CS 2200 - Introduction to Systems

Fall 2016

Homework 10

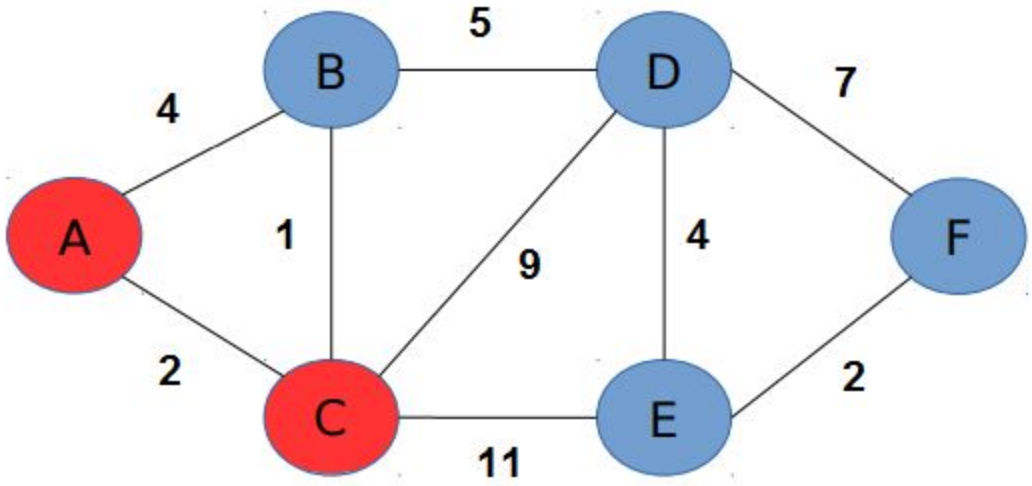
Rules:

- **This homework is due on T-Square, please record your answers in a word processor IN THE SLOTS PROVIDED and save it as a PDF. DO NOT HANDWRITE AND SCAN YOUR ANSWERS. KEEP PROBLEMS / ANSWERS ON SAME PAGE.**
- This is an individual assignment. No collaboration is permitted.
- Due Date: 7th December 2016 – 11:59 PM.

Name:_____ GT Login:_____
Section_____

Problem 1:

Assume the graph below is an intermediate iteration of the Link State Routing algorithm due to Dijkstra's finding the shortest path from A to F. The red nodes are nodes whose shortest path are already known.



A. What is the shortest path from A to F (write as a sequence of letters) and its cost?

ACBDEF, 14

B. What is the next node to be discovered?

B

C. How many more iterations are necessary before the shortest path from A to F is found?

4

Problem 2:

For the problem below, assume single-error correcting double-error detecting (SECDED) Hamming codes. Assume 4 even parity bits (even meaning that there are an even number of 1's including the parity bit itself) and 4 data bits. These 4 bits include an overall parity bit for the entire vector at bit position 8. Assume that at most 2 bits are flipped over network transmission. Finally, positions are from left to right starting at 1.

A. Encode the following 4 bit data vector with SECDED: 1000

11100001

B. Encode the following 4 bit data vector with SECDED: 0110

11001100

C. Assume you receive the 8 bit encoded vector 00110111. What was the 4-bit data value that was originally sent? If this cannot be determined write "unknown".

1001

D. Assume you receive the 8 bit encoded vector 11001010. What was the 4-bit data value that was originally sent? If this cannot be determined write "unknown".

unknown

Problem 3:

Mark a T in the blank if the statement corresponds to TCP or a U in the blank if the statement corresponds to UDP.

a) ____**T**____ Reliable transport protocol
b) ___T_____ Connection Oriented
c) ___U_____ Used by DNS and VoIP
d) ___T_____ Used by HTTP and FTP
e) ____U____ The protocol to choose if speed is most important concern
f) ____T____ Protocol handles Error Recovery
g) ___T_____ Order of packets is preserved between sender and receiver

TRUE / FALSE

a) ____F____ A TCP socket receive command is guaranteed to return all the data that a TCP socket send command sends in one call.
b) ____F____ A UDP socket does no error checking.

c) ___F_____ TCP/UDP are application layer protocols
d) ____F____ TCP provides encryption by default.