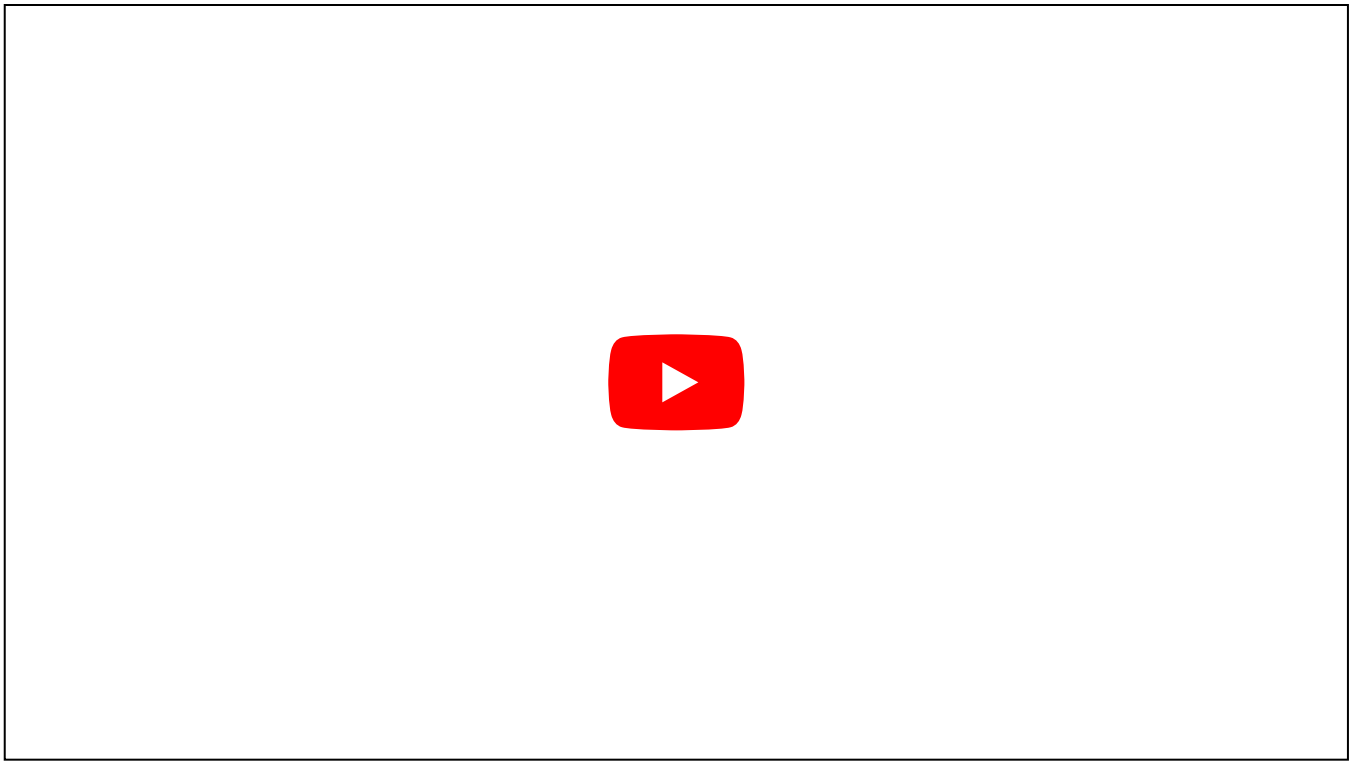
Using the Hough Transform to Find Lines from Canny Edges

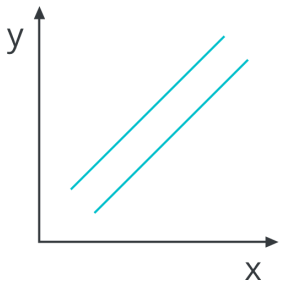


In image space, a line is plotted as x vs. y, but in 1962, Paul Hough devised a method for representing lines in parameter space, which we will call “Hough space” in his honor.

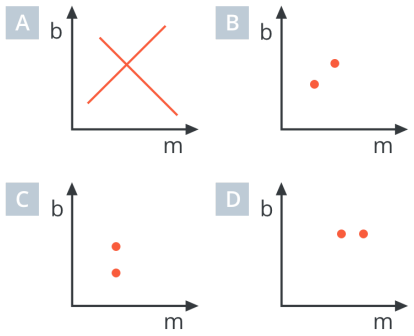
In Hough space, I can represent my "x vs. y" line as a point in "m vs. b" instead. The Hough Transform is just the conversion from image space to Hough space. So, the characterization of a line in image space will be a single point at the position (m, b) in Hough space.

