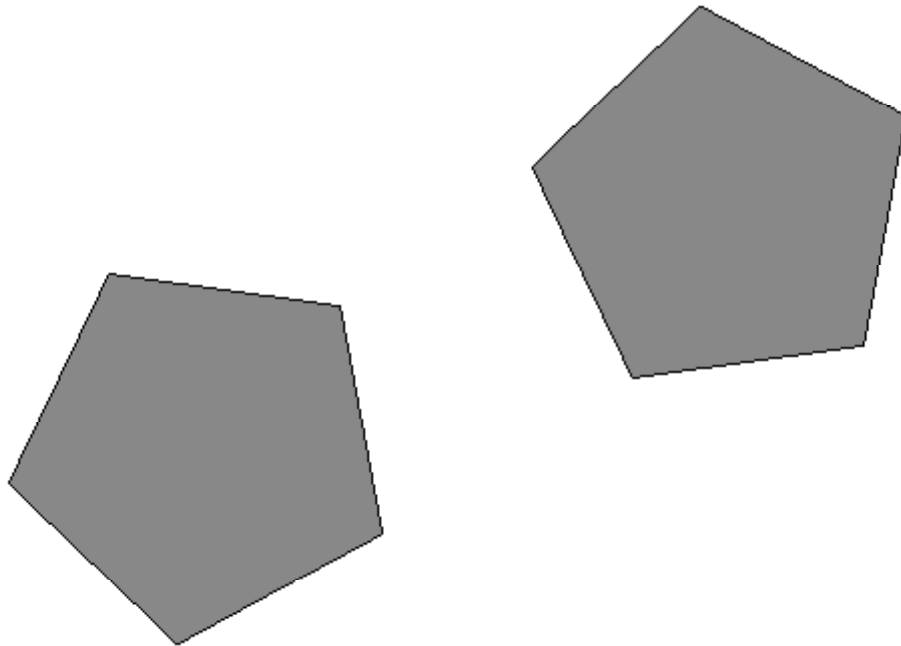


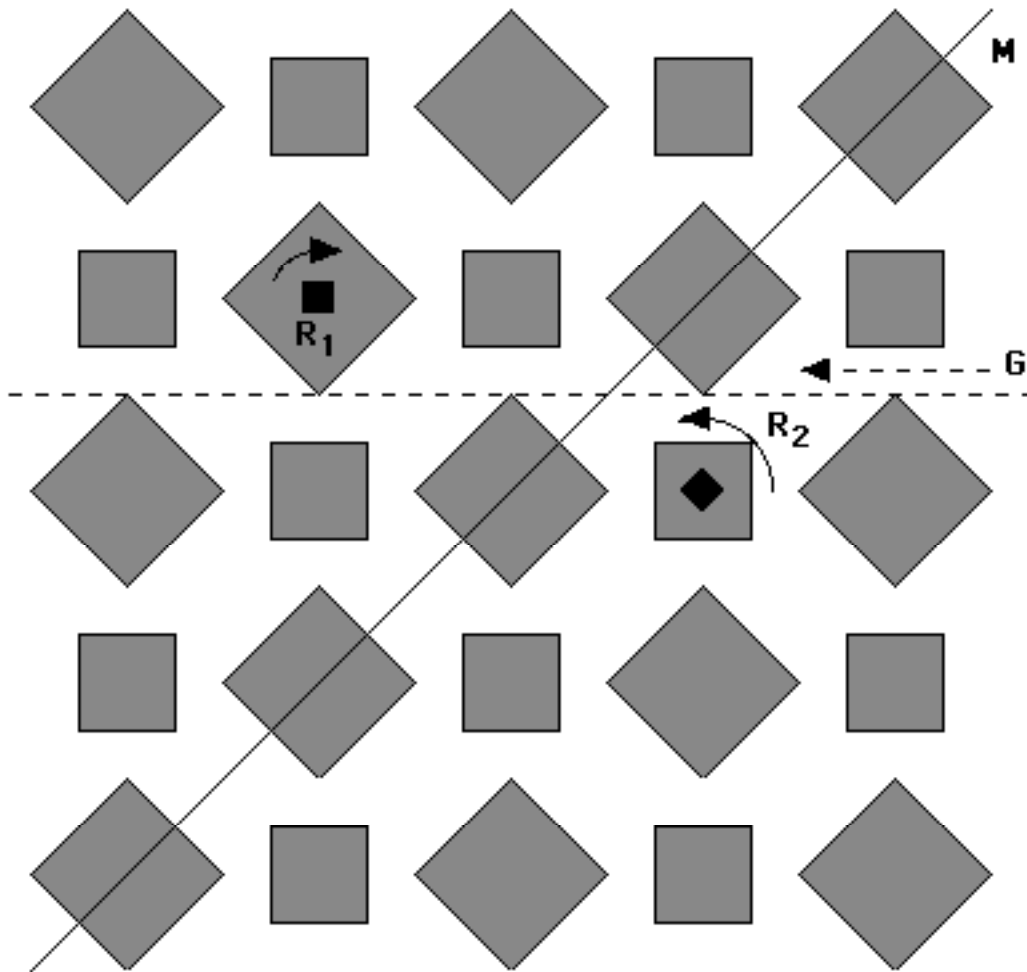
## MAT 203 -- Final Exam

(1) Determine a glide reflection mapping the set on the left to the set on the right:

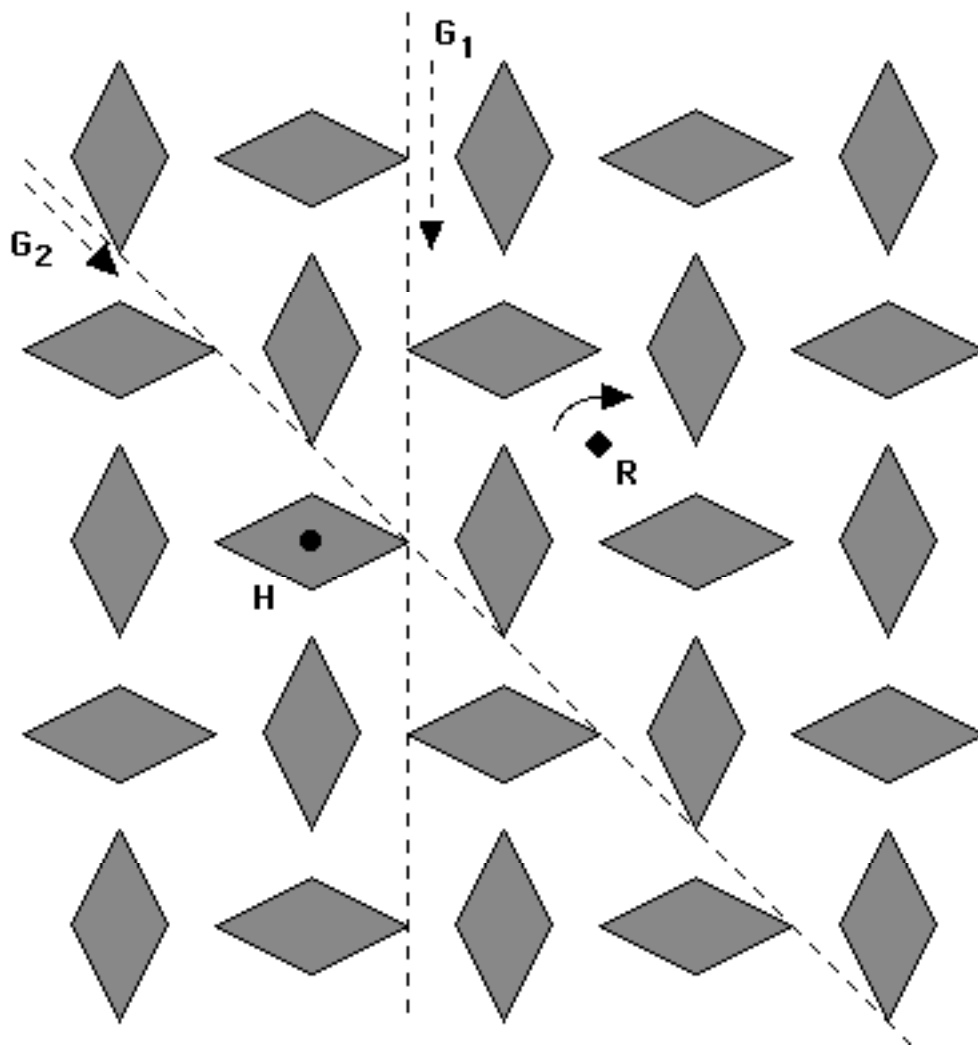


(2) Determine the following compositions:

(a)  $\mathbf{G} \circ \mathbf{R}_1$ , where  $\mathbf{R}_1$  is a clockwise  $90^\circ$  rotation