



Figure 1: Four image masks.

- (a) Let \vec{x} be the four-element vector that represents the magnitude of light emanating from the four cave entrances. Write a matrix \mathbf{K} that performs the masking process in Figure 1 on the vector \vec{x} , such that $\mathbf{K}\vec{x}$ is the result of the four measurements.
- (b) Does Kody's set of masks give us a unique solution for all four caves' light intensities? Why or why not?
- (c) Nara, in her infinite wisdom, places her one hand diagonally across the entrances, covering two of the cave entrances. However, her hand is not wide enough, letting in 50% of the light from the caves covered and 100% of the light from the caves not covered. The following diagram shows the percentage of light let through from each cave:

50%	100%
100%	50%

Does this additional measurement give them enough information to solve the problem? Why or why not?