2.50)  
   a) $T_s = 10$
   b) $T_L = 7$
   c) $T_s = 97$, $T_L = 87$

2.51)  
   Peak correlation value for Barker of length 7 is 7. All correlations of the length 7 Barker with cyclic shifts of itself have correlation values of -1.

2.58)  
   The output of the filter matched to $s_1(t)$ and $s_1(t)$ is:
   
   $$ y_s(t) = \begin{cases} 
   t & t < T/2 \\
   T - t & T/2 \leq t < T \\
   0 & \text{elsewhere}
   \end{cases} $$

   The peak value of $y_s(t)$ occurs at $t = T/2$ and is equal to $y_s(T/2) = T/2$.

   The output of the filter matched to $s_1(t)$ and $s_0(t)$ is:
   
   $$ y_x(t) = \begin{cases} 
   t - T/2 + \Delta & T/2 - \Delta < t < T - \Delta \\
   3T/2 - t - \Delta & T - \Delta \leq t < 3T/2 - \Delta \\
   0 & \text{elsewhere}
   \end{cases} $$

   At $t = T/2$, $y_x(T/2) = \Delta$.

   The detection threshold should be halfway between $\Delta$ and $T/2$ or at $T/4 + \Delta/2$. The lowest BER rate will occur when the separation between $y_s(T/2)$ and $y_x(T/2)$ is greatest. This occurs when $\Delta = 0$.

2.39)  
   a) $N = 7$
   b) SNR (dB) = 39.64 dB

2.42)  
   a) Use $f_s = 1500$ Hz
   b) $N = 3$