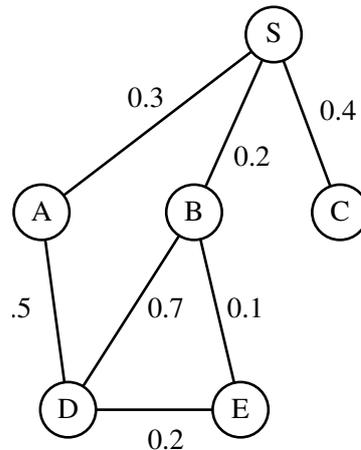


2011 Paper 9 Question 6

Mobile and Sensor Systems

This question concerns Wireless Sensor Networks (WSNs).

- (a) Explain the advantages of using event-based concurrency versus traditional concurrency through processes. Also explain how TinyOS implements event-based concurrency. [4 marks]
- (b) In most WSNs, devices are battery operated and the use of the radio interface needs to be limited to preserve energy. Describe the salient characteristics of duty cycling through basic preamble sampling. [2 marks]
- (c) Describe XMAC and how it optimises over basic preamble sampling approaches. [3 marks]
- (d) Consider the WSN depicted in the picture below. Assume MintRoute is used as the routing protocol. Describe how MintRoute works and explain how the numbers on the edges in the network depicted below are generated by the protocol. What is the path that the packets would follow from source S to destination D if MintRoute were applied?



[5 marks]

- (e) Explain why wireless reprogramming is important in WSNs. Describe the sensor network reprogramming described in the lectures and explain the role of the parameters which govern its behaviour. Also, what are the limitations of the approach when applied to mobile sensor networks? [6 marks]