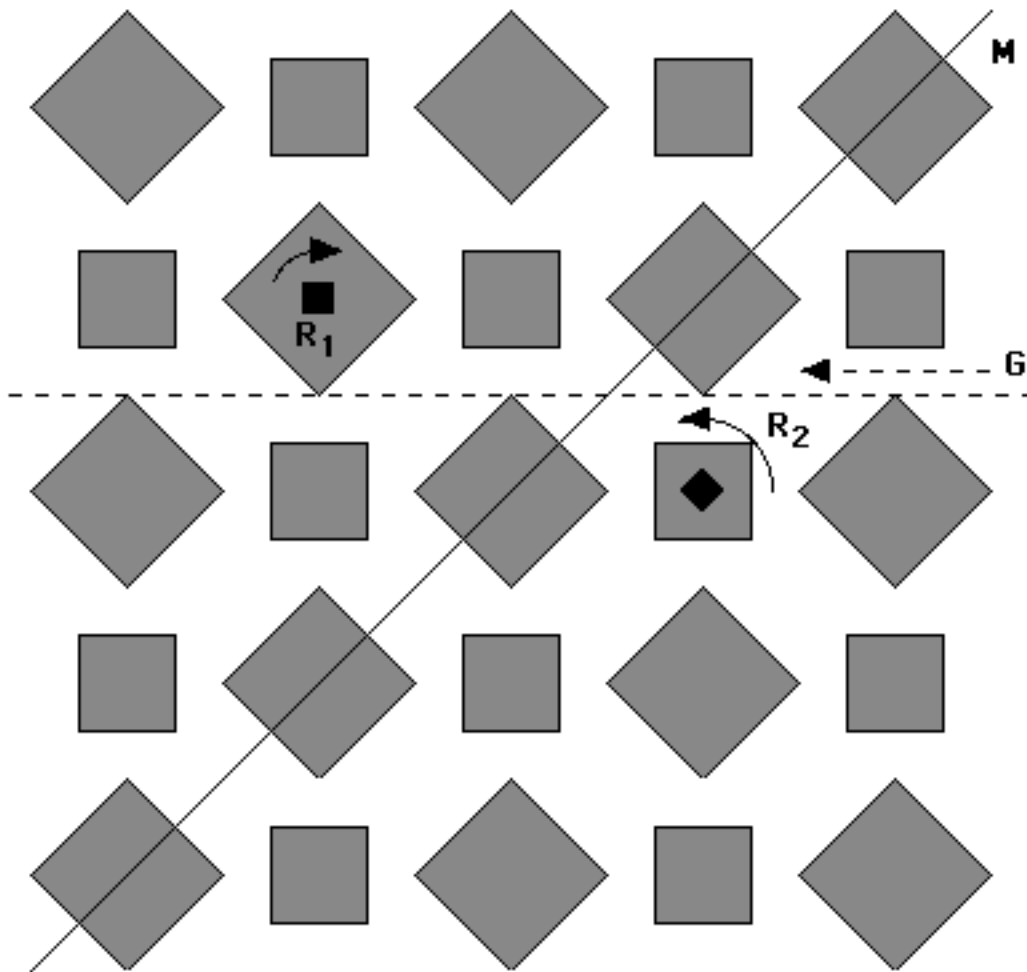


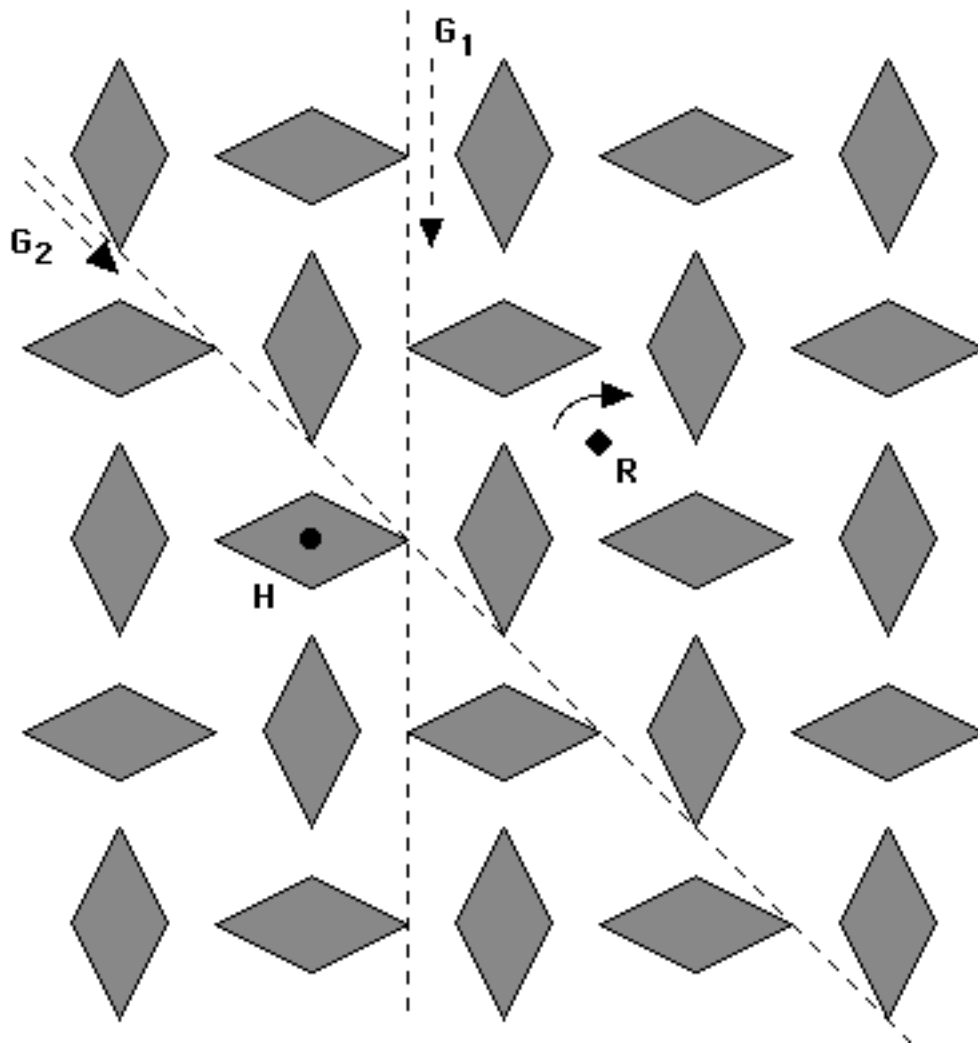
MAT 203 -- Final Exam

(1) Determine the following compositions:

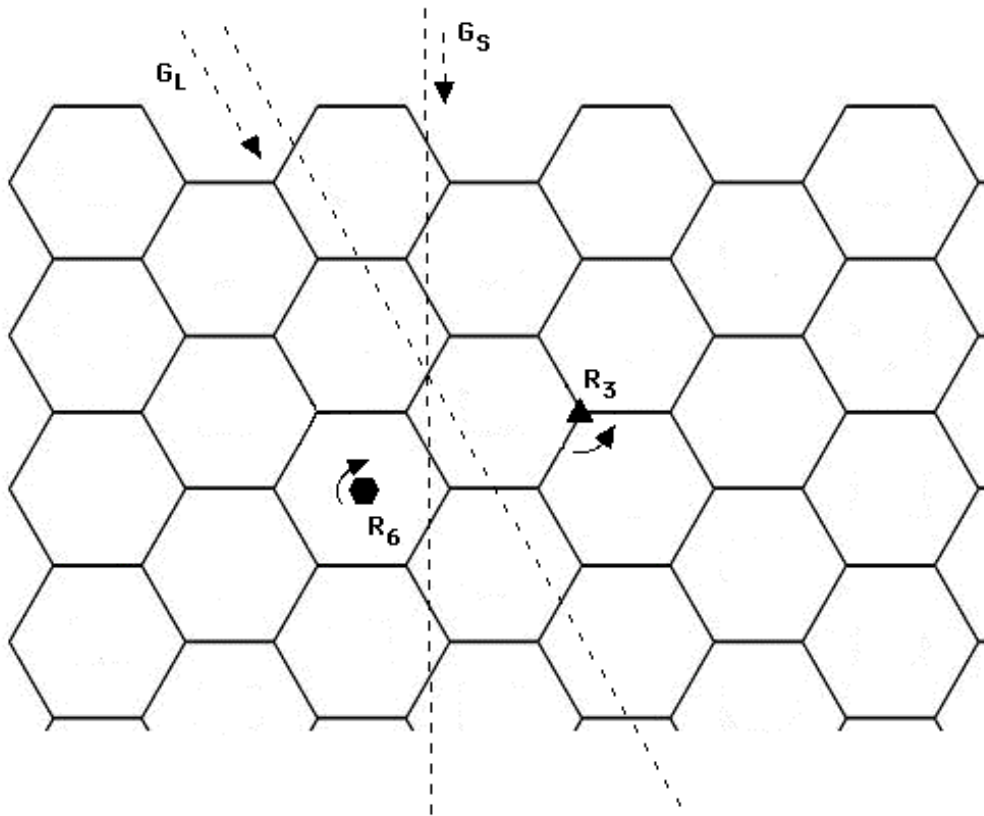
(a) $R_2 * G$, where R_2 is a counterclockwise 90° rotation and G is a horizontal glide reflection.