and  $\mathbf{G}$  is a horizontal glide reflection.

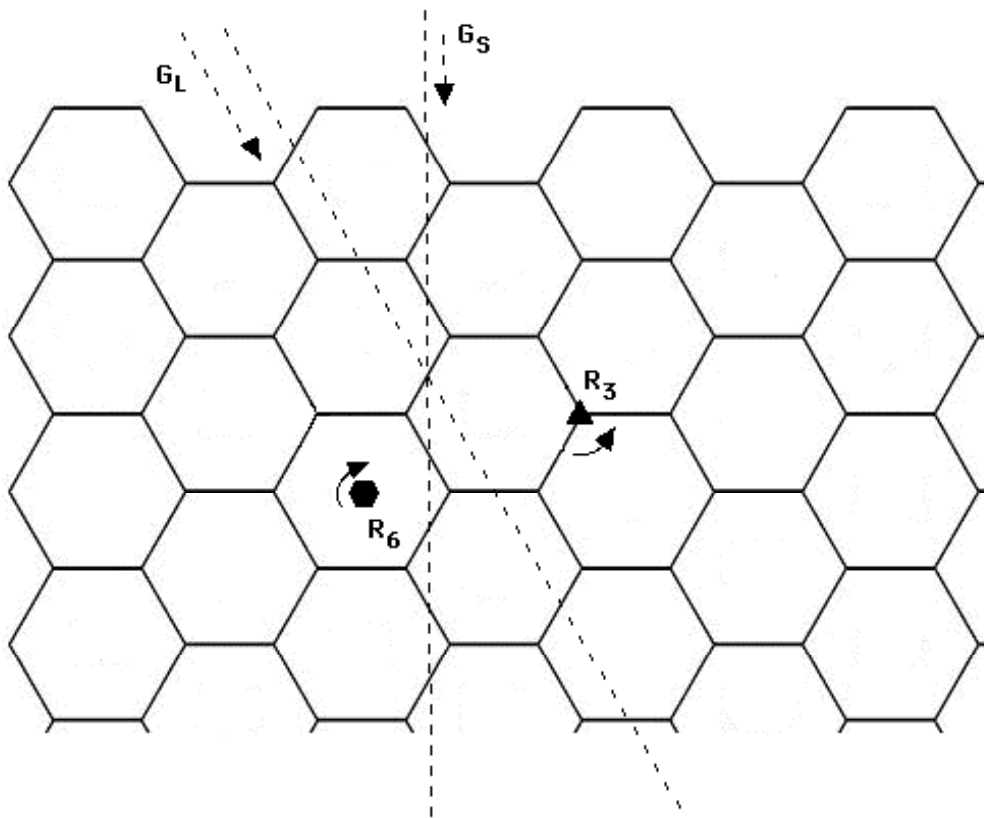


(b)  $H \cdot G_2$ , where  $H$  is a half turn and  $G_2$  is a diagonal glide reflection.

