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EECS 148 Homework 4

**1. IP Addressing**

**Chapter 4, P13**

Subnet 1: 223.1.17.0/26

Subnet 2: 223.1.17.128/25

Subnet 3: 223.1.17.64/28

**Chapter 4, P21**

1. Home addresses: 192.168.1.1, 192.168.1.2, 192.168.1.3  
   Router interface: 192.168.1.4
2. NAT Translation Table

|  |  |
| --- | --- |
| WAN Side | LAN Side |
| 24.34.112.235, 5001 | 192.168.1.1, 3345 |
| 24.34.112.235, 5002 | 192.168.1.1, 3346 |
| 24.34.112.235, 5003 | 192.168.1.2, 3347 |
| 24.34.112.235, 5004 | 192.168.1.2, 3348 |
| 24.34.112.235, 5005 | 192.168.1.3, 3349 |
| 24.34.112.235, 5006 | 192.168.1.3, 3350 |

**2. BGP**

**Chapter 4, P40**

W’s view X’s view

 

From X’s view, there is no link between A and C because X does not get an

advertised route that uses that link to get to W or Y.

**3. Routing Algorithms**

**(a)** Route: H1-A-B-C-D-E-H2

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Step | S | d(A), p(A) | d(B), p(B) | d(C), p(C) | d(D), p(D) | d(E), p(E) | d(H2), p(H2) |
| 0 | H1 | 10, H1 | ∞ | ∞ | ∞ | ∞ | ∞ |
| 1 | H1A |  | 20, A | ∞ | 60, A | ∞ | ∞ |
| 2 | H1AB |  |  | 40, B | 60, A | 100, B | ∞ |
| 3 | H1ABC |  |  |  | 50, C | 100, B | ∞ |
| 4 | H1ABCD |  |  |  |  | 90, D | ∞ |
| 5 | H1ABCDE |  |  |  |  |  | 100, E |
| 6 | H1ABCDEH2 |  |  |  |  |  |  |

\*cost for each link is transmission delay + propagation delay in milliseconds

**(b)** No. This route is not the same as the minimum number of hops.

**(c)**  Initial Tables

Node A (B,D) **|** Node B (A,C,D,E) **|** Node C (B,D,E) **|**  Node D (A,B,C,E) **|** Node E(B,C,D)

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Dest | Via | Delay | Dest | Via | Delay | Dest | Via | Delay | Dest | Via | Delay | Dest | Via | Delay |
| A  B  C  D  E | A  -  -  -  - | 0  ∞  ∞  ∞  ∞ | A  B  C  D  E | -  B  -  -  - | ∞  0  ∞  ∞  ∞ | A  B  C  D  E | -  -  C  -  - | ∞  ∞  0  ∞  ∞ | A  B  C  D  E | -  -  -  D  - | ∞  ∞  ∞  0  ∞ | A  B  C  D  E | -  -  -  -  E | ∞  ∞  ∞  ∞  0 |

Tables after first exchange

Node A (B,D) **|** Node B (A,C,D,E) **|** Node C (B,D,E) **|**  Node D (A,B,C,E) **|** Node E(B,C,D)

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Dest | Via | Delay | Dest | Via | Delay | Dest | Via | Delay | Dest | Via | Delay | Dest | Via | Delay |
| A  B  C  D  E | A  A  -  A  - | 0  10  ∞  50  ∞ | A  B  C  D  E | B  B  B  B  B | 10  0  20  40  80 | A  B  C  D  E | -  C  C  C  C | ∞  20  0  10  60 | A  B  C  D  E | D  D  D  D  D | 50  40  10  0  40 | A  B  C  D  E | -  E  E  E  E | ∞  80  60  40  0 |

Tables after second exchange

Node A (B,D) **|** Node B (A,C,D,E) **|** Node C (B,D,E) **|**  Node D (A,B,C,E) **|** Node E(B,C,D)

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Dest | Via | Delay | Dest | Via | Delay | Dest | Via | Delay | Dest | Via | Delay | Dest | Via | Delay |
| A  B  C  D  E | A  A  B  A  B | 0  10  30  50  90 | A  B  C  D  E | B  B  B  C  B | 10  0  20  30  80 | A  B  C  D  E | B  C  C  C  D | 30  20  0  10  50 | A  B  C  D  E | D  C  D  D  D | 50  30  10  0  40 | A  B  C  D  E | B  E  D  E  E | 90  80  50  40  0 |

