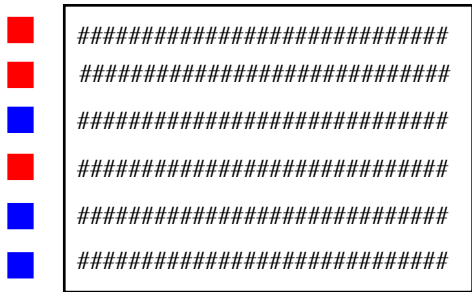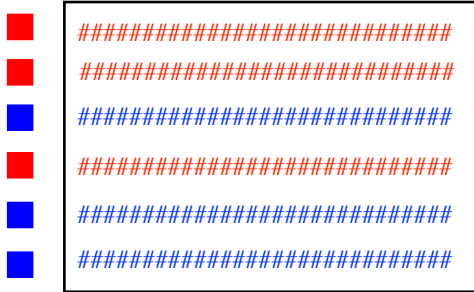original data   factor matrix

group membership