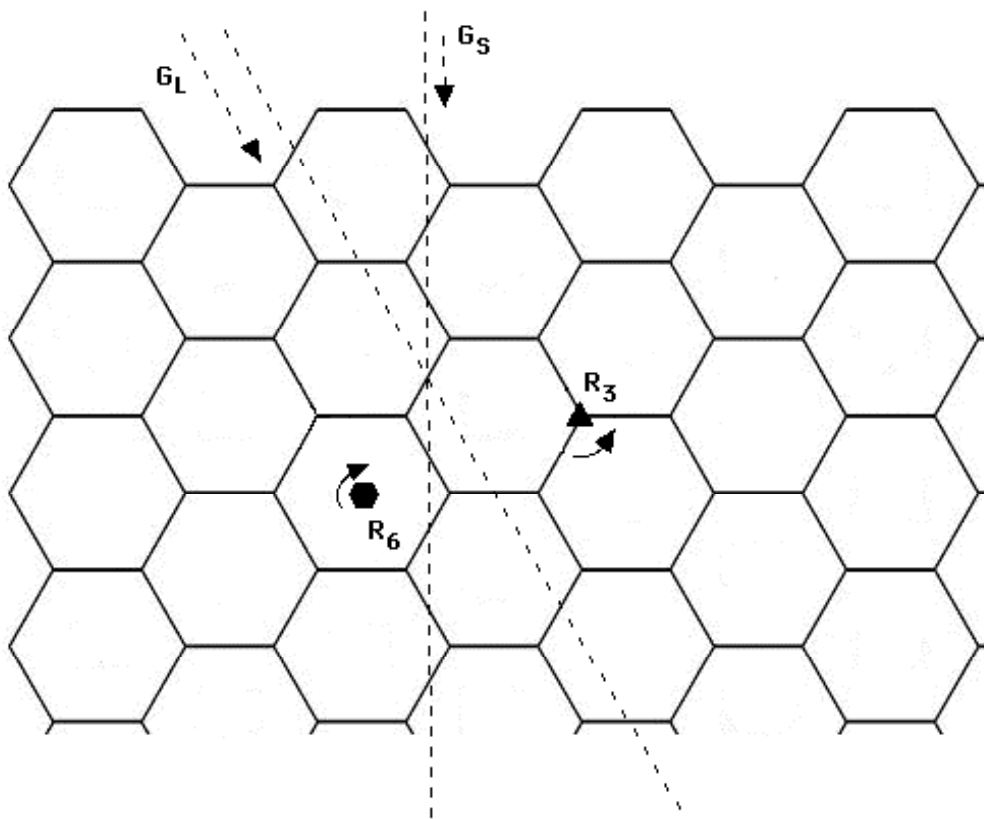


(3) Determine the following images:

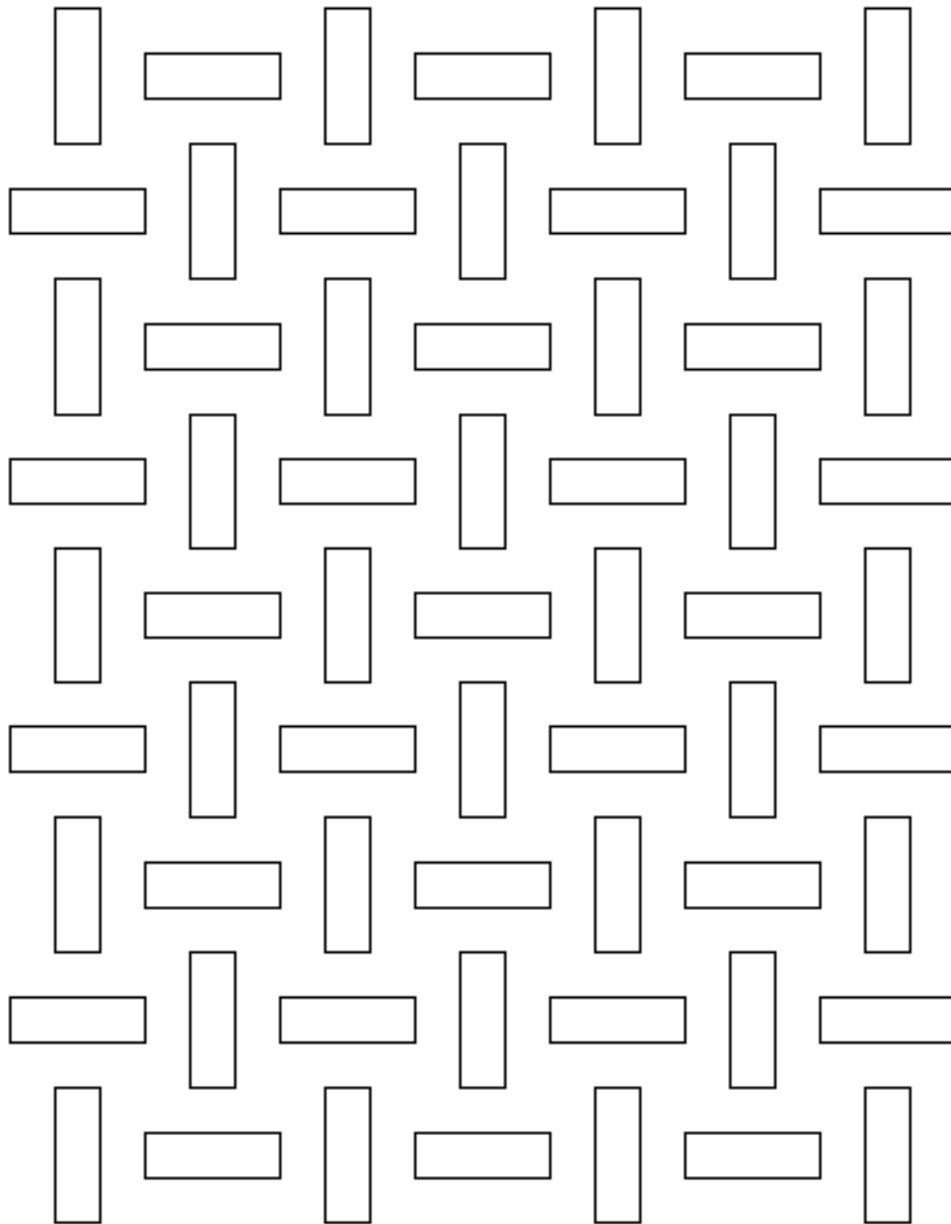
(a)  $\mathbf{G}_L[\mathbf{R}_3]$ , where  $\mathbf{G}_L$  is a diagonal glide reflection and  $\mathbf{R}_3$  is a counterclockwise  $120^\circ$  rotation.



