# Practice Problems and Tasks

## Numerical Problems

Q1: A signal contains frequency components up to 3 kHz. What is the minimum sampling frequency required to avoid aliasing?  
  
Q2: A signal is sampled at 6 kHz and then reconstructed. If the signal has frequency components above 4 kHz, what kind of distortion occurs? Explain.  
  
Q3: Given a sine wave of 1 kHz sampled at 1.5 kHz, calculate the aliased frequency.

## Simulation Tasks

Task 1: Sample a 10 Hz sine wave at 8 Hz, 20 Hz, and 50 Hz. Plot and analyze aliasing.  
  
Task 2: Reconstruct sampled signal using linear interpolation and zero-order hold.  
  
Task 3: Apply a low-pass filter before sampling a noisy signal to observe its effect.