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CS 118

Homework 4

Problem 1

1. The shortest path between R1 and P is the path with a cost of 4. The **largest** packet size that is guaranteed to get through without fragmentation is 512.

Explanation for the last equation: Find the neighbor N for which the distance from R to P is minimized. Then, compute the minimum maximum packet size in that route, which is precisely .

Diagram

Description automatically generated

Diagram, schematic

Description automatically generated

Diagram

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Diagram

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Diagram

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At time t = 4, all estimates converge.

Diagram

Description automatically generated

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Diagram

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Diagram

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Problem 2

1. LSP sent by R4:

Table

Description automatically generated with medium confidence

LSP sent by R5:

Table

Description automatically generated with medium confidence

LSP sent by R6:

A picture containing table

Description automatically generated

1. LSP sent by R4 after the links R4-R2 and R4-R3 crash:

Table

Description automatically generated with medium confidence

Diagram

Description automatically generated

Diagram

Description automatically generated

Although R5 has incorrect link state packets from R2 and R3, it will conclude that ECE is unreachable as soon as it gets the link state from R4. This is because when R5 locally runs the Dijkstra algorithm, it will take itself as the source node and start from itself. So, it will first look at its own link state, which has neighbors R4, R6, and bioeng. From there, the Dijkstra algorithm will continue exploring by looking at the link state of the closest neighbor. It will continue this process by only exploring nodes accessible from itself, given the link states of all other nodes stored locally in R5. Since R4’s link state is correct, once the algorithm visits R4, we will not look at the wrong link states of R2 and R3 because the link state of R4 reflects the crash. Thus, we will never visit ECE and the algorithm concludes ECE is unreachable.