Lecture 3: Digital Image Fundamentals

Part 4: Logical Operations

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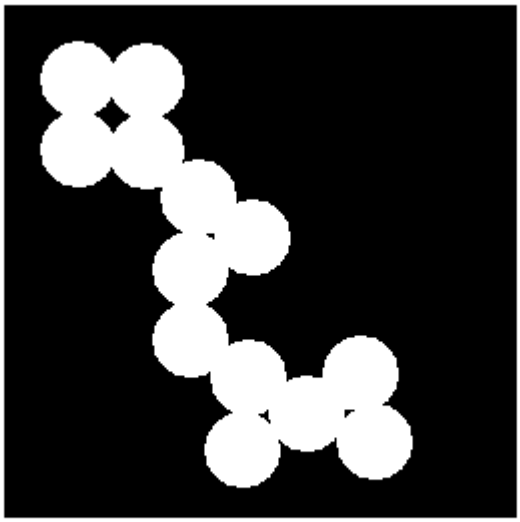
Notes:

- Sample images are available in both Matlab IPT *imdata* folder and *images* folder in the current directory. (You may need to add images folder into your path.)
- Related lecture: Lecture3 - Digital Image Fundamentals
- pdf versions of the .mlx files are also available for those using GNU Octave

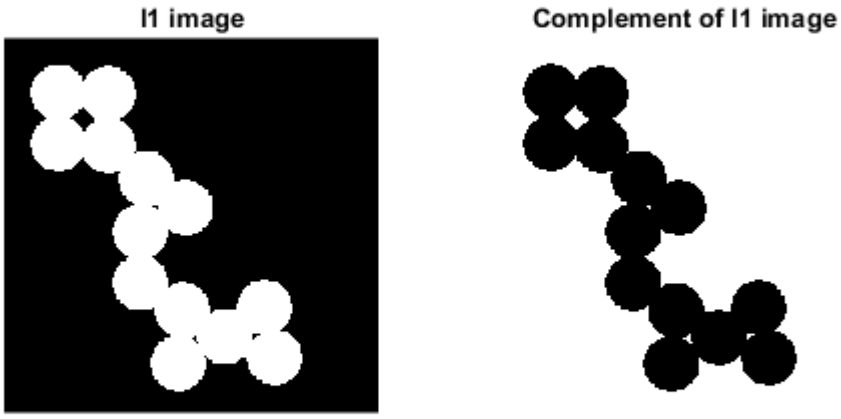
```
% clear workspace variables and close windows
clc, clearvars, close all;
```

```
% read a binary image
I1 = imread('circles.png');
imshow(I1)
```



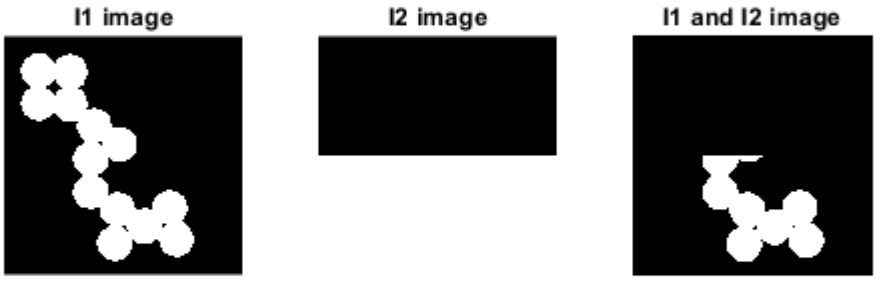
```
% create a binary image of the same size
I2 = ones(size(I1));
I2(1:128,:) = 0;
I2 = logical(I2); % convert to logical type to perform logical operations
imshow(I2)
```

```
% perform logical operations on the images
figure, subplot(1,2,1), imshow(I1), title("I1 image")
subplot(1,2,2), imshow(not(I1)), title("Complement of I1 image")
```

