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Q/hough5.stex
% ho07f ho08 ho09 ho12 ho11 ho10 ho12f ho13 ho16 ho17 ho18 ho19
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You are given the following set of (x, y) picture points:

$$(1,1),\ (1,4),\ (2,6),\ (2,5),\ (4,7),\ (4,8),\ (4,9),\ (8,10),\ (8,13)$$

Apply the technique of the Hough Transform to detect patterns given by the following parameterization:

$$y = a \log_2 x + b$$

Quantize a into the 6 values 0,1,2,3,4,5. Quantize b into the 6 values 0,1,2,3,4,5.

The lines in the parameter space have the form:

$$b = y - a log_2 x$$

The point	$(1,1)$	gives the following line:	$b = 1$
The point	$(1,4)$	gives the following line:	$b = 4$
The point	$(2,6)$	gives the following line:	$b = 6 - a$
The point	$(2,5)$	gives the following line:	$b = 5 - a$
The point	$(4,7)$	gives the following line:	$b = 7 - 2a$
The point	$(4,8)$	gives the following line:	$b = 8 - 2a$
The point	$(4,9)$	gives the following line:	$b = 9 - 2a$
The point	$(8,10)$	gives the following line:	$b = 10 - 3a$
The point	$(8,13)$	gives the following line:	$b = 13 - 3a$

A

What is the accumulator space?

b							
5	1	2	1	0	0	0
4	1	2	4	2	1	1
3	0	0	2	2	0	0
2	0	0	0	2	1	0
1	1	1	1	3	4	2
0	0	0	0	0	1	1
	0	1	2	3	4	5
	a					

B

What are the three most likely patterns?

1. $y = 2log_2 x + 4$
2. $y = 4log_2 x + 1$
3. $y = 3log_2 x + 1$