(b) $\mathbf{H}*\mathbf{G}_1$, where \mathbf{H} is a half turn and \mathbf{G}_1 is a vertical glide reflection.

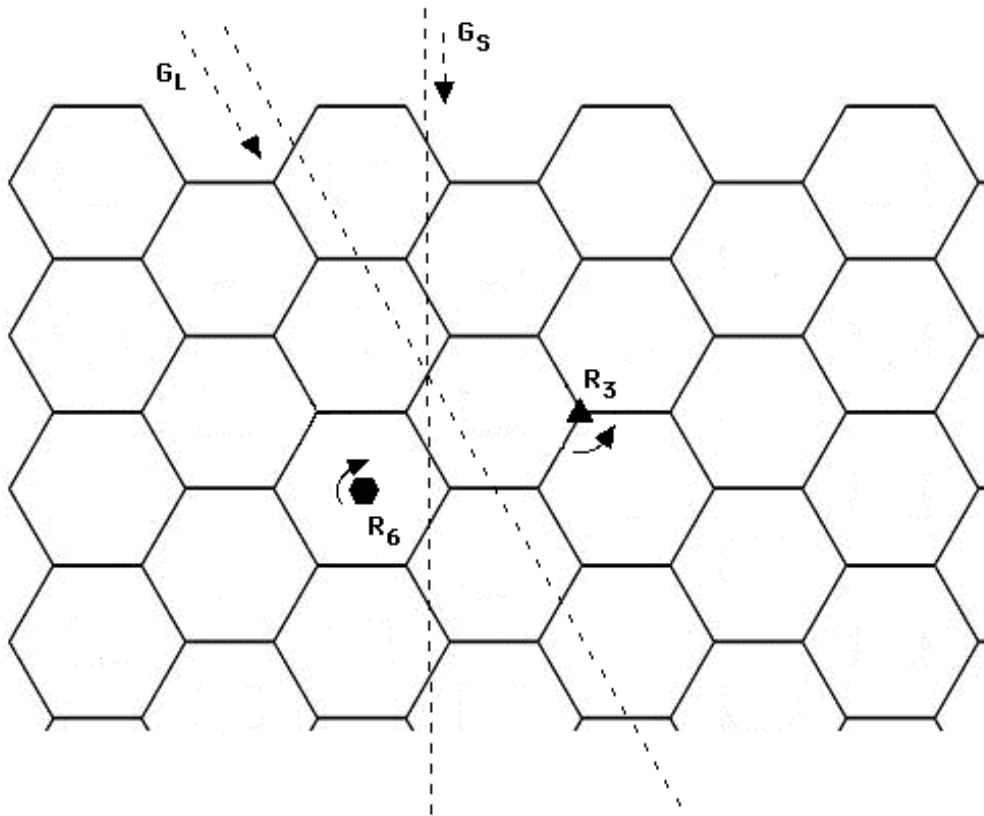


(c) $G_S * G_L$, where G_L and G_S are the indicated glide reflections.

