Practice for Chapter 21: Route Summarization

This appendix includes two features. First, it contains extra practice problems and answers related to Chapter 21, "Route Summarization," specifically about how to summarize routes. The second feature shows how to summarize routes using binary, as promised in Chapter 21, in case you want to understand what happens in binary when you summarize routes.

Note that you can find additional practice at the author's CCNA blog, which is linked from the author's website, www.certskills.com.

Practice Finding the Best Summary Route

Table I-1 lists four sets of subnets that need to be summarized as part of a summary route. Find the subnet number/mask combination that is the best summary route.

Table I-1 Practice Problems: Finding the Best Summary Route

Problem 1	Problem 2	Problem 3	Problem 4
10.100.200.0/23	172.21.100.0/23	172.22.100.0/25	192.168.2.128/28
10.100.192.0/21	172.21.104.0/23	172.22.98.0/25	192.168.2.160/29
10.100.204.0/24	172.21.106.0/23	172.22.99.0/25	192.168.2.152/30
10.100.190.0/23	172.21.102.0/23	172.22.101.128/25	192.168.2.156/30

Answers to Practice Problems

This section lists the answers to the practice problems along with a description of how to use the process in this book to solve the problems. For each problem, the first table lists the results of the first two steps; the grayed boxes show the low and high end of the range that the new summary route must enclose. The second table for each problem shows the results of each pass through Step 4, with the final (rightmost) pass showing the correct answer.

Practice Problem 1

Table I-2 Practice Problem 1: First Two Steps

Subnet IDs/Masks	Subnet Broadcasts
10.100.200.0	10.100.201.255
10.100.192.0	10.100.199.255
10.100.204.0	10.100.204.255
10.100.190.0	10.100.191.255

For Problem 1, at Step 3, the shortest mask is /21, so the initial mask will be one smaller, or /20. Finding the correct answer requires four passes through calculating a new subnet ID and mask, with the final answer shown in Table I-3.

Table I-3 Practice Problem 1: Multiple Passes Through Step 4 (Correct Answer Highlighted)

All Passes Use 10.100.190.0	1st Pass: /20	2nd Pass: /19	3rd Pass: /18	4th Pass: /17
Subnet ID	10.100.176.0	10.100.160.0	10.100.128.0	10.100.128.0
Broadcast Address	10.100.191.255	10.100.191.255	10.100.191.255	10.100.255.255

The best summary route will use subnet ID 10.100.128.0, mask /17.

Practice Problem 2

Table I-4 Practice Problem 2: First Two Steps

Subnet IDs/Masks	Subnet Broadcasts
172.21.100.0	172.21.101.255
172.21.104.0	172.21.105.255
172.21.106.0	172.21.107.255
172.21.102.0	172.21.103.255

For Problem 2, at Step 3, all the original masks are /23, so the initial mask will be one smaller, or /22. Finding the correct answer requires three passes through calculating a new subnet ID and mask, with the final answer shown in Table I-5.

Table I-5 Practice Problem 2: Multiple Passes Through Step 4 (Correct Answer Highlighted)

All Passes Use 172.21.100.0	1st Pass: /22	2nd Pass: /21	3rd Pass: /20
Subnet ID	172.21.100.0	172.21.96.0	172.21.96.0
Broadcast Address	172.21.103.255	172.21.103.255	172.21.111.255

The best summary route will use subnet ID 172.21.96.0, mask /20.

Practice Problem 3

Table I-6 Practice Problem 3: First Two Steps

Subnet IDs/Masks	Subnet Broadcasts
172.22.100.0	172.22.100.127
172.22.98.0	172.22.98.127
172.22.99.0	172.22.99.127
172.22.101.128	172.22.101.255

For Problem 3, at Step 3, all the original masks are /25, so the initial mask will be one smaller, or /24. Finding the correct answer requires four passes through calculating a new subnet ID and mask, with the final answer shown in Table I-7.

Table I-7 Practice Problem 3: Multiple Passes Through Step 4 (Correct Answer Highlighted)

All Passes Use 172.22.98.0	1st Pass: /24	2nd Pass: /23	3rd Pass: /22	4th Pass: /21
Subnet ID	172.22.98.0	172.22.98.0	172.22.96.0	172.22.96.0
Broadcast Address	172.22.98.255	172.22.99.255	172.22.99.255	172.22.103.255

The best summary route will use subnet ID 172.22.96.0, mask /21.

Practice Problem 4

Table I-8 Practice Problem 4: First Two Steps

Subnet IDs/Masks	Subnet Broadcasts
192.168.2.128	192.168.2.143
192.168.2.160	192.168.2.167
192.168.2.152	192.168.2.155
192.168.2.156	192.168.2.159

For Problem 4, at Step 3, the shortest mask is /28, so the initial mask will be one smaller, or /27. Finding the correct answer requires only two passes through calculating a new subnet ID and mask, with the final answer shown in Table I-9.

Table I-9 Practice Problem 4: Multiple Passes Through Step 4 (Correct Answer Highlighted)

All Passes Use 192.168.2.128	1st Pass: /27	2nd Pass: /26
Subnet ID	192.168.2.128	192.168.2.128
Broadcast Address	192.168.2.159	192.168.2.191

The best summary route will use subnet ID 192.168.2.128, mask /26.