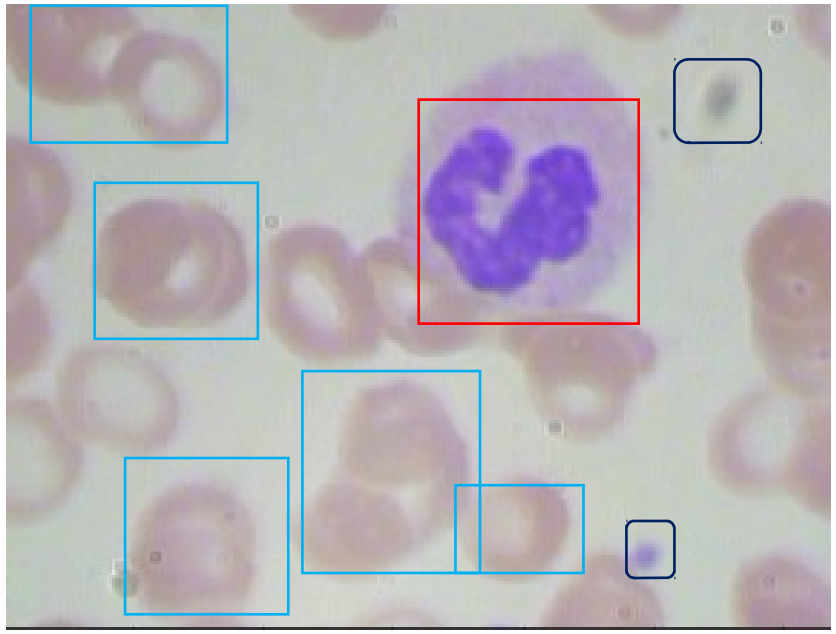
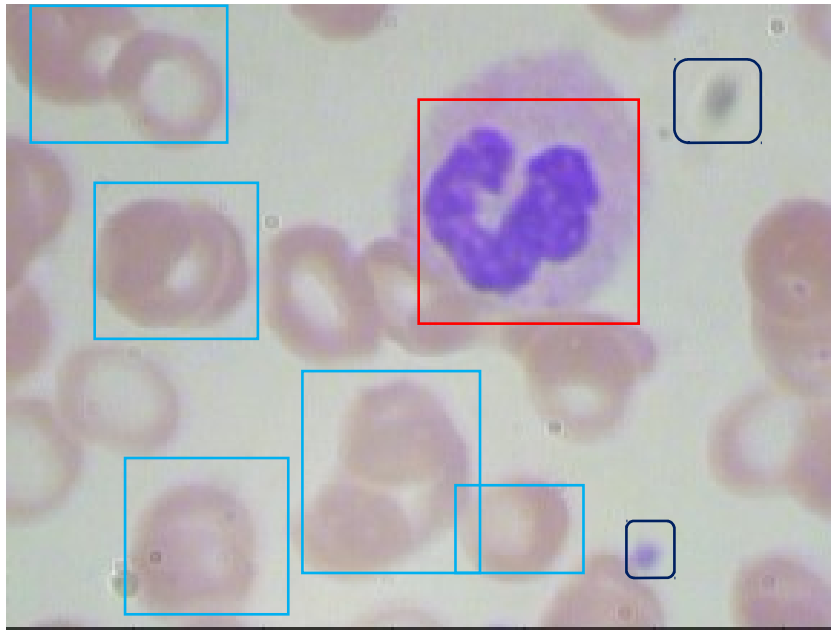
A Naïve Approach to solve Blood Cell Detection Challenge

Naive Approach



Naive Approach: Simplify the Data



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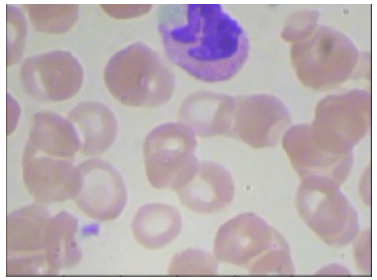

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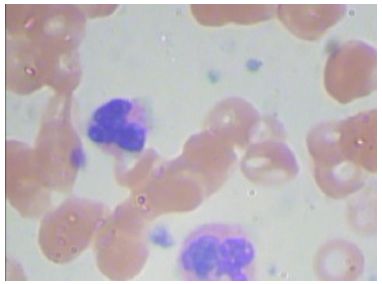

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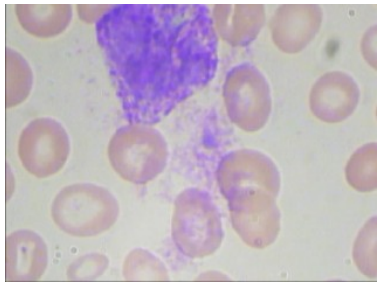

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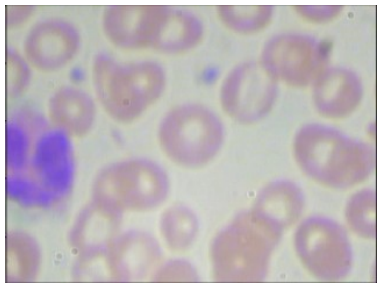

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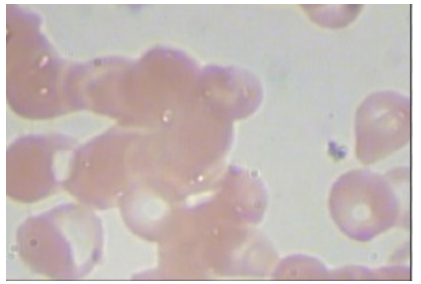

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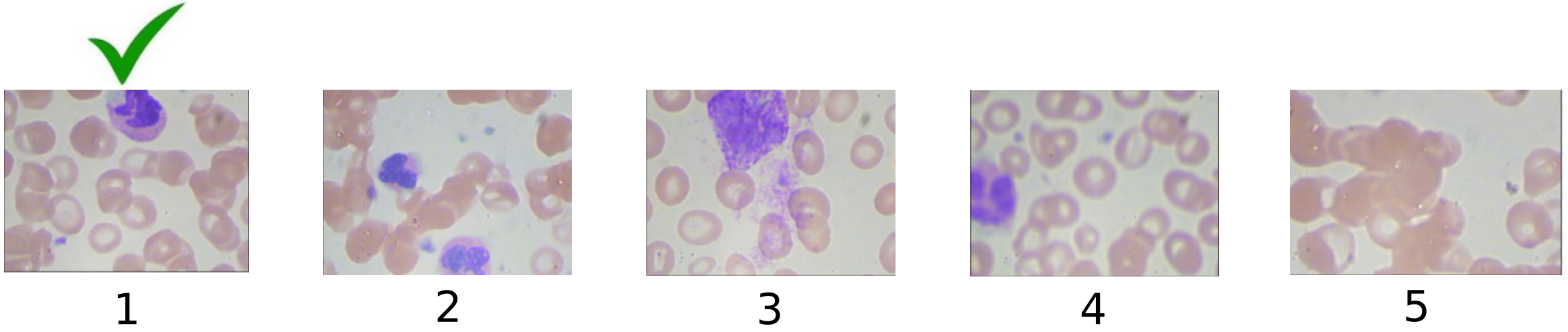

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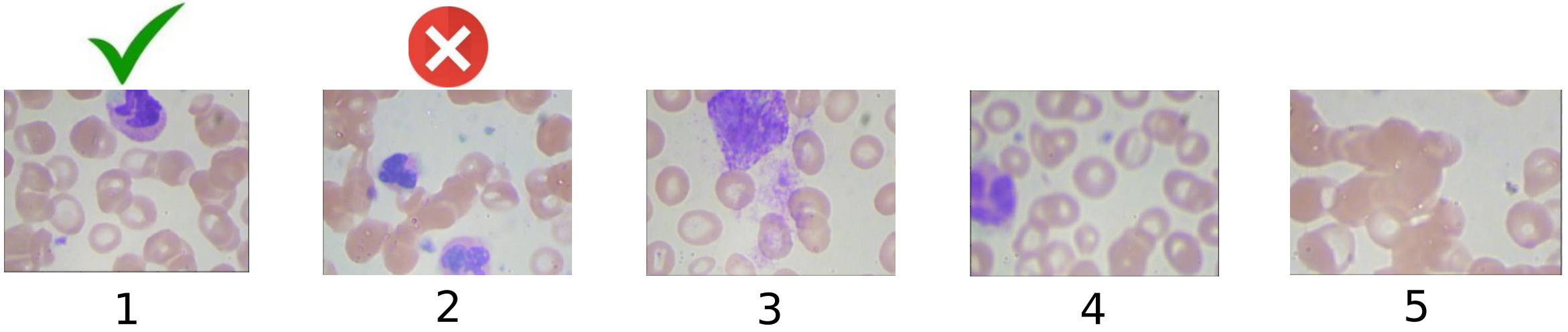

1 2 3 4 5

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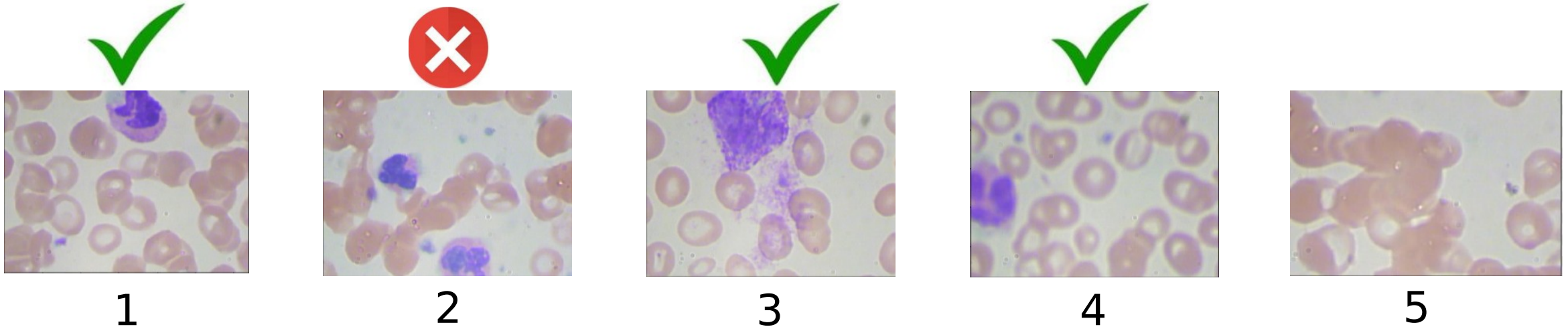

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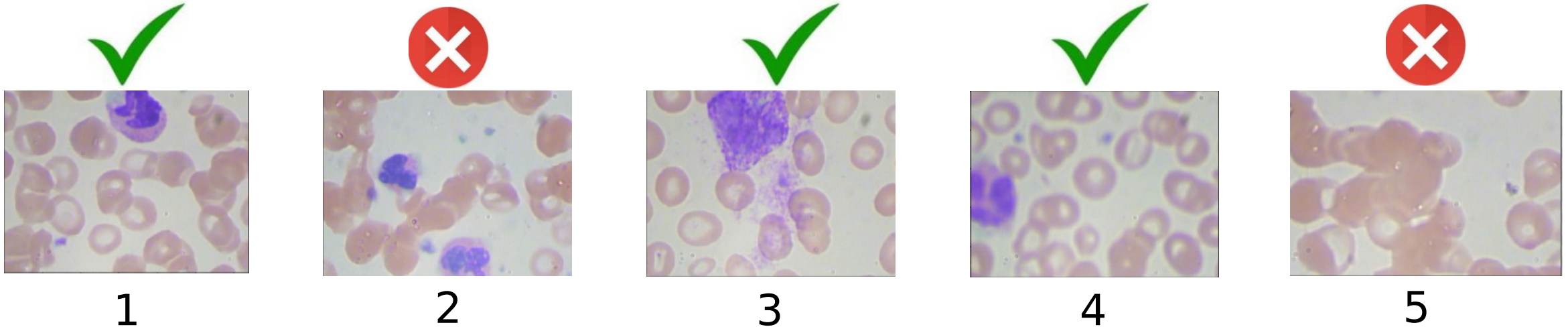
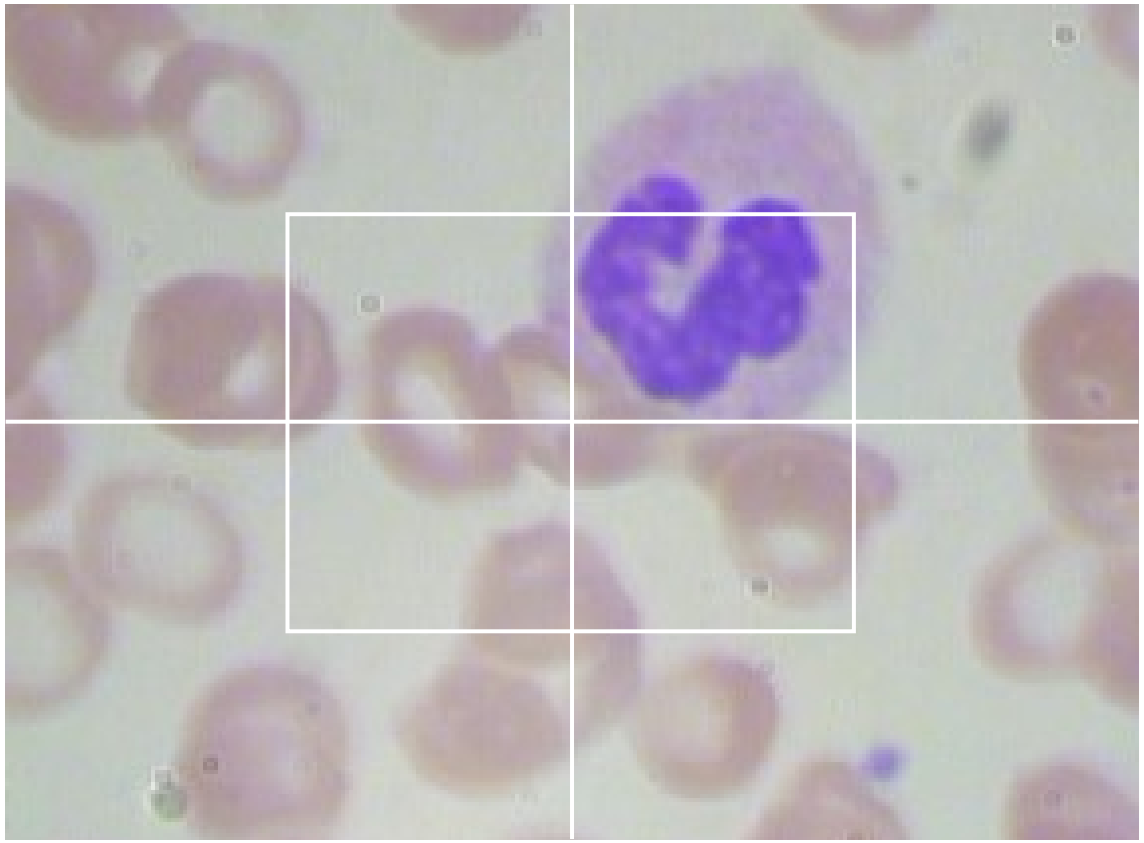


Naive Approach: Create Patches



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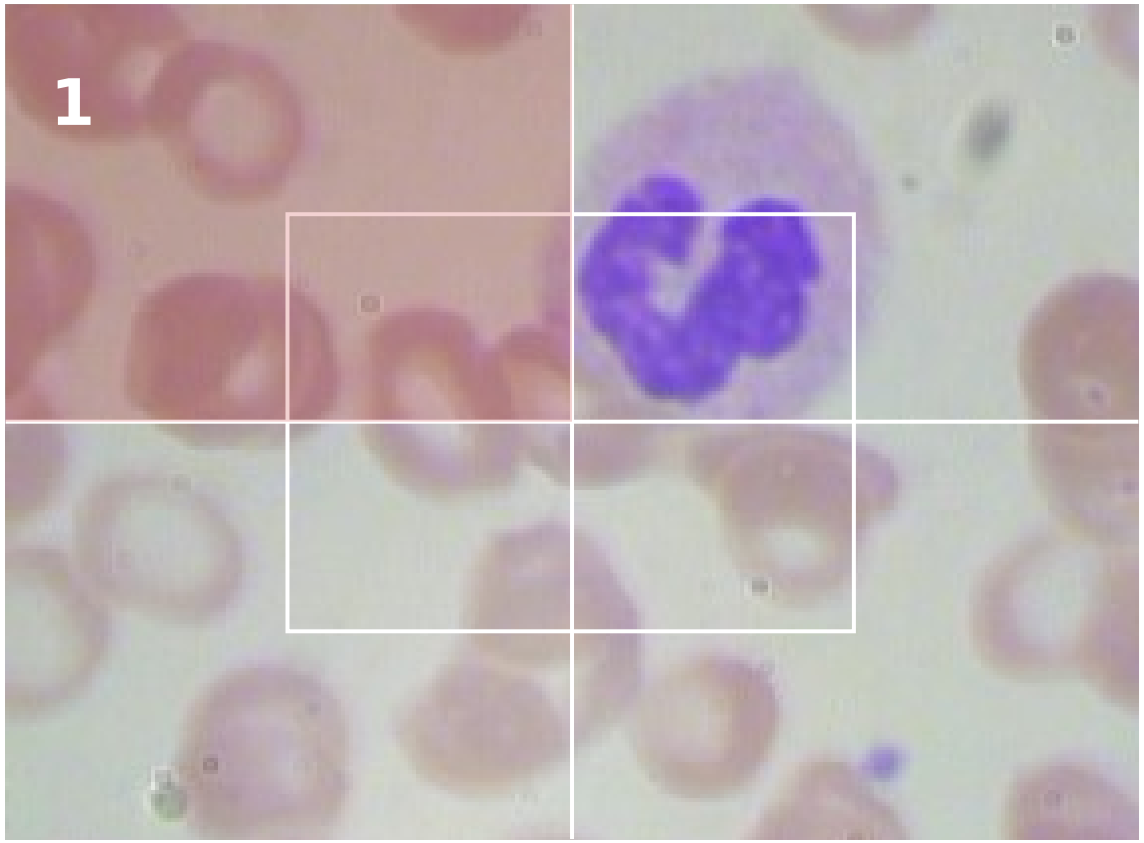

