001:0200:00FF:FE00:0001 /52	
4	FDDF:8080:0880:1001:0000:00FF:FE01:0507 /48	
5	32CC:0000:0000:000D:210F:0000:0000:0000 /44	
6	2100:000E:00E0:0000:0000:0000:0000:0E00 /60	
7	3A11:CA00:0000:0000:0000:00FF:FECC:000C /56	
8	3799:9F9F:F000:0000:FFFF:0000:0000:0001 /52	
9	2A2A:0000:0000:0000:0000:0000:0000:2A2A /48	
10	3194:0000:0000:0000:0001:0000:0000:0101 /44	

Answers to Address Abbreviating and Expanding Problems

Table H-4 lists the answers to the problems listed earlier in Table H-1.

Table H-4 Answers: IPv6 Address Abbreviation and Expansion Practice

Full		Abbreviation
1	2987:BA11:B011:B00A:1000:0001:F001:F003	2987:BA11:B011:B00A:1000:1:F001:F003
2	3100:0000:0000:1010:D00D:D000:D00B:B00D	3100::1010:D00D:D000:D00B:B00D
3	FD00:0001:0001:0001:0200:00FF:FE00:0001	FD00:1:1:1:200:FF:FE00:1
4	FDDF:8080:0880:1001:0000:00FF:FE01:0507	FDDF:8080:880:1001:0:FF:FE01:507
5	32CC:0000:0000:000D:210F:0000:0000:0000	32CC:0:0:D:210F::
6	2100:000E:00E0:0000:0000:0000:0000:0E00	2100:E:E0::E00
7	3A11:CA00:0000:0000:0000:00FF:FECC:000C	3A11:CA00::FF:FECC:C
8	3799:9F9F:F000:0000:FFFF:0000:0000:0001	3799:9F9F:F000:0:FFFF::1
9	2A2A:0000:0000:0000:0000:0000:0000:2A2A	2A2A::2A2A
10	3194:0000:0000:0000:0001:0000:0000:0101	3194::1:0:0:101

	Full	Abbreviation
11	2001:0DB8:0000:0000:0001:0000:0002:0100	2001:DB8::1:0:2:100
12	2001:0DB8:0000:0000:0000:0000:0010:A000	2001:DB8::10:A000
13	3330:0000:0000:0100:0000:0002:0000:0003	3330::100:0:2:0:3
14	FD00:0000:0000:1000:2000:0000:0001:0020	FD00::1000:2000:0:1:20
15	FD11:1000:0100:0010:0001:0000:1000:0100	FD11:1000:100:10:1:0:1000:100
16	2000:0000:0000:0000:0000:0000:0000:0002	2000::2

Answers to Calculating IPv6 Prefix Problems

Tables H-5 and H-6 list the answers to the problems listed earlier in Tables H-2 and H-3.

Table H-5 Answers: Finding the IPv6 Prefix, with a /64 Prefix Length

	Address (Assume a /64 Prefix Length)	Prefix (Subnet)
1	2987:BA11:B011:B00A:1000:0001:F001:F003	2987:BA11:B011:B00A::/64
2	3100:0000:0000:1010:D00D:D000:D00B:B00D	3100:0:0:1010::/64
3	FD00:0001:0001:0001:0200:00FF:FE00:0001	FD00:1:1:1::/64
4	FDDF:8080:0880:1001:0000:00FF:FE01:0507	FDDF:8080:880:1001::/64
5	32CC:0000:0000:000D:210F:0000:0000:0000	32CC:0:0:D::/64
6	2100:000E:00E0:0000:0000:0000:0000:0E00	2100:E:E0::/64
7	3A11:CA00:0000:0000:0000:00FF:FECC:000C	3A11:CA00::/64
8	3799:9F9F:F000:0000:FFFF:0000:0000:0001	3799:9F9F:F000::/64
9	2A2A:0000:0000:0000:0000:0000:0000:2A2A	2A2A::/64
10	3194:0000:0000:0000:0001:0000:0000:0101	3194::/64
11	2001:0DB8:0000:0000:0001:0000:0002:0100	2001:DB8::/64
12	2001:0DB8:0000:0000:0000:0000:0010:A000	2001:DB8::/64
13	3330:0000:0000:0100:0000:0002:0000:0003	3330:0:0:100::/64
14	FD00:0000:0000:1000:2000:0000:0001:0020	FD00:0:0:1000::/64
15	FD11:1000:0100:0010:0001:0000:1000:0100	FD11:1000:100:10::/64
16	2000:0000:0000:0000:0000:0000:0000:0002	2000::/64

Table H-6 Answers: Finding the IPv6 Prefix, with Other Prefix Lengths

	Address	Prefix (Subnet)
1	2987:BA11:B011:B00A:1000:0001:F001:F003 /60	2987:BA11:B011:B000::/60
2	3100:0000:0000:1010:D00D:D000:D00B:B00D /56	3100:0:0:1000::/56
3	FD00:0001:0001:0001:0200:00FF:FE00:0001 /52	FD00:1:1::/52
4	FDDE:8080:0880:1001:0000:00FF:FE01:0507 /48	FDDE:8080:880::/48
5	32CC:0000:0000:000D:210F:0000:0000:0000 /44	32CC::/44
6	2100:000E:00E0:0000:0000:0000:0000:0E00 /60	2100:E:E0::/60
7	3A11:CA00:0000:0000:0000:00FF:FECC:000C /56	3A11:CA00::/56
8	3799:9F9F:F000:0000:FFFF:0000:0000:0001 /52	3799:9F9F:F000::/52
9	2A2A:0000:0000:0000:0000:0000:0000:2A2A /48	2A2A::/48
10	3194:0000:0000:0000:0001:0000:0000:0101 /44	3194::/44