Lab 5

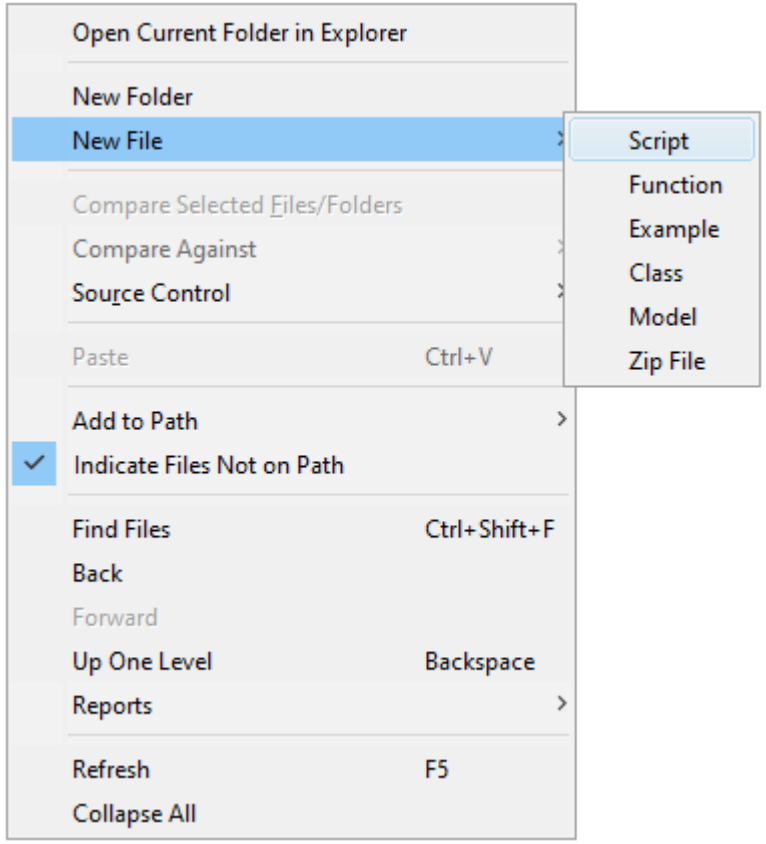
CPS592 – Visual Computing and Mixed Reality

Preparation

- Open MATLAB
- Create Lab5 folder
- Copy *autumn.jpg* and *spring.jpg* to Lab5 folder