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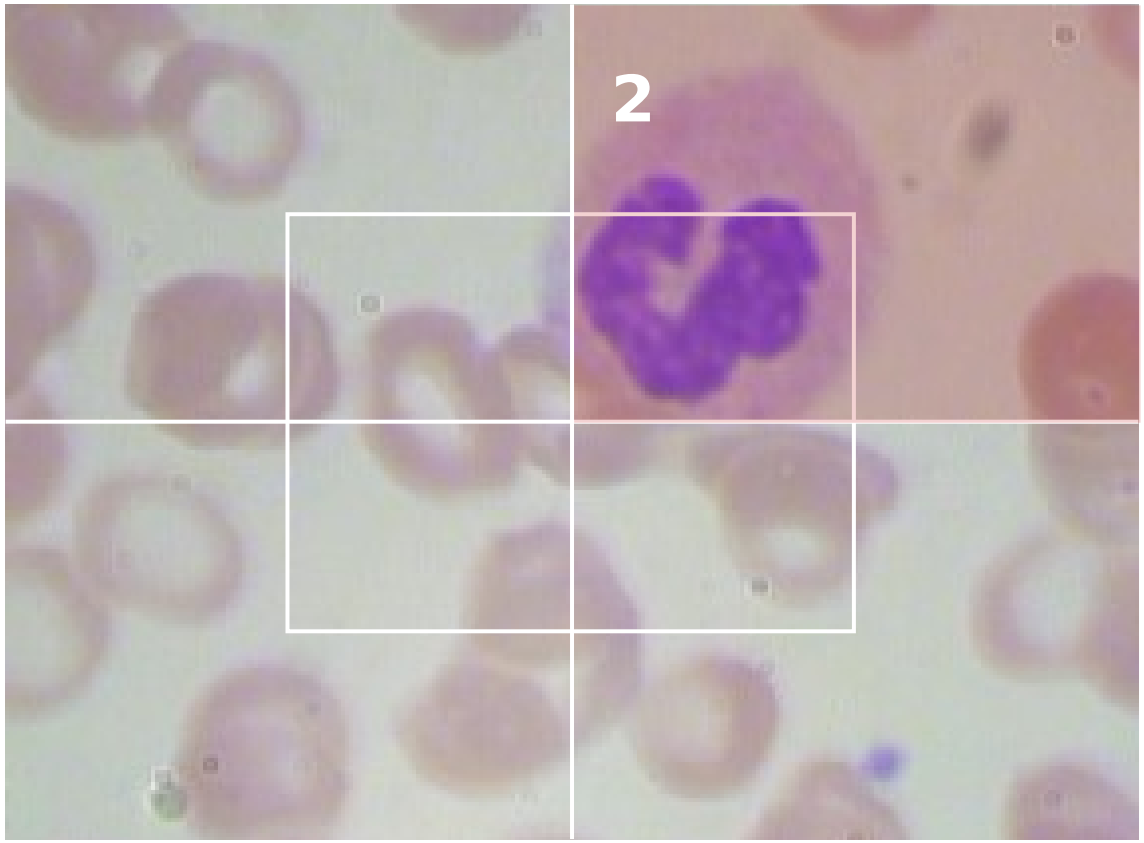

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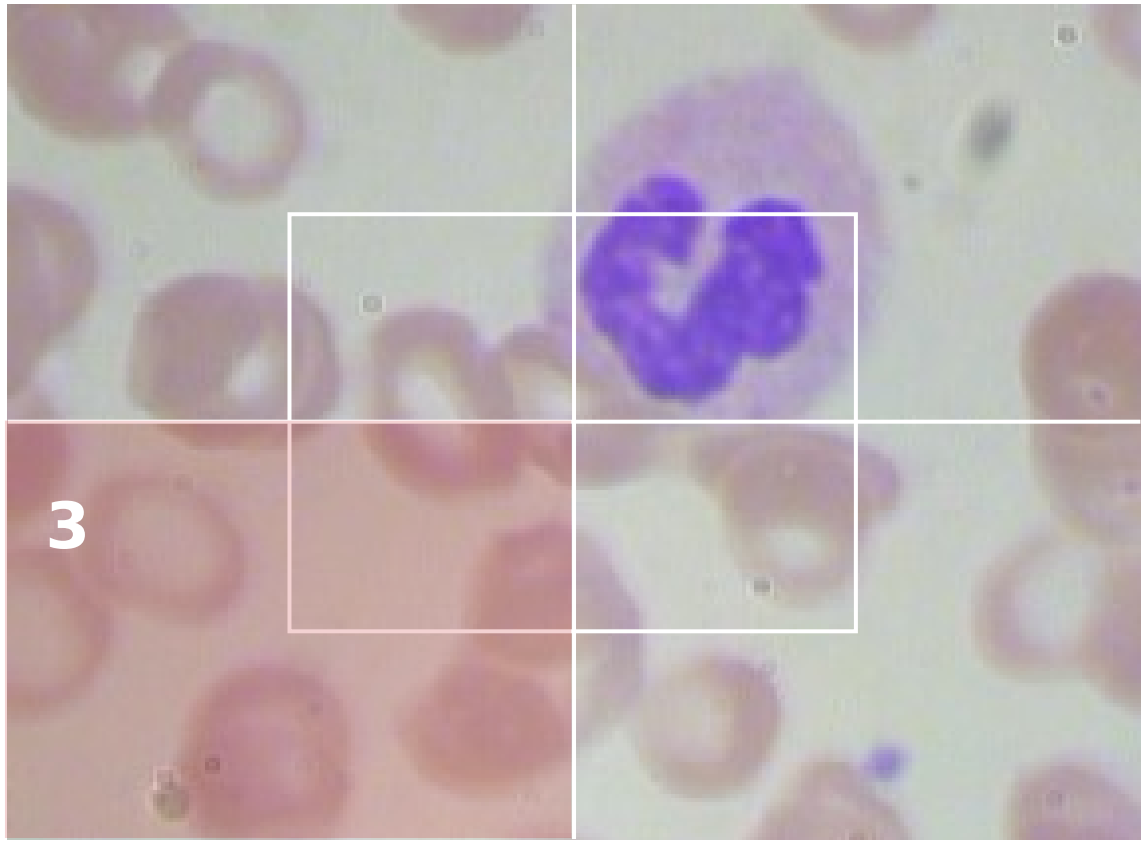

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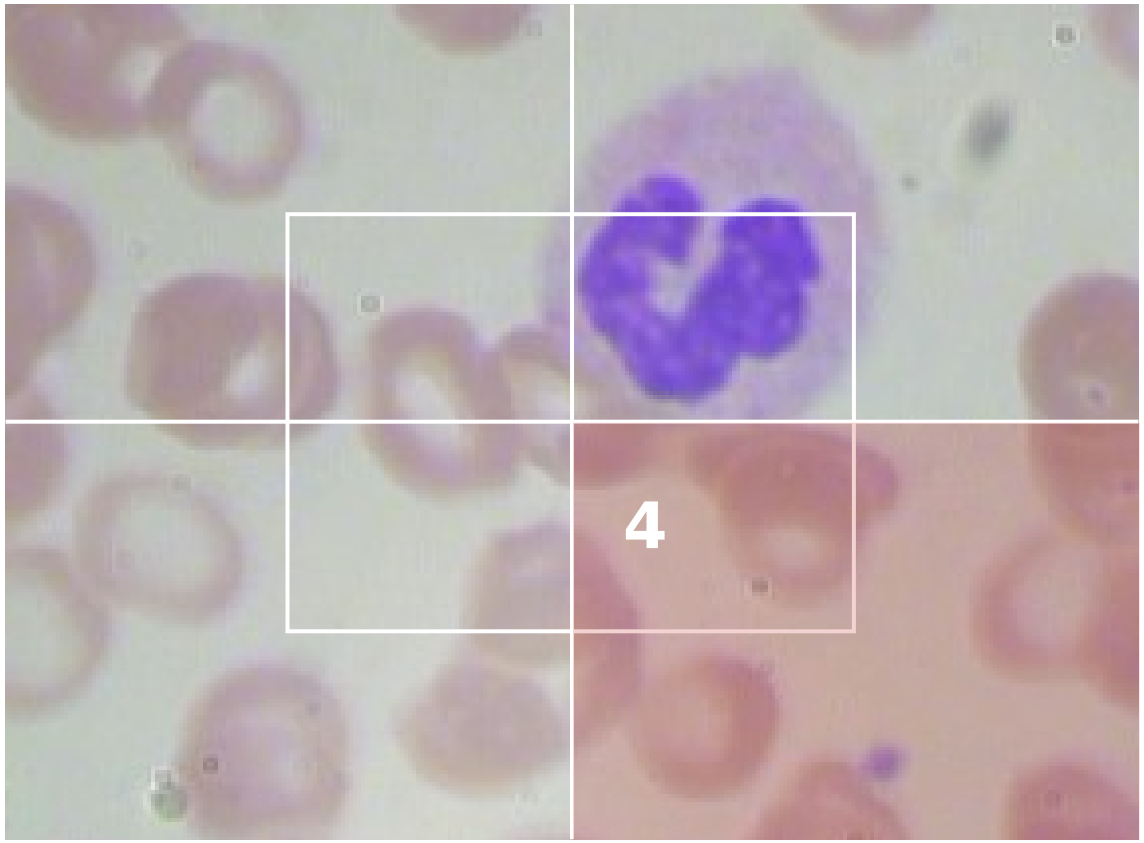

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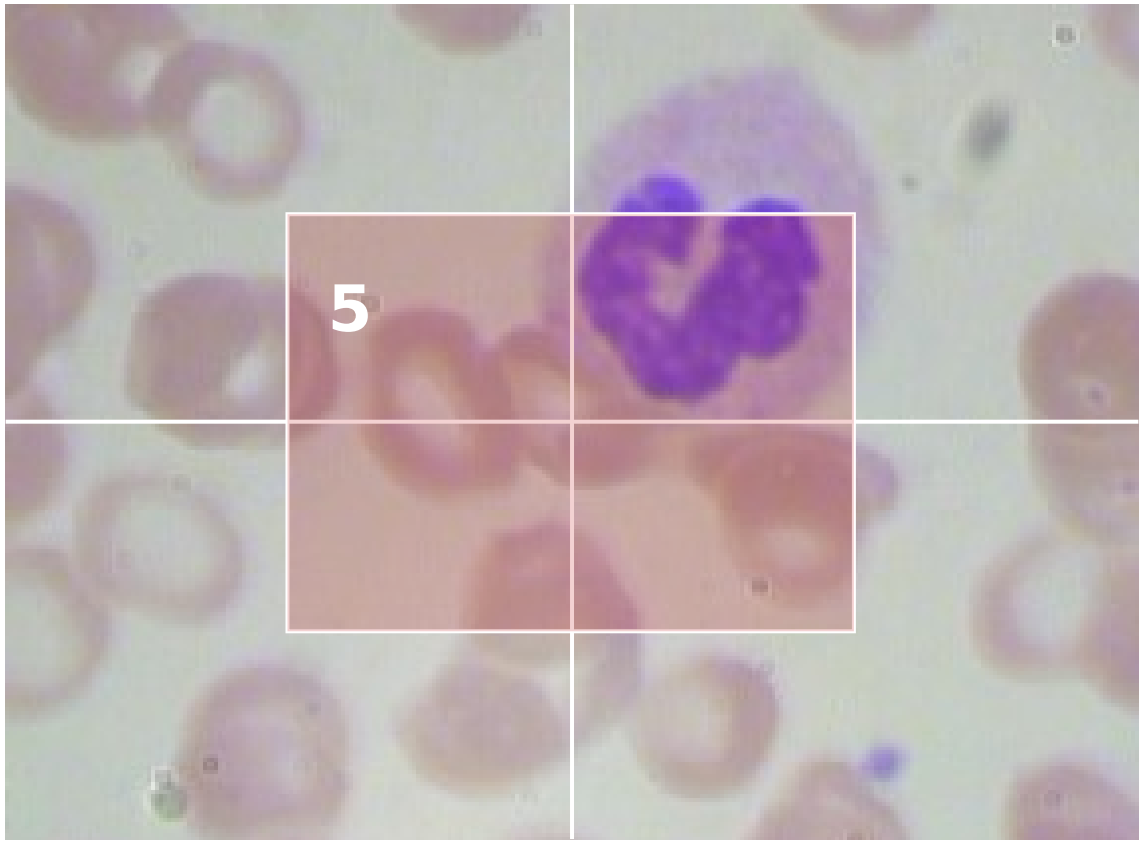

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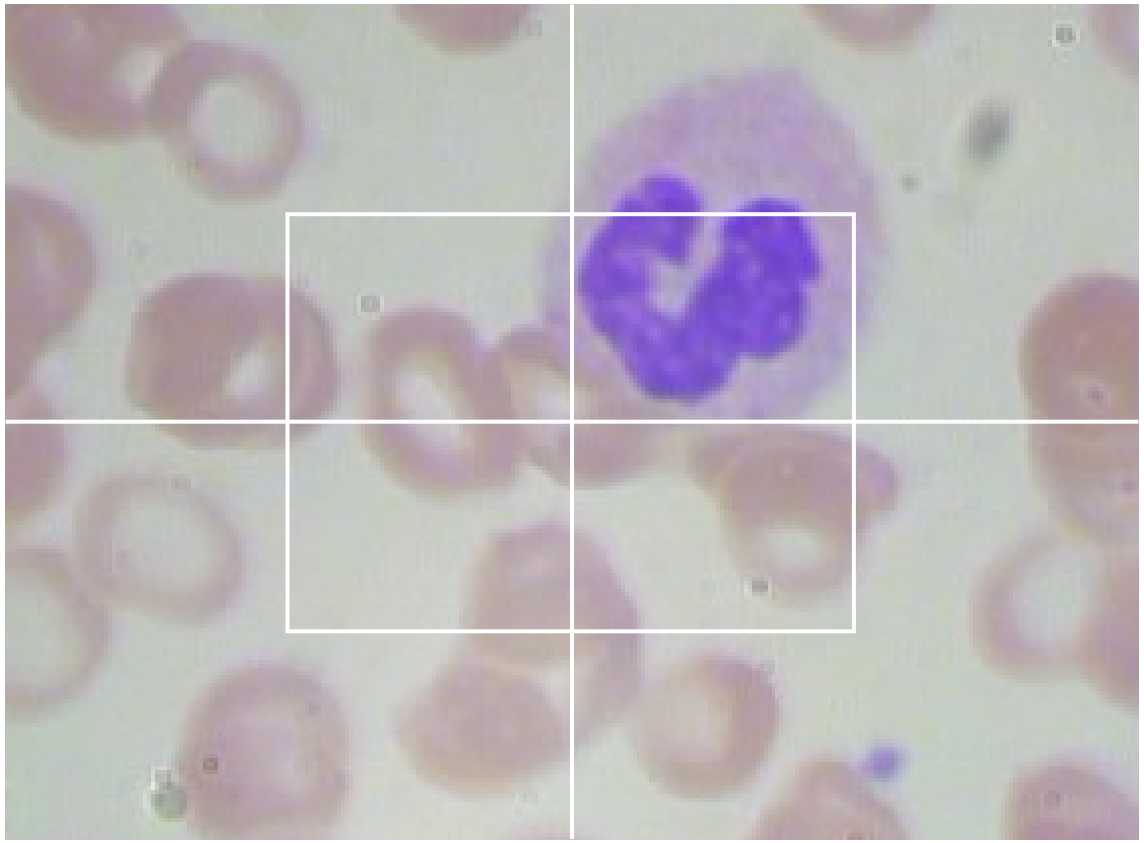