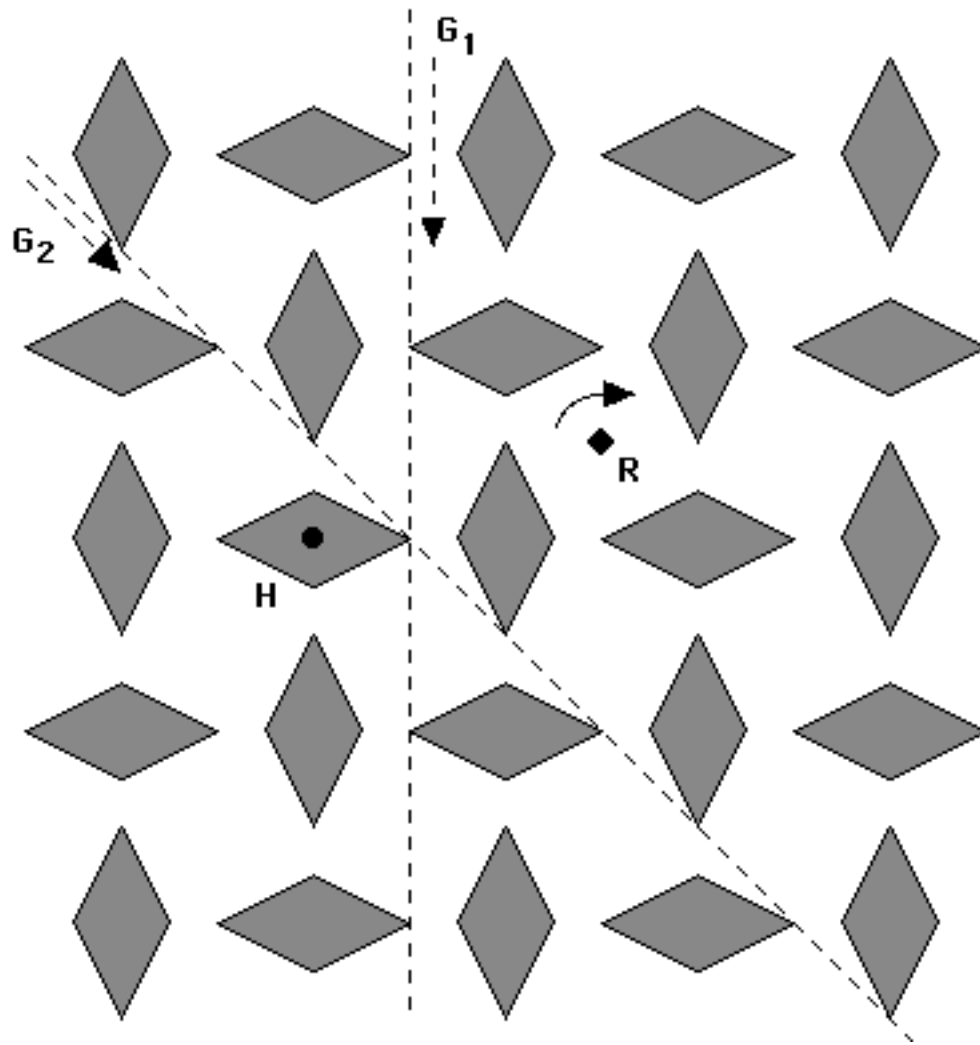


(2) Determine the following images:

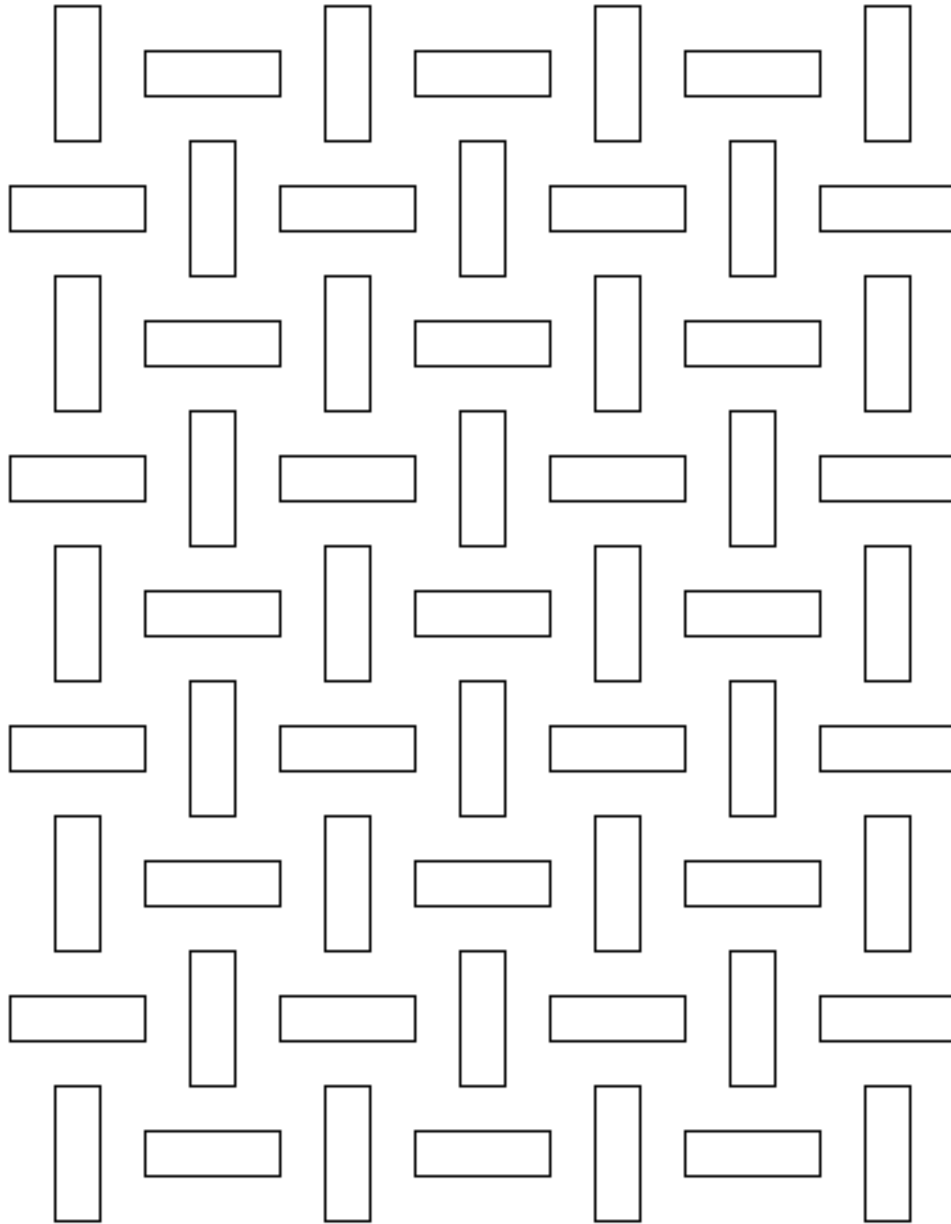
(a) $\mathbf{G}_S[\mathbf{R}_3]$, where \mathbf{G}_S is a vertical glide reflection and \mathbf{R}_3 is a counterclockwise 120° rotation.



(b) $R[H]$, where R is a clockwise 90° rotation and H is a half turn.

