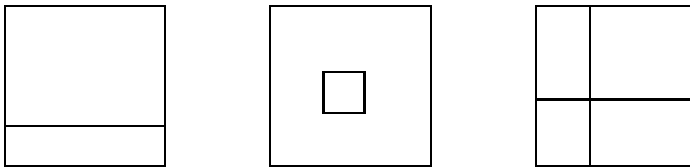


Homework Set #6

1. Images.

Consider an $n \times n$ array x of 0's and 1's . Thus x has n^2 bits.



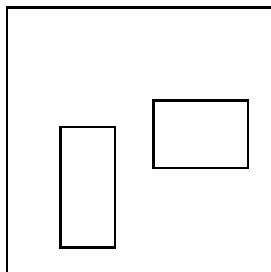
Find the Kolmogorov complexity $K(x | n)$ (to first order) if

- (a) x is a horizontal line.
- (b) x is a square.
- (c) x is the union of two lines, each line being vertical or horizontal.

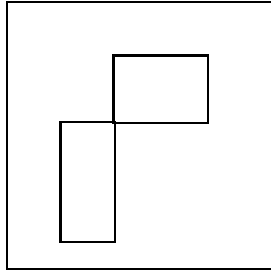
2. Kolmogorov complexity.

Assume n very large and known. Let all rectangles be parallel to the frame.

- (a) What is the (maximal) Kolmogorov complexity $K(x|n)$ of the union of two rectangles on an $n \times n$ grid?



(b) What if the rectangles intersect at a corner?



(c) What if they have the same (unknown) shape?

(d) What if they have the same (unknown) area?

(e) What is the minimum Kolmogorov complexity of the union of two rectangles?
That is, what is the simplest union?

(f) What is the (maximal) Kolmogorov complexity $K(x|n)$ over all images (not necessarily rectangles) on an $n \times n$ grid?