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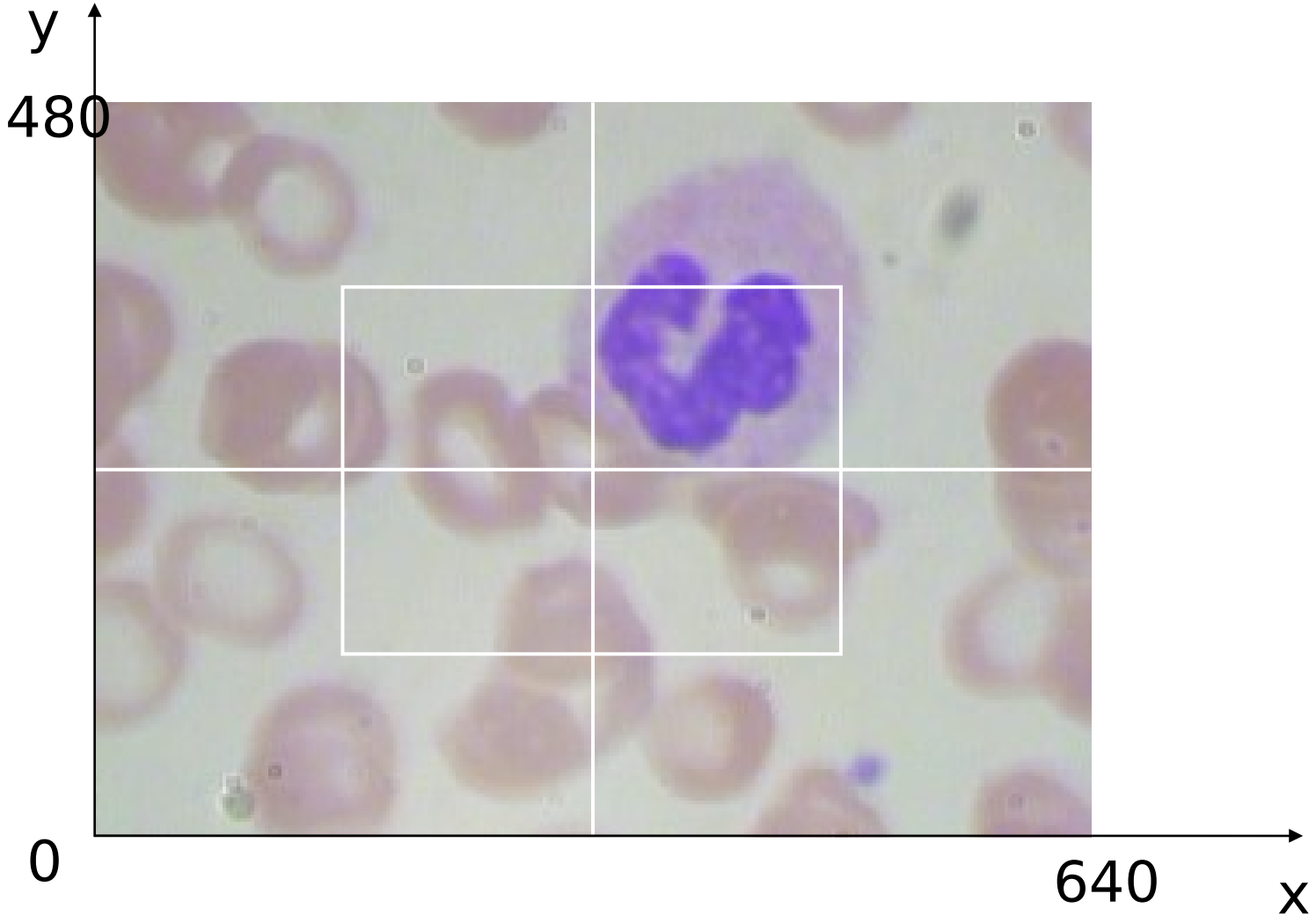

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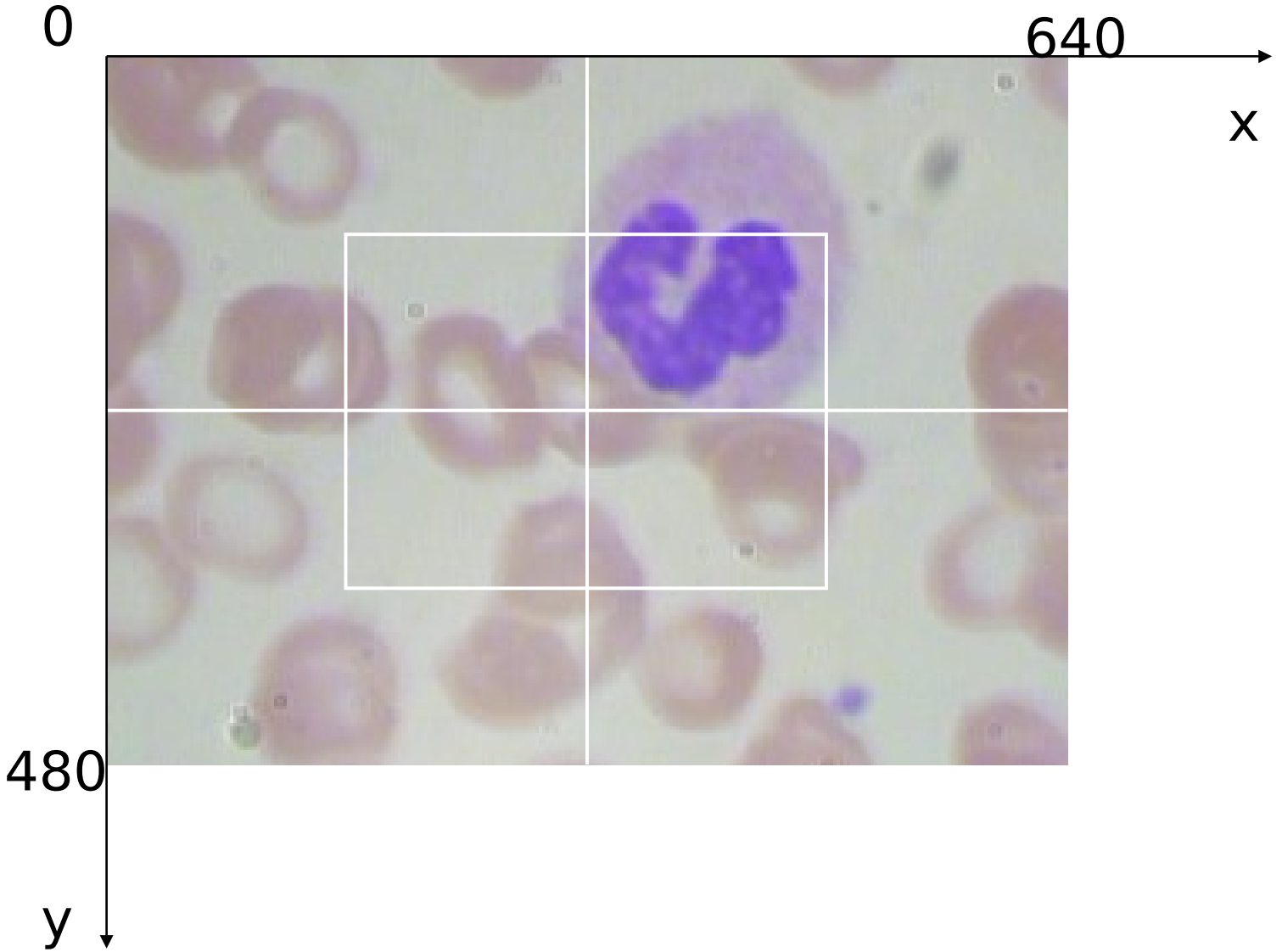

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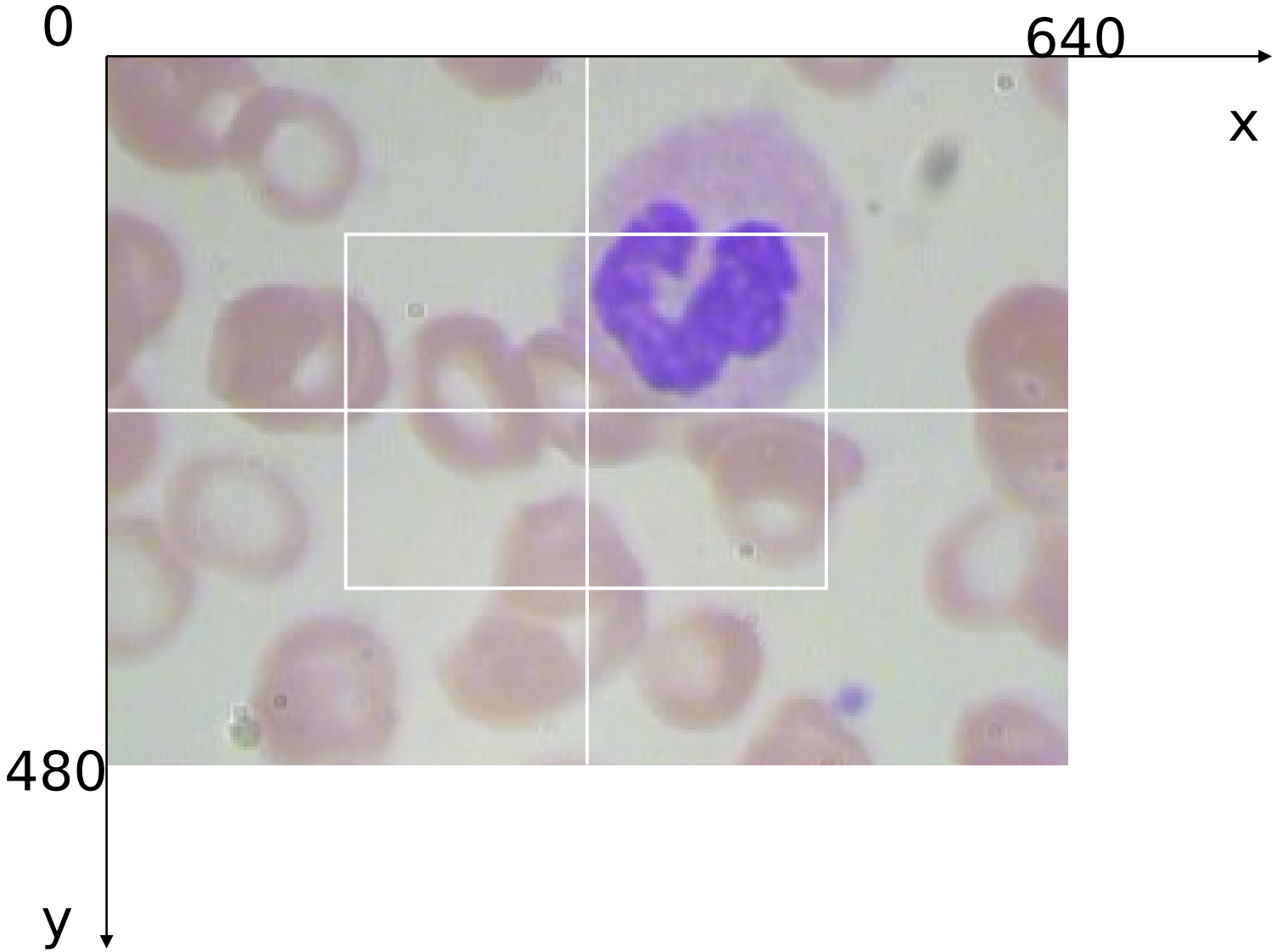

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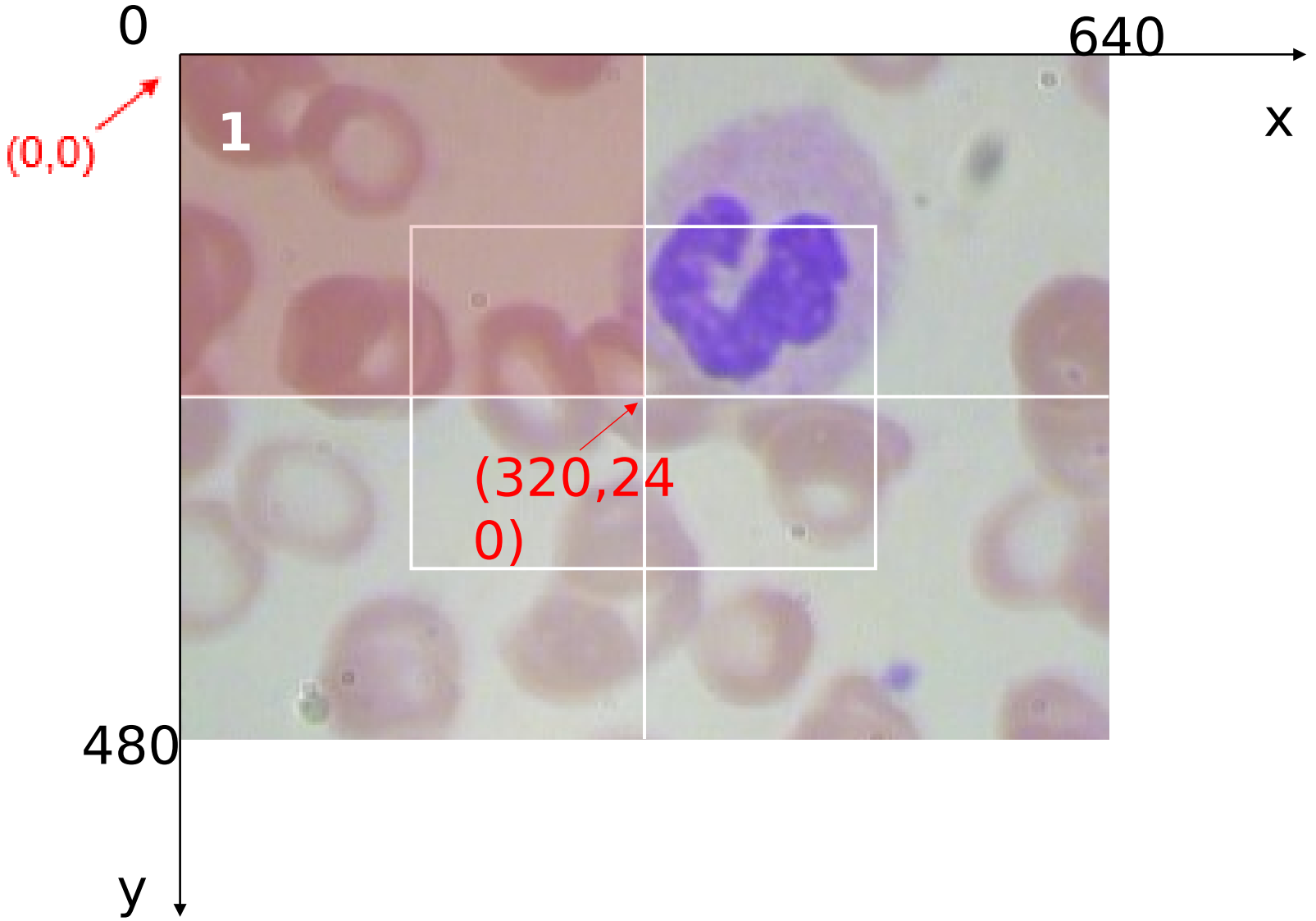

