MATLAB

Exercício 02

Matrizes

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ENG 1118 – Tópicos Especiais

janks.link/matlab/aula02.zip

Material da Aula 02

Exercício 02 A

$$A = \begin{bmatrix} 2 & 13 & 9 \\ 4 & 1 & 7 \end{bmatrix}$$

$B =$ matriz 20x3 de 7s

$$C = \begin{bmatrix} 9 & 8 & \dots & -10 \\ 9 & 8 & \dots & -10 \\ 9 & 8 & \dots & -10 \end{bmatrix}$$

Declare as variáveis A, B e C

Acesse o terceiro elemento de A. Depois, o elemento da 2ª linha e 3ª coluna de A. Depois, os elementos de todas as linhas e apenas das colunas pares de C.

Multiplique os elementos de C com os da matriz B transposta.

Encontre os elementos de C menores que 0 e substitua-os por π.

Exercício 02 A

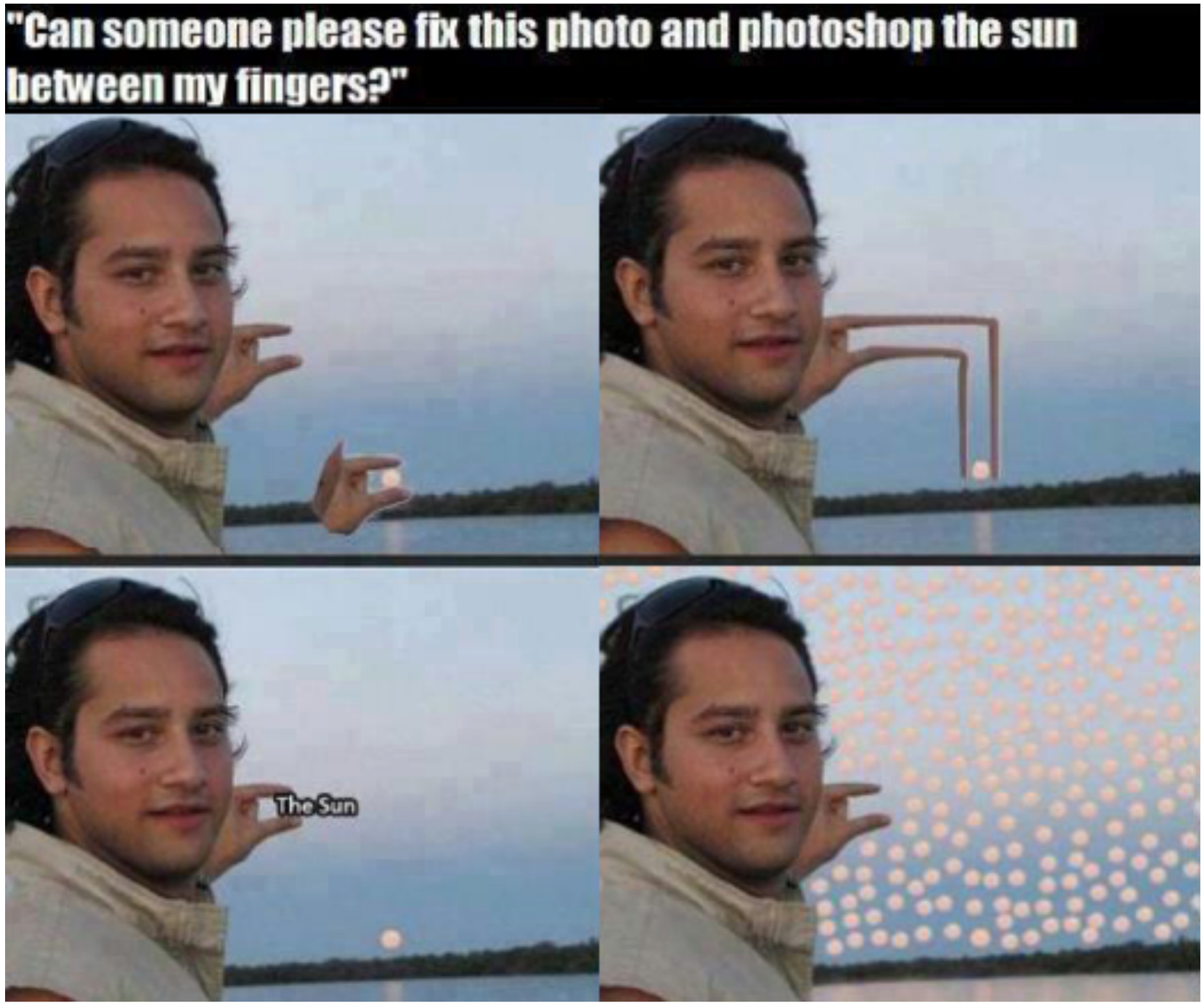
Declare as variáveis D e E.

$$D = \begin{bmatrix} \begin{bmatrix} 10 & 20 & 30 \\ 10 & 20 & 30 \\ 10 & 20 & 30 \end{bmatrix} \\ \begin{bmatrix} 3 & 2 & 7 \\ 1.5 & 4 & 9 \\ 0.7 & 10 & 100 \end{bmatrix} \end{bmatrix}$$

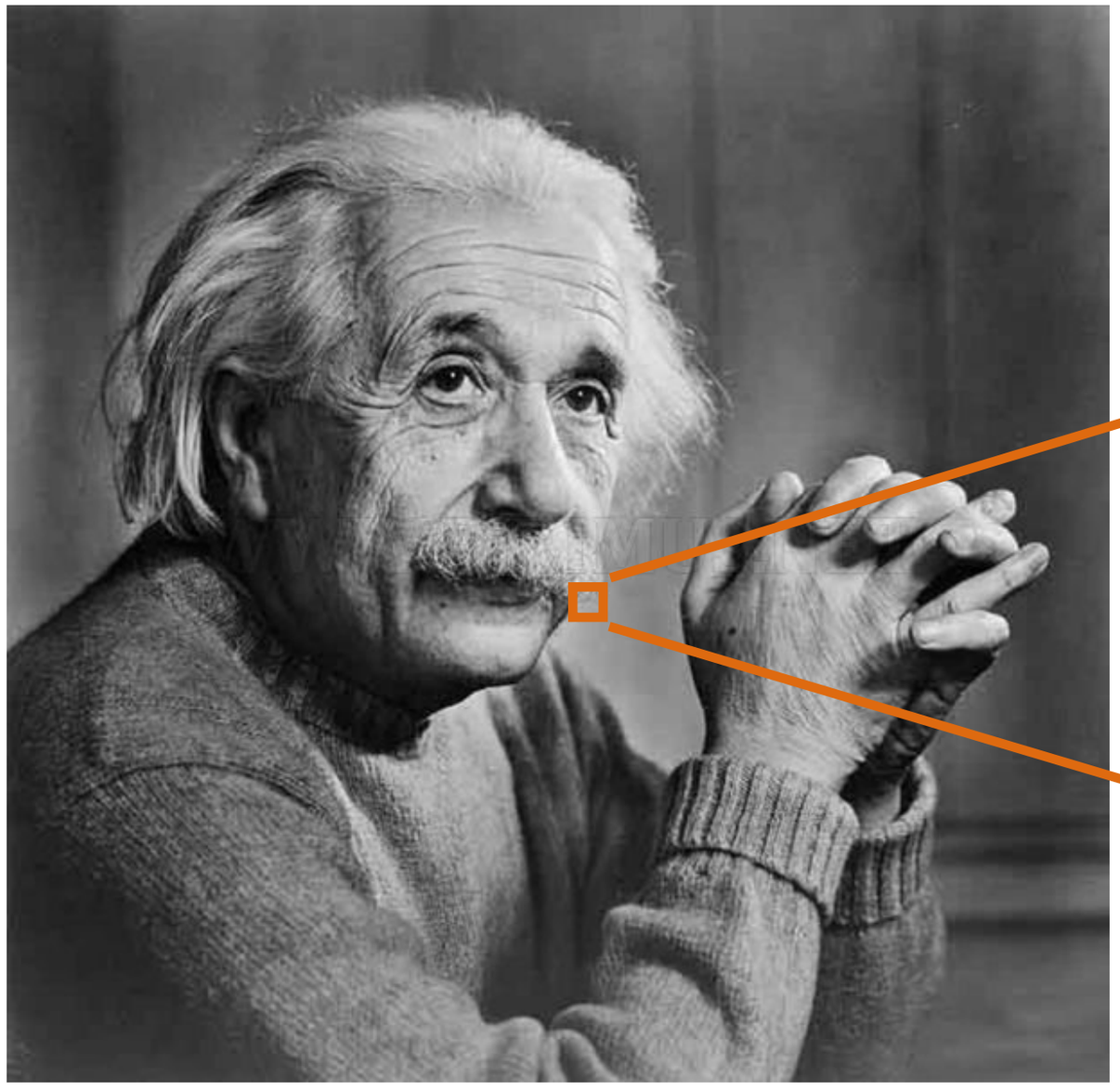
Concatene D e E na horizontal. Depois, na vertical. Depois, uma atrás da outra (DICA: crie outra matriz).