Tables after third exchange

Node A (B,D) **|** Node B (A,C,D,E) **|** Node C (B,D,E) **|**  Node D (A,B,C,E) **|** Node E(B,C,D)

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Dest | Via | Delay | Dest | Via | Delay | Dest | Via | Delay | Dest | Via | Delay | Dest | Via | Delay |
| A  B  C  D  E | A  A  B  C  B | 0  10  30  40  90 | A  B  C  D  E | B  B  B  C  D | 10  0  20  30  70 | A  B  C  D  E | B  C  C  C  D | 30  20  0  10  50 | A  B  C  D  E | B  C  D  D  D | 40  30  10  0  40 | A  B  C  D  E | B  C  D  E  E | 90  70  50  40  0 |

Tables after fourth exchange

Node A (B,D) **|** Node B (A,C,D,E) **|** Node C (B,D,E) **|**  Node D (A,B,C,E) **|** Node E(B,C,D)

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Dest | Via | Delay | Dest | Via | Delay | Dest | Via | Delay | Dest | Via | Delay | Dest | Via | Delay |
| A  B  C  D  E | A  A  B  C  D | 0  10  30  40  80 | A  B  C  D  E | B  B  B  C  D | 10  0  20  30  70 | A  B  C  D  E | B  C  C  C  D | 30  20  0  10  50 | A  B  C  D  E | B  C  D  D  D | 40  30  10  0  40 | A  B  C  D  E | B  C  D  E  E | 80  70  50  40  0 |

**(d)** Yes. The algorithm converges.  
 Tables at steady state

Node A (B,D) **|** Node B (A,C,D,E) **|** Node C (B,D,E) **|**  Node D (A,B,C,E) **|** Node E(B,C,D)

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Dest | Via | Delay | Dest | Via | Delay | Dest | Via | Delay | Dest | Via | Delay | Dest | Via | Delay |
| A  B  C  D  E | A  A  B  C  D | 0  10  30  40  80 | A  B  C  D  E | B  B  B  C  D | 10  0  20  30  70 | A  B  C  D  E | B  C  C  C  D | 30  20  0  10  50 | A  B  C  D  E | B  C  D  D  D | 40  30  10  0  40 | A  B  C  D  E | B  C  D  E  E | 80  70  50  40  0 |

Tables after links AB and BE fail: first exchange

Node A (B,D) **|** Node B (A,C,D,E) **|** Node C (B,D,E) **|**  Node D (A,B,C,E) **|** Node E(B,C,D)

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Dest | Via | Delay | Dest | Via | Delay | Dest | Via | Delay | Dest | Via | Delay | Dest | Via | Delay |
| A  B  C  D  E | A  A  B  A  D | 0  ∞  30  50  80 | A  B  C  D  E | B  B  B  C  D | ∞  0  20  30  70 | A  B  C  D  E | B  C  C  C  D | ∞  20  0  10  50 | A  B  C  D  E | B  C  D  D  D | ∞  30  10  0  40 | A  B  C  D  E | B  C  D  E  E | ∞  70  50  40  0 |

Tables after links AB and BE fail: second exchange

Node A (B,D) **|** Node B (A,C,D,E) **|** Node C (B,D,E) **|**  Node D (A,B,C,E) **|** Node E(B,C,D)

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Dest | Via | Delay | Dest | Via | Delay | Dest | Via | Delay | Dest | Via | Delay | Dest | Via | Delay |
| A  B  C  D  E | A  D  B  A  D | 0  90  30  50  90 | A  B  C  D  E | D  B  B  C  D | 80  0  20  30  70 | A  B  C  D  E | D  C  C  C  D | 60  20  0  10  50 | A  B  C  D  E | D  C  D  D  D | 50  30  10  0  40 | A  B  C  D  E | D  C  D  E  E | 90  70  50  40  0 |

*\*\*\*delay is in milliseconds for question 3, parts (c) and (d)*