1. Read in the training data into csr matrix R;
2. Read in the testing data into csr matrix T;
3. Get k (the latent dimension), λ (the control parameter), maxIters (the maximum number of iterations allowed) and epsilon (the ratio of objective value change) from the user of your recommender system;
   /* learn the factorization model */
4. Initialize dense factor matrix P and Q (with 1/k, randomly, or from input)
5. t = 0;
6. While (t < maxIters)
   a. t ++;
   b. fix Q and solve for P; /* P = LS_closed(R, P, Q, k, λ); or P = LS_gd(R, P, Q, k, epsilon)*/
   c. fix P and solve for Q; /* Q = LS_closed(R^T, Q, P, k, λ); note: transpose of R; or Q = LS_gd(P^T, Q, P, k epsilon)*/
   d. If | f(t) – f(t-1) | / f(t - 1) < epsilon break; /* f(t) is the value of function f (equation 1 in the optimization sheet) at iteration t*/
7. End
   /* generate the recommendations */
8. MSE = 0; RMSE = 0;
9. Foreach user u in T
   a. Foreach item i that u has in T
      i. Pred = P(u, .) * Q(i, .) ; /* dot product */
      ii. MSE += $(T(u, i) - pred)^2$;

   MSE = MSE / # ratings in T; /* not # users in T */
   RMSE = sqrt(MSE);