

MASSACHUSETTS INSTITUTE OF TECHNOLOGY
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6.263/16.37
Problem Set No. 1

Issued: Sep 9, 2008
Due: Sep 16, 2008

Reading: sections 2.3, 2.4, 2.5, 2.6

Problem 1: text problem 2.10

Problem 2: text problem 2.11

Problem 3: text problem 2.33

Problem 4: text problem 2.39

Problem 5: CRC codes

A) Given a generator string $G = 1011$ and data string $M = 10110$, find the CRC and the transmitted string T . Give the shift-register implementation of this CRC generator.

B) Suppose $G = 1001$ and the received string was $T' = 1010111$. Did any transmission errors occur?

C) Suppose $G = 1001$ and the received string was $T' = 1010011$. Did any transmission errors occur?

Problem 6: Stop and Wait ARQ over a satellite link

A) A GEO satellite link has a transmission rate of 1Mbps and a (round-trip) propagation delay of 500ms. With a data packet size of 10000 bits and a packet loss probability p of 10^{-1} , what is the expected transmission time of a packet in this system? (Assume the acknowledgement packets are also 10000 bits, and incur losses with probability p of 10^{-1}). What is the efficiency of the system?

B) Suppose the minimum acceptable efficiency is 0.2. Assuming all other parameters are the same as part (A), what does the packet size have to be?

Problem 7: Internet checksum

A) Describe the type of two bit error patterns that would go undetected by an internet checksum.

B) Suppose that the internet checksum is used on blocks of length K (i.e., the resulting checksum is K bits long). What fraction of two bit error patterns would go undetected by this checksum?