第二章作业如下：

2-1. A noiseless 8-kHz channel is sampled every 1 msec. What is the maximum data rate?

2-2. If a binary signal is sent over a 3-kHz channel whose signal-to-noise ratio is 20 dB, what is the maximum achievable data rate?

2-3. How much bandwidth is there in 0.1 microns of spectrum at a wavelength of 1 micron?

2-4. It is desired to send a sequence of computer screen images over an optical fiber. The screen is 1920x1200 pixels, each pixel being 24 bits. There are 50 screen images per second. How much bandwidth is needed?

2-5. Radio antennas often work best when the diameter of the antenna is equal to the wavelength of the radio wave. Reasonable antennas range from 1 cm to 5 meters in diameter. What frequency range does this cover?

2-6. Ten signals, each requiring 4000 Hz, are multiplexed onto a single channel using FDM. What is the minimum bandwidth required for the multiplexed channel? Assume that the guard bands are 400 Hz wide.

2-7. Why has the PCM sampling time been set at 125 μsec?

2-8. Compare the maximum data rate of a noiseless 4-kHz channel using  
(a) Analog encoding (e.g., QPSK) with 2 bits per sample.  
(b) The T1 PCM system.

2-9. A CDMA receiver gets the following chips: (-1 +1 -3 +1 -1 -3 +1 +1). Assuming the chip sequences defined in Fig. 2-28(a), which stations transmitted, and which bits did each one send?

2-10. A cable company decides to provide Internet access over cable in a neighborhood consisting of 5000 houses. The company uses a coaxial cable and spectrum allocation allowing 100 Mbps downstream bandwidth per cable. To attract customers, the company decides to guarantee at least 2 Mbps downstream bandwidth to each house at any time. Describe what the cable company needs to do to provide this guarantee.