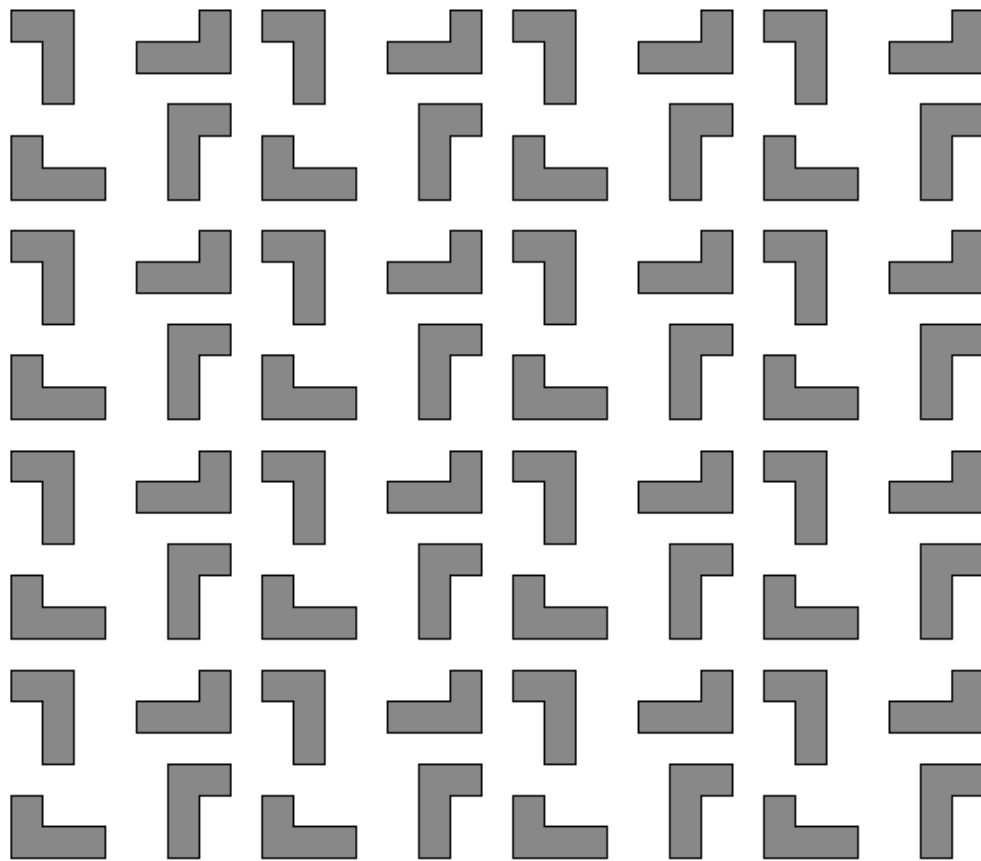
(b)  $R_6[G_S]$ , where  $R_6$  is a clockwise  $60^\circ$  rotation and  $G_S$  is a vertical glide reflection.



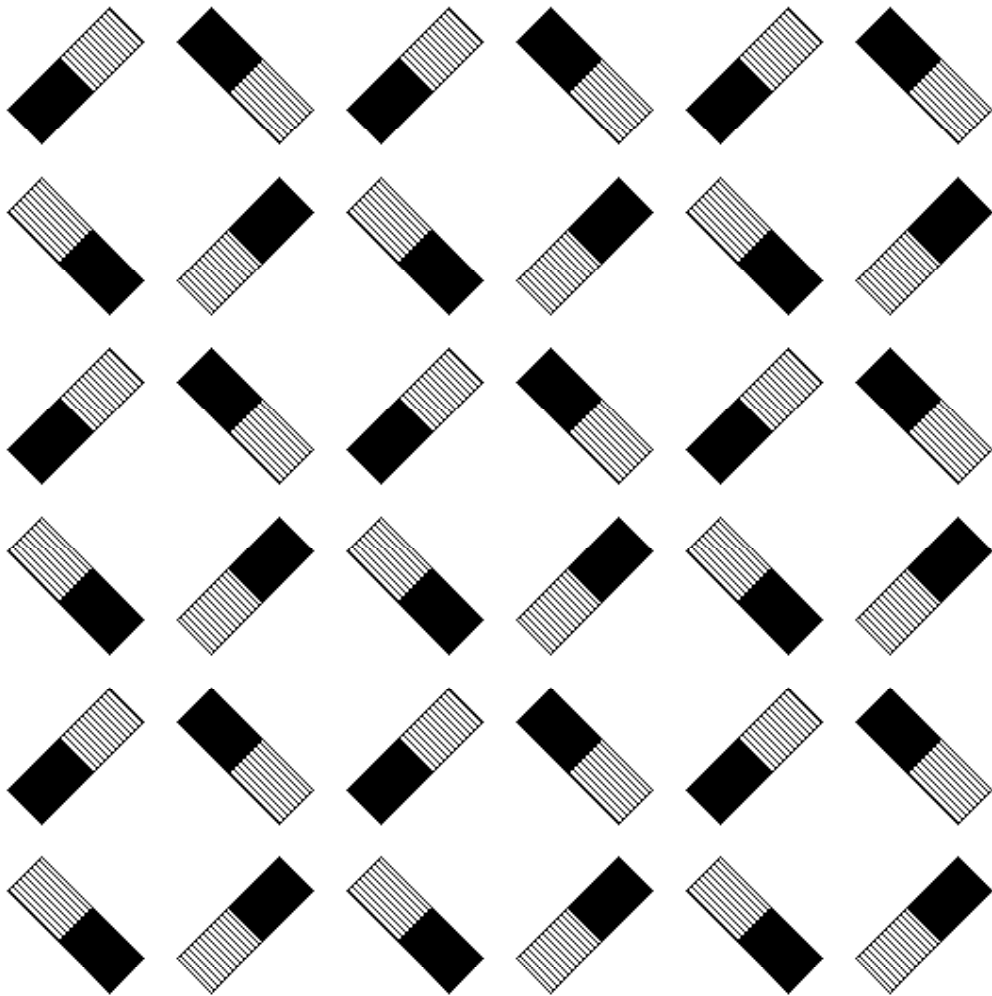
(4) Tile the given **p4g** pattern by piled copies of a single **p1a1** border pattern.