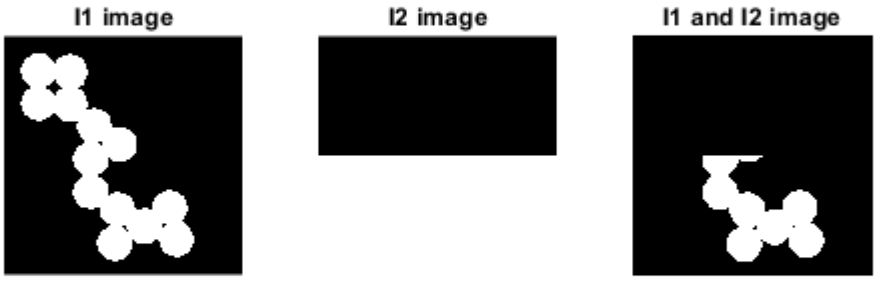


```
% you can use both ~ operator and not()
figure, subplot(1,2,1), imshow(I2), title("I2 image")
subplot(1,2,2), imshow(~I2), title("Complement of I2 image")
```

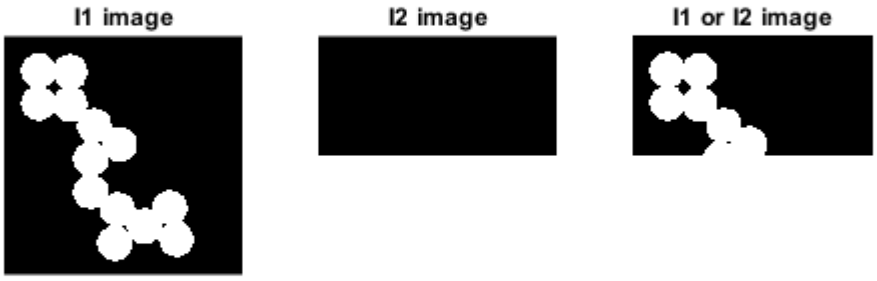

```
figure, subplot(1,3,1), imshow(I1), title("I1 image")
subplot(1,3,2), imshow(I2), title("I2 image")
subplot(1,3,3), imshow(and(I1,I2)), title("I1 and I2 image")
```



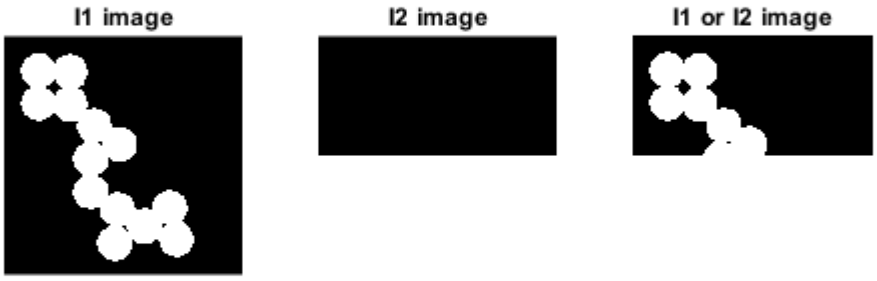

```
figure, subplot(1,3,1), imshow(I1), title("I1 image")
subplot(1,3,2), imshow(I2), title("I2 image")
subplot(1,3,3), imshow(I1&I2), title("I1 and I2 image")
```



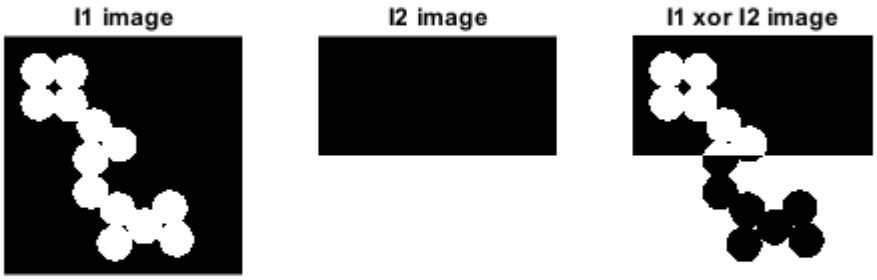

```
figure, subplot(1,3,1), imshow(I1), title("I1 image")
subplot(1,3,2), imshow(I2), title("I2 image")
subplot(1,3,3), imshow(or(I1,I2)), title("I1 or I2 image")
```




```
figure, subplot(1,3,1), imshow(I1), title("I1 image")
subplot(1,3,2), imshow(I2), title("I2 image")
subplot(1,3,3), imshow(I1|I2), title("I1 or I2 image")
```




```
figure, subplot(1,3,1), imshow(I1), title("I1 image")
subplot(1,3,2), imshow(I2), title("I2 image")
subplot(1,3,3), imshow(xor(I1,I2)), title("I1 xor I2 image")
```


I1 image
I2 image
I1 xor I2 image