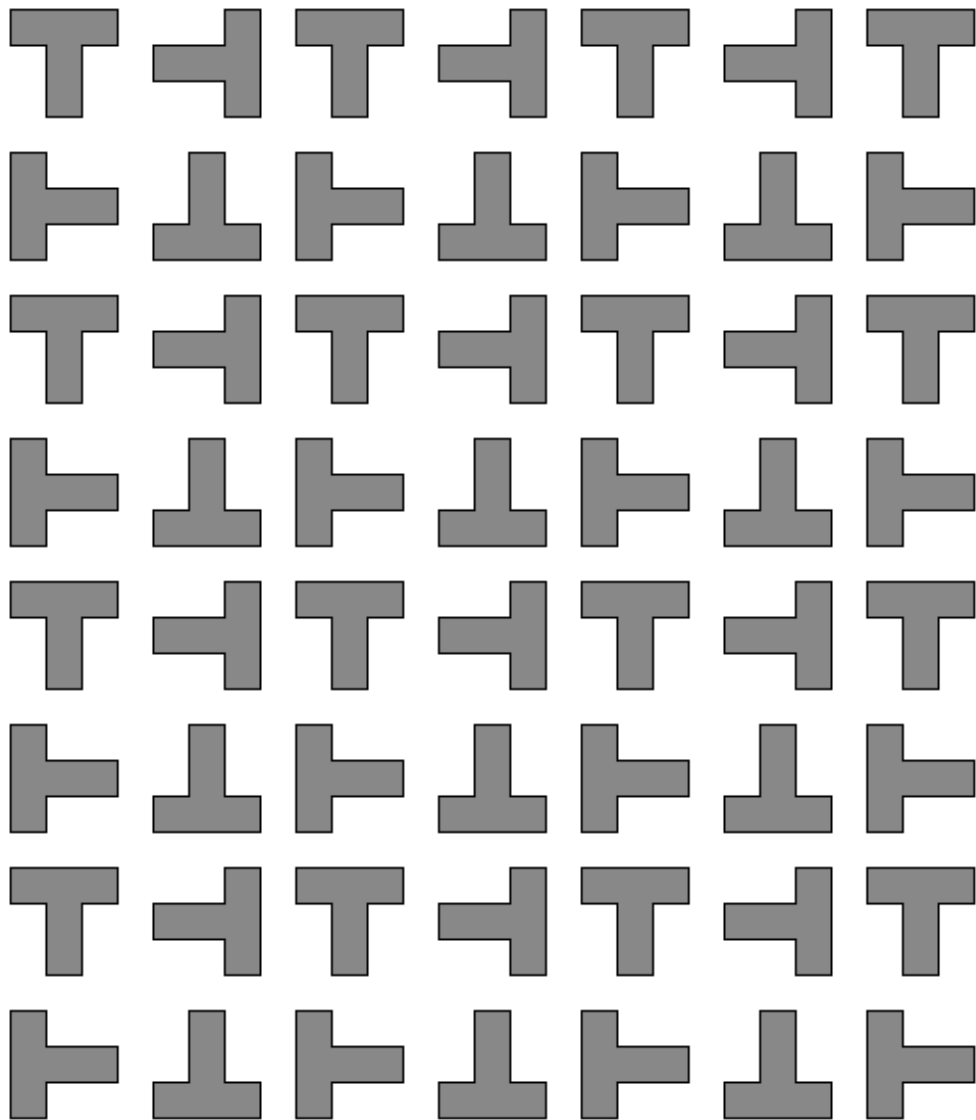


(3) Tile the given **p4g** pattern by copies of a single **pma2** border pattern.

