Algorithm 1 Multiple Discriminant Analysis

Determine $\vec{m}_t$
for all Classes D_i in Discriminant Set D **do**
  Compute $\vec{m}_i$
  Determine n_i
  Determine $\hat{m}_i = \vec{m}_i - \vec{m}_t$
  Compute $S_i = \sum_{\vec{x_i} \in D_i} (\vec{x_i} - \vec{m}_i)(\vec{x_i} - \vec{m}_i)^T$
end for
$S_w = \sum_{S_i \in D} S_i$
Compute $S_B = \sum_{\hat{m_i} \in D} n_i \hat{m}_i$
Compute Top eigenvectors for equation:

$$\mathbf{S_B w_i} = \lambda_i \mathbf{S_W w_i}$$

return $\mathbf{W}, \mathbf{\Lambda}$