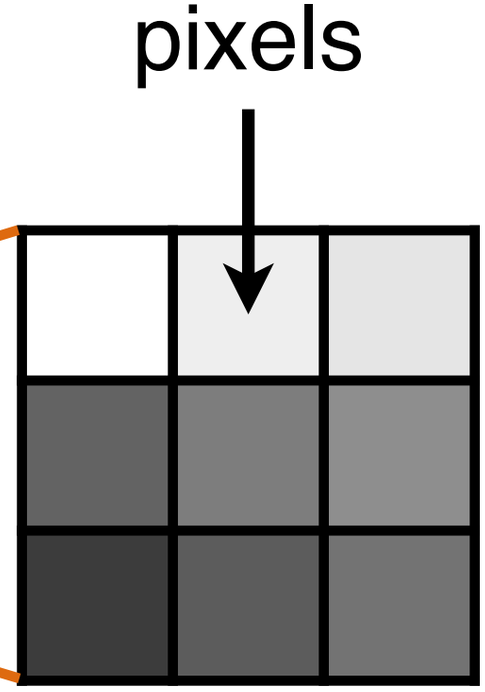
$E =$ matriz 3x3x2 de 11s

Exercício 02 B



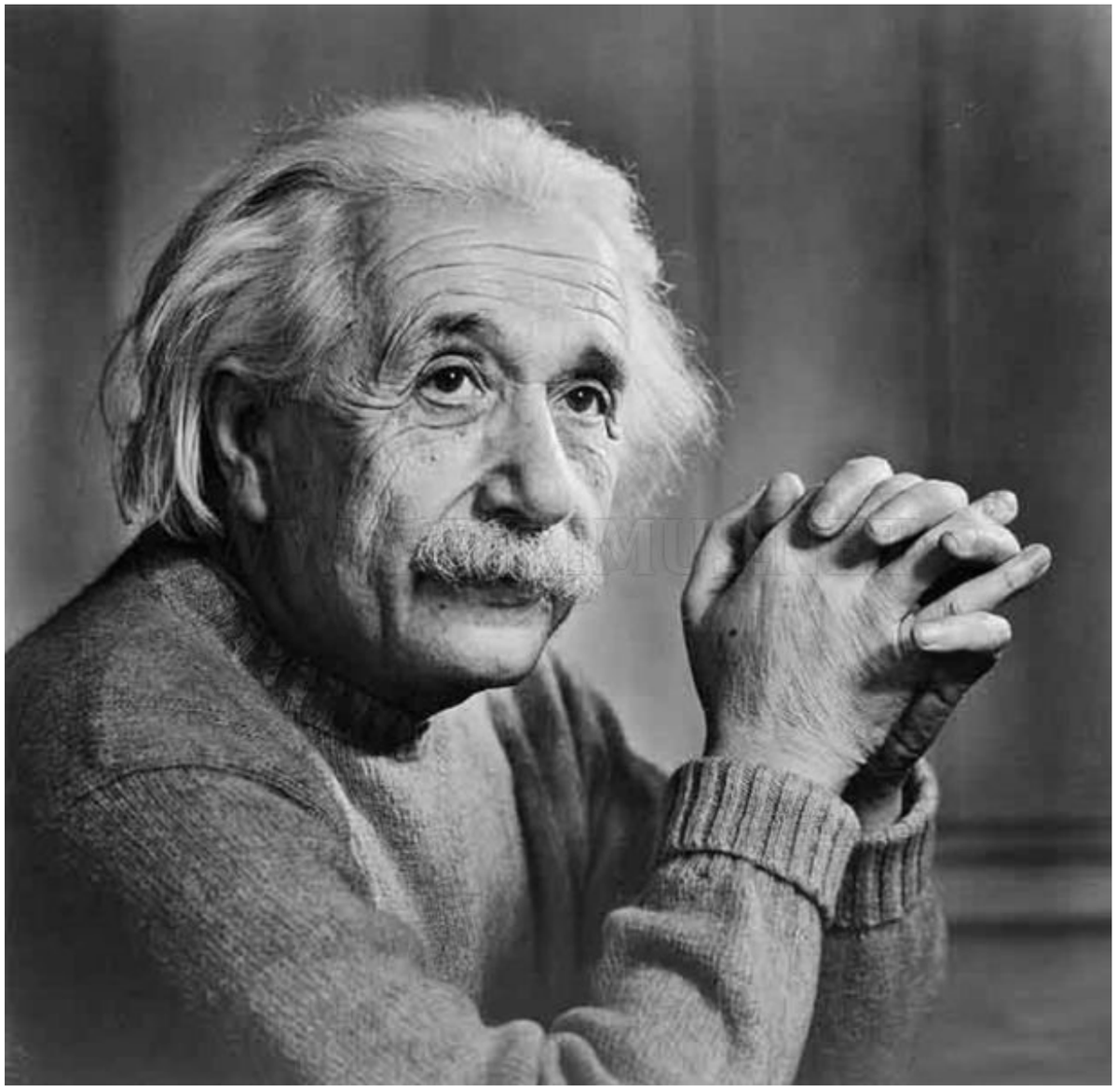
Processamento de Imagens





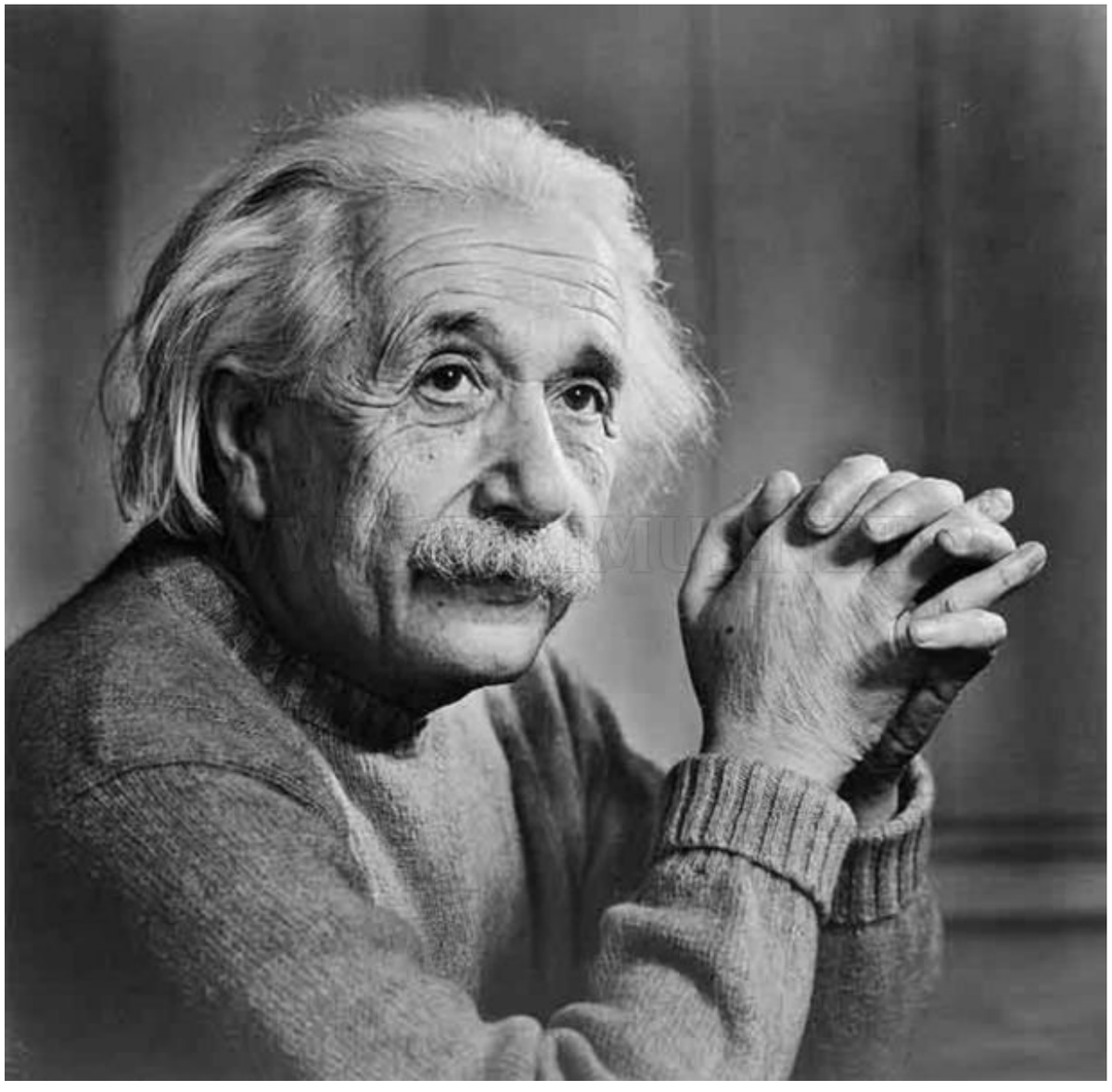
0 255

Representação de uma Imagem no Computador



$$=\begin{bmatrix} 100 & 98 & 85 & 84 \\ 124 & 190 & 213 & 242 \\ \dots & \dots & \dots & 93 \\ 0 & 36 & 41 & 56 \end{bmatrix}$$

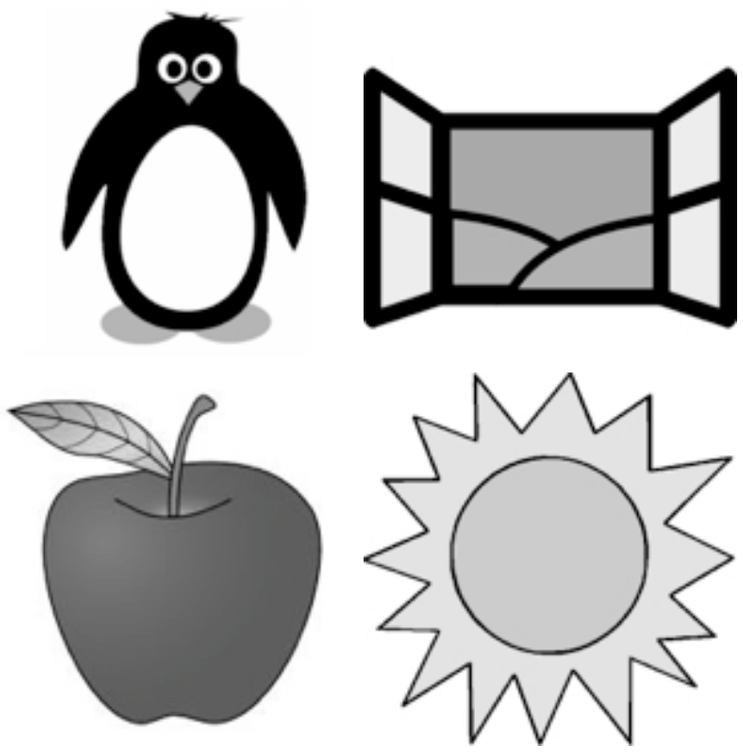
Representação de uma Imagem no Computador