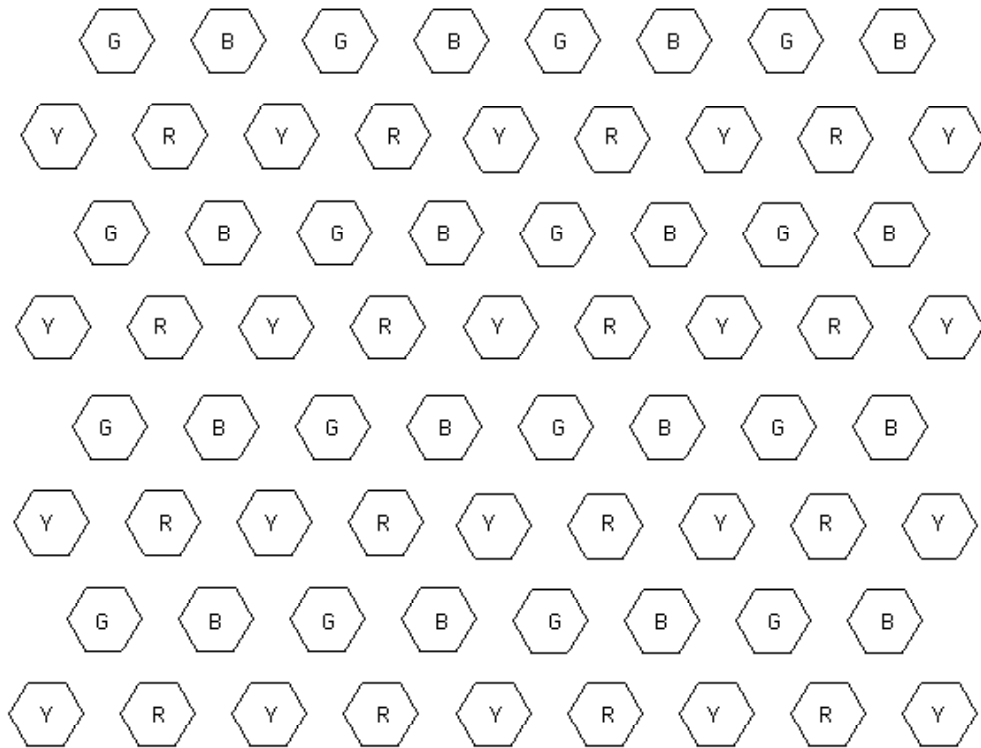
(5) Classify the following wallpaper pattern:



(6) Classify the following two-colored pattern:



(7) Classify the following multi-colored pattern:



(8) 'Multiply' the given **cm** pattern by the given half turn and classify the resulting pattern:

