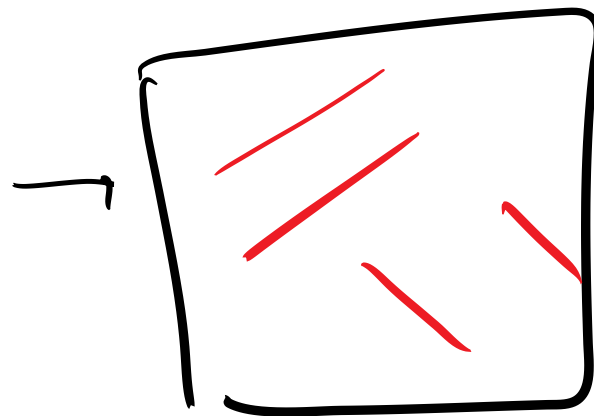
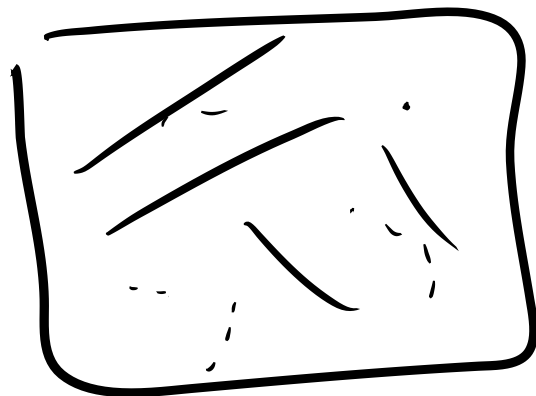
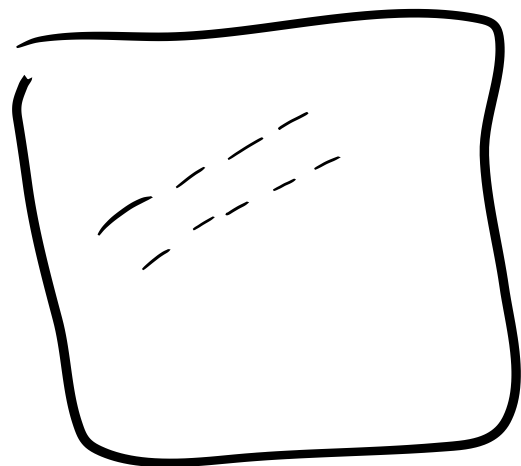
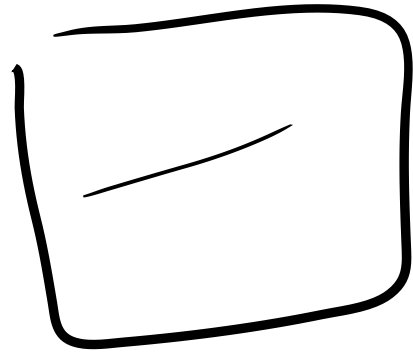
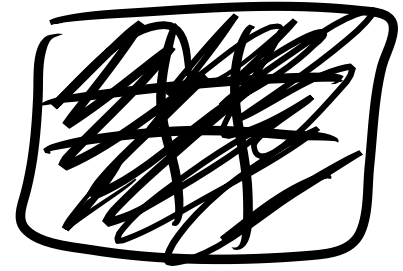
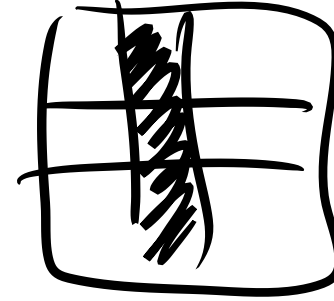
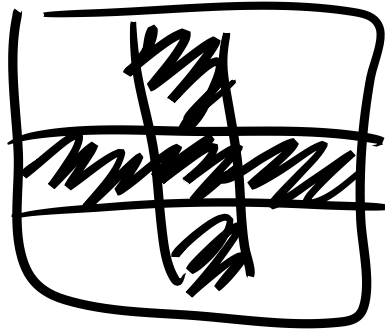