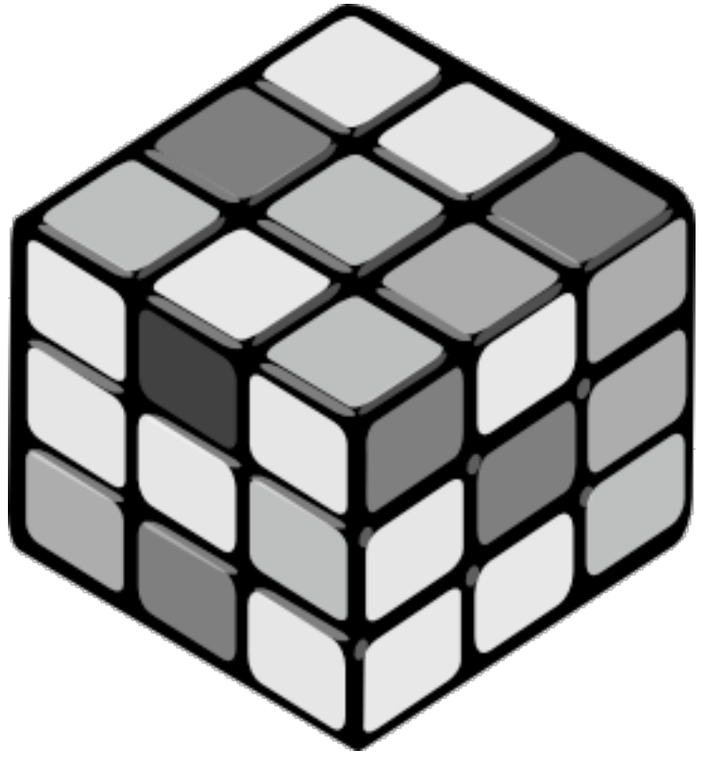


=

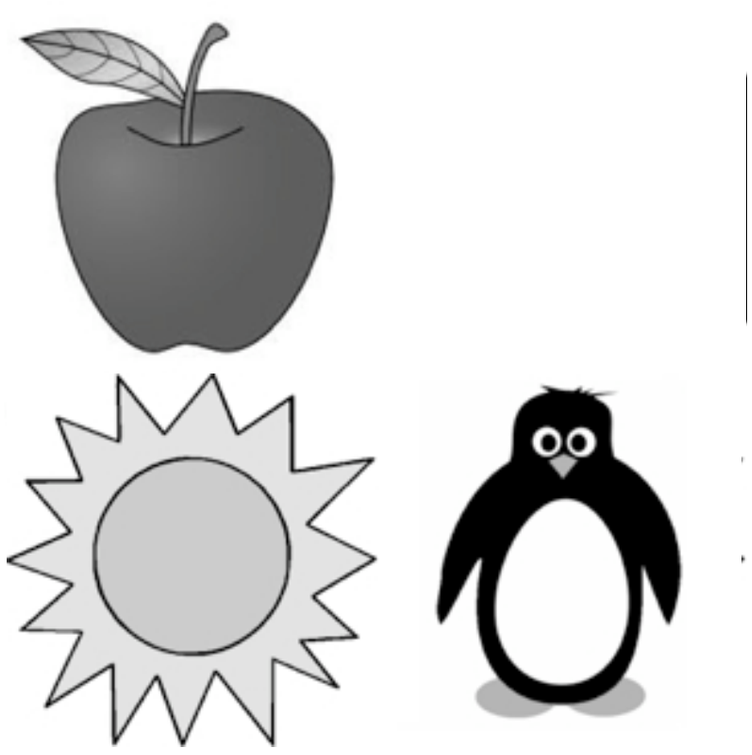
matriz

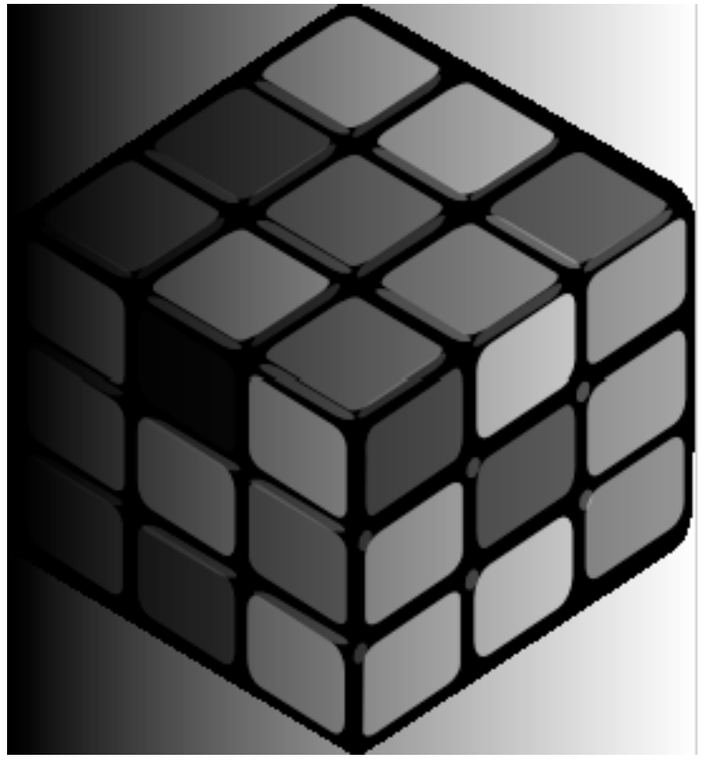
Representação de uma Imagem no Computador





Exercício B: Estado Inicial das Imagens

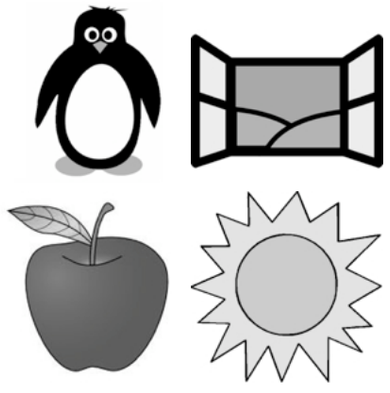
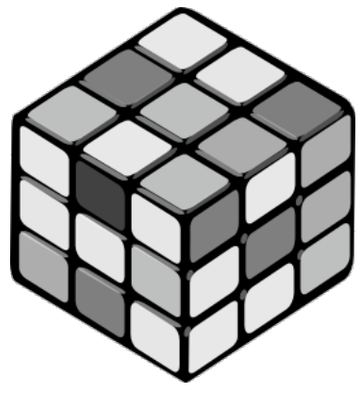
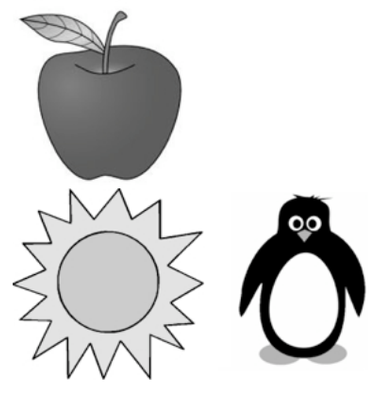
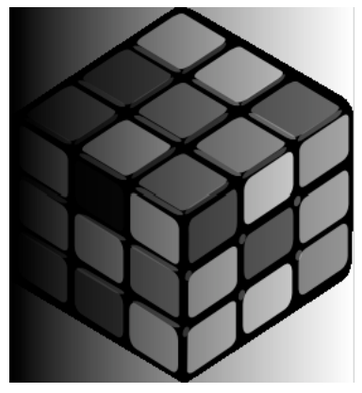




Exercício B: Estado Final das Imagens

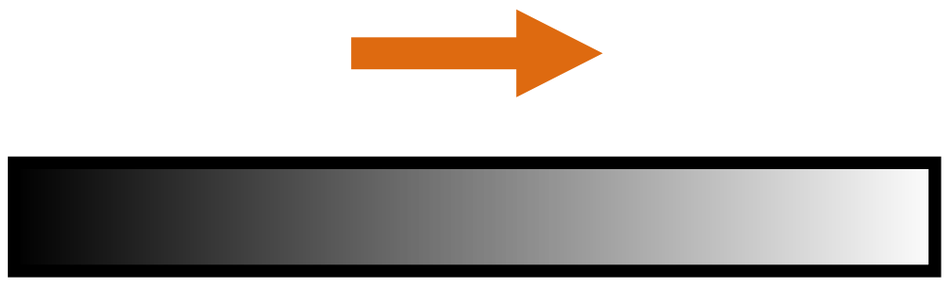




Exercício B: Transformação de Imagens

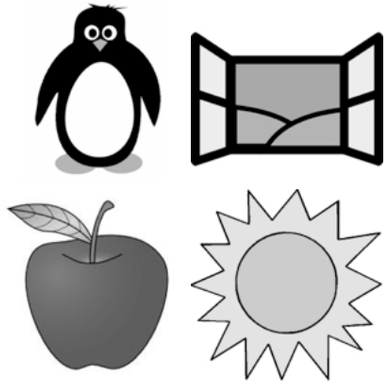
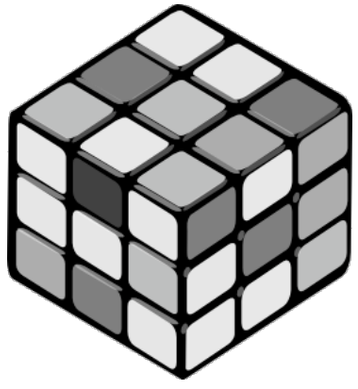
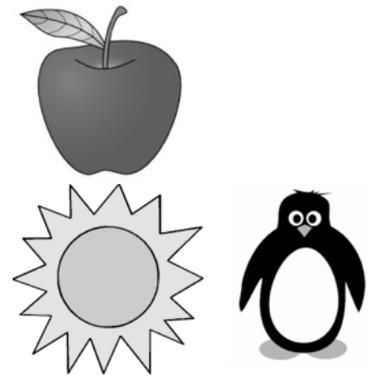
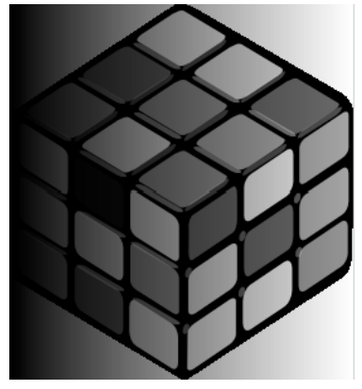
aumentar brilho = aumentar valores



