Input: time series array X of length T (T=113 in our data set)

Output:

p1 is probability that there is a consistent upward trend in the last 21 days

p2 is probability that there is a consistent downward trend in the last 21 days

Process:

perform STL decomposition on X to get trend array

trend is now an array of length T

N = 21 (21 days)

dX = array of length N

for i = T-N+1 to T:

dX[i-T+N] = trend[i] - trend[i-1]

v0 = sample\_variance(dX)

dXbar = average(dX)

posterior\_mean = v0/(1/(T-1)+v0)\*dXbar

posterior\_var = 1/(1/v0 + n)

p1 = pnorm(9, posterior\_mean, posterior\_var, lower.tail = FALSE)

p2 = 1 - p1

Repeat this process for all 1998 time series. Each time series would create one pair of (p1, p2)

rank the signatures by decreasing p1, show top 5 consistent upward trend signatures

rank the signatures by decreasing p2, show top 5 consistent downward trend signatures