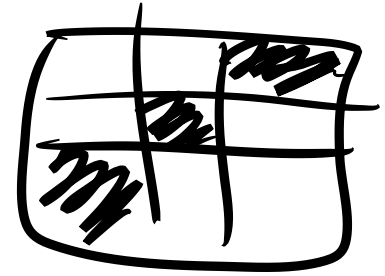
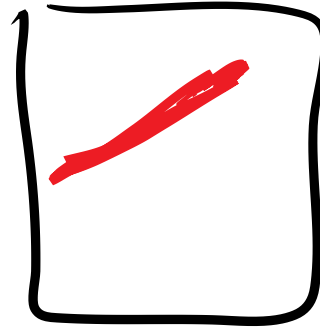
Morphology



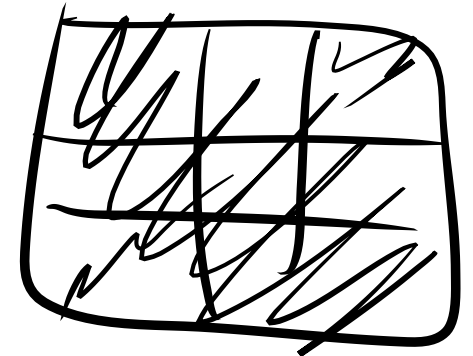
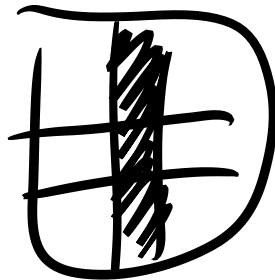
Dilate