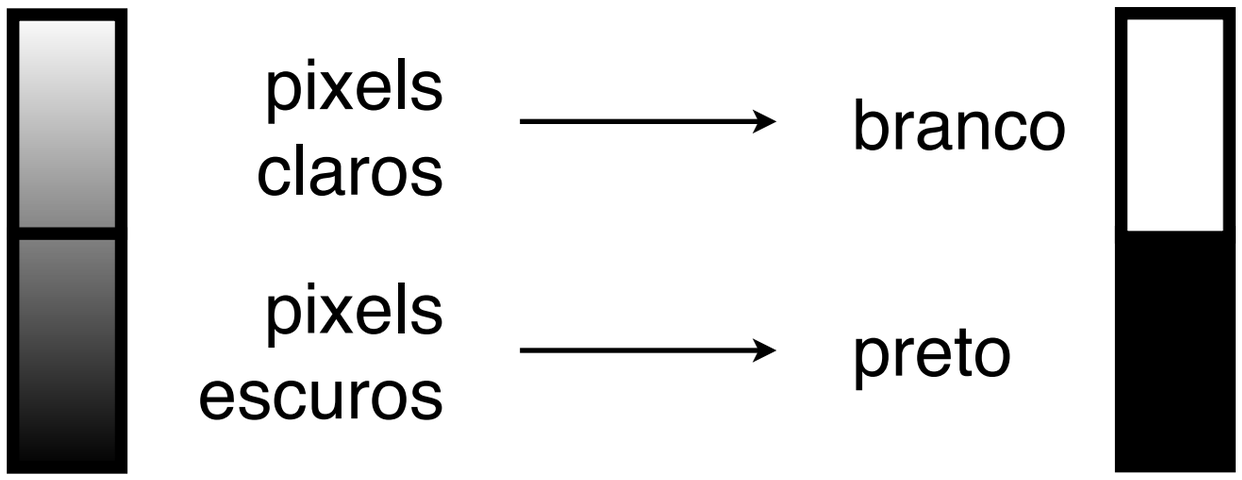
Exercício B: Parte 1



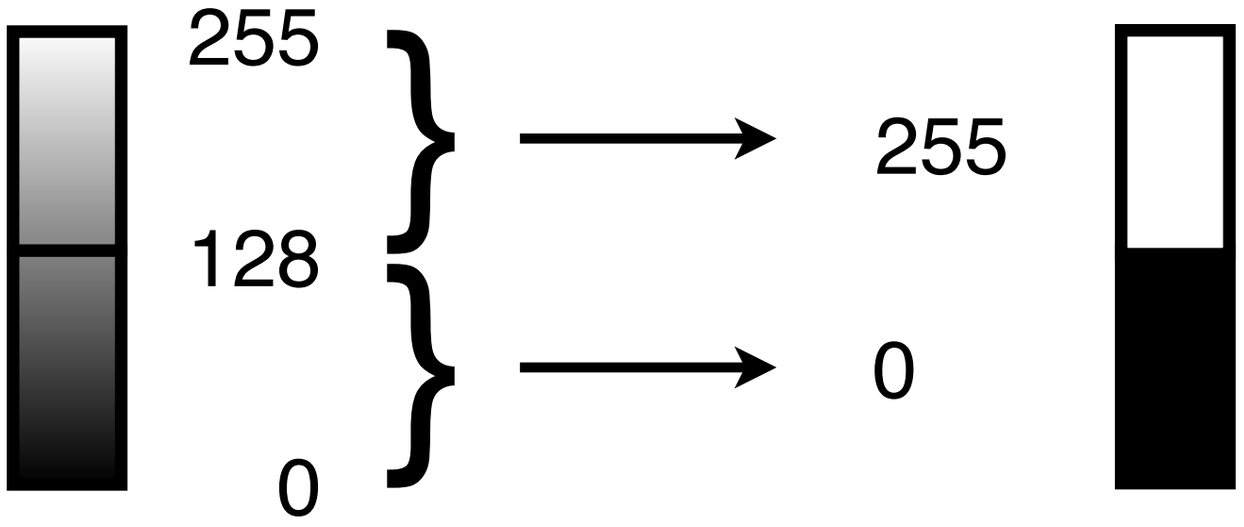


Exercício B: Antes x Depois



Exercício B: Parte 2

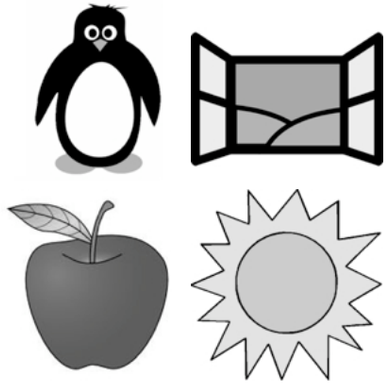
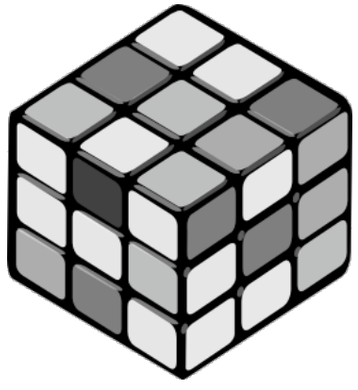
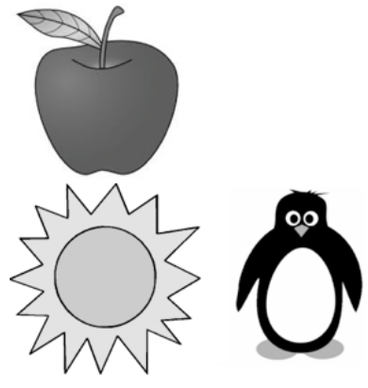
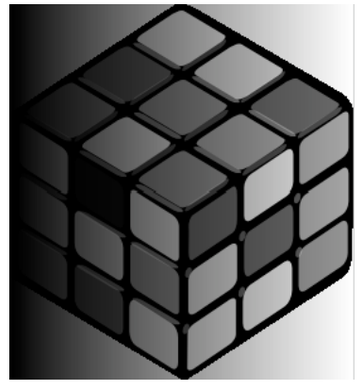


usar função “find” para achar valores “claros” e “escuros”

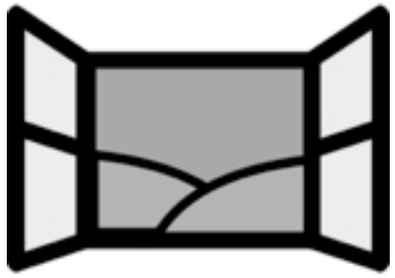
Exercício B: Parte 2

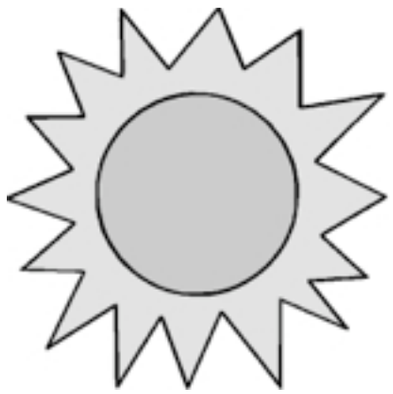


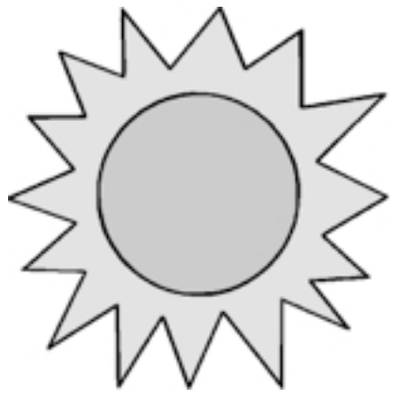


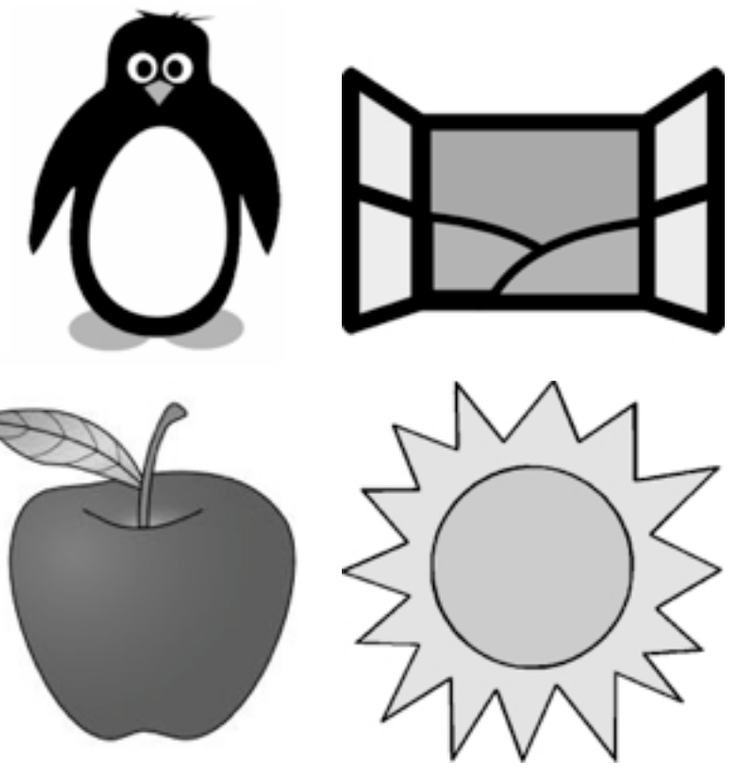
Exercício B: Antes x Depois

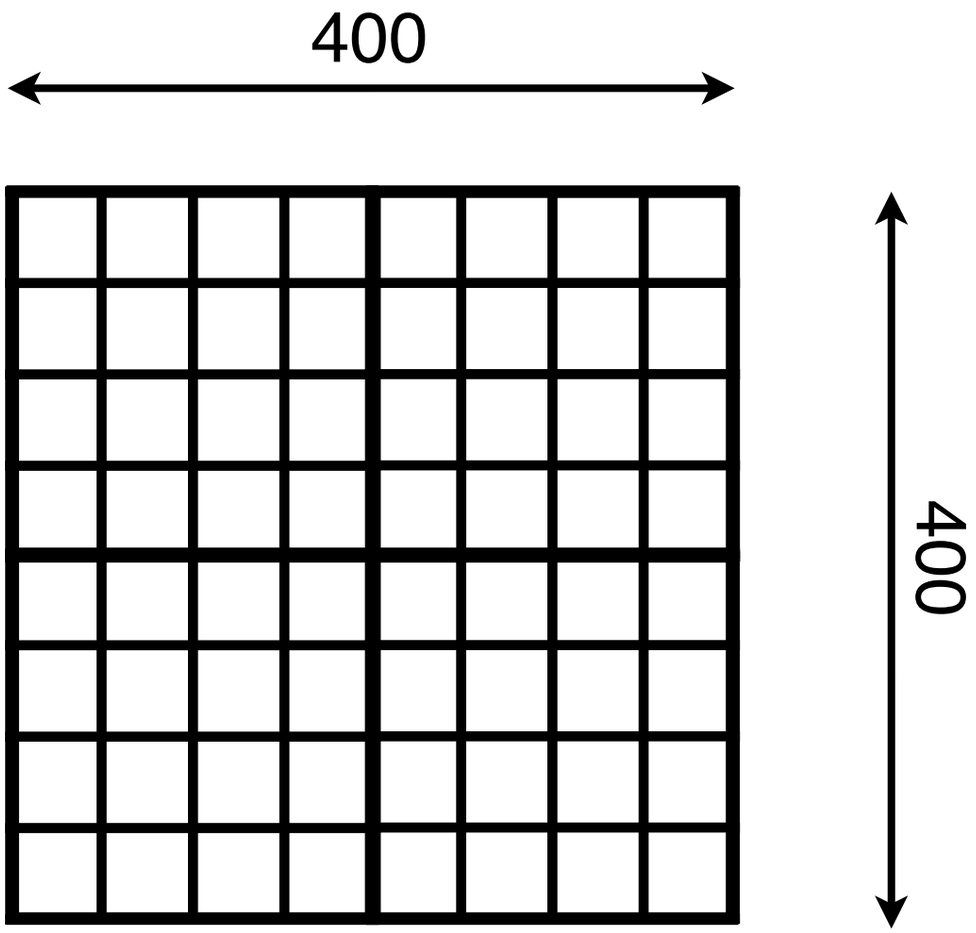




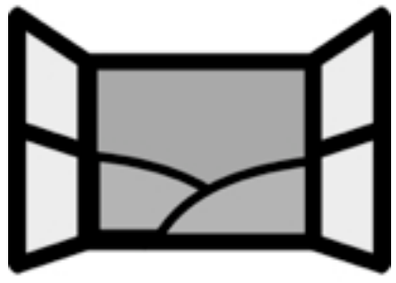


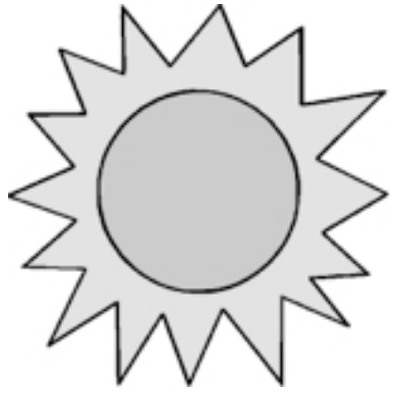
Exercício B: Parte 3





Exercício B: Parte 3





200

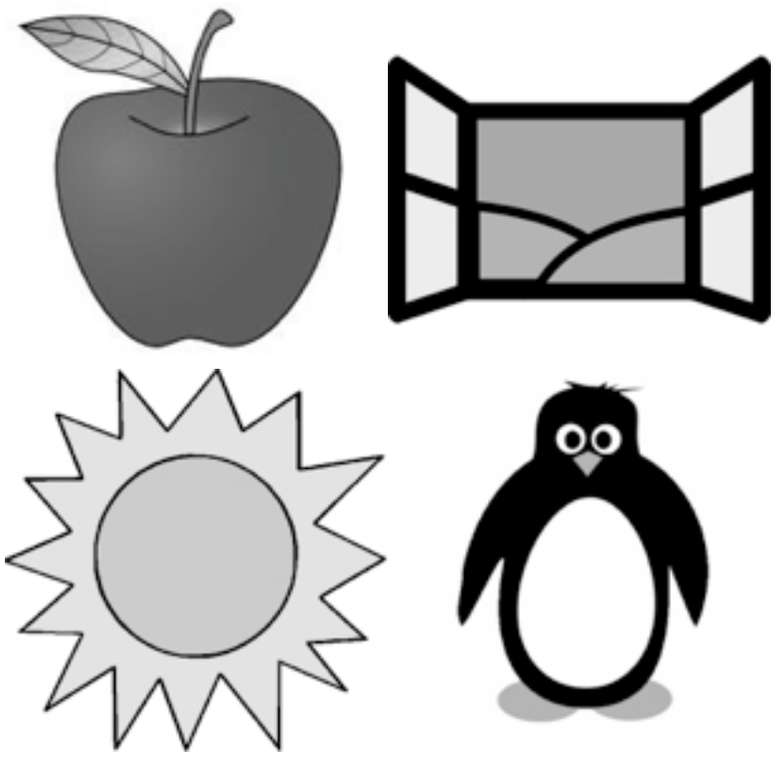
matriz 1 matriz 2

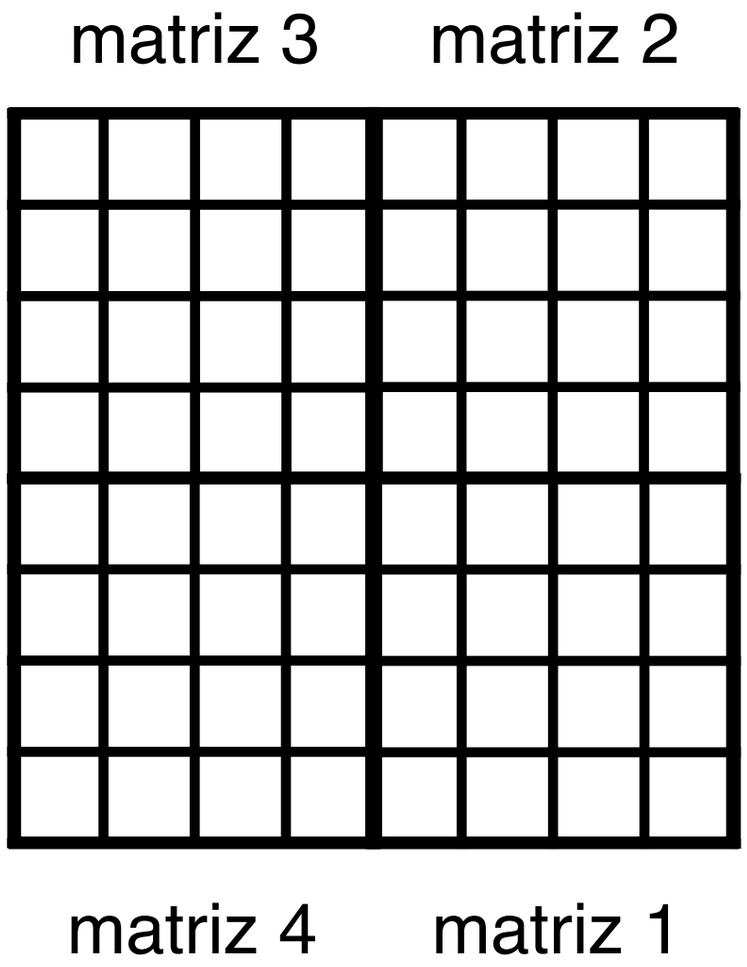
200

matriz 3 matriz 4

criar quatro submatrizes

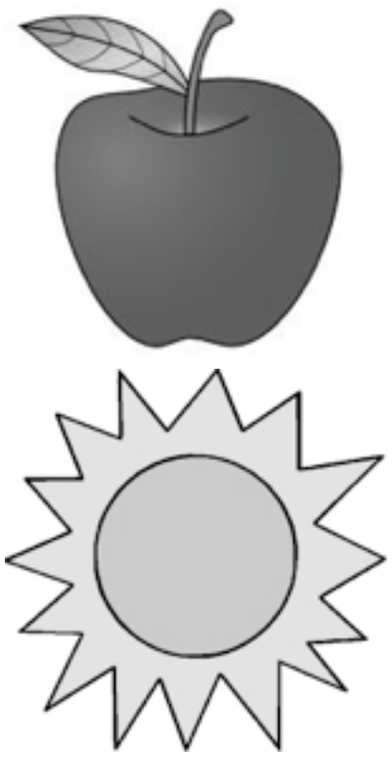
Exercício B: Parte 3





concatenar em uma nova ordem

Exercício B: Parte 3



matriz 3 matriz 2

				255	255	255	255
				255	255	255	255
				255	255	255	255
				255	255	255	255

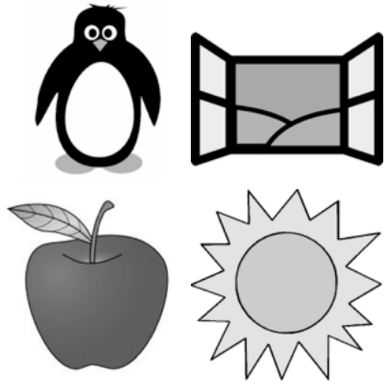
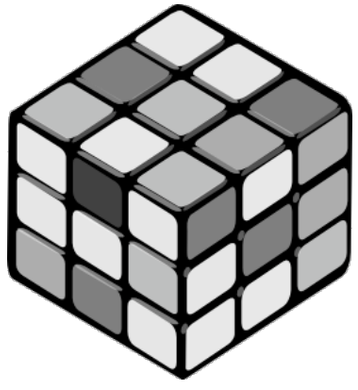
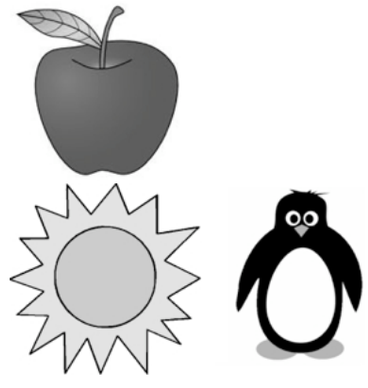
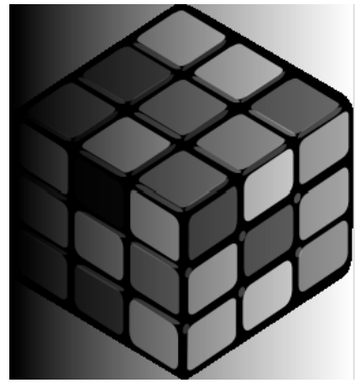
matriz 4 matriz 1

alterar elementos

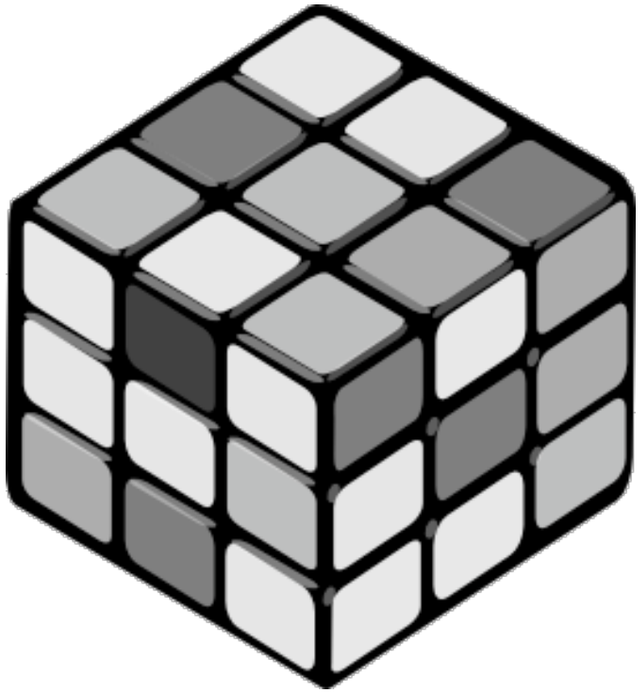
Exercício B: Parte 3

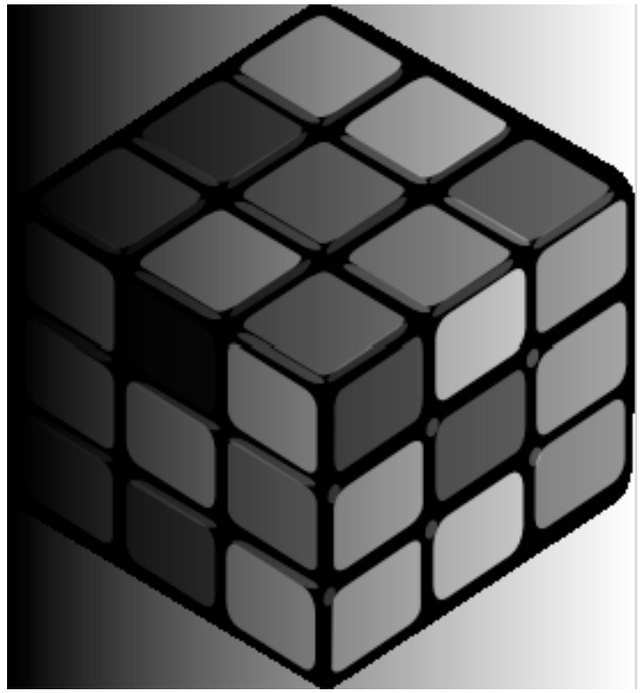


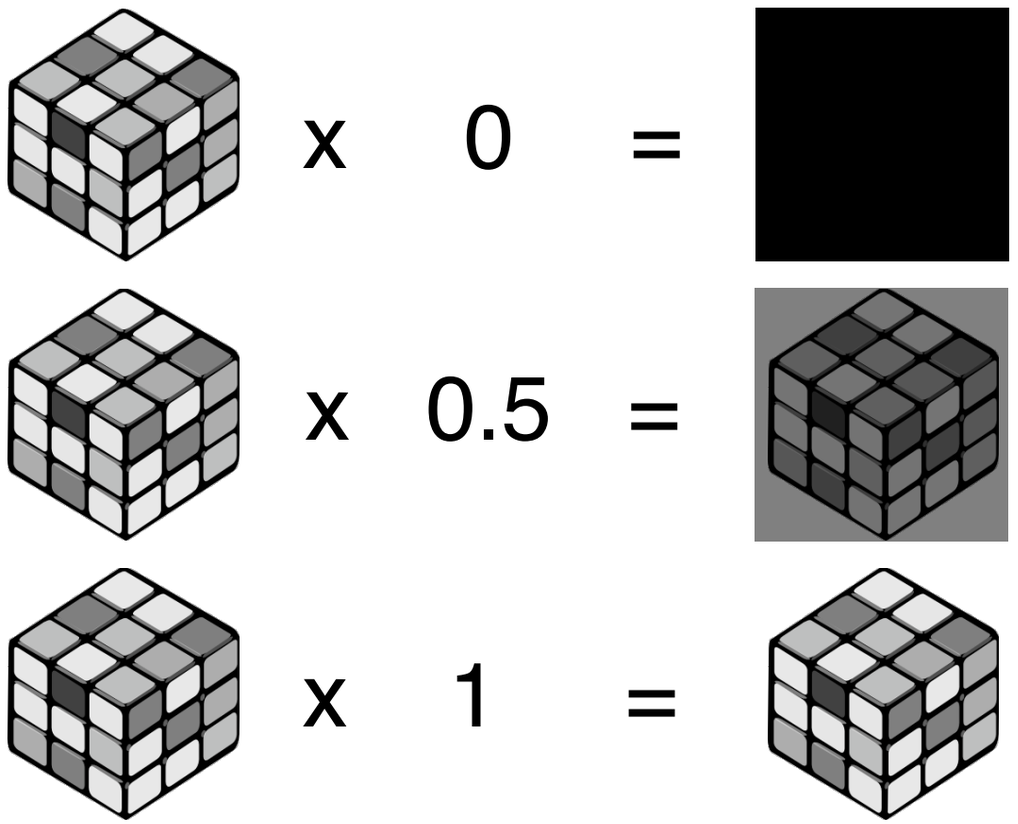


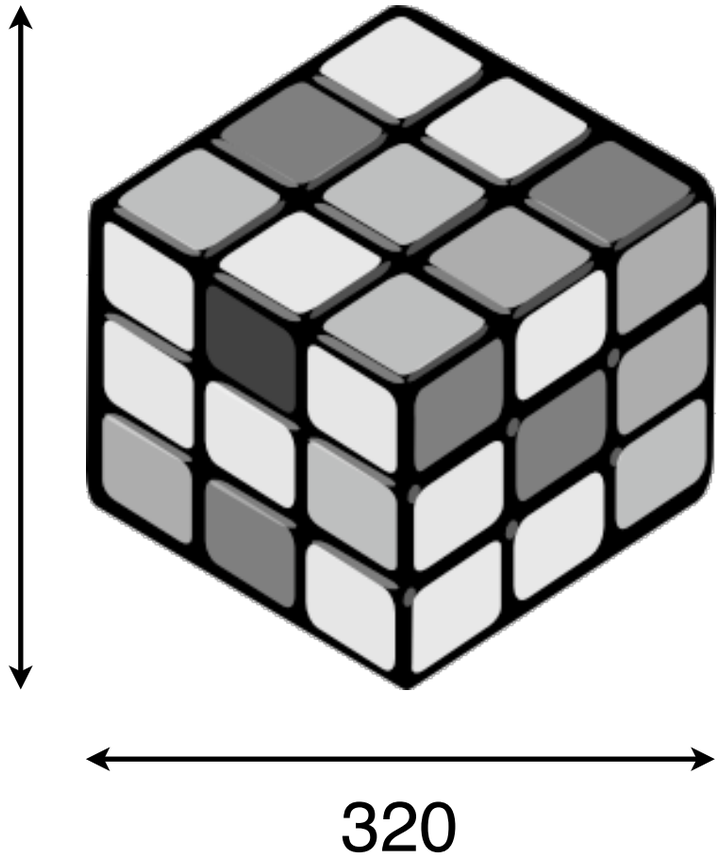
Exercício B: Antes x Depois



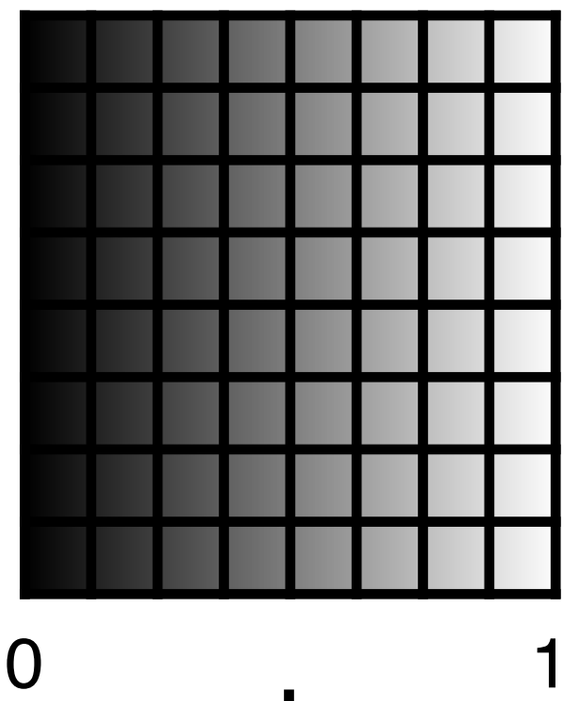




Exercício B: Parte 4



x



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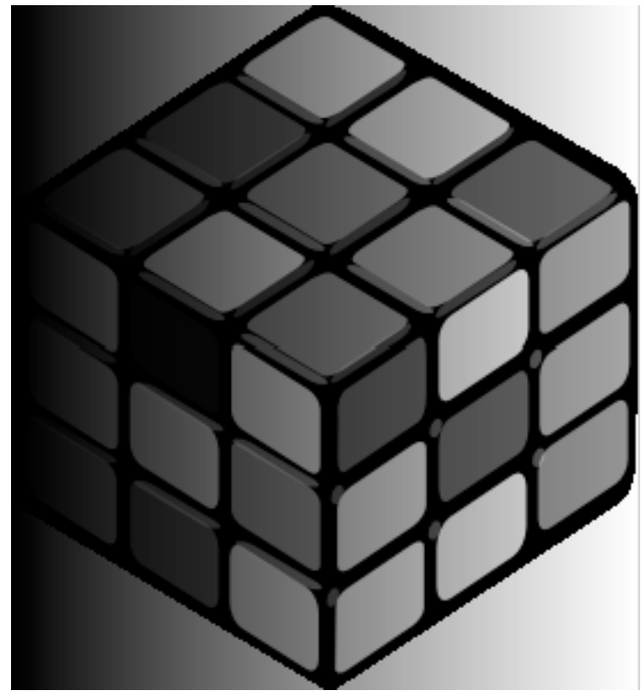

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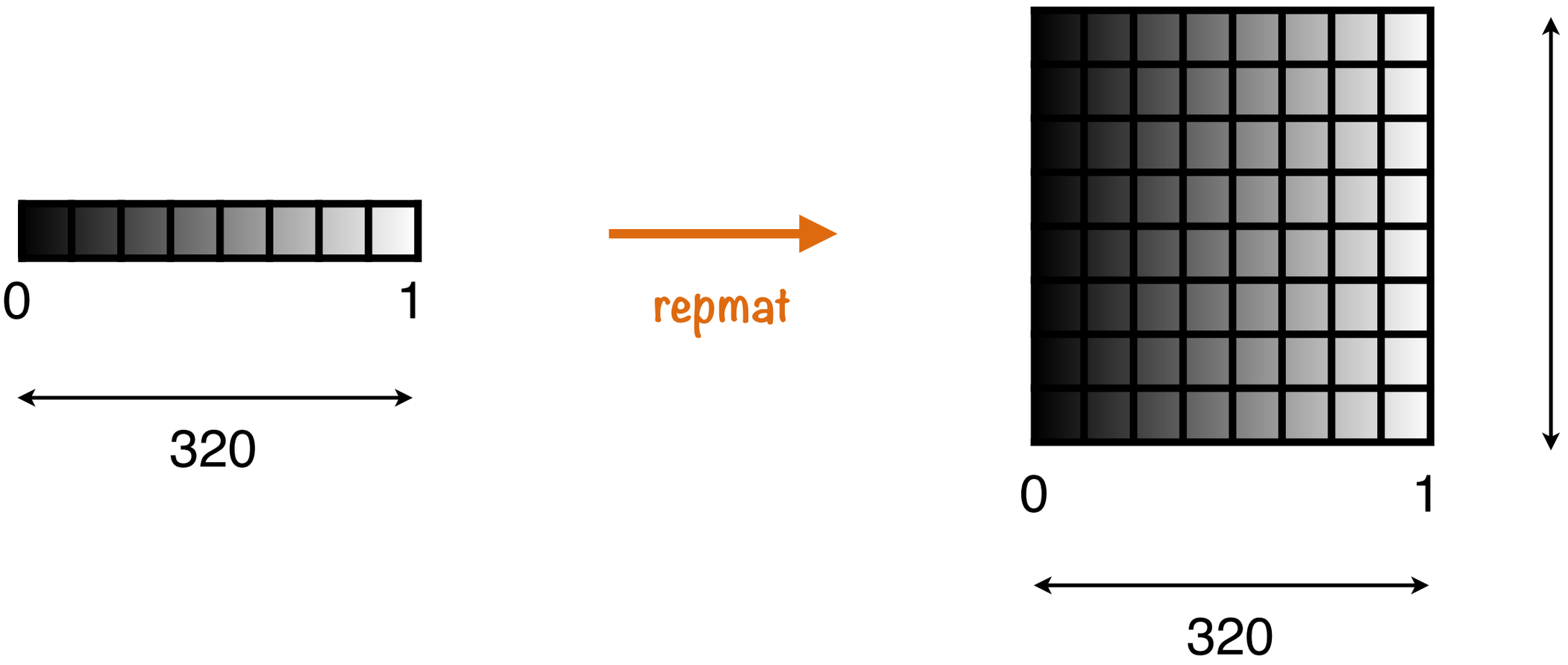
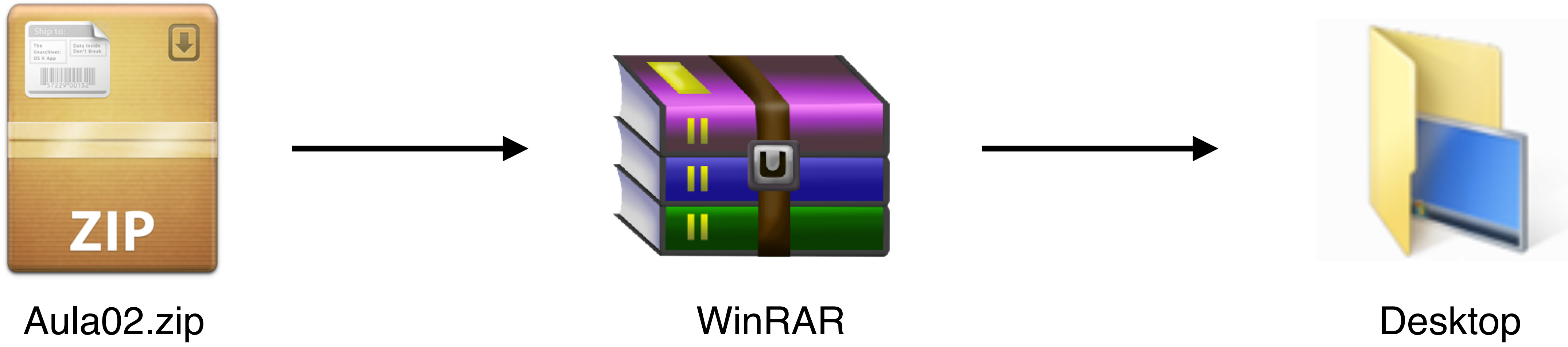
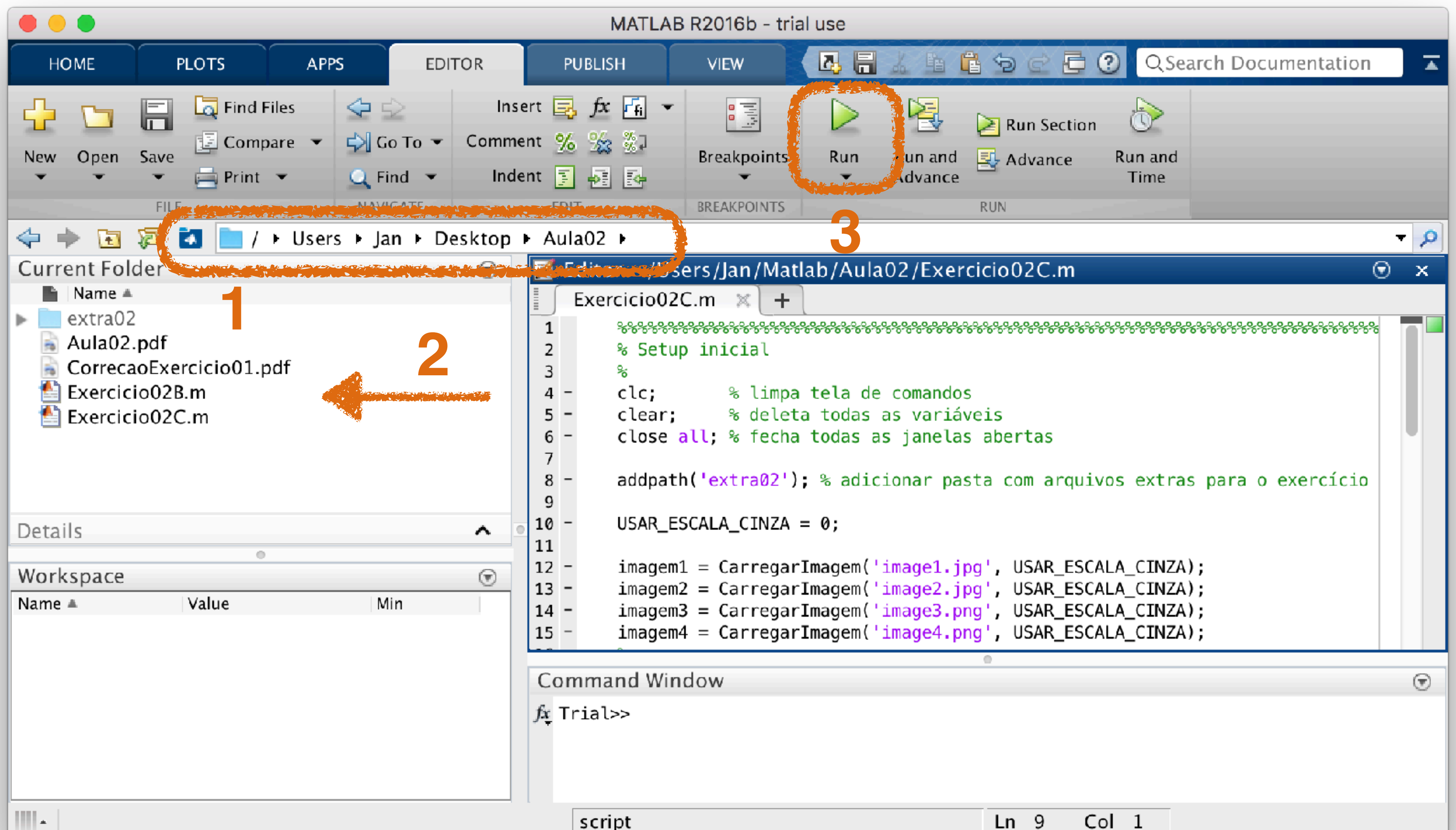
Exercício B: Parte 4



Exercício B: Parte 4





Preparativos para o Exercício B

Editor - /Users/Jan/Matlab/Aula02/Exercicio02B.m

Exercicio02B.m

```
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
% Setup inicial
%
clc ;       % limpa tela de comandos
clear ;     % deleta todas as variáveis
close all ; % fecha todas as janelas abertas

addpath('extra02'); % adicionar pasta com arquivos extras para o exercício

USAR_ESCALA_CINZA = 1;

imagem1 = CarregarImagem('image1.jpg', USAR_ESCALA_CINZA);
imagem2 = CarregarImagem('image2.jpg', USAR_ESCALA_CINZA);
imagem3 = CarregarImagem('image3.png', USAR_ESCALA_CINZA);
imagem4 = CarregarImagem('image4.png', USAR_ESCALA_CINZA);
%
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%

%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
% COLOQUE O SEU CÓDIGO AQUI!
%

% Aumente o brilho da Imagem 1
novaImagem1 = imagem1;

% Converta os pixels para branco/preto na Imagem 2
novaImagem2 = imagem2;

% Divida a Imagem 3 em 4 partes, reordene-as e apague a janela.
novaImagem3 = imagem3;

% Aplique uma sombra na Imagem 4
novaImagem4 = imagem4;

%
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%

%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
```

Arquivo Exercicio02B.m

Exercício 02 B

Aumente o brilho da Imagem 1.
↳ DICA: aumente os valores da matriz.

Converta os pixels para preto/branco na Imagem 2.
↳ DICA: use a função find.

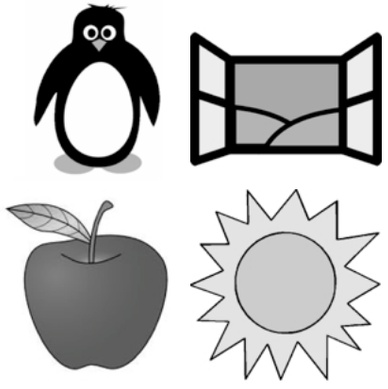
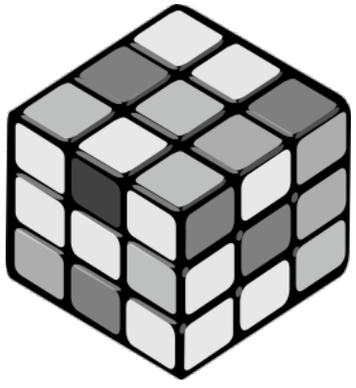
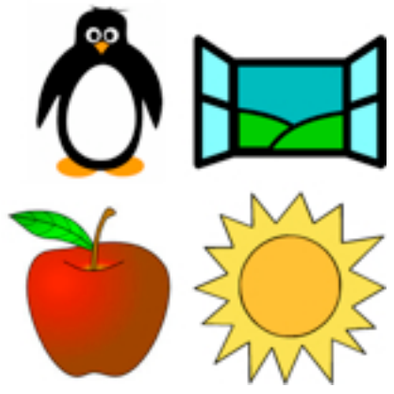
Divida a Imagem 3 em 4 partes, reordene-as e apague a janela.
↳ DICA: use indexação, concatenação e substituição.

Aplique uma sombra horizontal na Imagem 4.
↳ DICA: crie uma matriz de sombra usando a função repmat e a multiplicação entre elementos.

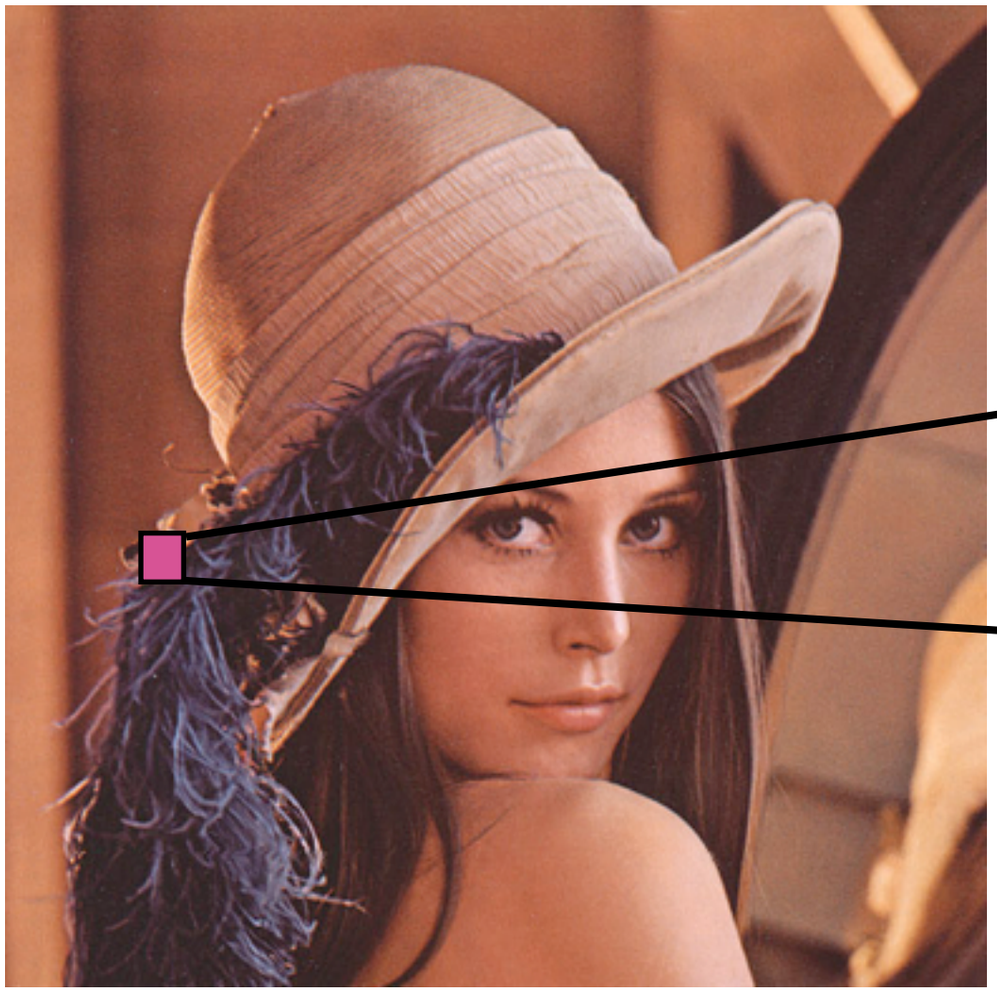
Exercício 02 C





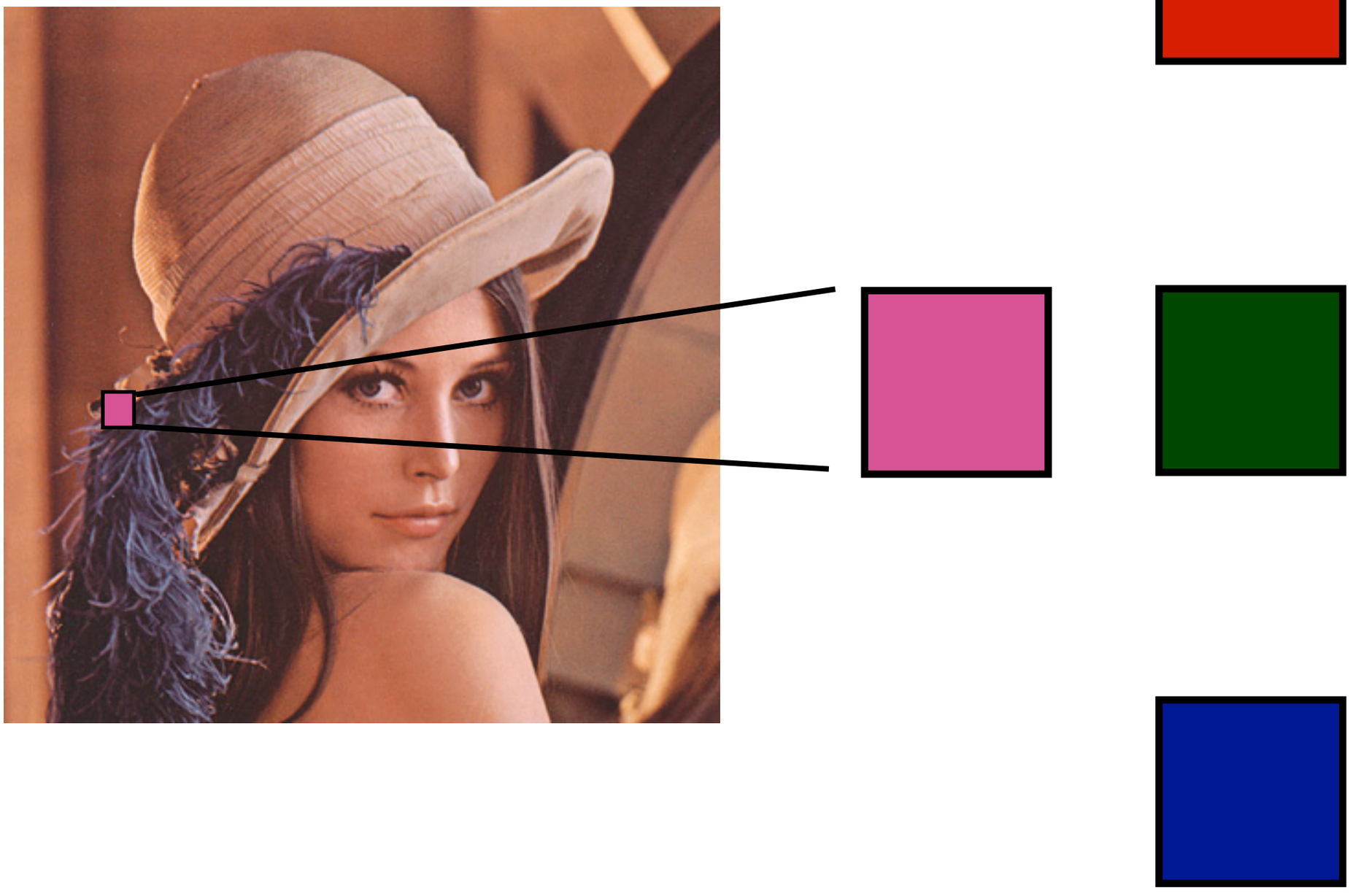





Imagens em Preto e Branco vs Coloridas



= número?