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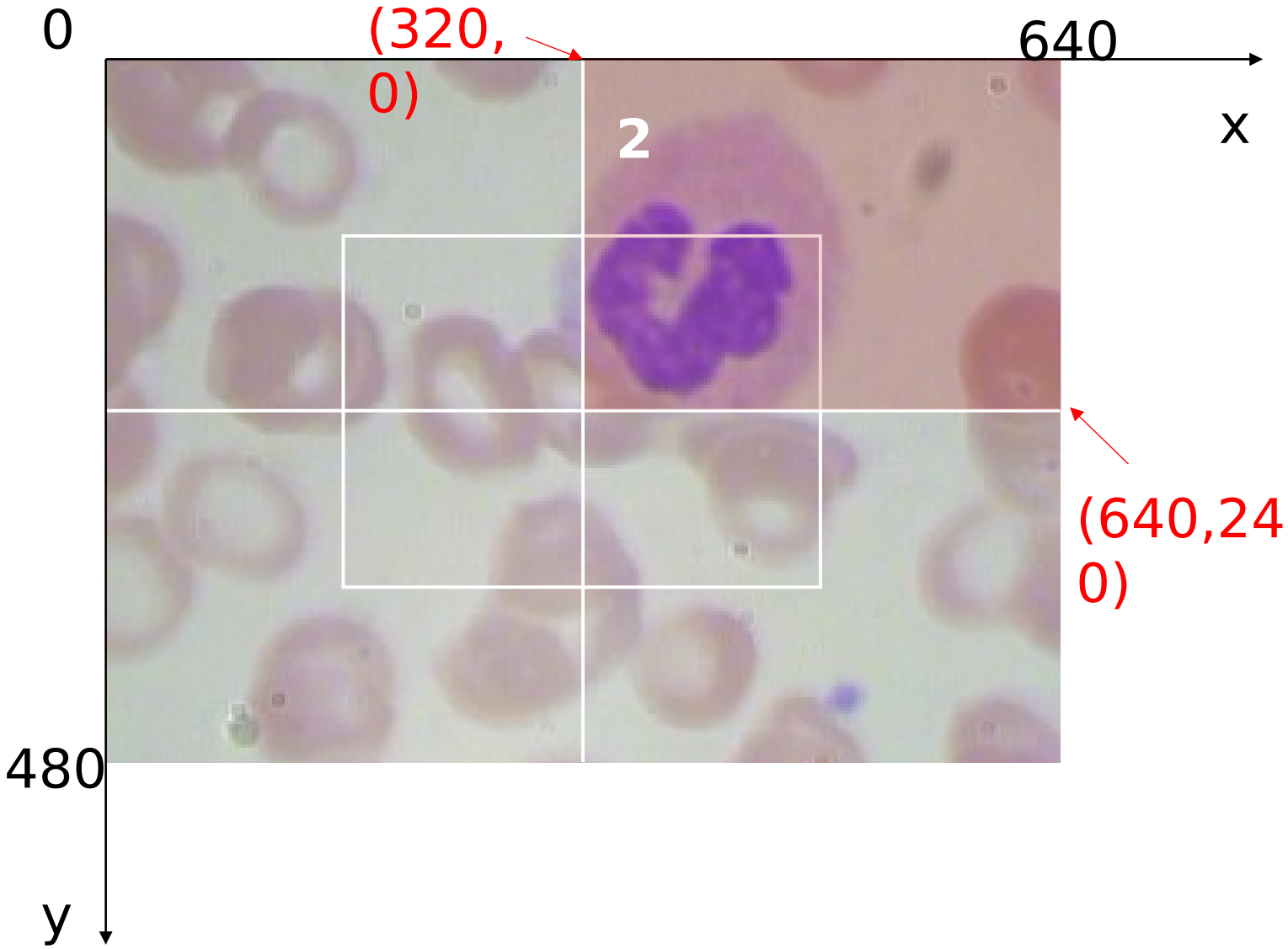

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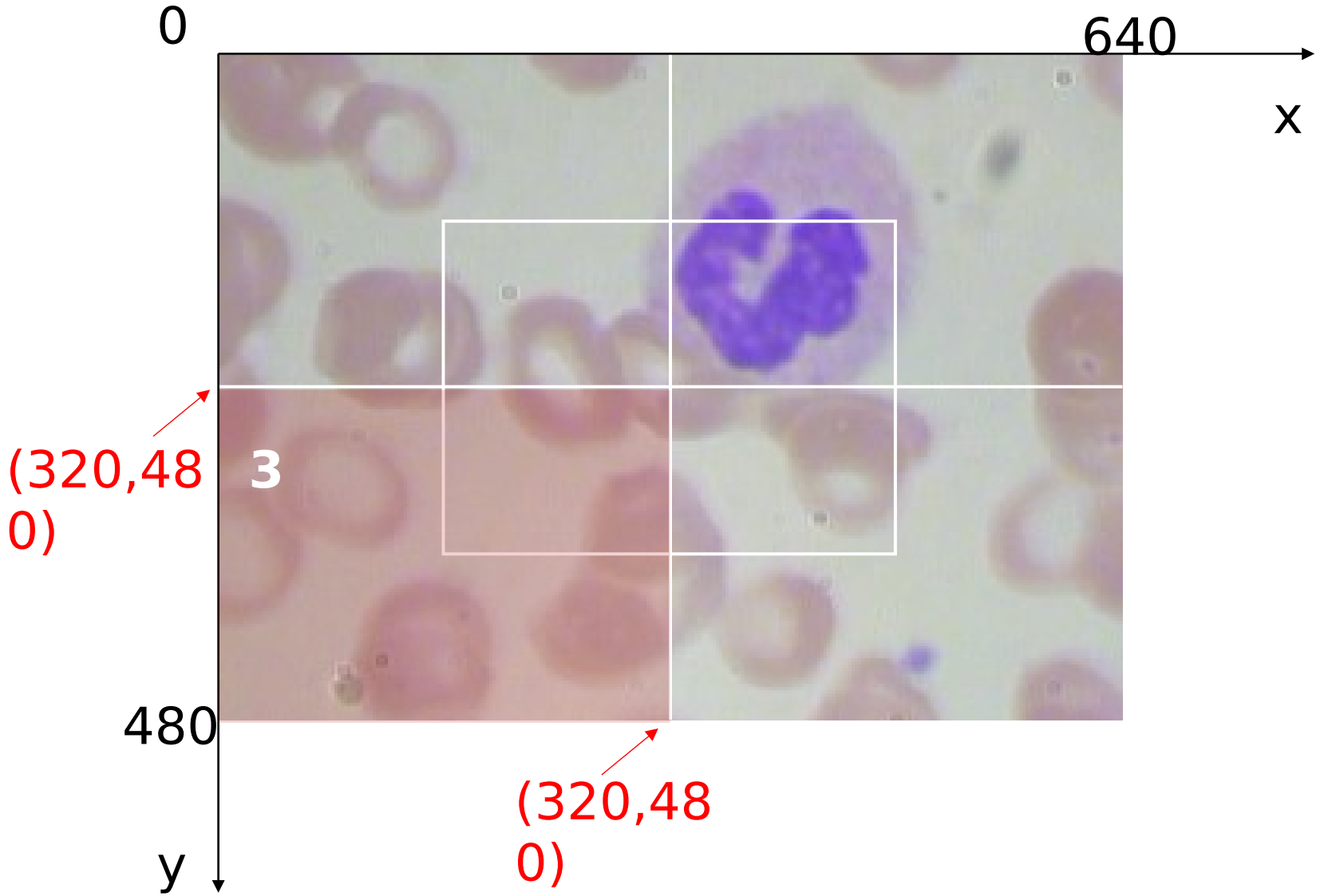

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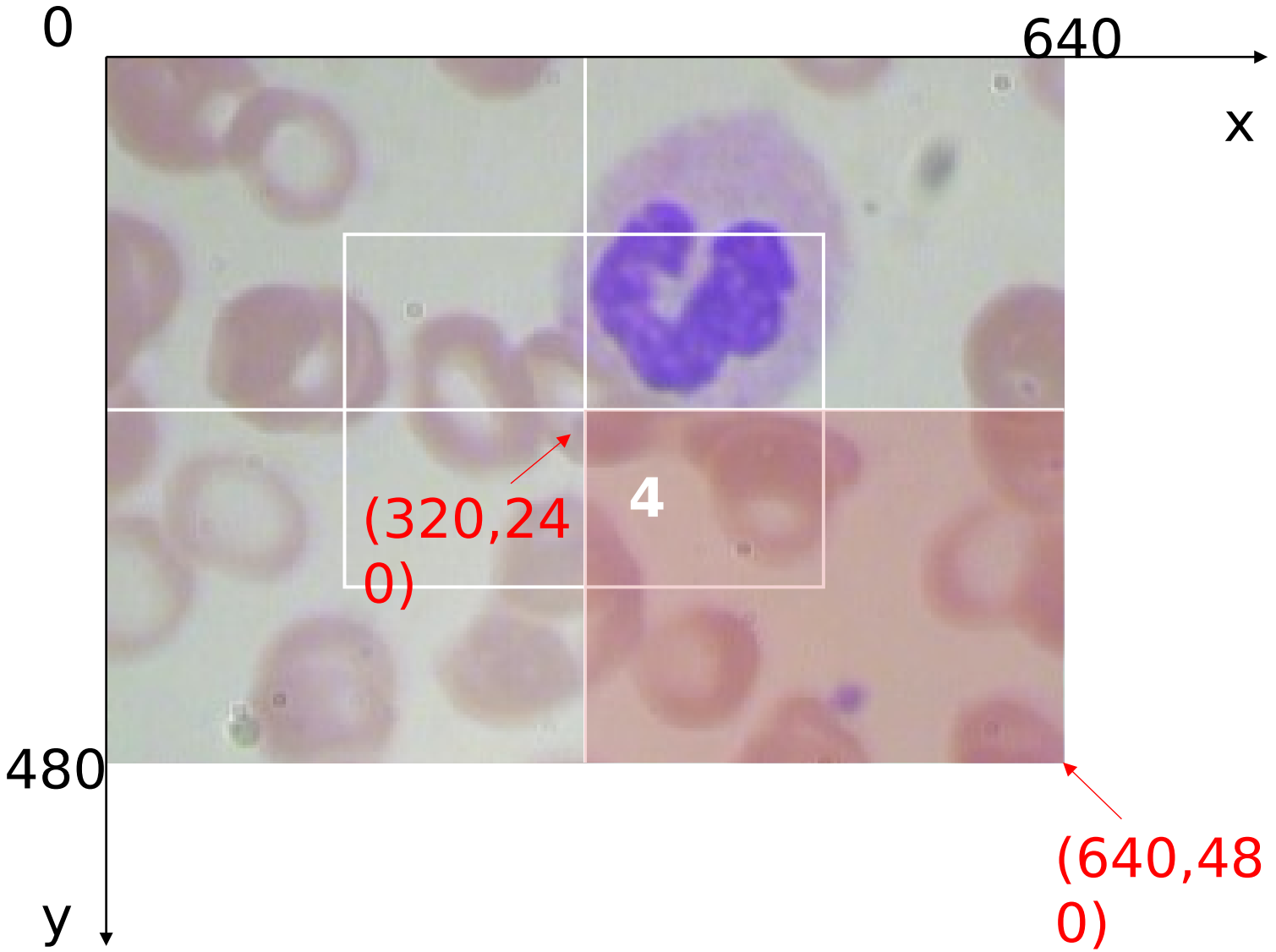

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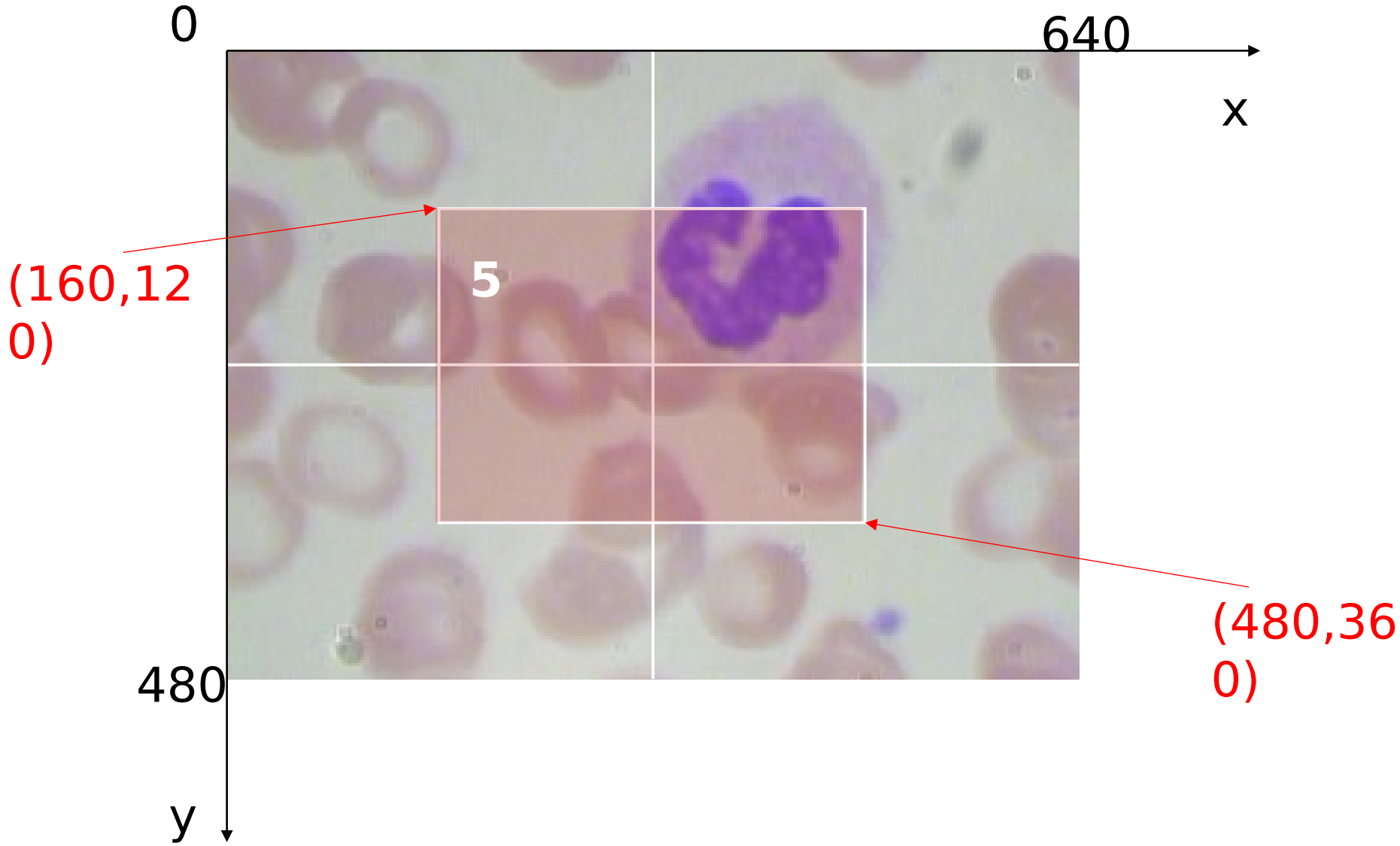

Naive Approach: Find class of Patch

filename	patch	xmin	xmax	ymin	ymax	WBC (1/0)
1.jpg	1	0	320	0	240	
1.jpg	2	320	640	0	240	
1.jpg	3	0	320	240	480	
1.jpg	4	320	640	240	480	
1.jpg	5	160	480	120	360	

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1.jpg	1	0	320	0	240	
1.jpg	2	320	640	0	240	
1.jpg	3	0	320	240	480	
1.jpg	4	320	640	240	480	
1.jpg	5	160	480	120	360	

filename	cell_type	xmin	xmax	ymin	ymax
1.jpg	RBC	5	90	249	354
1.jpg	RBC	210	323	8	118
1.jpg	RBC	158	256	283	394
1.jpg	WBC	310	530	50	240
1.jpg	Platelet	534	635	13	116

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1.jpg	1	0	320	0	240	
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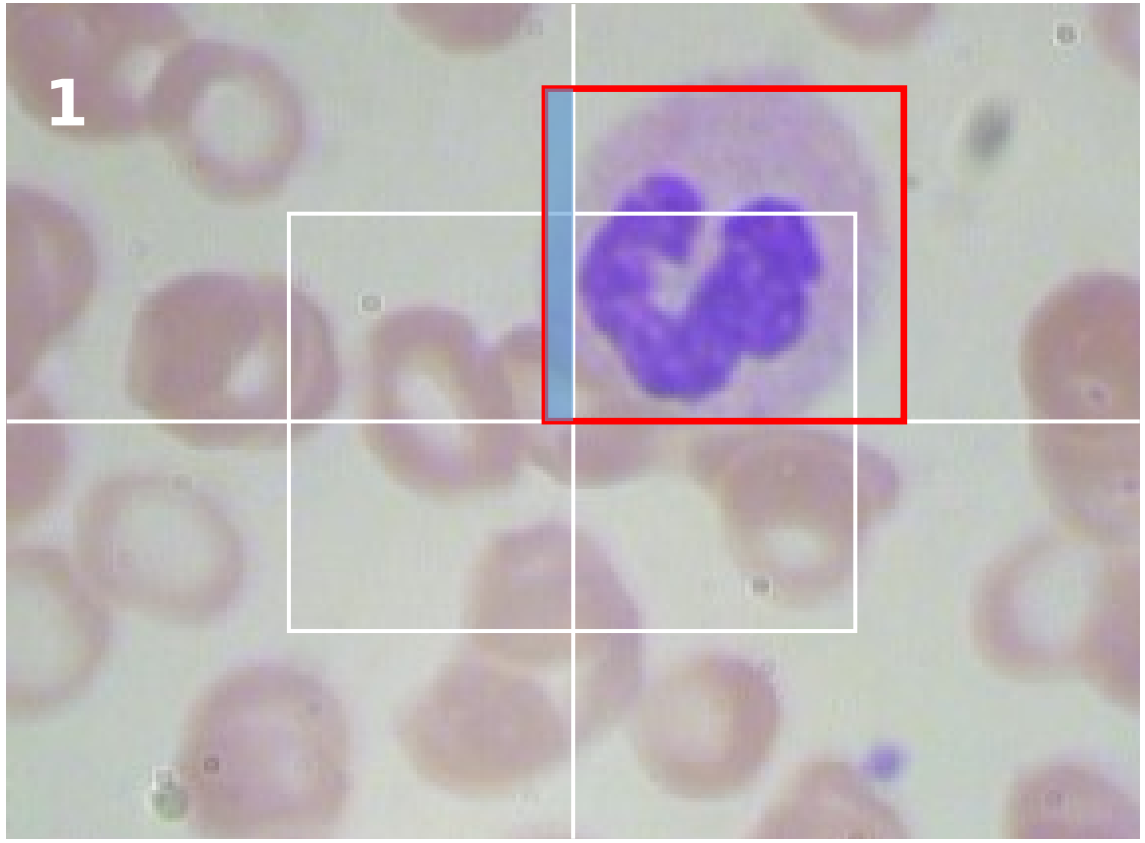
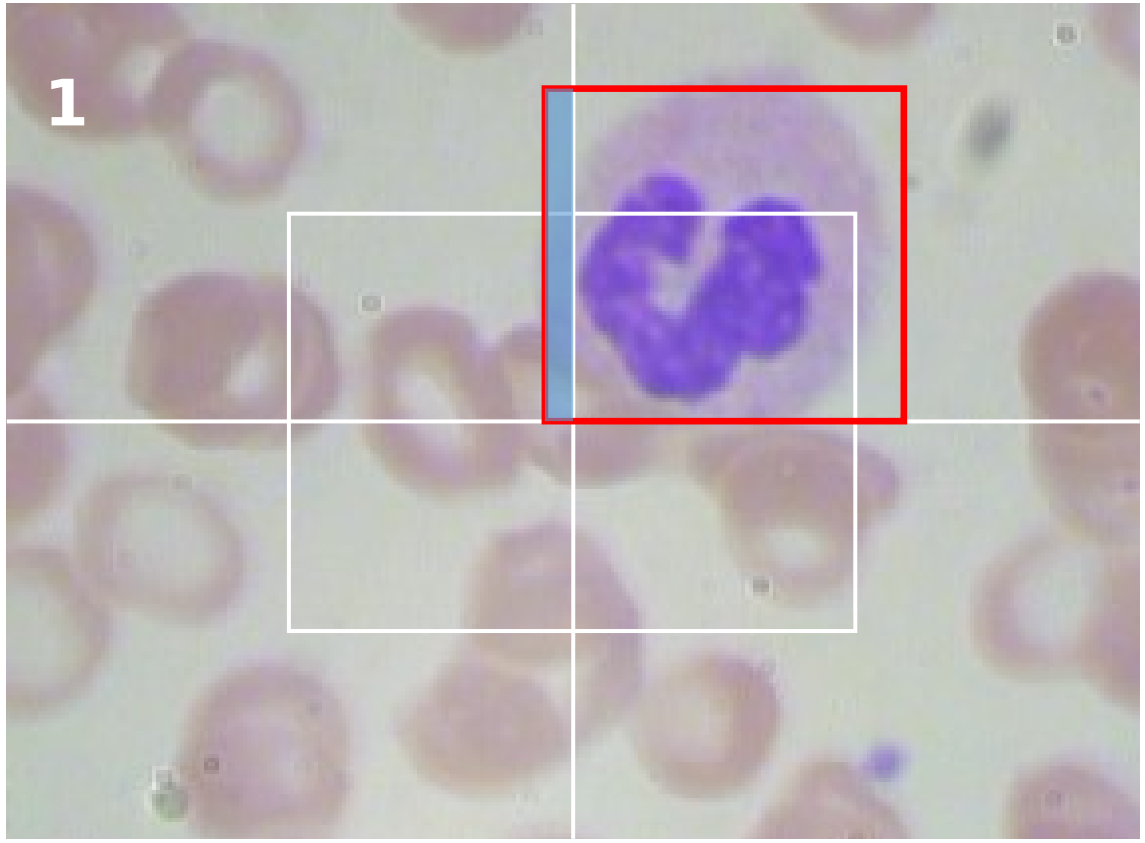


Naive Approach: Find class of Patch

filename	patch	xmin	xmax	ymin	ymax	WBC (1/0)
1.jpg	1	0	320	0	240	

filename	cell_type	xmin	Xmax	Ymin	Ymax
1.jpg	WBC	310	530	50	240



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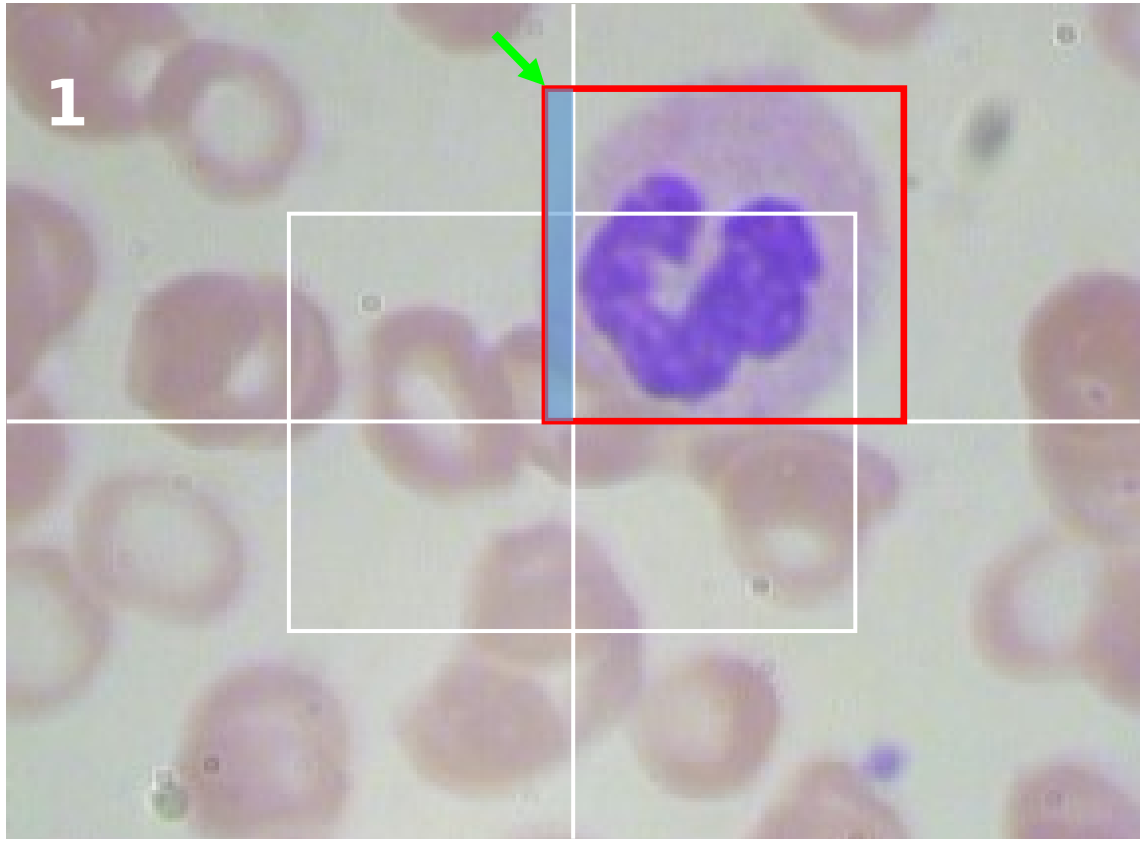
1.jpg	1	0	320	0	240	

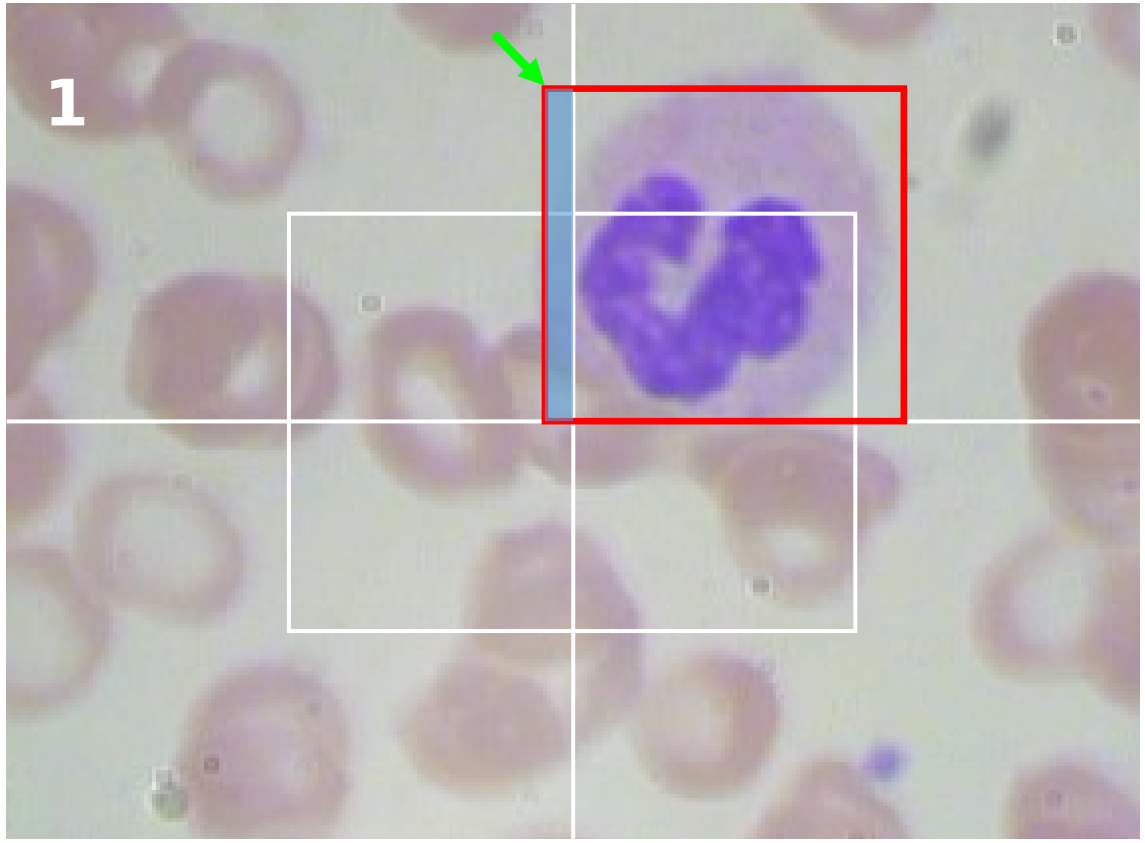
filename	cell_type	xmin	Xmax	Ymin	Ymax
1.jpg	WBC	310	530	50	240



Naive Approach: Find class of Patch

filename	patch	xmin	xmax	ymin	ymax	WBC (1/0)
1.jpg	1	0	320	0	240	

filename	cell_type	xmin	Xmax	Ymin	Ymax
1.jpg	WBC	310	530	50	240



Coordinates of Intersection

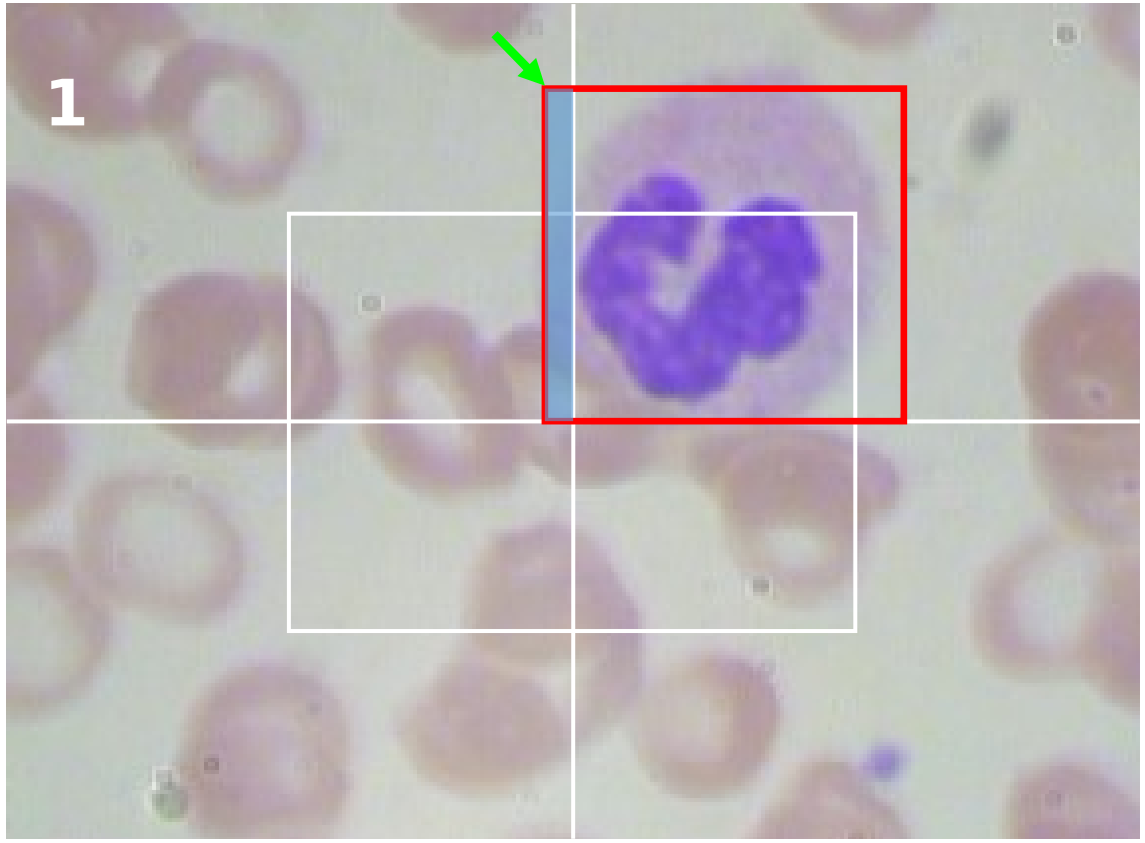
$x_{min} = \max (x_{min\ (Patch)} , x_{min\ (WBC)})$

$y_{min} = \max (y_{min\ (Patch)} , y_{min\ (WBC)})$

Naive Approach: Find class of Patch

filename	patch	xmin	xmax	ymin	ymax	WBC (1/0)
1.jpg	1	0	320	0	240	

filename	cell_type	xmin	Xmax	Ymin	Ymax
1.jpg	WBC	310	530	50	240



Coordinates of Intersection

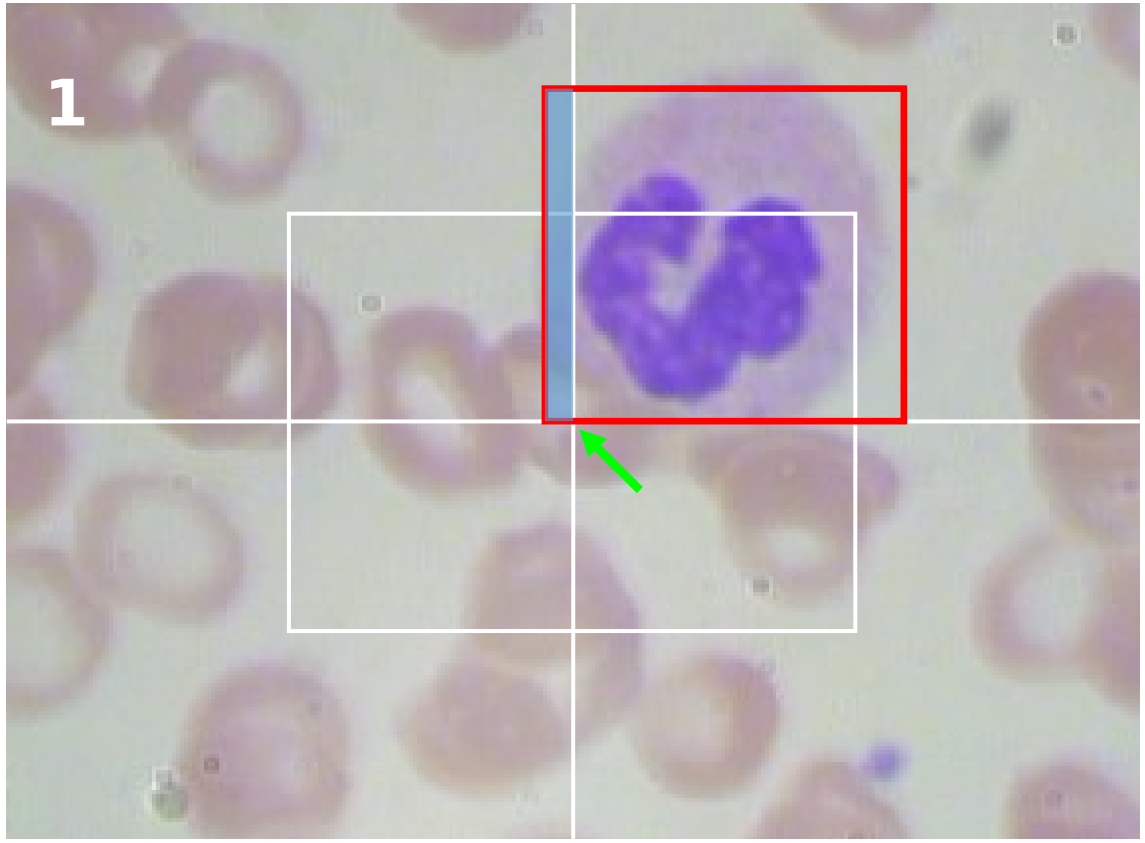
$x_{min} = max\ (x_{min\ (Patch)}\ ,\ x_{min\ (WBC)}\ ) = max\ (0, 310) = 310$

$y_{min} = max\ (y_{min\ (Patch)}\ ,\ y_{min\ (WBC)}\ ) = max\ (0, 50) = 50$

Naive Approach: Find class of Patch

filename	patch	xmin	xmax	ymin	ymax	WBC (1/0)
1.jpg	1	0	320	0	240	

filename	cell_type	xmin	Xmax	Ymin	Ymax
1.jpg	WBC	310	530	50	240



Coordinates of Intersection

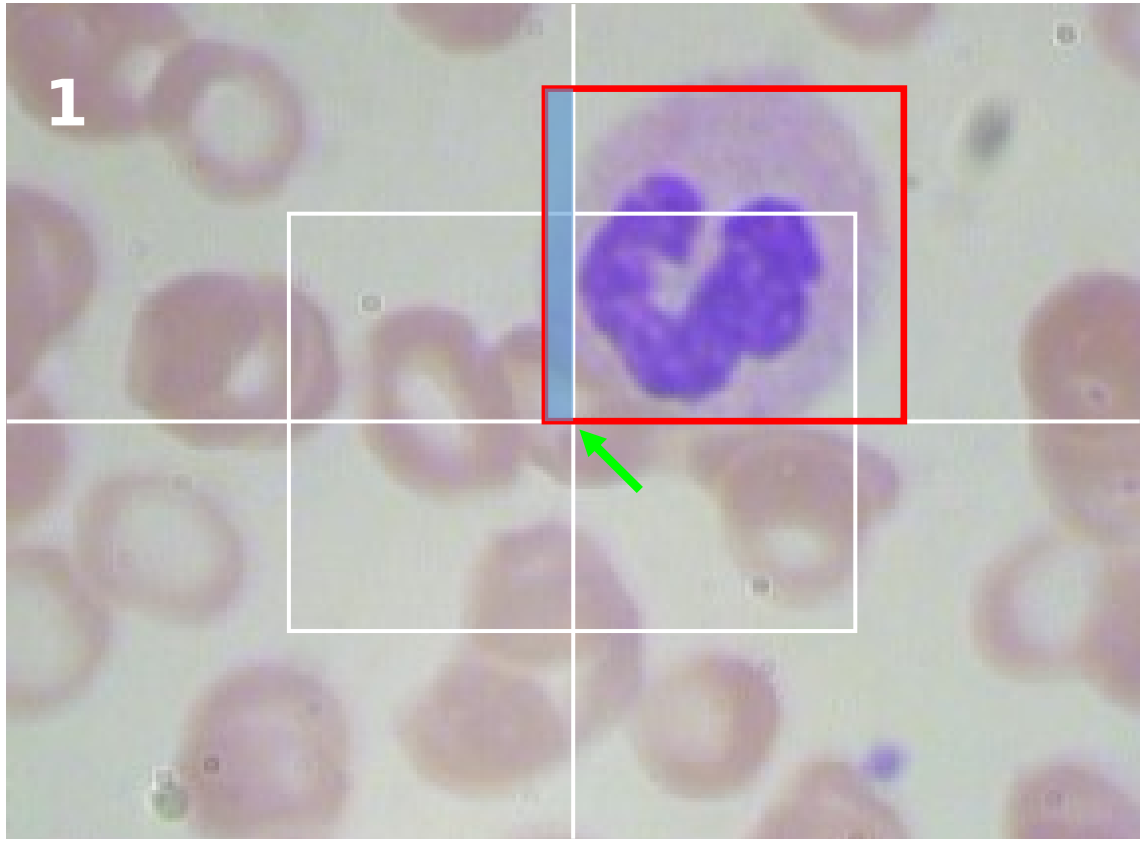
$x_{min} = \max (x_{min\ (Patch)} , x_{min\ (WBC)}) = \max (0, 310) = 310$
$y_{min} = \max (y_{min\ (Patch)} , y_{min\ (WBC)}) = \max (0, 50) = 50$

$x_{max} = \min (x_{max\ (Patch)} , x_{max\ (WBC)}) = \min (320, 530) = 320$

Naive Approach: Find class of Patch

filename	patch	xmin	xmax	ymin	ymax	WBC (1/0)
1.jpg	1	0	320	0	240	

filename	cell_type	xmin	Xmax	Ymin	Ymax
1.jpg	WBC	310	530	50	240



Coordinates of Intersection

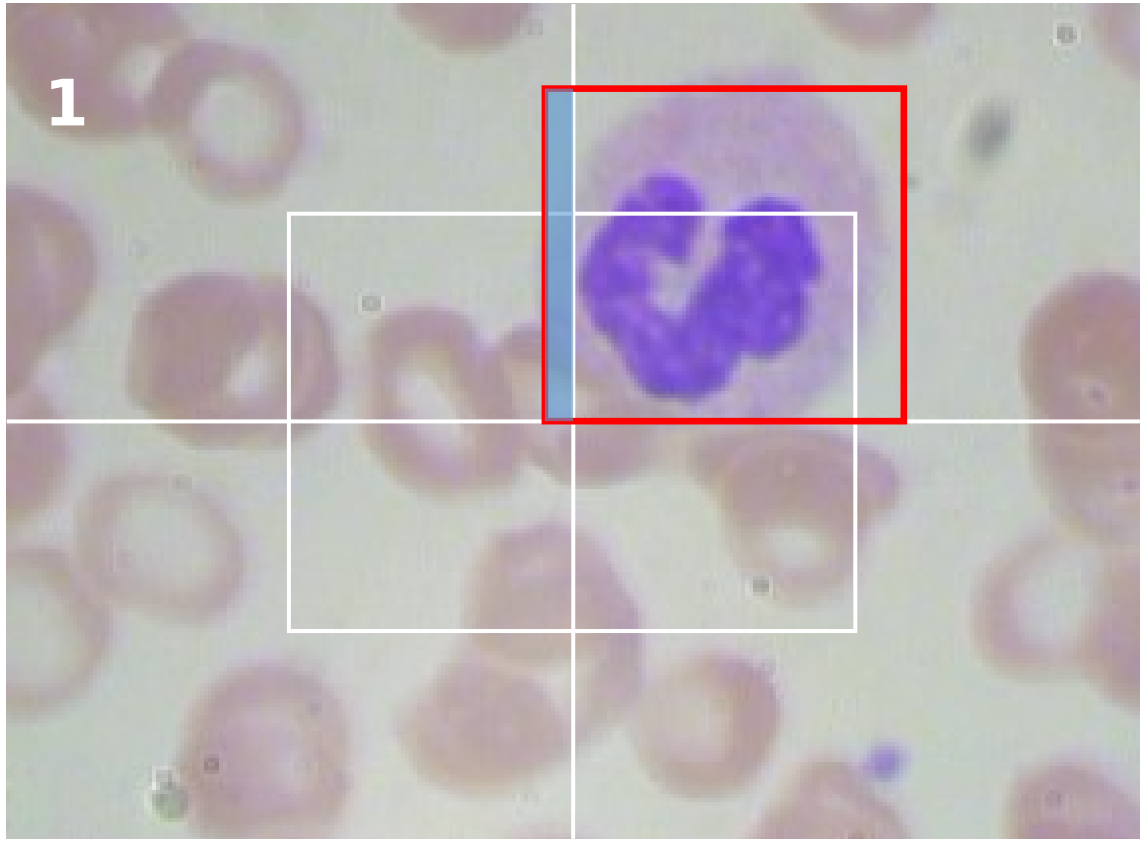
$x_{min} = \max (x_{min\ (Patch)} , x_{min\ (WBC)}) = \max (0, 310) = 310$
$y_{min} = \max (y_{min\ (Patch)} , y_{min\ (WBC)}) = \max (0, 50) = 50$

$x_{max} = \min (x_{max\ (Patch)} , x_{max\ (WBC)}) = \min (320, 530) = 320$
$y_{max} = \min (y_{max\ (Patch)} , y_{max\ (WBC)}) = \min (240, 240) = 240$

Naive Approach: Find class of Patch

filename	patch	xmin	xmax	ymin	ymax	WBC (1/0)
1.jpg	1	0	320	0	240	

filename	cell_type	xmin	Xmax	Ymin	Ymax
1.jpg	WBC	310	530	50	240



Coordinates of Intersection

$x_{min} = max (x_{min\ (Patch)} , x_{min\ (WBC)}) = max (0, 310) = 310$
$x_{max} = min (x_{max\ (Patch)} , x_{max\ (WBC)}) = min (320, 530) = 320$

$y_{min} = max (y_{min\ (Patch)} , y_{min\ (WBC)}) = max (0, 50) = 50$
$y_{max} = min (y_{max\ (Patch)} , y_{max\ (WBC)}) = min (240, 240) = 240$

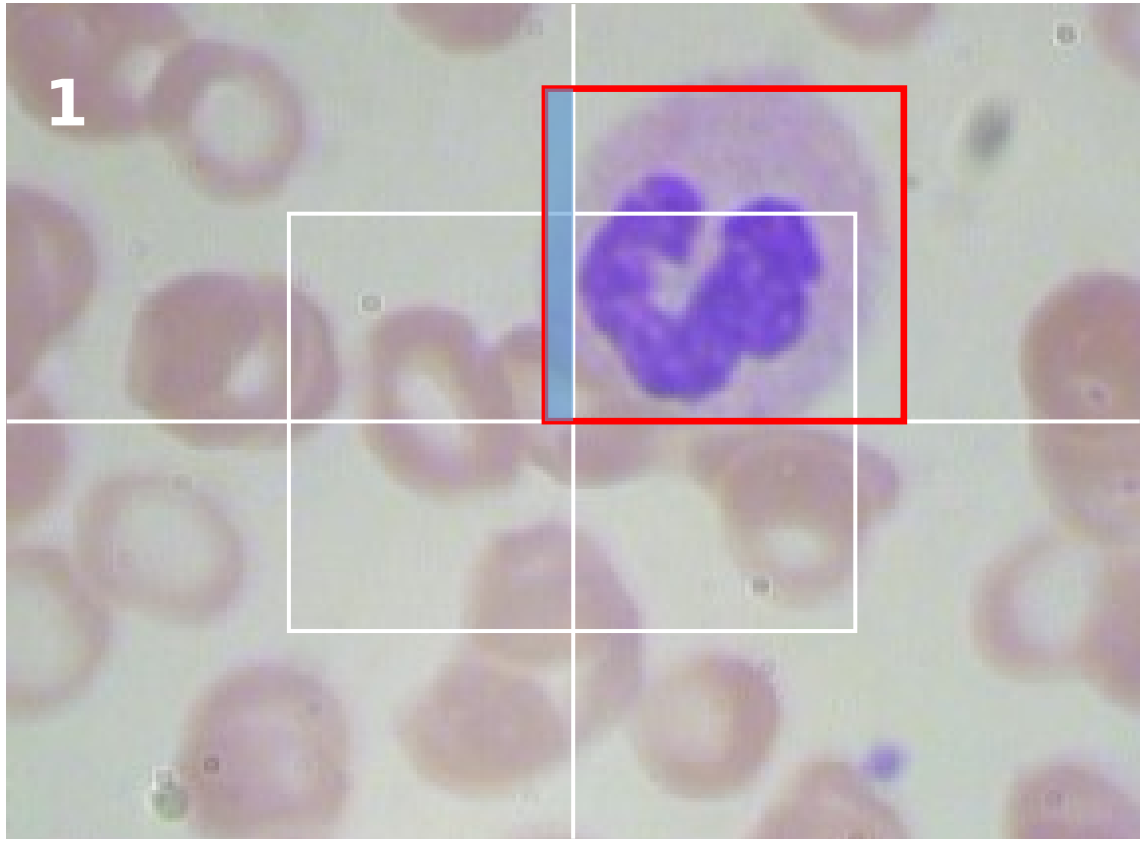
Naive Approach: Find class of Patch

filename	patch	xmin	xmax	ymin	ymax	WBC (1/0)
1.jpg	1	0	320	0	240	

filename	cell_type	xmin	Xmax	Ymin	Ymax
1.jpg	WBC	310	530	50	240

Area of intersection = $(x_{max} - x_{min})*(y_{max} - y_{min})$
= 10 * 190
= 1900

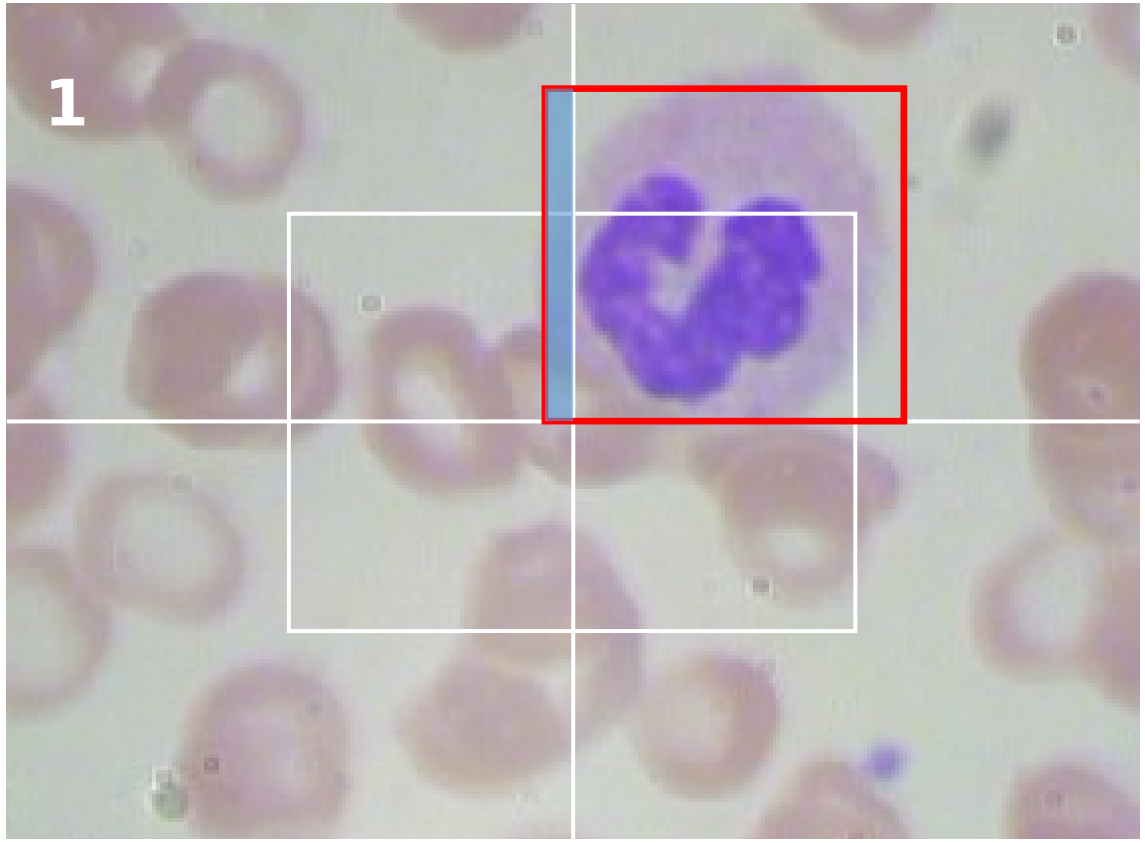
Area of patch = 320 * 240 = 76800



Naive Approach: Find class of Patch

filename	patch	xmin	xmax	ymin	ymax	WBC (1/0)
1.jpg	1	0	320	0	240	

filename	cell_type	xmin	Xmax	Ymin	Ymax
1.jpg	WBC	310	530	50	240



Area of intersection = $(x_{max} - x_{min})*(y_{max} - y_{min})$
= 10 * 190
= 1900

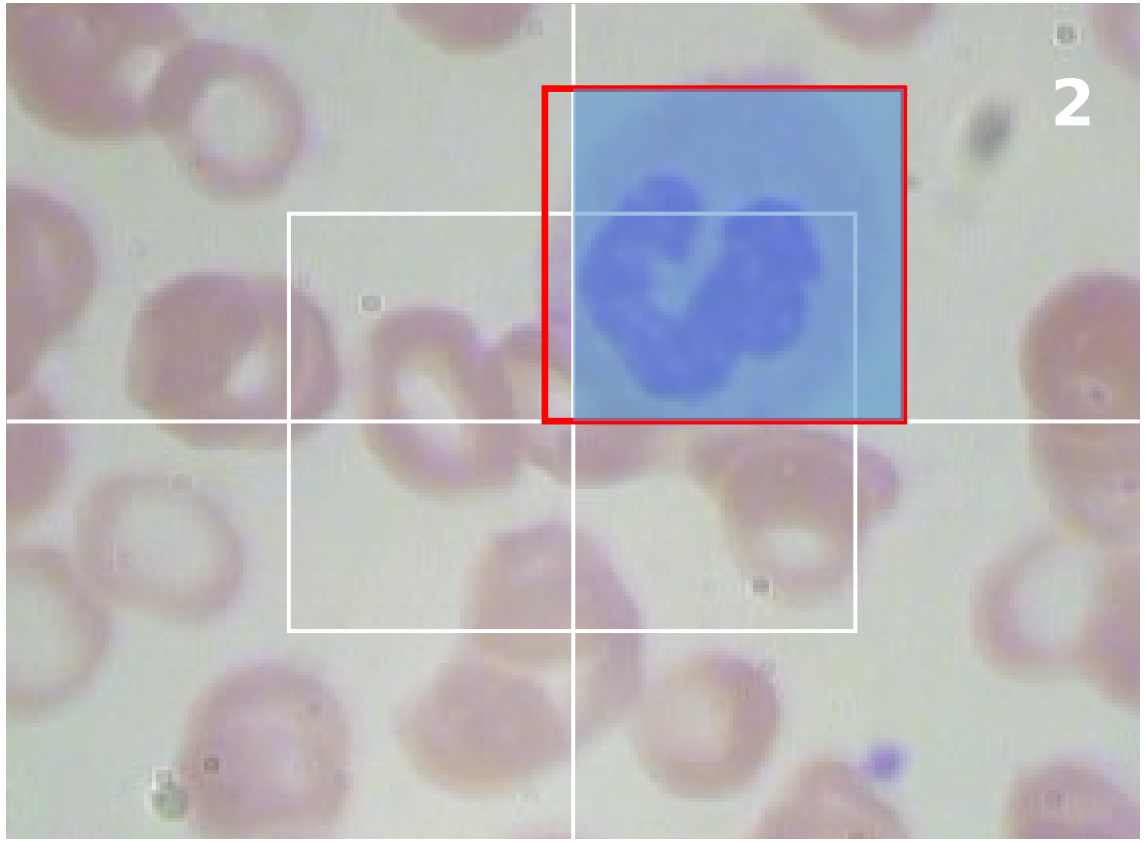
Area of patch = 320 * 240 = 76800

Ratio of intersection = 1900/76800 = 0.02

Naive Approach: Find class of Patch

filename	patch	xmin	xmax	ymin	ymax	WBC (1/0)
1.jpg	1	0	320	0	240	0
1.jpg	2	320	640	0	240	
1.jpg	3	0	320	240	480	
1.jpg	4	320	640	240	480	
1.jpg	5	160	480	120	360	

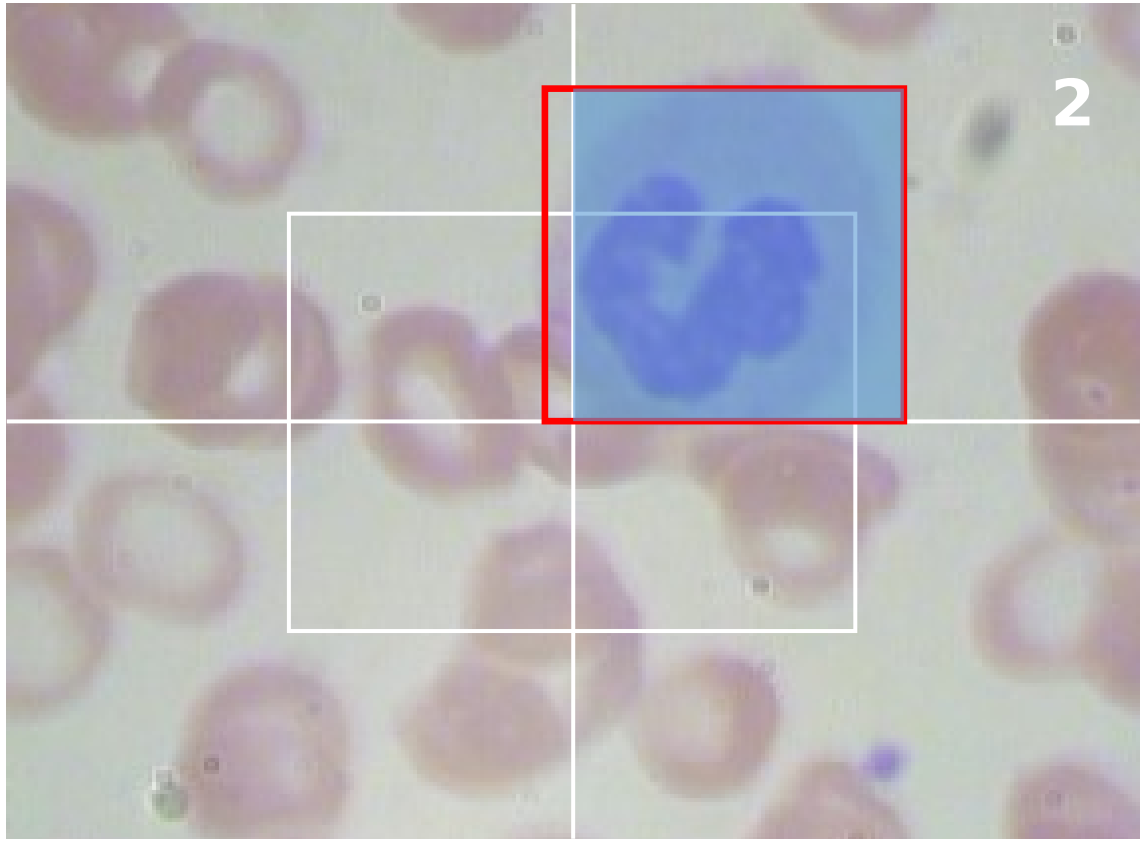
filename	cell_type	xmin	Xmax	Ymin	Ymax
1.jpg	WBC	310	530	50	240



Naive Approach: Find class of Patch

filename	patch	xmin	xmax	ymin	ymax	WBC (1/0)
1.jpg	1	0	320	0	240	0
1.jpg	2	320	640	0	240	

filename	cell_type	xmin	Xmax	Ymin	Ymax
1.jpg	WBC	310	530	50	240



Area of intersection = 48090

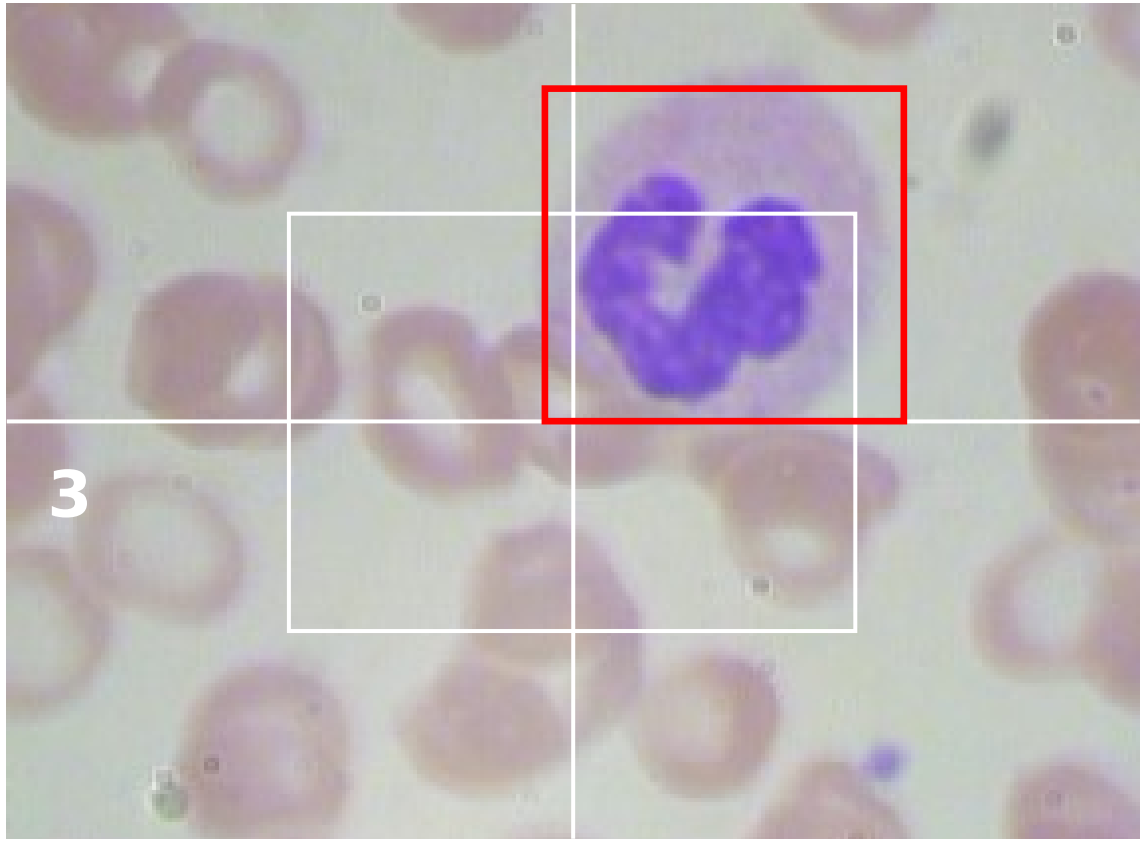
Area of Patch = 76800

Ratio of intersection = 48090/76800 = 0.63

Naive Approach: Find class of Patch

filename	patch	xmin	xmax	ymin	ymax	WBC (1/0)
1.jpg	1	0	320	0	240	0
1.jpg	2	320	640	0	240	1
1.jpg	3	0	320	240	480	
1.jpg	4	320	640	240	480	
1.jpg	5	160	480	120	360	

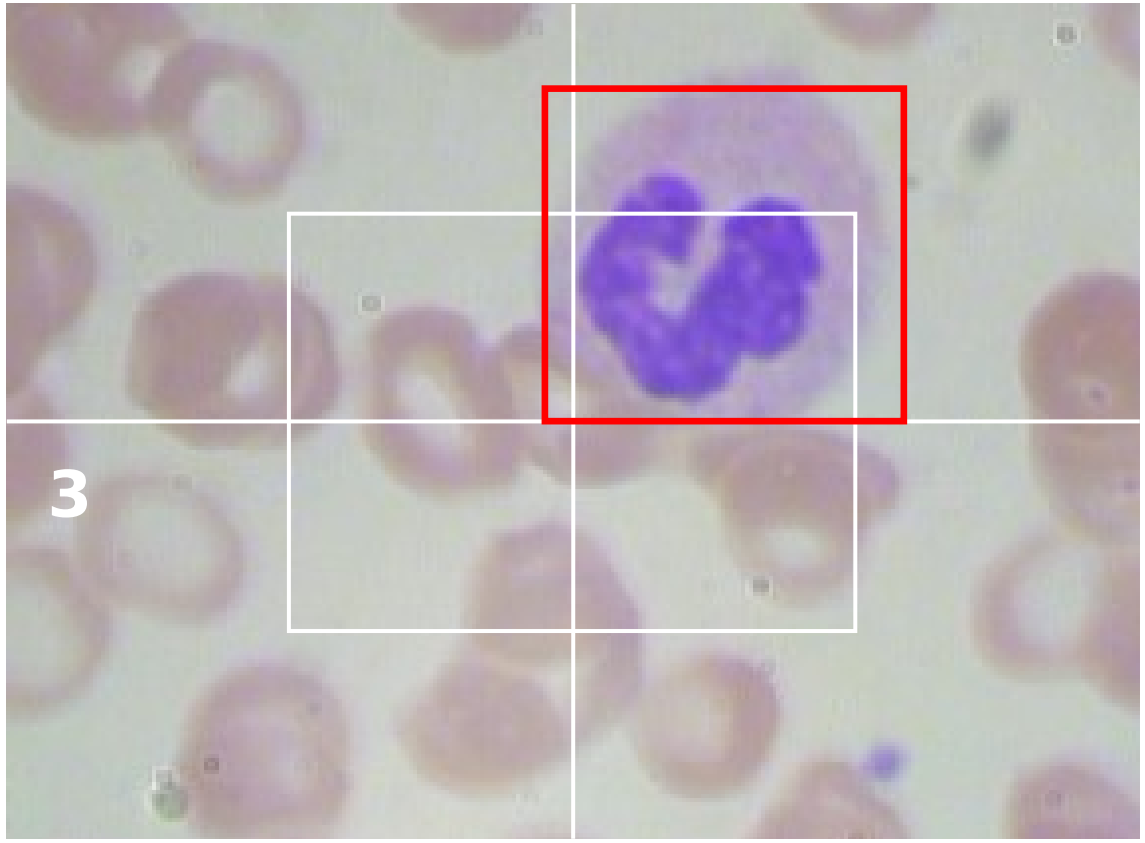
filename	cell_type	xmin	Xmax	Ymin	Ymax
1.jpg	WBC	310	530	50	240



Naive Approach: Find class of Patch

filename	patch	xmin	xmax	ymin	ymax	WBC (1/0)
1.jpg	1	0	320	0	240	0
1.jpg	2	320	640	0	240	1
1.jpg	3	0	320	240	480	

filename	cell_type	xmin	Xmax	Ymin	Ymax
1.jpg	WBC	310	530	50	240



Area of intersection = 0

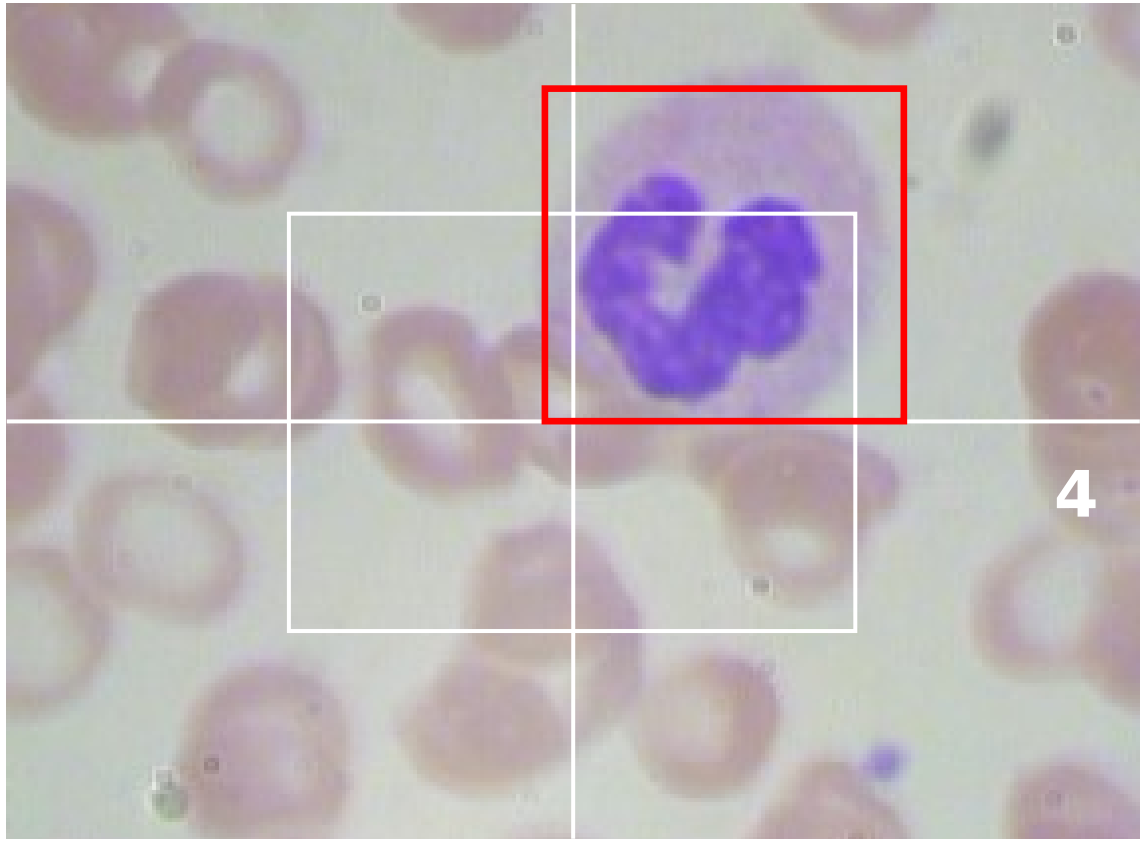
Area of Patch = 76800

Ratio of intersection = 0

Naive Approach: Find class of Patch

filename	patch	xmin	xmax	ymin	ymax	WBC (1/0)
1.jpg	1	0	320	0	240	0
1.jpg	2	320	640	0	240	1
1.jpg	3	0	320	240	480	0
1.jpg	4	320	640	240	480	

filename	cell_type	xmin	Xmax	Ymin	Ymax
1.jpg	WBC	310	530	50	240



Area of intersection = 0

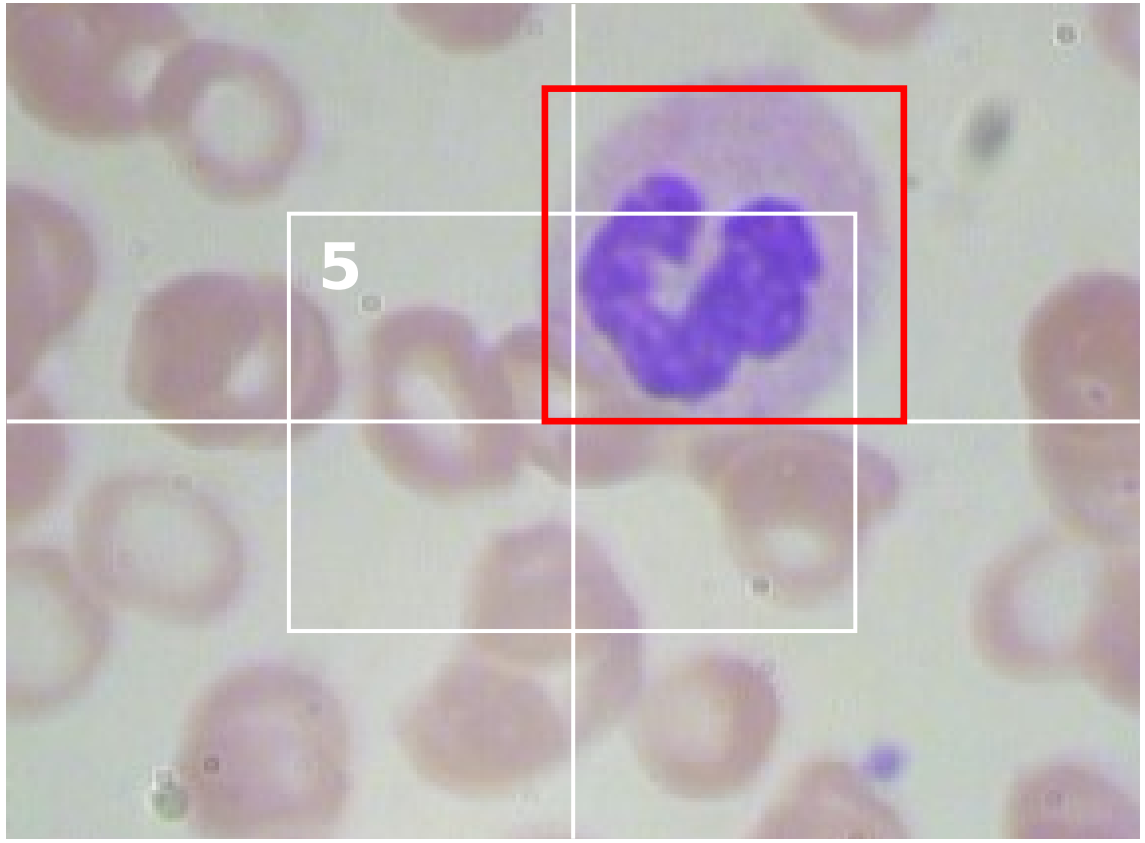
Area of Patch = 76800

Ratio of intersection = 0

Naive Approach: Find class of Patch

filename	patch	xmin	xmax	ymin	ymax	WBC (1/0)
1.jpg	1	0	320	0	240	0
1.jpg	2	320	640	0	240	1
1.jpg	3	0	320	240	480	0
1.jpg	4	320	640	240	480	0
1.jpg	5	160	480	120	360	

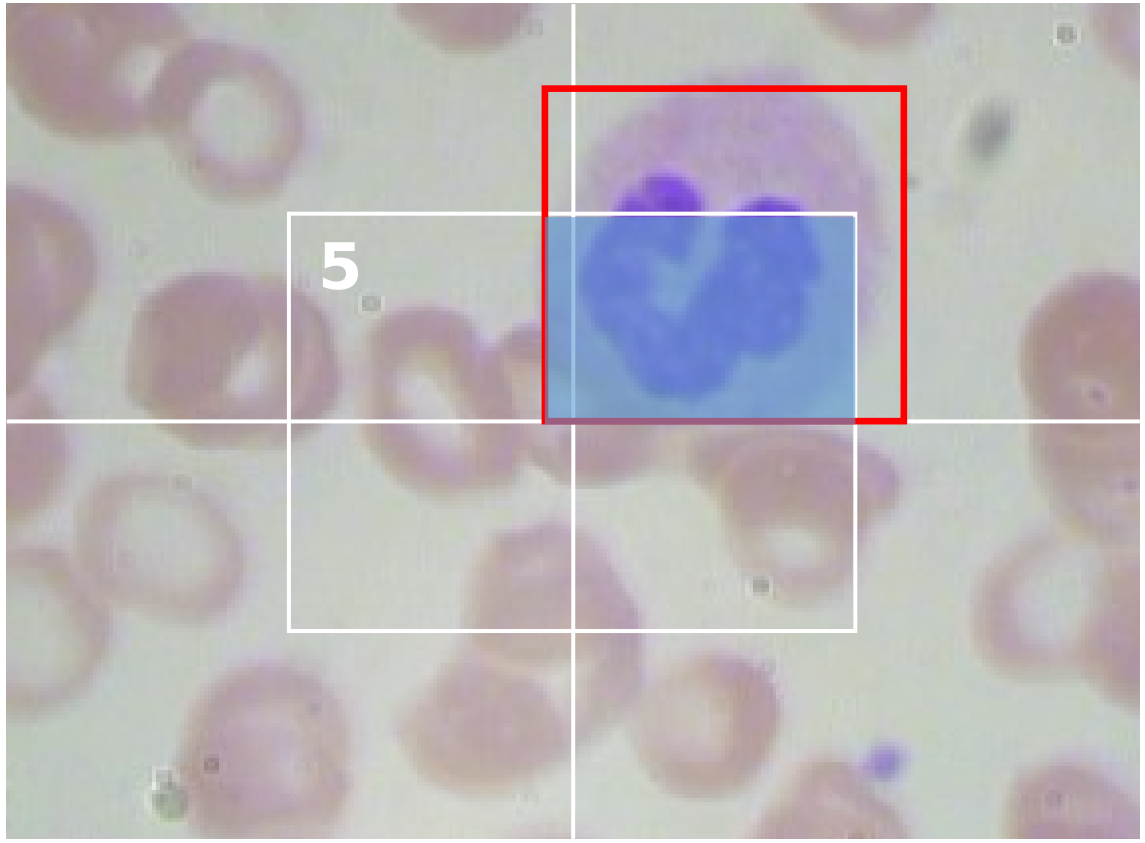
filename	cell_type	xmin	Xmax	Ymin	Ymax
1.jpg	WBC	310	530	50	240



Naive Approach: Find class of Patch

filename	patch	xmin	xmax	ymin	ymax	WBC (1/0)
1.jpg	1	0	320	0	240	0
1.jpg	2	320	640	0	240	1
1.jpg	3	0	320	240	480	0
1.jpg	4	320	640	240	480	0
1.jpg	5	160	480	120	360	

filename	cell_type	xmin	Xmax	Ymin	Ymax
1.jpg	WBC	310	530	50	240

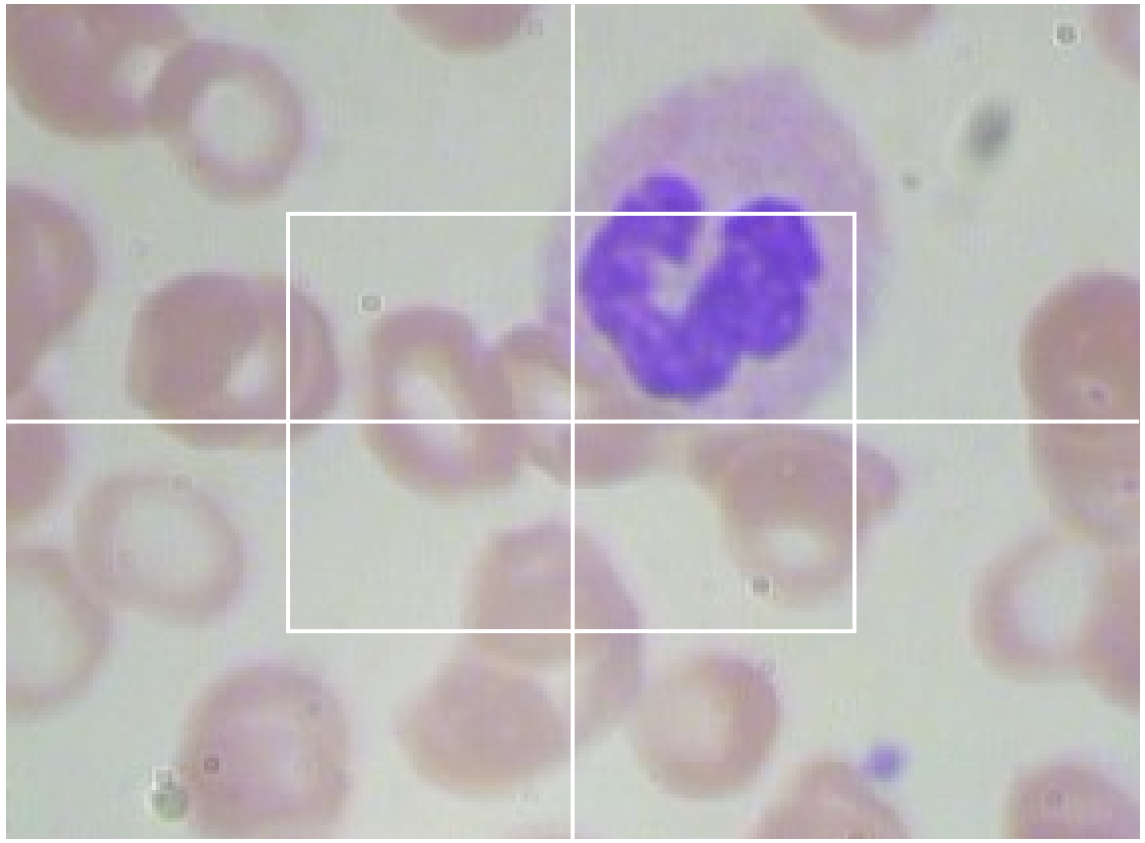


Area of intersection = 20400

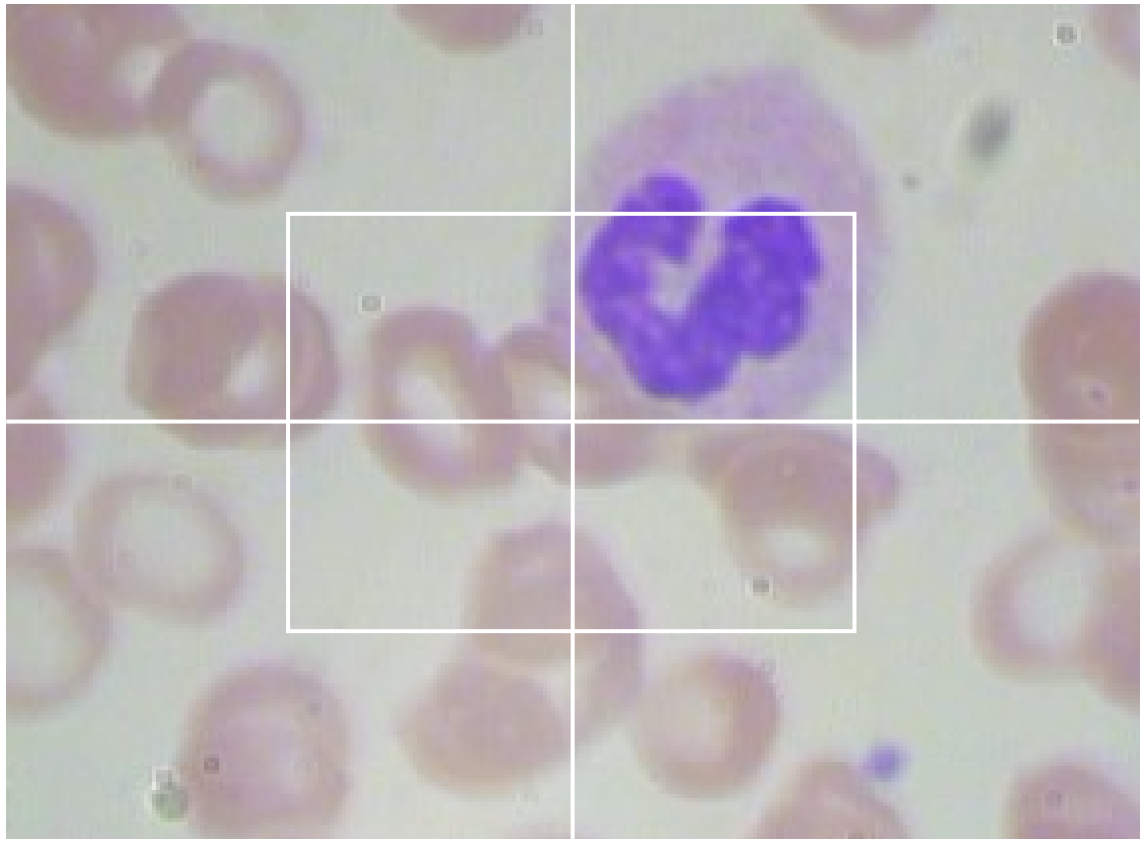
Area of Patch = 76800

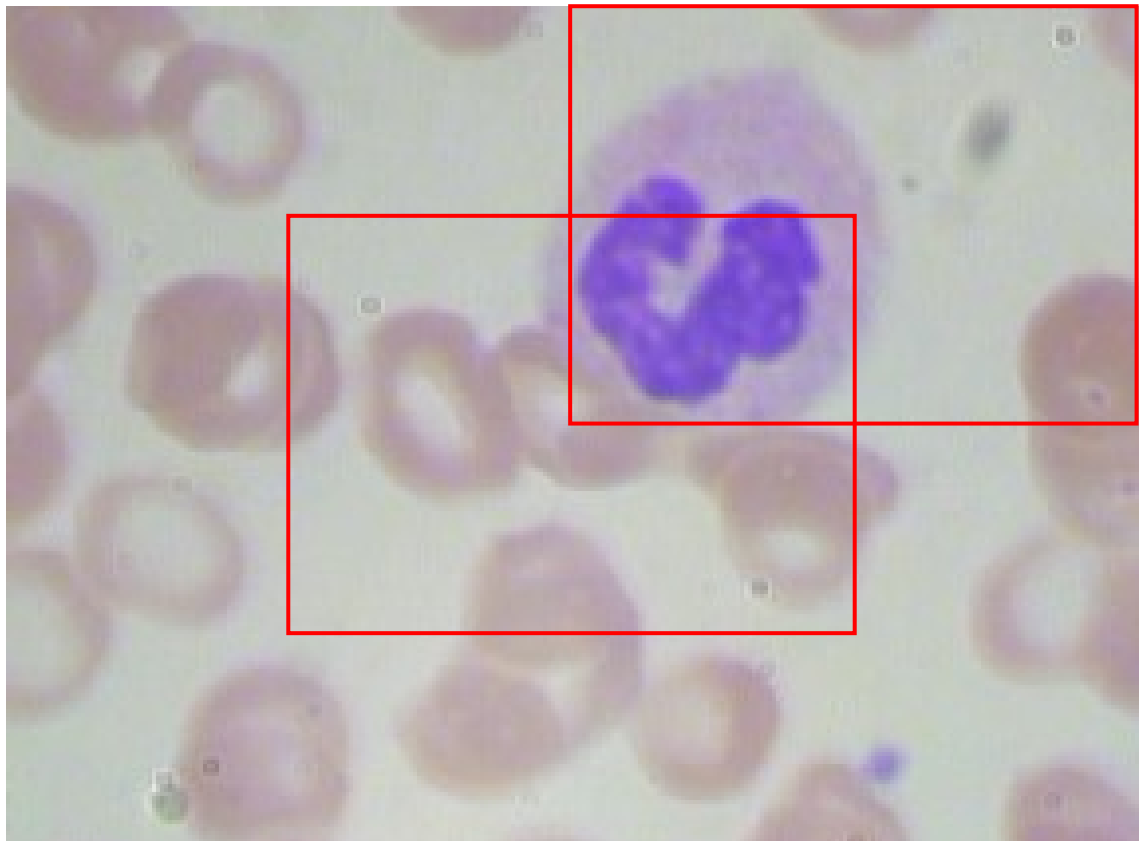
%age of intersection = 20400/76800 = 0.26

Naive Approach: Find class of Patch



Naive Approach: Find class of Patch





Let’s code!