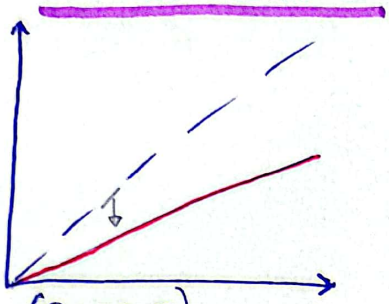
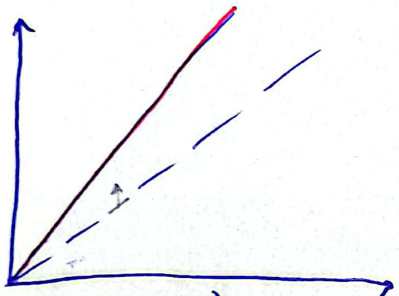
Operatori Punctuali

LUMINOZITATE

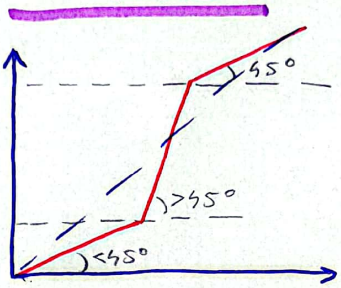


(SCADE)



(CREȘTE)

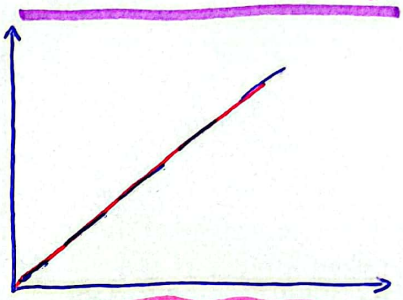
CONTRAST



<45° → SCADE

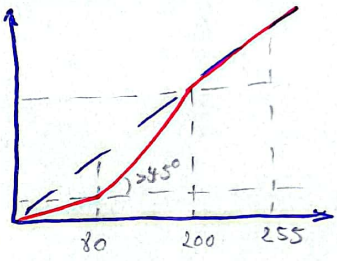
>45° → CREȘTE

NU SE MODIFICĂ

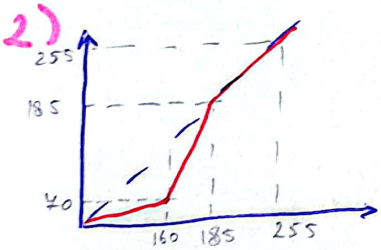


EXERCIȚII

1) [0,80], L scade
[80,200], C crește
[200,255], NU SE MODIFICĂ

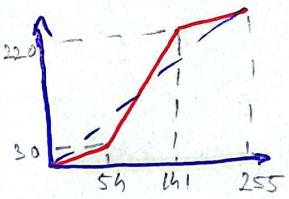


2)



[0,160], L scade
C scade
[160,185], C crește
[185,255], IMG NU SE MODIF.

3) EXPRESIA OPERATORULUI



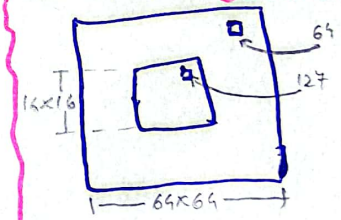
[0,54]:
$y = ax \Leftrightarrow 30 = a * 40 \Leftrightarrow a = 0{,}75$

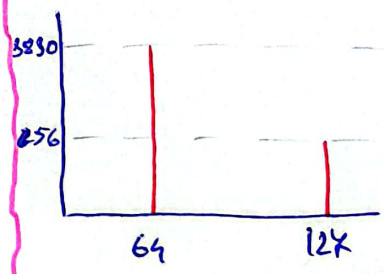
[54,141]:
$\frac{x - x_0}{x_1 - x_0} = \frac{y - y_0}{y_1 - y_0} \Leftrightarrow$

$\Leftrightarrow \frac{x-54}{141-54} = \frac{y-30}{220-30} \Leftrightarrow \frac{x-54}{87} = \frac{y-30}{190} \Leftrightarrow 190(x-54) = 87(y-30) \Leftrightarrow$

$\Leftrightarrow 190x - 87y = 7740$ ✓

4) REPREZENTARE GRAFICĂ A HISTOGRAMEI





127: 16 x 16 = 256

64: 64x64 - 16x16 = 3830

Filtre

FILTRE TRECE-JOS

1) FILTRE DE MEDIERE:
   - F. MEDIE ARITMETICĂ
   - F. BINOMIAL
   - F. GAUSSIAN
2) FILTRE BAZATE PE STATISTICI DE ORDINE:
   - F. MEDIAN
   - F. MIN
   - F. MAX
   - F MID-POINT

CERINȚĂ MASCĂ

TOȚI COEFICIENȚII MĂȘTII DE FILTRARE TRECE-JOS SUNT EGALI CU 1.

ÎNTREBUINȚARE

NETEZIREA IMAGINII, ATENUÂND COMPONENTELE DE ÎNALTĂ FRECVENȚĂ ȘI PĂSTRÂND COMPONENTELE DE JOASĂ FRECVENȚĂ.

FILTRE TRECE-SUS

- PREWITT
- SOBEL
- ROBERTS
- CANNY
- LAPLACE
- MARR-HILDRETH
- UNSHARP MASK
- ...

CERINȚĂ MASCĂ

TOȚI COEFICIENȚII MĂȘTII DE FILTRARE TRECE-SUS SUNT EGALI CU 0.

ÎNTREBUINȚARE

CLARIFICAREA IMAGINII, ATENUÂND COMPONENTELE DE JOASĂ FRECVENȚĂ ȘI PĂSTREAZĂ COMPONENTELE DE ÎNALTĂ FRECVENȚĂ.

Filtre Trece-Jos

FILTRE DE MEDIERE: FILTRU MEDIE ARITMETICĂ

$\frac{1}{9}(3\times3); \frac{1}{16}(4\times4); \frac{1}{25}(5\times5)$

64	64	64
64	64	64
64	64	127

$* \frac{1}{9} *$

1	1	1
1	1	1
1	1	1

$=$

7,1	7,1	7,1
7,1	7,1	7,1
7,1	7,1	14,1

$=$

$= (8 * 7,1) + 14,1 = 70,9 \simeq 71$

FILTRE BAZATE PE STATISTICI DE ORDINE:

FILTRU MEDIAN

5×5

117	116	70	71	68
116	117	117	71	71
116	116	[illegible]	70	71
117	117	117	68	71
117	118	117	71	71

$f(x,y)$

$f(x,y) = g(x,y)$

68	68	70	70	71	71	71	71	71	71	71	116	[illegible]	116	116	117	117

117	117	117	117	117	117	117	118

$g(x,y)$

Filtre trecă Jus

FILTRUL SOBEL

$$S_x = \begin{array}{|c|c|c|}\hline -1 & 0 & 1 \\ \hline -2 & 0 & 2 \\ \hline -1 & 0 & 1 \\ \hline \end{array} \quad \longleftrightarrow \quad S_y = \begin{array}{|c|c|c|}\hline -1 & -2 & -1 \\ \hline 0 & 0 & 0 \\ \hline 1 & 2 & 1 \\ \hline \end{array}$$

UNGHI = MATH.ATAN2 (S_x, S_y) * (180/MATH.PI);

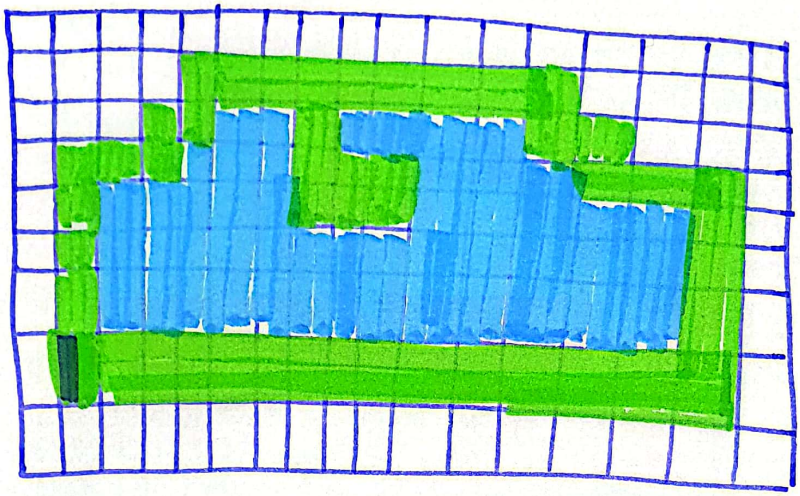
$G = \sqrt{S_x^2 + S_y^2}$;

yColor = ((UNGHI + 180) * 128/360) + 127;

PIXEL $P = \begin{cases} yColor, & G \geq \text{PRAGUL ALES} \\ 0, & G < \text{PRAGUL ALES} \end{cases}$

Operații Morfologice

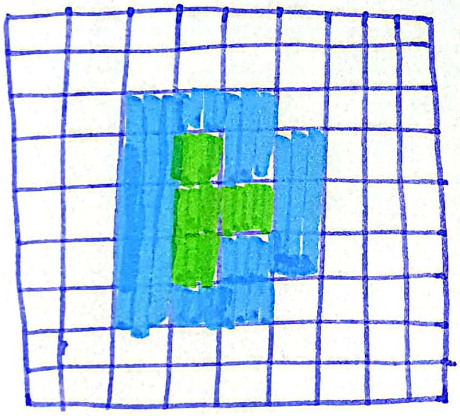
I DILATAREA



PIXELI IMAGINE

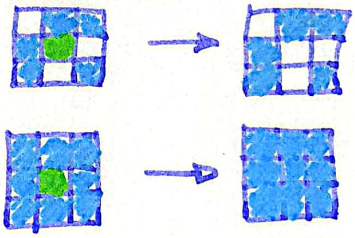
DILATARE

II ERODARE

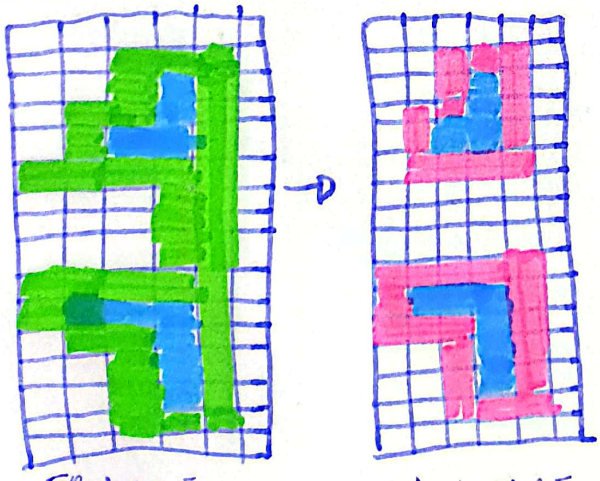


PIXELI IMAGINE INIȚIALĂ

PIXELI RĂMAȘI DUPĂ ERODARE



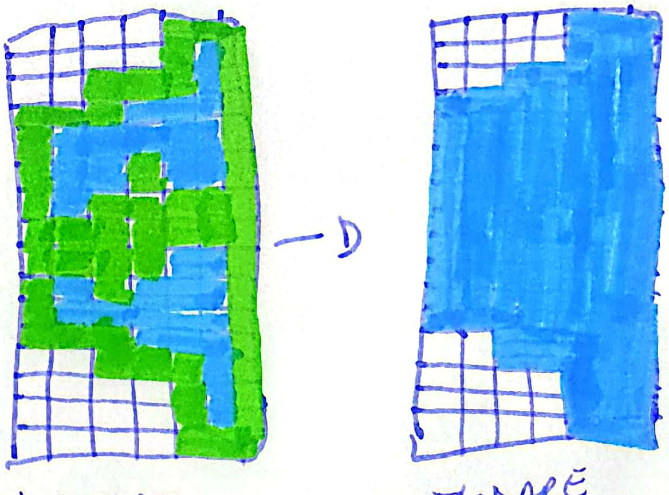
III OPENING



ERODARE

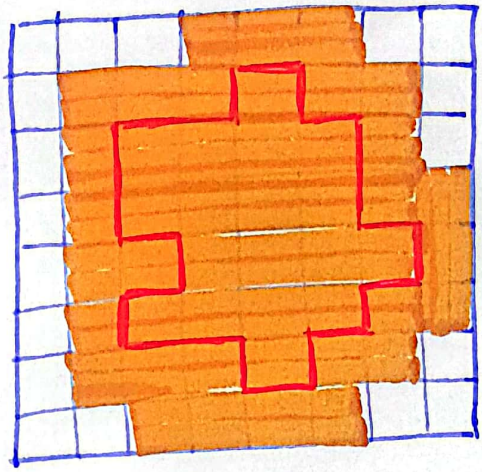
DILATARE

IV CLOSING

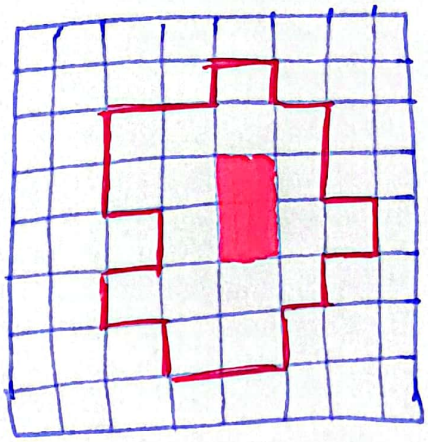


DILATARE

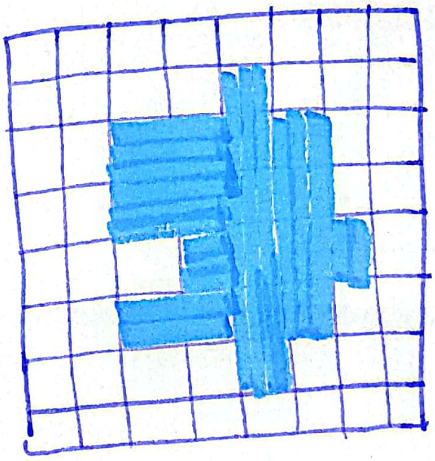
ERODARE



DILATARE

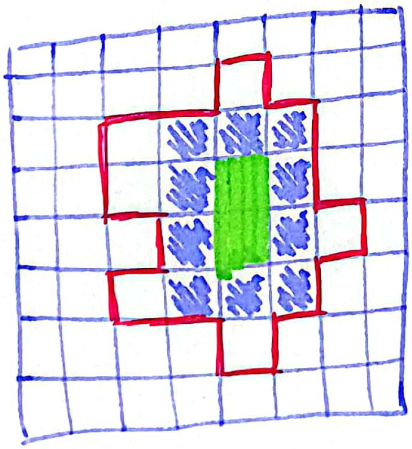


ERODARE



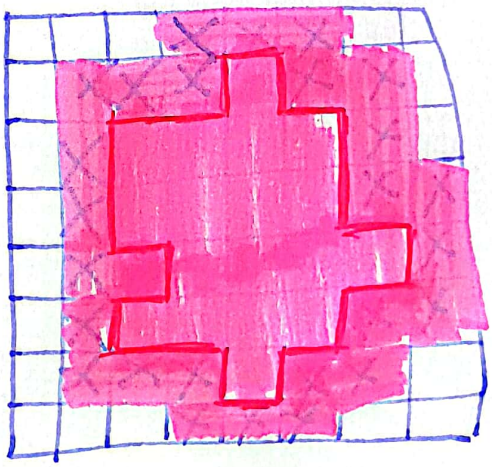
IMAGINE ORIGINALĂ

OPENING

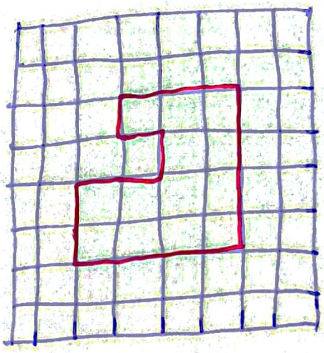


ERODARE - DILATARE

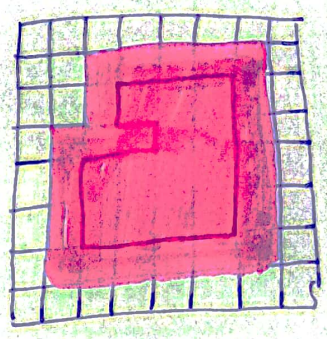
CLOSING

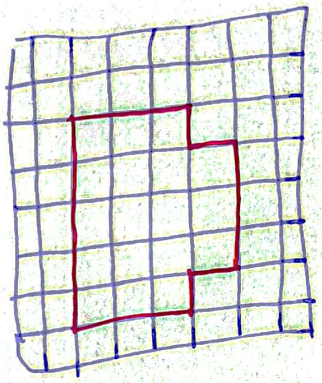


DILATARE - ERODARE

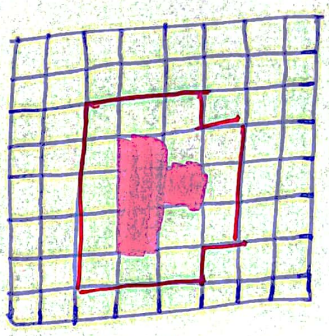


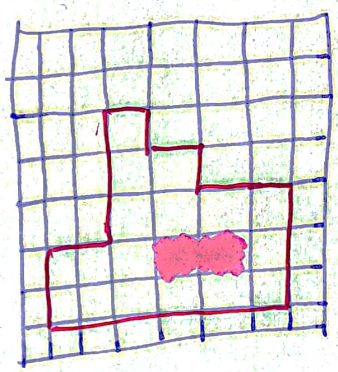
DILATARE



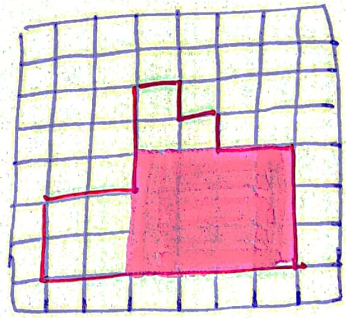


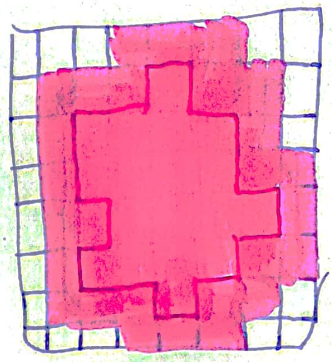
ERODARE



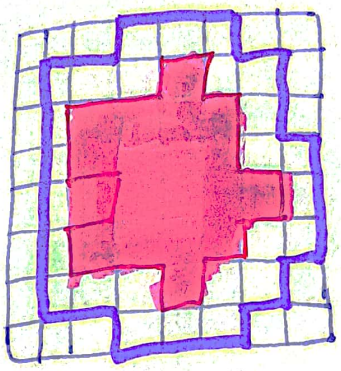


OPENING





CLOSING



Modelul RGB

MODEL ADITIV

MODELUL RGB (RED-GREEN-BLUE)

MODEL SUBTRACTIV

MODELUL CMYK (CYAN-MAGENTA-YELLOW-KEY)

KEY = CYAN + MAGENTA + YELLOW = NEGRU

NORMALIZARE

Ex/ (20, 150, 70) , suma = 20 + 150 + 70 = 240

$r = \frac{20}{240} = \frac{2}{24} = \frac{1}{12}$

$g = \frac{150}{240} = \frac{15}{24} = \frac{5}{8}$

$b = \frac{70}{240} = \frac{7}{24}$