Representação de Imagens Coloridas no Computador



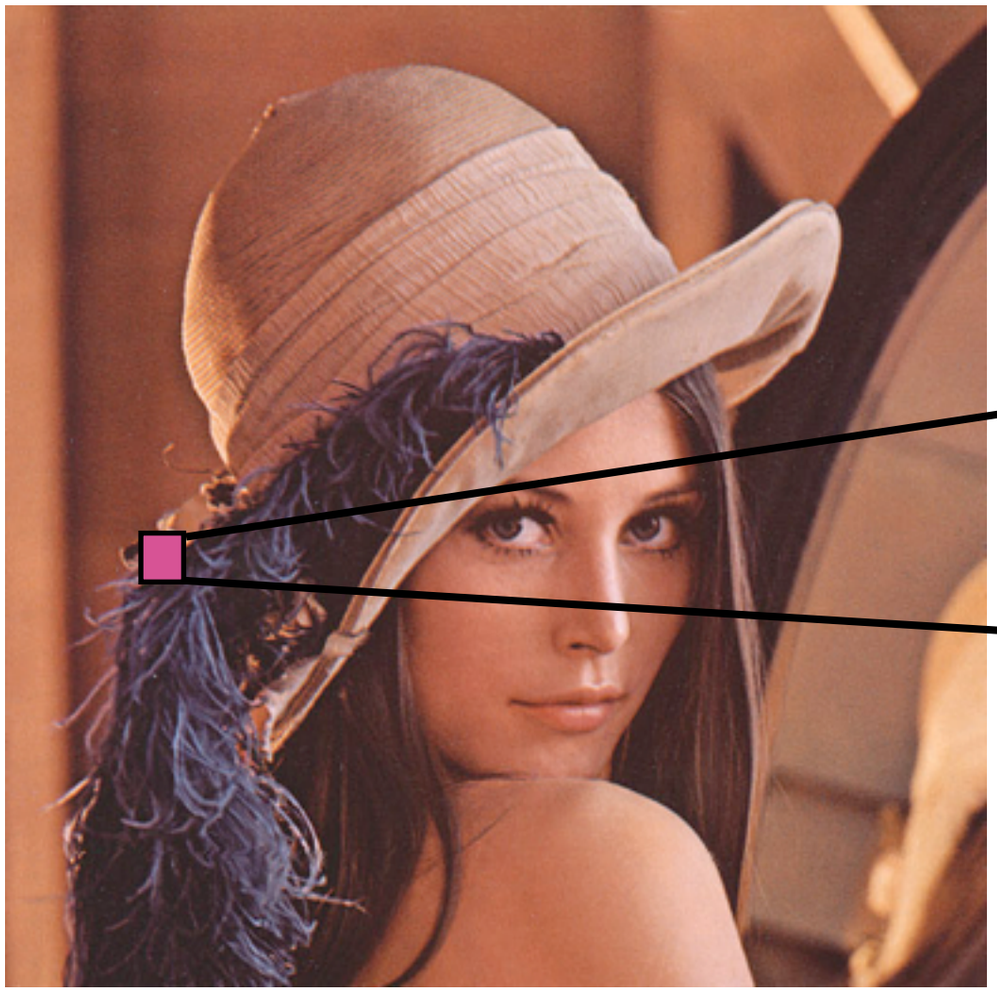
Representação de Imagens Coloridas no Computador

0 255

0 255

0 255

Escala RGB (Red, Green, Blue)



= número

= número

= número

Representação de Imagens Coloridas no Computador

= matriz?

Representação de Imagens Coloridas no Computador

Representação de Imagens Coloridas no Computador

$$\begin{bmatrix} 70 & \dots & 134 \\ \dots & \dots & \dots \\ 255 & \dots & 0 \end{bmatrix}$$

$$\begin{bmatrix} 76 & \dots & 32 \\ \dots & \dots & \dots \\ 13 & \dots & 30 \end{bmatrix}$$

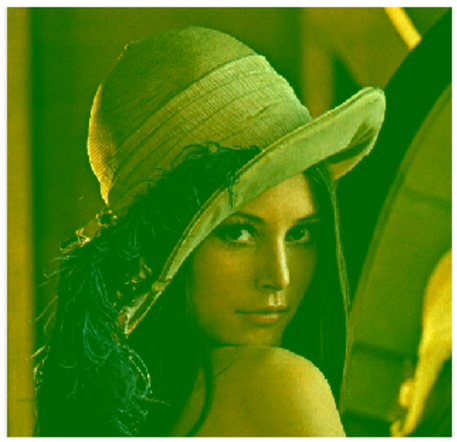
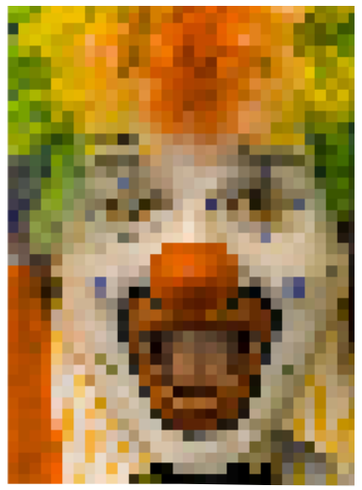
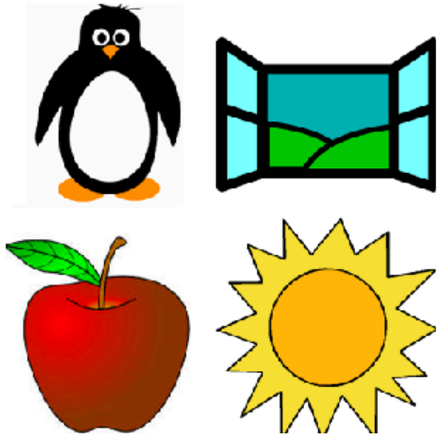
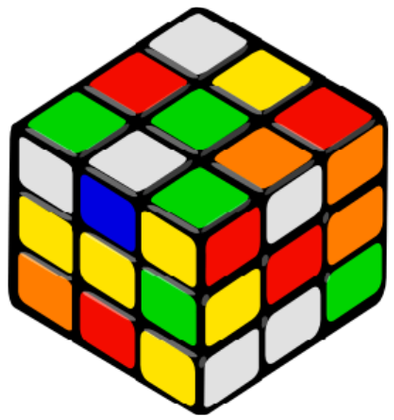
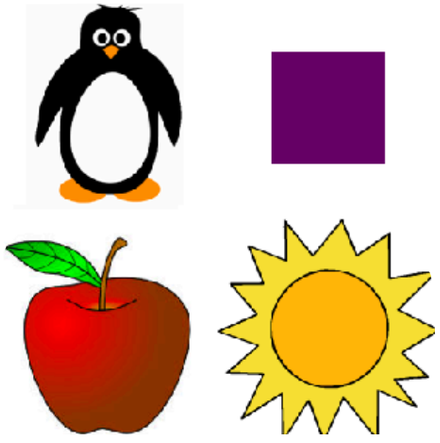
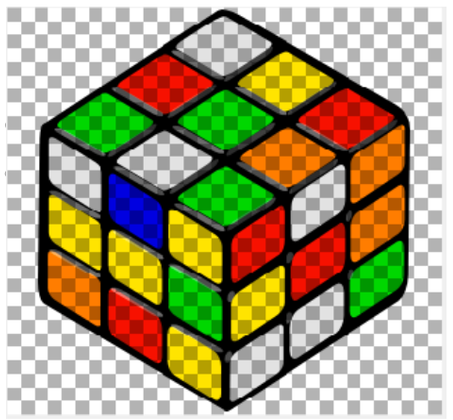
$$\begin{bmatrix} 100 & \dots & 20 \\ \dots & \dots & \dots \\ 0 & \dots & 10 \end{bmatrix}$$

Representação de Imagens Coloridas no Computador

= matriz tridimensional

Representação de Imagens Coloridas no Computador



Exercício C: Novas Edições nas Imagens Coloridas

Editor - /Users/Jan/Matlab/Aula02/Exercicio02C.m

Exercicio02C.m

```
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
% Setup inicial
%
clc;       % limpa tela de comandos
clear;     % deleta todas as variáveis
close all; % fecha todas as janelas abertas

addpath('extra02'); % adicionar pasta com arquivos extras para o exercício

USAR_ESCALA_CINZA = 0;

imagem1 = CarregarImagem('image1.jpg', USAR_ESCALA_CINZA);
imagem2 = CarregarImagem('image2.jpg', USAR_ESCALA_CINZA);
imagem3 = CarregarImagem('image3.png', USAR_ESCALA_CINZA);
imagem4 = CarregarImagem('image4.png', USAR_ESCALA_CINZA);
%
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%

%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
% COLOQUE O SEU CÓDIGO AQUI ABAIXO!
%

% Intensifique a cor verde da Imagem 1
novaImagem1 = imagem1;

% Pixele a Imagem 2
novaImagem2 = imagem2;

% Desenhe um quadrado roxo 100x100 na Imagem 3
novaImagem3 = imagem3;

% Adicione uma marca d'água xadrez na Imagem 4
novaImagem4 = imagem4;

%
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%

%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
```

Arquivo Exercicio02C.m

Exercício 02 C

Intensifique a cor verde da Imagem 1.
↳ DICA: aumente os valores de todas as linhas e colunas da 2ª página da matriz.

Pixele a Imagem 2.
↳ DICA: faça com que a nova imagem tenha apenas um vigésimo das linhas e colunas da original (mas com as três cores).

Desenhe um quadrado roxo 100x100 na Imagem 3.
↳ DICA: roxo = 95 de vermelho, 0 de verde e 95 de azul.

Adicione uma marca d'água xadrez na Imagem 4.
↳ DICA: crie uma nova matriz de sombra usando a função repmat, com quadrados de 10x10 pixels.