Mobile Communications
Problem Set 6

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1. You want to deploy a Gigabit local area network in your company using Jumbo frames of size 9000 Byte and link speeds of 1 Gbps. The maximum distance of the computing stations in your network is 500 meters. Assume a wave propagation speed of $2{\cdot}10^8 m/s$ in cable. Which random MAC technique would you use and why?

2. Consider a 802.11 system using the DCF. The throughput for a single station can be calculated using the renewal reward theorem as

$$S = \frac{l}{t_{\text{DIFS}} + t_{\text{backoff}} + t_{\text{preamble}} + t_{\text{data}} + t_{\text{SIFS}} + t_{\text{ack}}}$$

with $t_{\text{data}} = l/C$ where l is the packet length in bit and C is the nominal channel capacity. Name 4 different possibilities to increase the throughput of the considered systems including pros and cons.