Dear Students:

I made a mistake in the lecture on “longest prefix matching” (at 20 minutes into lecture 18),
and would like to correct the mistake in this email (thanks to Xiwei for pointing it out).

The short version of the correction is that:
– When an IP address is matched to the prefixes in a forwarding table, the prefix has to match completely.
– If the IP address matches only part of the prefix, then it is not considered a match.

Here is the longer explanation, using the toy example we worked out in class.

Say IP addresses are 3 bits long, and a router must forward the first 3 IP addresses to interface #1 as follows:

000 –> interface #1
001 –> interface #1
010 –> interface #1

And the remaining 5 IP addresses to interface #2 as follows:

011 –> interface #2
100 –> interface #2
101 –> interface #2
110 –> interface #2
111 –> interface #2

The correct forwarding table should be the following (please ignore the one we finalized in the lecture):

Prefix	–>	Interface
0	–>	#1
011	–>	#2
1	–>	#2

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Now let’s consider what happens when this router gets a packet with a destination IP address as: 010
In the class I *incorrectly* said that the longest prefix match for this IP address would be prefix “011”. But this is NOT correct because prefix "011” does not FULLY match IP address 010.
Said differently, prefix “011” is not fully contained in the IP address 010.

However, prefix “0” is fully contained in the IP address 010, and that is the longest matching prefix. As a result, packet with destination IP address 010 should be forwarded to interface #1.

On the other hand, a packet with destination IP address 011 has a full match with prefix “011”, hence this packet will be forwarded to interface #2.

Finally, all packets with destination IP address starting with 1 will have a full match with prefix “1”, so they will be forwarded to interface #2 as well.

I hope this clarifies the mistake.

Best,
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