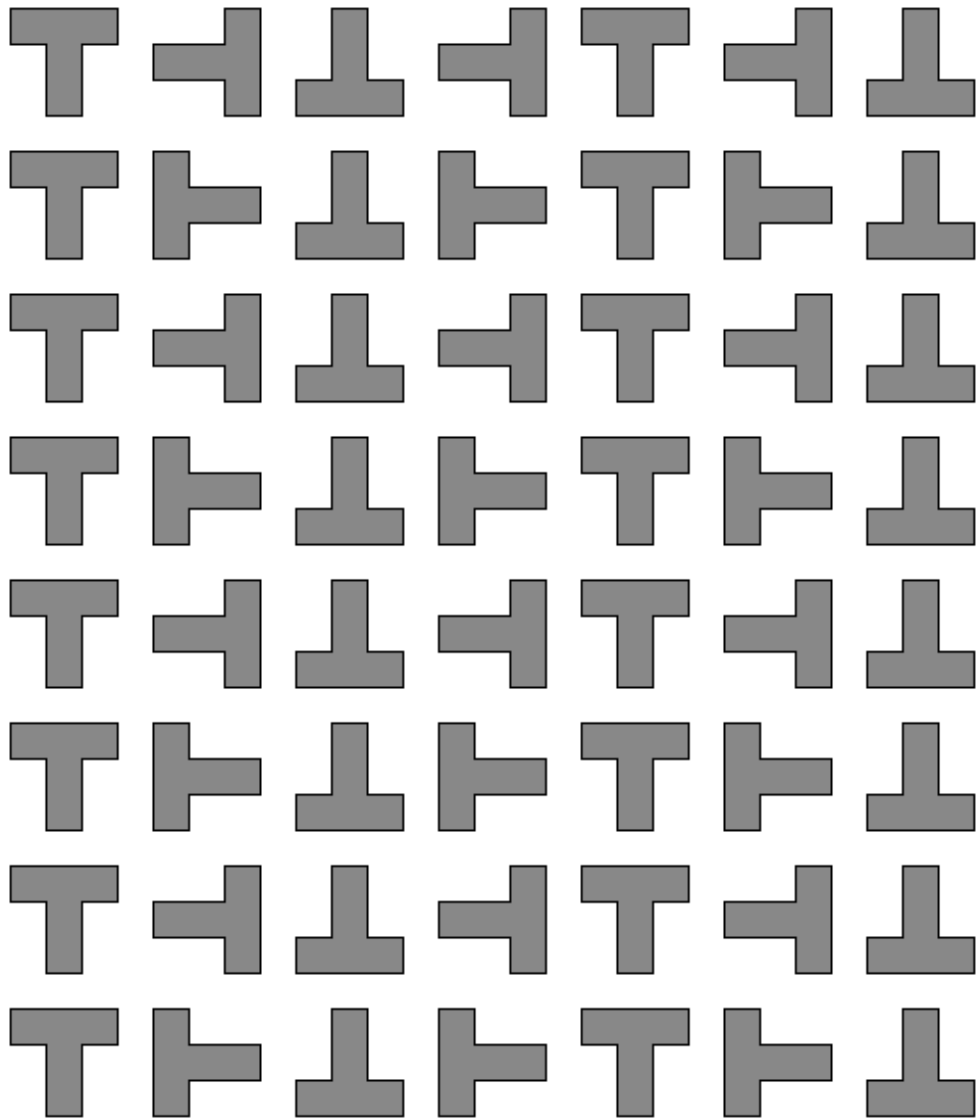


(4) Classify the following wallpaper patterns:

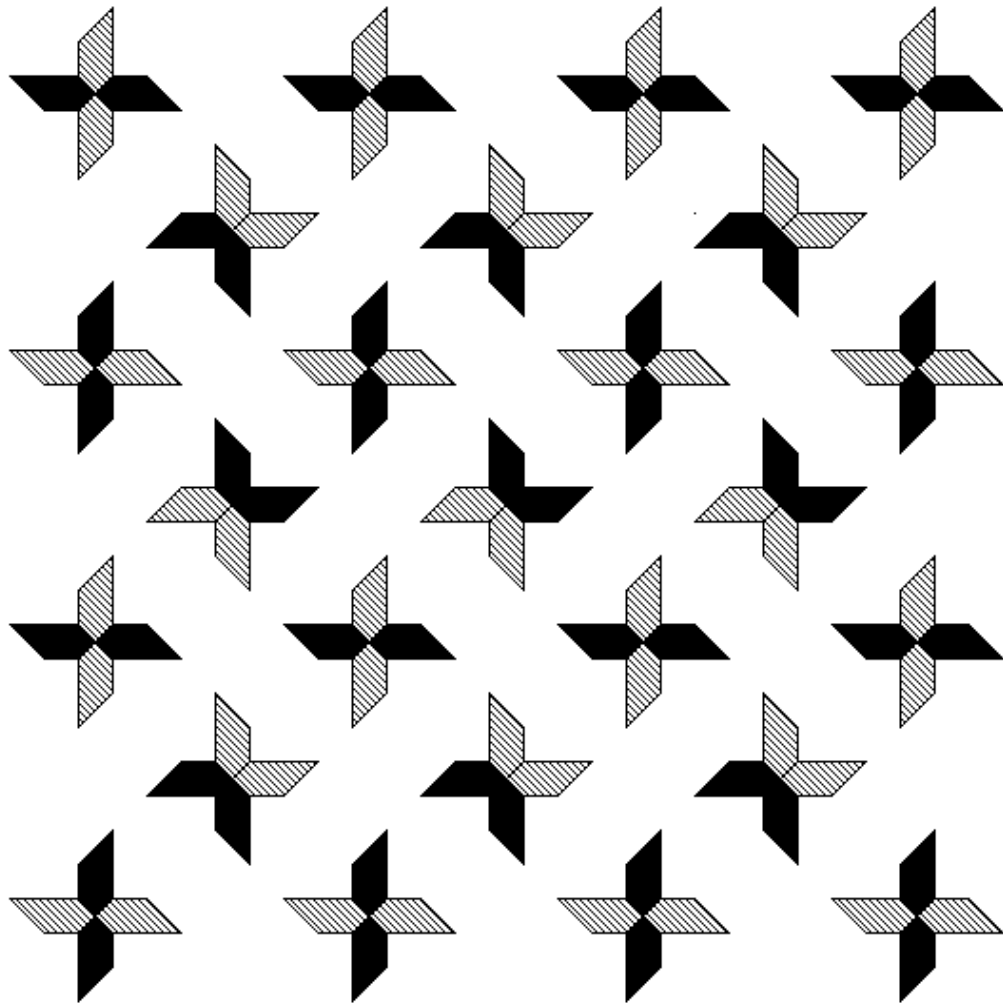
(a)



(b)



(5) Classify the following two-colored pattern:



(6) Classify the following multi-colored pattern:

