

Chapitre 06

Traitement morphologique de l'image

Exemples

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Élément de structure

- Les opérations morphologiques sont définies sur la base des "éléments structurels"
- Un élément de structure est un petit ensemble ou une sous-image, utilisé pour spécifier la structure
- Exemples:

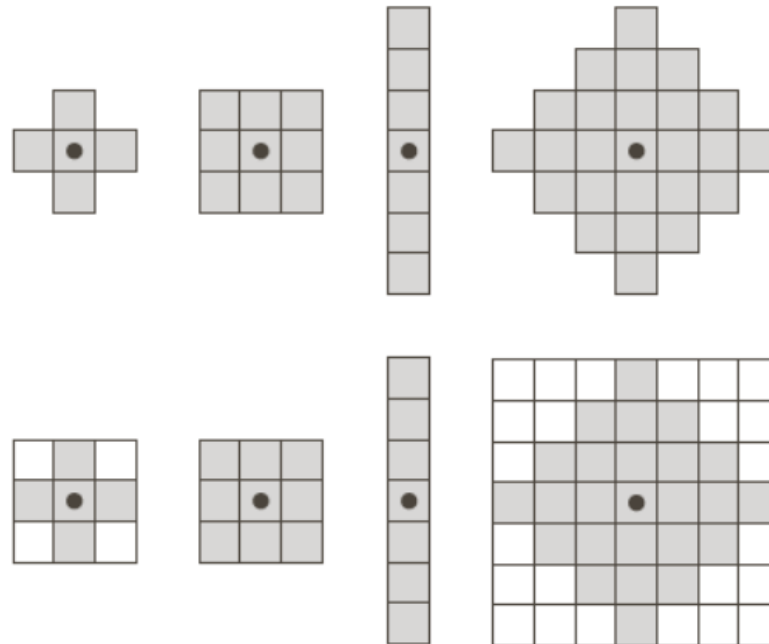


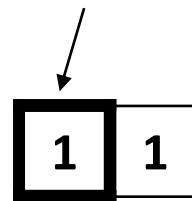
FIGURE 9.2 First row: Examples of structuring elements. Second row: Structuring elements converted to rectangular arrays. The dots denote the centers of the SEs.

Érosion (exemple 1)

0	0	0	0	0	0
1	1	1	1	1	1
0	0	1	0	0	0
0	0	1	0	0	0
0	0	1	0	0	0
0	0	0	0	0	0

A

Origine de B



B

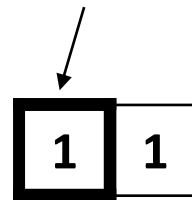
$A \ominus B$

Érosion (exemple 1)

0	0	0	0	0	0
1	1	1	1	1	1
0	0	1	0	0	0
0	0	1	0	0	0
0	0	1	0	0	0
0	0	0	0	0	0

A

Origine de B



B

0					

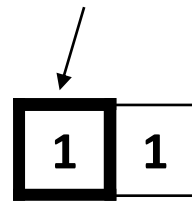
$A \ominus B$

Érosion (exemple 1)

0	0	0	0	0	0
1	1	1	1	1	1
0	0	1	0	0	0
0	0	1	0	0	0
0	0	1	0	0	0
0	0	0	0	0	0

A

Origine de B



B

0	0				

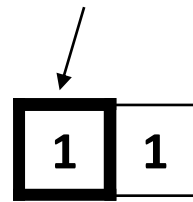
$A \ominus B$

Érosion (exemple 1)

0	0	0	0	0	0	
1	1	1	1	1	1	
0	0	1	0	0	0	
0	0	1	0	0	0	
0	0	1	0	0	0	
0	0	0	0	0	0	

A

Origine de B



B

0	0	0	0	0	0	

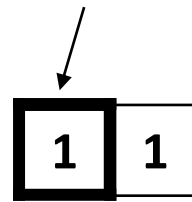
$A \ominus B$

Érosion (exemple 1)

0	0	0	0	0	0
1	1	1	1	1	1
0	0	1	0	0	0
0	0	1	0	0	0
0	0	1	0	0	0
0	0	0	0	0	0

A

Origine de B



B

0	0	0	0	0	0
1					

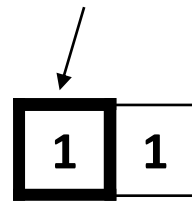
$A \ominus B$

Érosion (exemple 1)

0	0	0	0	0	0
1	1	1	1	1	1
0	0	1	0	0	0
0	0	1	0	0	0
0	0	1	0	0	0
0	0	0	0	0	0

A

Origine de B



B

0	0	0	0	0	0
1	1				

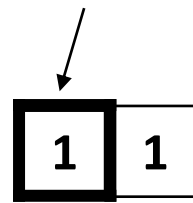
$A \ominus B$

Érosion (exemple 1)

0	0	0	0	0	0
1	1	1	1	1	1
0	0	1	0	0	0
0	0	1	0	0	0
0	0	1	0	0	0
0	0	0	0	0	0

A

Origine de B



B

0	0	0	0	0	0
1	1	1			

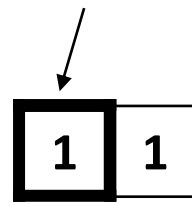
$A \ominus B$

Érosion (exemple 1)

0	0	0	0	0	0
1	1	1	1	1	1
0	0	1	0	0	0
0	0	1	0	0	0
0	0	1	0	0	0
0	0	0	0	0	0

A

Origine de B



B

0	0	0	0	0	0
1	1	1	1		

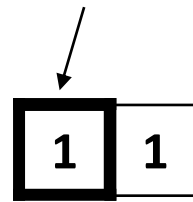
$A \ominus B$

Érosion (exemple 1)

0	0	0	0	0	0
1	1	1	1	1	1
0	0	1	0	0	0
0	0	1	0	0	0
0	0	1	0	0	0
0	0	0	0	0	0

A

Origine de B



B

0	0	0	0	0	0
1	1	1	1	1	

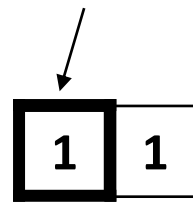
$A \ominus B$

Érosion (exemple 1)

0	0	0	0	0	0
1	1	1	1	1	1
0	0	1	0	0	0
0	0	1	0	0	0
0	0	1	0	0	0
0	0	0	0	0	0

A

Origine de B



B

0	0	0	0	0	0
1	1	1	1	1	0

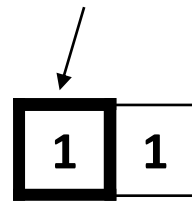
$A \ominus B$

Érosion (exemple 1)

0	0	0	0	0	0
1	1	1	1	1	1
0	0	1	0	0	0
0	0	1	0	0	0
0	0	1	0	0	0
0	0	0	0	0	0

A

Origine de B



B

0	0	0	0	0	0
1	1	1	1	1	0
		0			

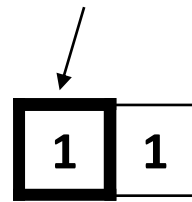
$A \ominus B$

Érosion (exemple 1)

0	0	0	0	0	0
1	1	1	1	1	1
0	0	1	0	0	0
0	0	1	0	0	0
0	0	1	0	0	0
0	0	0	0	0	0

A

Origine de B



0	0	0	0	0	0
1	1	1	1	1	0
		0			
		0			

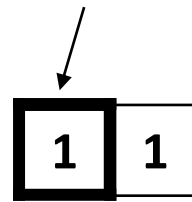
$A \ominus B$

Érosion (exemple 1)

0	0	0	0	0	0
1	1	1	1	1	1
0	0	1	0	0	0
0	0	1	0	0	0
0	0	1	0	0	0
0	0	0	0	0	0

A

Origine de B



B

0	0	0	0	0	0
1	1	1	1	1	0
		0			
		0			
		0			

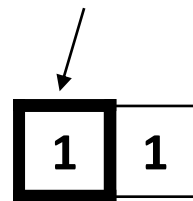
$A \ominus B$

Érosion (exemple 1)

0	0	0	0	0	0
1	1	1	1	1	1
0	0	1	0	0	0
0	0	1	0	0	0
0	0	1	0	0	0
0	0	0	0	0	0

A

Origine de B

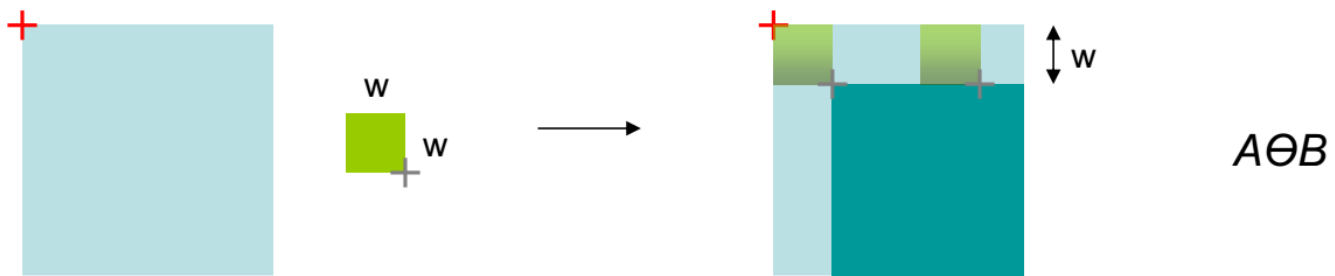
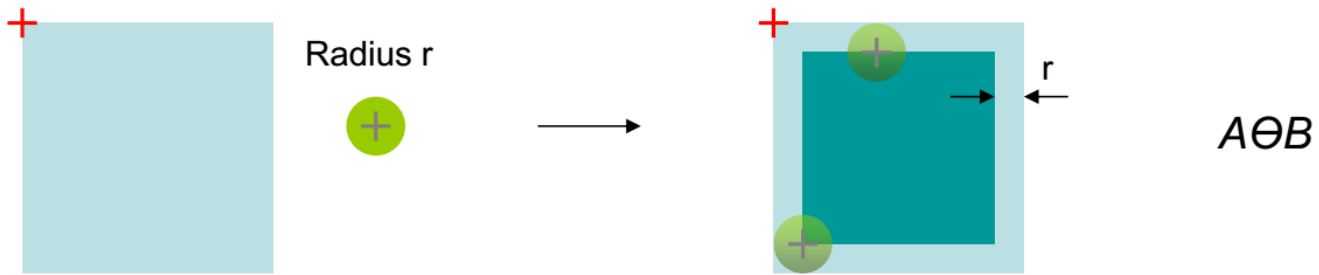
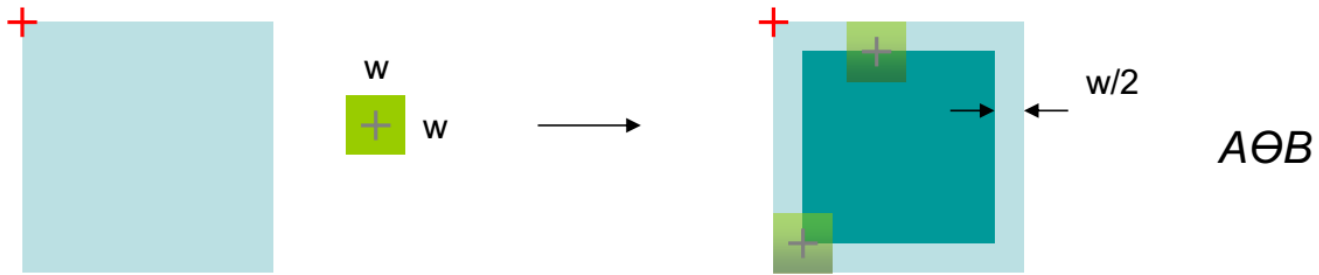


B

0	0	0	0	0	0
1	1	1	1	1	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0

$A \ominus B$

Érosion (autres exemples)



Dilatation (Exemple 1)

0	0	0	0	0	0
0	0	1	1	0	0
0	0	0	0	1	0
0	0	1	1	0	0
0	1	0	0	1	0
0	0	0	0	0	0

A

Origine de B



1	1
---	---

B

--	--

\hat{B}

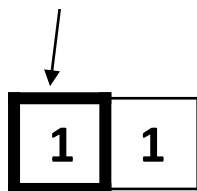
$A \oplus B$

Dilatation (Exemple 1)

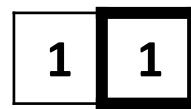
0	0	0	0	0	0
0	0	1	1	0	0
0	0	0	0	1	0
0	0	1	1	0	0
0	1	0	0	1	0
0	0	0	0	0	0

A

Origine de B



B



\hat{B}

Réflexion B

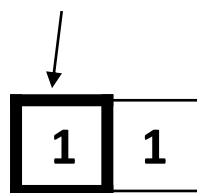
$A \oplus B$

Dilatation (Exemple 1)

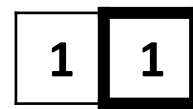
	0	0	0	0	0	0
0	0	1	1	0	0	
0	0	0	0	1	0	
0	0	1	1	0	0	
0	1	0	0	1	0	
0	0	0	0	0	0	

A

Origine de B



B



\hat{B}

Réflexion B

0						

$A \oplus B$

Dilatation (Exemple 1)

0	0	0	0	0	0
0	0	1	1	0	0
0	0	0	0	1	0
0	0	1	1	0	0
0	1	0	0	1	0
0	0	0	0	0	0

A

Origine de B



1	1
---	---

B

1	1
---	---

\hat{B}

Réflexion B

	0				

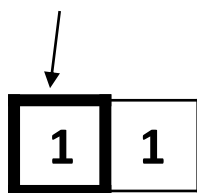
$A \oplus B$

Dilatation (Exemple 1)

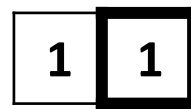
0	0	0	0	0	0
0	0	1	1	0	0
0	0	0	0	1	0
0	0	1	1	0	0
0	1	0	0	1	0
0	0	0	0	0	0

A

Origine de B



B



\hat{B}

Réflexion B

	0	0			

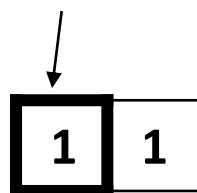
$A \oplus B$

Dilatation (Exemple 1)

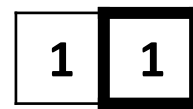
0	0	0	0	0	0
0	0	1	1	0	0
0	0	0	0	1	0
0	0	1	1	0	0
0	1	0	0	1	0
0	0	0	0	0	0

A

Origine de B



B



\hat{B}

Réflexion B

0	0	0	0	0	0

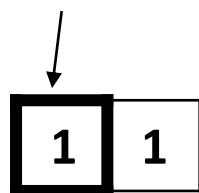
$A \oplus B$

Dilatation (Exemple 1)

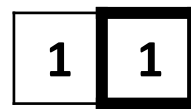
0	0	0	0	0	0
0	0	1	1	0	0
0	0	0	0	1	0
0	0	1	1	0	0
0	1	0	0	1	0
0	0	0	0	0	0

A

Origine de B



B



\hat{B}

Réflexion B

0	0	0	0	0	0
		1			

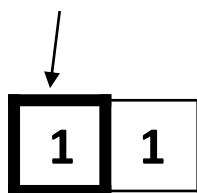
$A \oplus B$

Dilatation (Exemple 1)

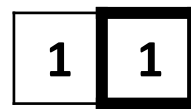
0	0	0	0	0	0
0	0	1	1	0	0
0	0	0	0	1	0
0	0	1	1	0	0
0	1	0	0	1	0
0	0	0	0	0	0

A

Origine de B



B



\hat{B}

↑
Réflexion B

0	0	0	0	0	0
		1	1		

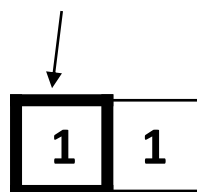
$A \oplus B$

Dilatation (Exemple 1)

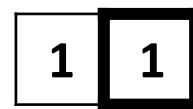
0	0	0	0	0	0
0	0	1	1	0	0
0	0	0	0	1	0
0	0	1	1	0	0
0	1	0	0	1	0
0	0	0	0	0	0

A

Origine de B



B



\hat{B}

Réflexion B

0	0	0	0	0	0
		1	1	1	

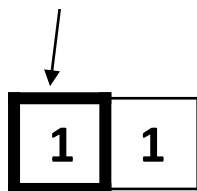
$A \oplus B$

Dilatation (Exemple 1)

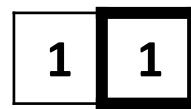
0	0	0	0	0	0
0	0	1	1	0	0
0	0	0	0	1	0
0	0	1	1	0	0
0	1	0	0	1	0
0	0	0	0	0	0

A

Origine de B



B



\hat{B}

Réflexion B

0	0	0	0	0	0
		1	1	1	
				1	1
		1	1	1	
	1	1		1	1

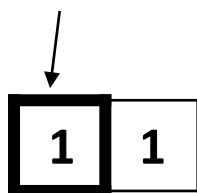
$A \oplus B$

Dilatation (Exemple 1)

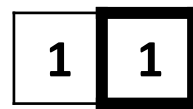
0	0	0	0	0	0
0	0	1	1	0	0
0	0	0	0	1	0
0	0	1	1	0	0
0	1	0	0	1	0
0	0	0	0	0	0

A

Origine de B



B



\hat{B}

↑
Réflexion B

0	0	0	0	0	0
0	0	1	1	1	0
0	0	0	0	1	1
0	0	1	1	1	0
0	1	1	0	1	1
0	0	0	0	0	0

$A \oplus B$

Dilatation (Exemple 2)

0	0	0	0	0	0
0	0	1	0	0	0
0	0	1	0	0	0
0	0	1	1	0	0
0	1	0	0	0	0
0	0	0	0	0	0

A

Origine de B

↓

1	1
1	

B

\hat{B}

$A \oplus B$

Dilatation (Exemple 2)

0	0	0	0	0	0
0	0	1	0	0	0
0	0	1	0	0	0
0	0	1	1	0	0
0	1	0	0	0	0
0	0	0	0	0	0

A

Origine de B



1	1
1	

B

	1
1	1

\hat{B}

$A \oplus B$

Dilatation (Exemple 2)

0	0	0	0	0	0
0	0	1	0	0	0
0	0	1	0	0	0
0	0	1	1	0	0
0	1	0	0	0	0
0	0	0	0	0	0

A

Origine de B



1	1
1	

B

	1
1	1

\hat{B}

		1			

$A \oplus B$

Dilatation (Exemple 2)

0	0	0	0	0	0
0	0	1	0	0	0
0	0	1	0	0	0
0	0	1	1	0	0
0	1	0	0	0	0
0	0	0	0	0	0

A

Origine de B

↓

1	1
1	

B

	1
1	1

\hat{B}

		1			
		1			

$A \oplus B$

Dilatation (Exemple 2)

0	0	0	0	0	0
0	0	1	0	0	0
0	0	1	0	0	0
0	0	1	1	0	0
0	1	0	0	0	0
0	0	0	0	0	0

A

Origine de B

↓

1	1
1	

B

	1
1	1

\hat{B}

		1			
		1			
		1			

$A \oplus B$

Dilatation (Exemple 2)

0	0	0	0	0	0
0	0	1	0	0	0
0	0	1	0	0	0
0	0	1	1	0	0
0	1	0	0	0	0
0	0	0	0	0	0

A

Origine de B

↓

1	1
1	

B

	1
1	1

\hat{B}

		1			
		1			
		1	1		

$A \oplus B$

Dilatation (Exemple 2)

0	0	0	0	0	0
0	0	1	0	0	0
0	0	1	0	0	0
0	0	1	1	0	0
0	1	0	0	0	0
0	0	0	0	0	0

A

Origine de B

↓

1	1
1	

B

	1
1	1

\hat{B}

		1			
		1			
		1	1		
	1				

$A \oplus B$

Dilatation (Exemple 2)

0	0	0	0	0	0
0	0	1	0	0	0
0	0	1	0	0	0
0	0	1	1	0	0
0	1	0	0	0	0
0	0	0	0	0	0

A

Origine de B



1	1
1	

B

	1
1	1

\hat{B}

		1	1		
		1			
		1	1		
	1				

$A \oplus B$

Dilatation (Exemple 2)

0	0	0	0	0	0
0	0	1	0	0	0
0	0	1	0	0	0
0	0	1	1	0	0
0	1	0	0	0	0
0	0	0	0	0	0

A

Origine de B



1	1
1	

B

	1
1	1

\hat{B}

		1	1		
		1	1		
		1	1		
	1				

$A \oplus B$

Dilatation (Exemple 2)

0	0	0	0	0	0
0	0	1	0	0	0
0	0	1	0	0	0
0	0	1	1	0	0
0	1	0	0	0	0
0	0	0	0	0	0

A

Origine de B

↓

1	1
1	

B

	1
1	1

\hat{B}

		1	1		
		1	1		
		1	1	1	
	1				

$A \oplus B$

Dilatation (Exemple 2)

0	0	0	0	0	0
0	0	1	0	0	0
0	0	1	0	0	0
0	0	1	1	0	0
0	1	0	0	0	0
0	0	0	0	0	0

A

Origine de B

↓

1	1
1	

B

	1
1	1

\hat{B}

		1	1		
		1	1		
		1	1	1	
	1		1		

$A \oplus B$

Dilatation (Exemple 2)

0	0	0	0	0	0
0	0	1	0	0	0
0	0	1	0	0	0
0	0	1	1	0	0
0	1	0	0	0	0
0	0	0	0	0	0

A

Origine de B

↓

1	1
1	

B

	1
1	1

\hat{B}

		1	1		
		1	1		
		1	1	1	
	1	1	1		

$A \oplus B$

Dilatation (Exemple 2)

0	0	0	0	0	0
0	0	1	0	0	0
0	0	1	0	0	0
0	0	1	1	0	0
0	1	0	0	0	0
0	0	0	0	0	0

A

Origine de B

↓

1	1
1	

B

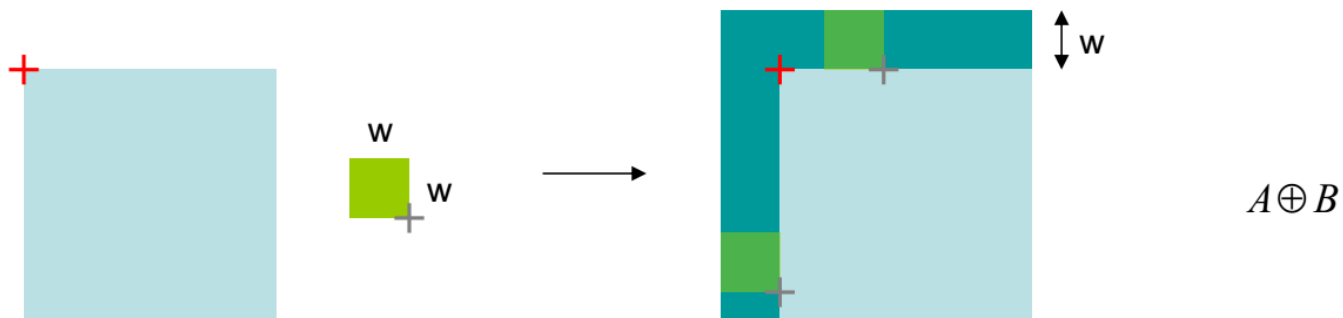
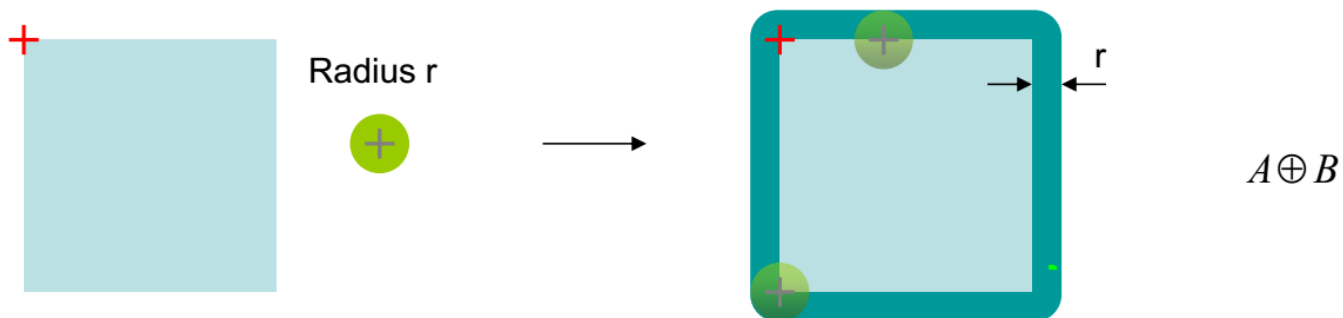
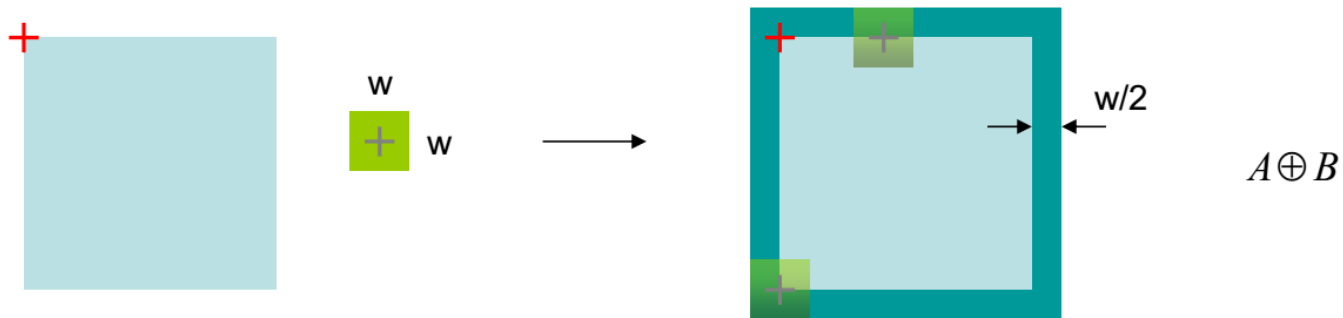
	1
1	1

\hat{B}

0	0	0	0	0	0
0	0	1	1	0	0
0	0	1	1	0	0
0	0	1	1	1	0
0	1	1	1	0	0
0	1	0	0	0	0

$A \oplus B$

Dilatation (autres exemples)



Dilatation (exercice)

A



B



$A \oplus B$