Dilate
→



Erode



Open

Erode \rightarrow Dilate

Close

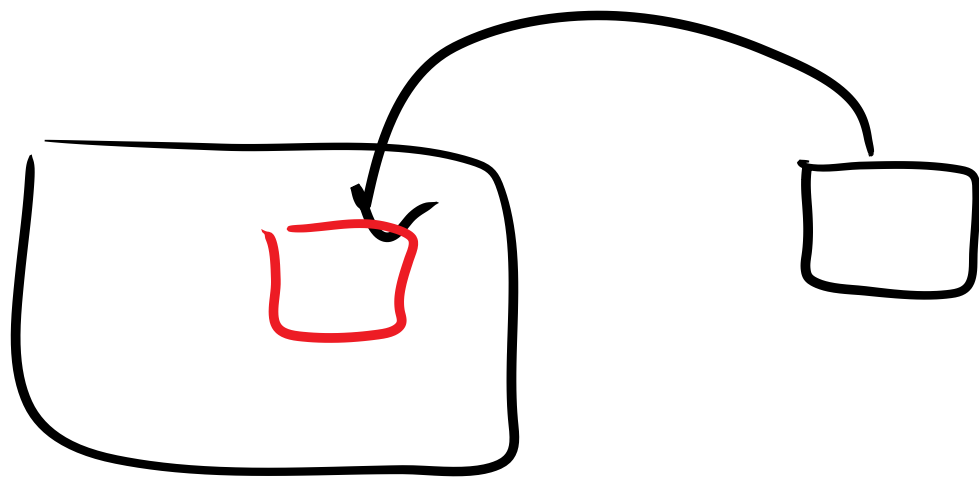
Dilate \rightarrow Erode

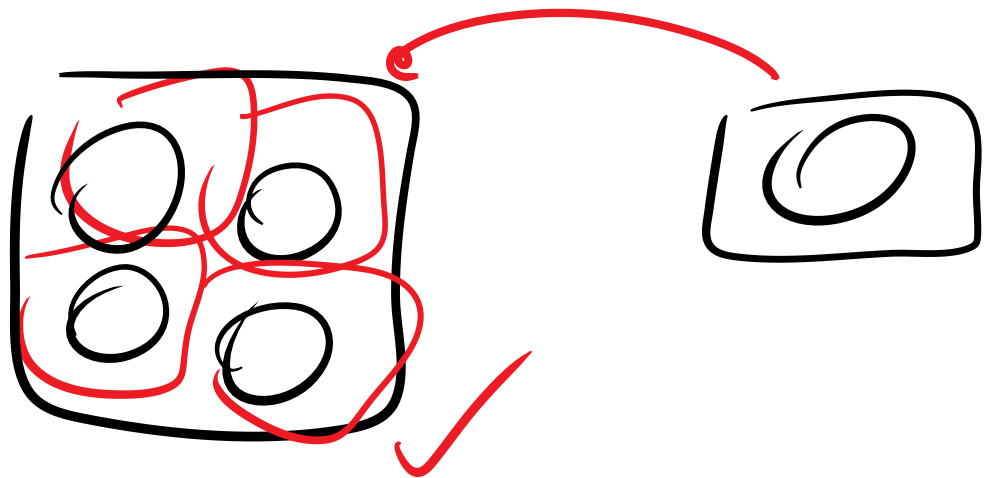
Morphology gradient

Dilate - image

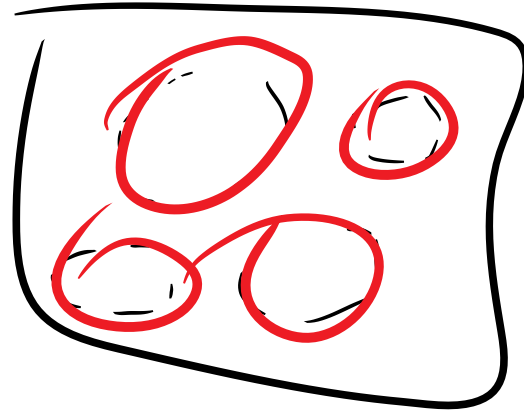
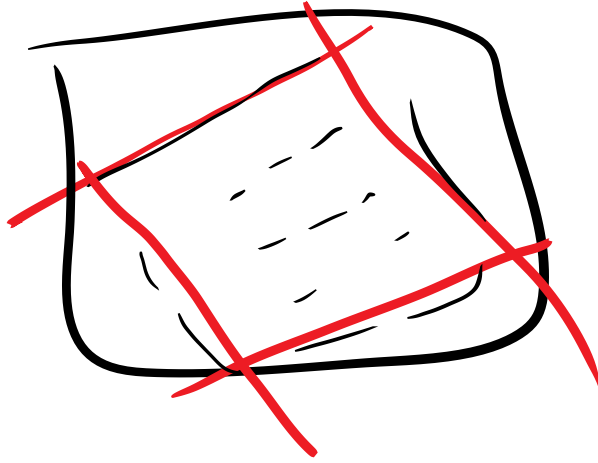
Skeleton

Template Matching



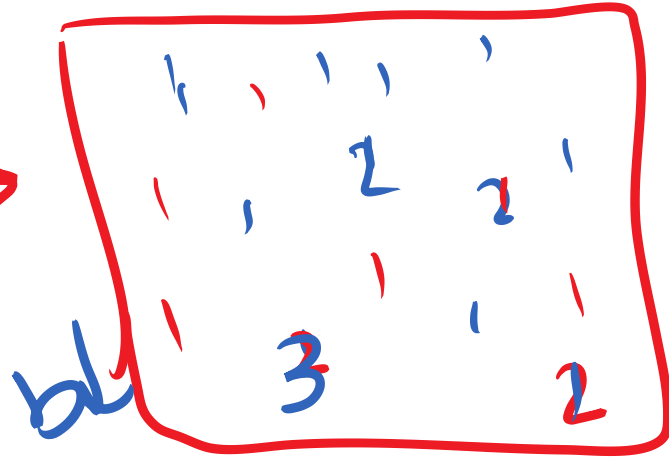
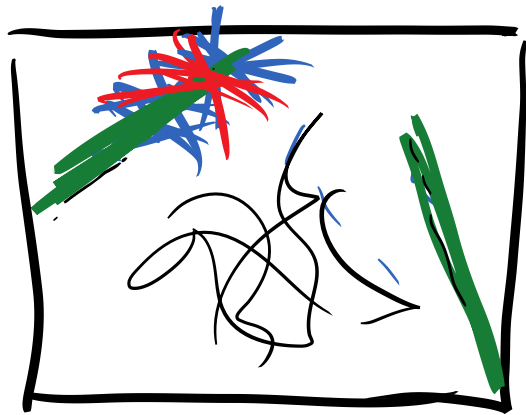


hough

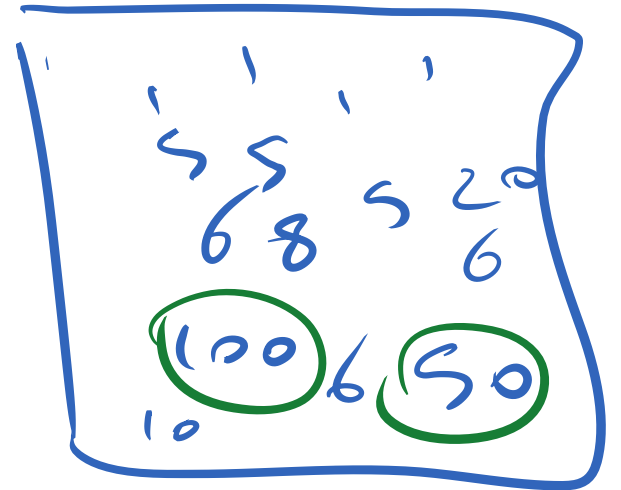


hough line

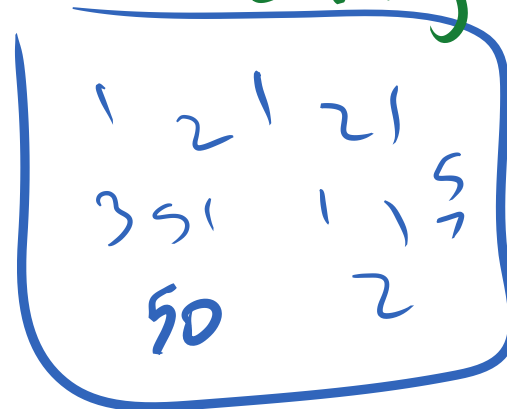
$$y = m \underline{x} + b$$

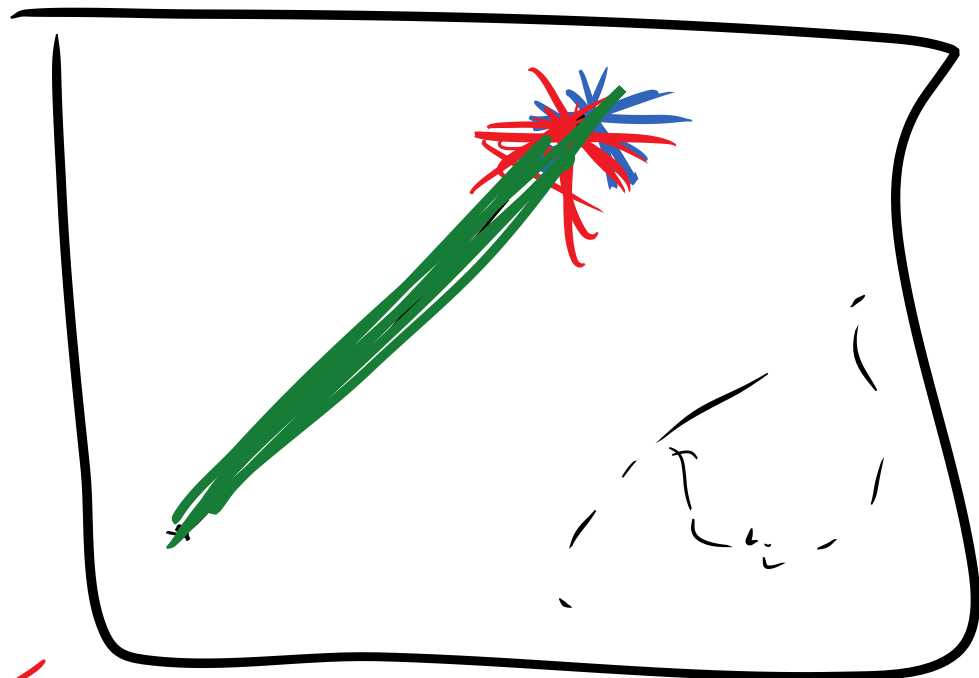
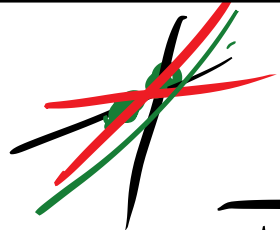


final



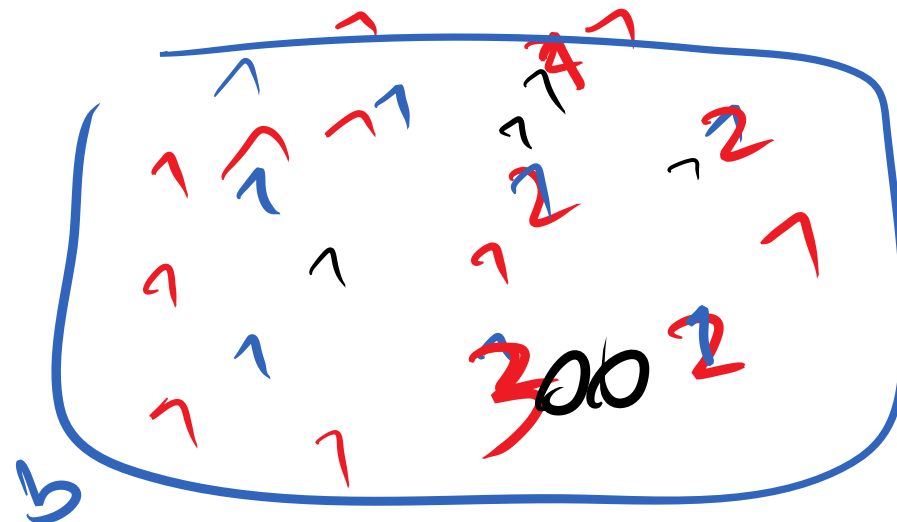
↓ hough

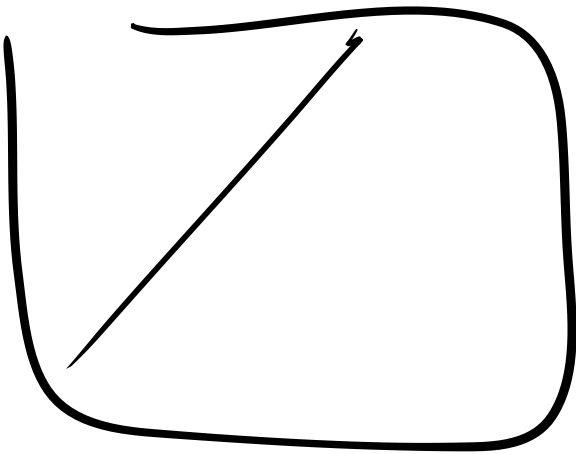




قطر
m
b → c

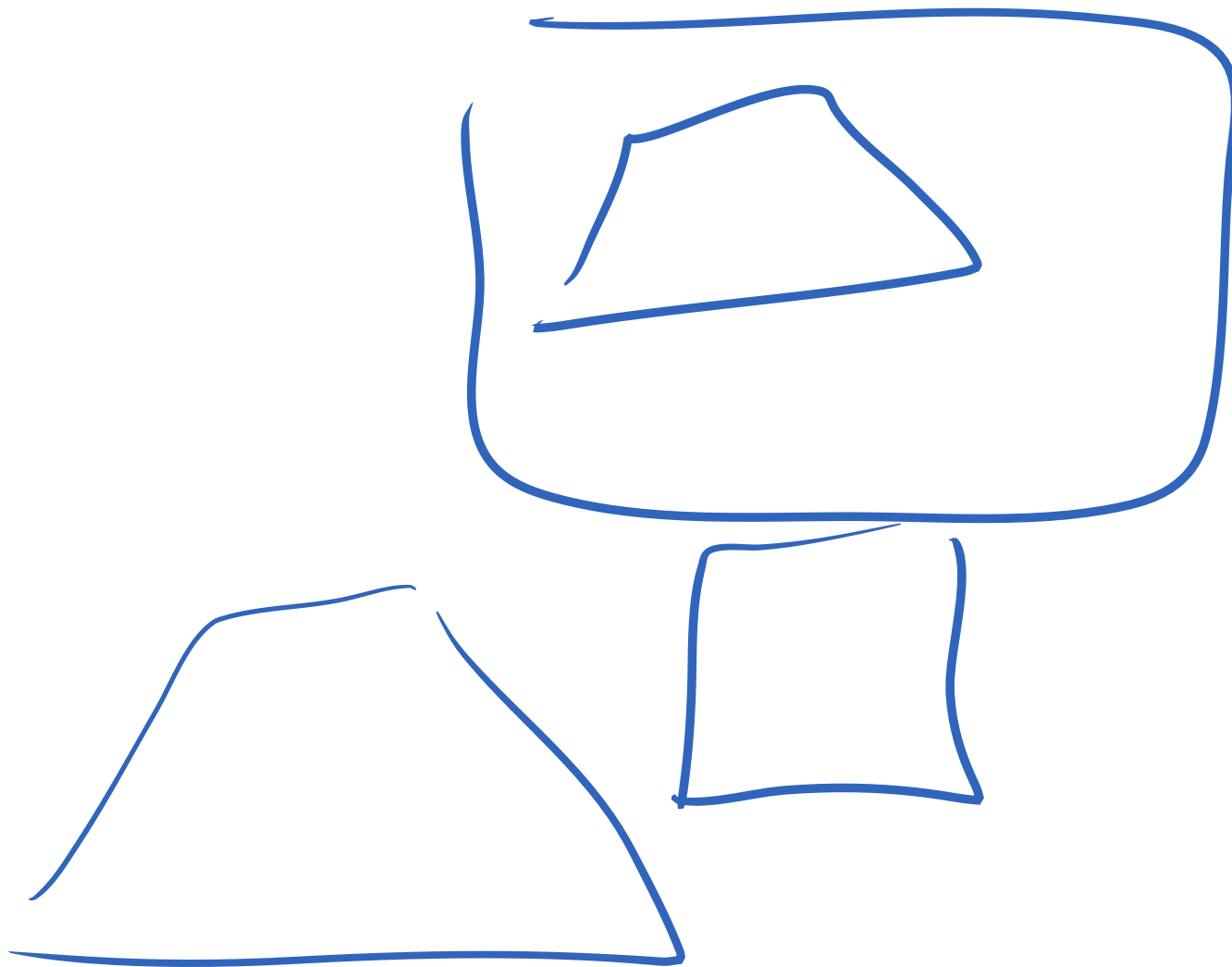
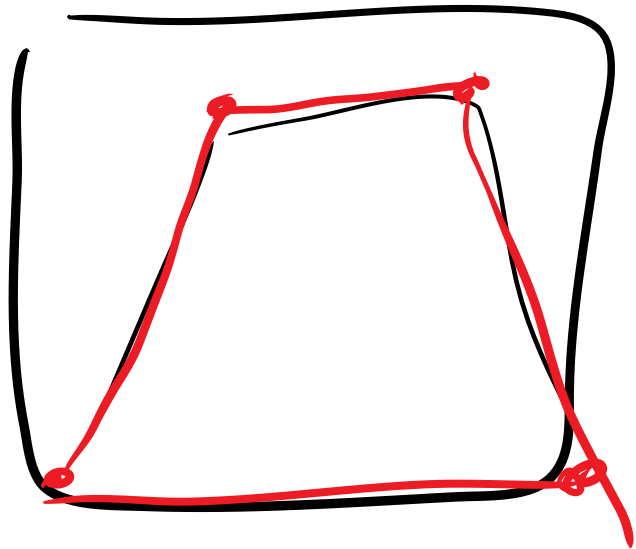
$$Y = \underline{m}x + b$$

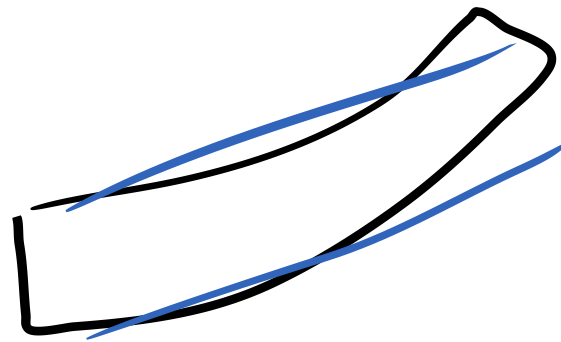
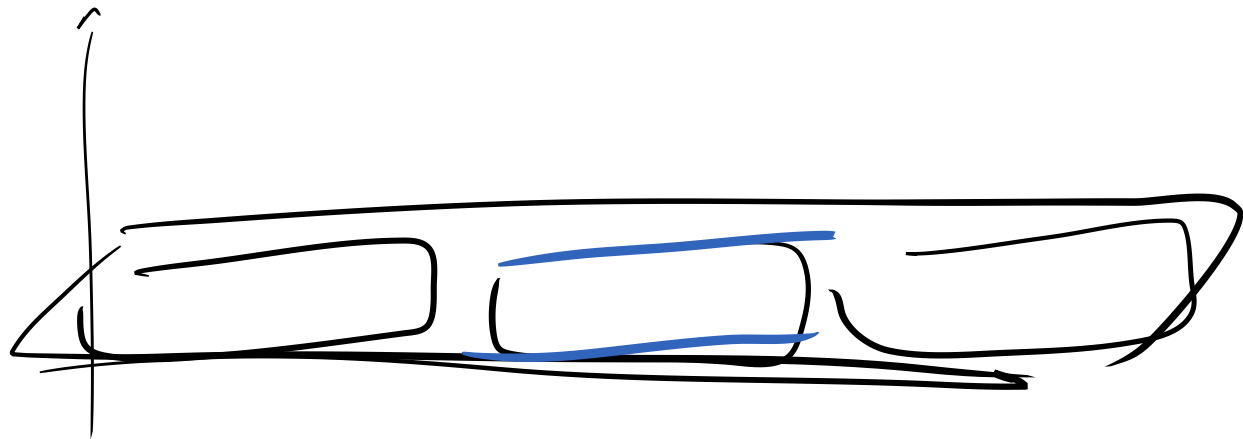


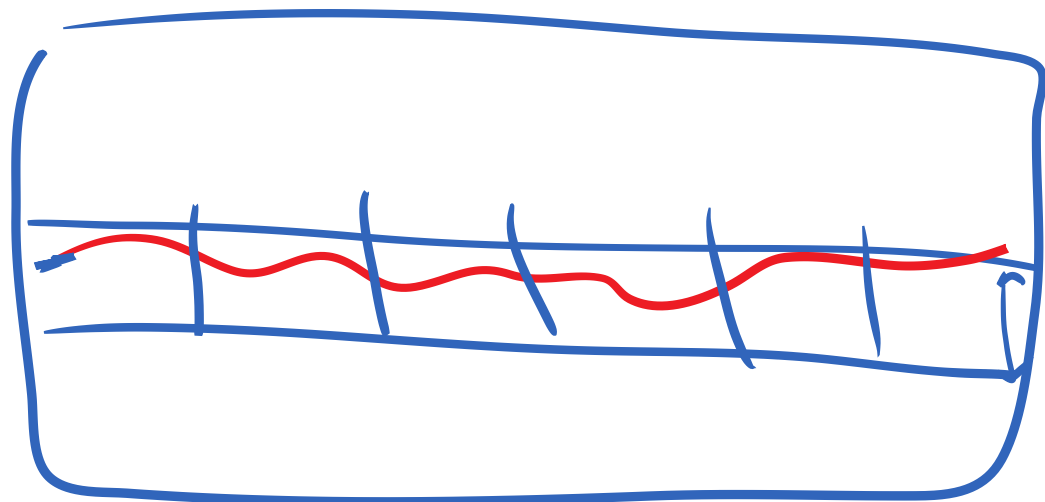


P_r
150
200

$$r = \sqrt{w^2 + h^2}$$
$$0 < \theta < 180$$







20 cm