So now I’d like to check your intuition... if a **line** in image space corresponds to a **point** in Hough space, what would **two parallel lines** in image space correspond to in Hough space?

Image Space



Hough Space



QUESTION 1 OF 5

What will be the representation in Hough space of two parallel lines in image space?

- A
- B
- C
- D

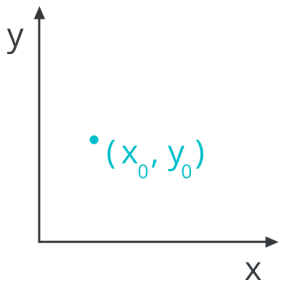
SUBMIT

Alright, so a line in image space corresponds to a point in Hough space. What does a point in image space correspond to in Hough space?

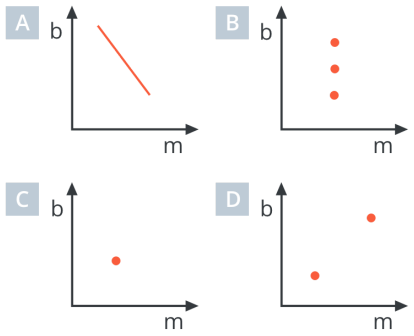
A single point in image space has many possible lines that pass through it, but not just any lines, only those with particular combinations of the m and b parameters. Rearranging the equation of a line, we find that a single point (x,y) corresponds to the line b = y - xm.

So what is the representation of a **point** in image space in Hough space?

Image Space



Hough Space



QUESTION 2 OF 5

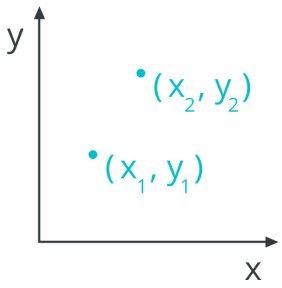
What does a point in image space correspond to in Hough space?

- A
- B
- C
- D

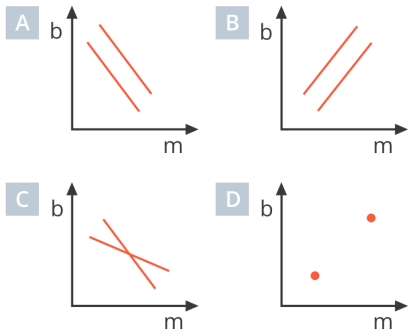
SUBMIT

What if you have **2 points** in image space. What would that look like in Hough space?

Image Space



Hough Space



QUESTION 3 OF 5

What is the representation in Hough space of two points in image space?

- A
- B
- C
- D

SUBMIT

Alright, now we have two intersecting lines in Hough Space. How would you represent their **intersection** at the point (m_0, b_0) in image space?

Hough Space

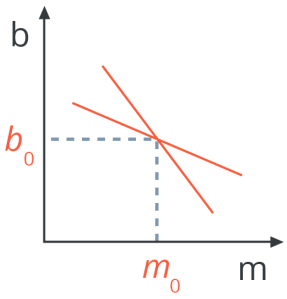
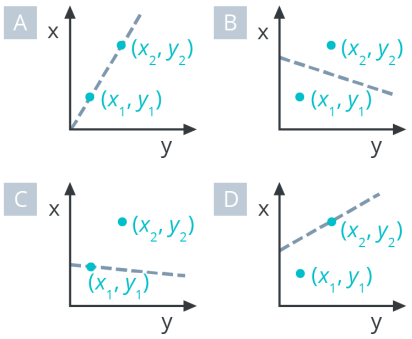


Image Space



QUESTION 4 OF 5

What does the intersection point of the two lines in Hough space correspond to in image space?

A) A line in image space that passes through both (x1, y1) and (x2, y2)

B) A line in image space that passes between (x1, y1) and (x2, y2)

C) A line in image space that passes through (x1, y1)

D) A line in image space that passes through only (x2, y2)

SUBMIT

So, what happens if we run a Hough Transform on an image of a square? What will the corresponding plot in Hough space look like?

QUESTION 5 OF 5

What happens if we run a Hough Transform on an image of a square? What will the corresponding plot in Hough space look like?

- A
- B

D

SUBMIT

NEXT