Module 5 Subnetting

Monday, 13 May 2024 7:59 AM

$2^{32-16} = 2^{16} = 65536$

190.100.0.0/16

1) 256 Address :

2^8 $32-8 = 24$

1: 190.100.0.0/24 – 190.100.0.255/24

2: 190.100.1.0/24 – 190.100.1.255/24

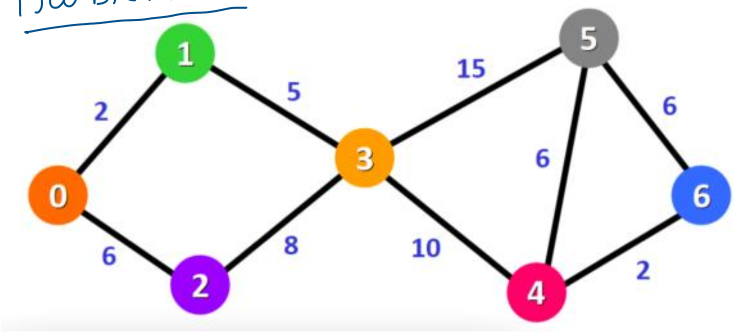
64: 190.100.63.0/24 – 190.100.63.255/24

2)

Module 5 Dijkstra Algorithm

Sunday, 12 May 2024 3:15 PM

Problem 1:



Initially:

Distance:

Unvisited Nodes:

{0, 1, 2, 3, 4, 5, 6}

0 : 0

1 : ∞

2 : ∞

3 : ∞

4 : ∞

5 : ∞

6 : ∞

Distance is unknown initially

Starting at Node 0:

Unvisited Nodes : {~~0~~, 1, 2, 3, 4, 5, 6}

0 : 0

1 : $\cancel{\infty}$ 2

2 : $\cancel{\infty}$ 6

3 : ∞

4 : ∞

5 : ∞

6 : ∞

Unvisited Nodes : { ~~0~~, ~~1~~, 2, 3, 4, 5, 6 }

Moving to Node 3 :

Distance:

0 : 0

1 : ~~∞~~ 2

2 : ~~∞~~ 5

3 : ~~∞~~ 7 (2+5)

4 : ∞

5 : ∞

6 : ∞

Unvisited Nodes:

{ ~~0~~, ~~1~~, ~~2~~, ~~3~~, 4, 5, 6 }

Move on Node 4 & 5 :

Distance :

0 : 0

1 : 2

2 : 5

3 : 7

4 : ~~∞~~ 7+10 = 17

5 : ∞

6 : ∞

Visited Nodes :

{ ~~0~~, ~~1~~, ~~2~~, ~~3~~, ~~4~~, 5, 6 }

Node 6 :

Unvisited Nodes:

Node 6:

Unvisited Nodes:

{~~0~~, ~~1~~, ~~2~~, ~~3~~, ~~4~~, 5, ~~6~~}

0, 0

1: 2

2: 5

3: 7

4: $\cancel{\infty}$ 7+10 = 17

5: ∞

6: $\cancel{\infty}$ 17 + 2 = 19

Node 5:

Unvisited Nodes:

{~~0~~, ~~1~~, ~~2~~, ~~3~~, ~~4~~, ~~5~~, ~~6~~}

0, 0

1: 2

2: 5

3: 7

4: $\cancel{\infty}$ 17

5: $\cancel{\infty}$ 17 + 6 or 7 + 15 => 23 or 22 : 22 less 0

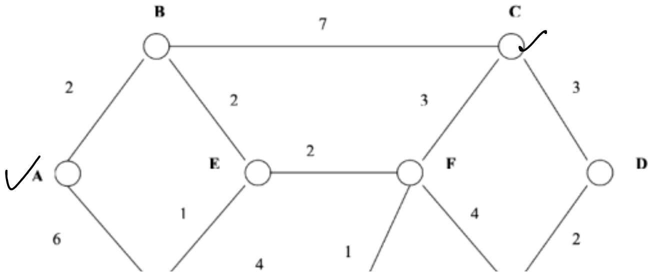
Shortest distance : 0 → 1 → 3 → 5

6: $\cancel{\infty}$ 22

Problem 2:

a. Dijkstra algorithm is used in computer networks to compute the shortest path between two nodes (hosts) in a network. Explain this algorithm clearly using the network presented in **Figure 1** and find the shortest path between A and D.

b. What is Distributed Routing Algorithm? Explain clearly using a network (subnet) of your choice with appropriate routing tables at nodes. You must use a network that is different from the ones that I used in class to explain this concept. You must also draw your network graph and provide the routing table that you considered.



A → B

B → E

E → G

— I

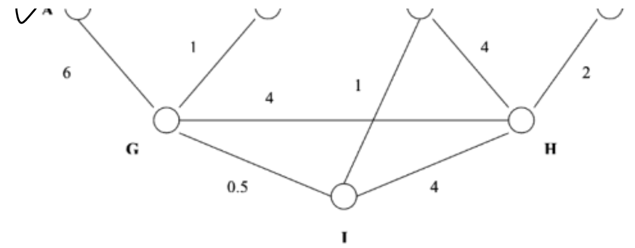


Figure 1: Figure for question 2(a)

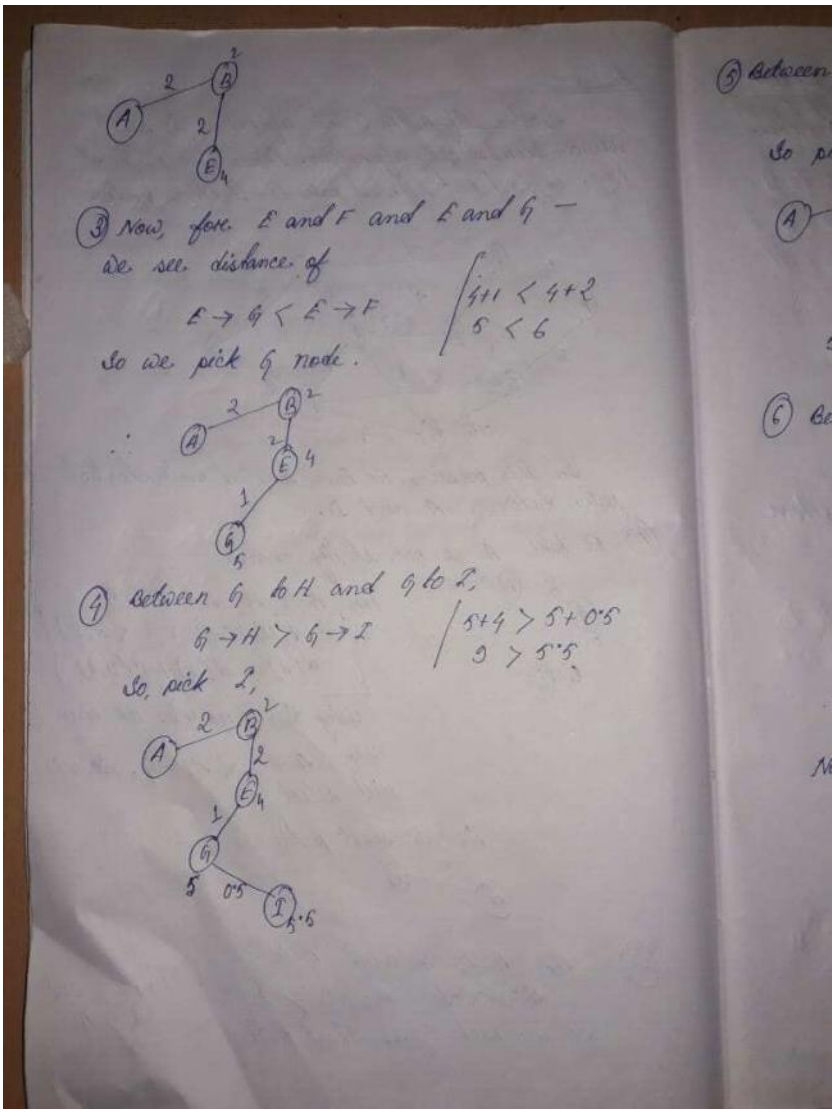
$E \to G$

$G \to I$

$I \to F$

$F \to C$

$C \to D$



(3) Now, for E and F and E and G —
we see distance of

$E \to G < E \to F$ | $4+1 < 4+2$, $5 < 6$

So we pick G node.

(4) Between G to H and G to I,

$G \to H > G \to I$ | $5+4 > 5+0.5$, $9 > 5.5$

So, pick I.

(5) Between

So p

(6) Be

(5) Between I to F and I to H,

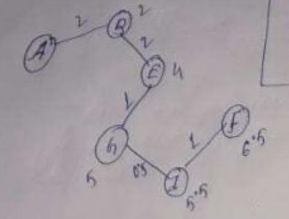
I→F < I→H.

$5.5 + 1 < 5.5 + 4$

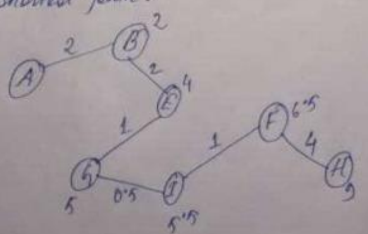
$6.5 < 9.5$

Here 6.5 is < 9, so we pick F as shortest

But on the step (4) we get the weight of H is 9. Now we check with 6.5 and 9.5. 6.5 is small.



(6) Between F to H and F to C..
We already get the weight of C is 9 (because from B to C, the weight is 9) and also the weight of H is also 9. If we see the distance of — F→H and F→C we get the value 10.5 and 9.5. Both are greater than 9. So we donot need to change the weight of C and H. So we can pick anyone as shortest. We pick H as shortest path.



(5) Between I to F and I to H,

I→F < I→H.

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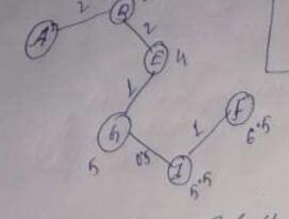

(6) Between F to H and F to C..
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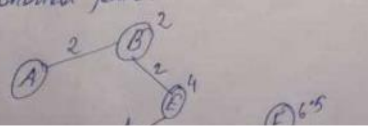
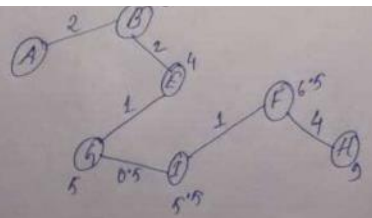
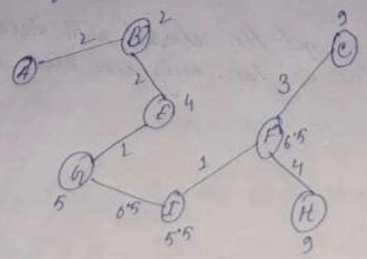




(7) From H we can go to value node D. But we also have to check the weight of lefted node C and D.

Here we can see that weight of C is 9 which is less that weight of D (as H to D distance is, $9+2=11$). So the path will visit C first.

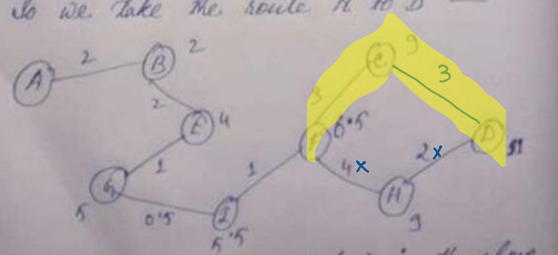


(8) From point C and H we can go to D. But we will take the short path. As we see,

$C \to D = 9+3 = 12$

$H \to D = 9+2 = 11$

So we take the route H to D —

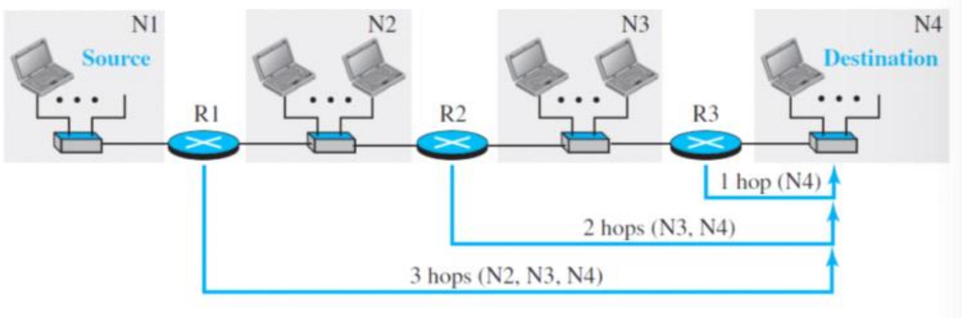


∴ The shortest path from A to D is the above diagram. And the shortest distance from A to D = 11//

Module 5 RIP

Sunday, 12 May 2024 3:54 PM

* It is based on hop count.
* Forwarding Table



Forwarding Table for R1

Destination Network	Next Router	Cost in hops
N1	—	1
N2	—	1
N3	R2	2
N4	R2	3

Forwarding Table for R2

Destination Network	Next Router	Cost in hops
N1	R1	2
N2	—	1
N3	—	1
N4	R3	2

Forwarding Table for R3

Destination Network	Next Router	cost in hops
N1	R2	3
N2	R2	2
N3	—	1
N4	—	1