Create script file for Lab 5

- Create Lab5.m script



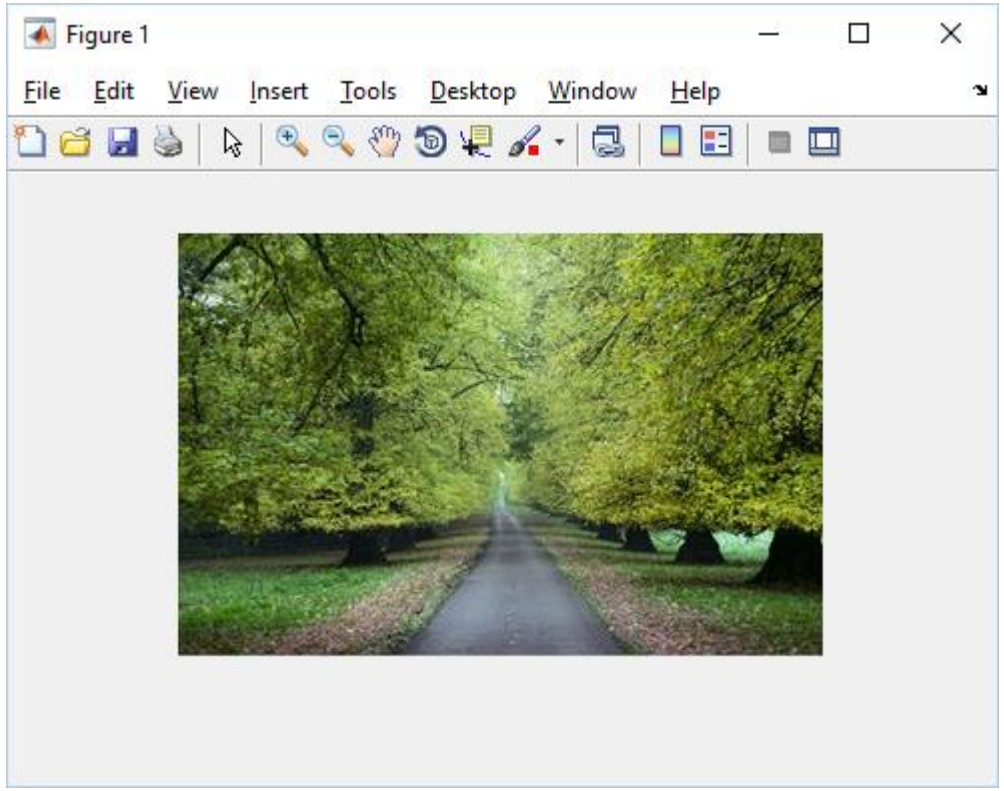
Read the images

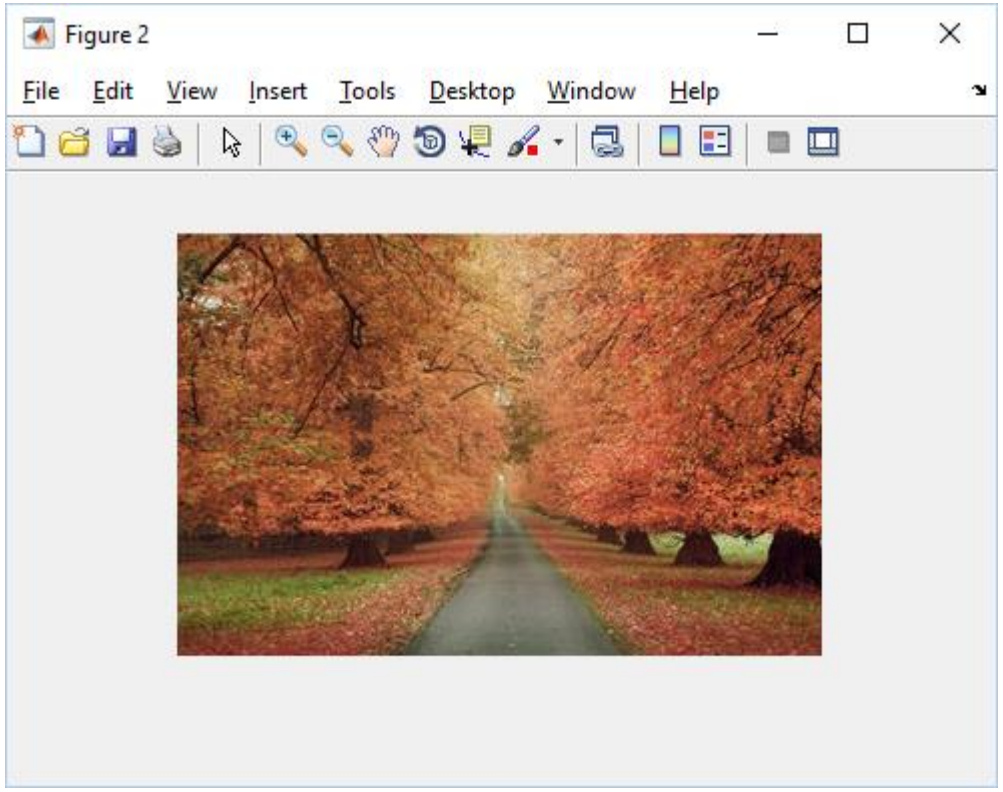
```
close all;
clear all;
clc;

img_source = imread('spring.jpg');
img_target = imread('autumn.jpg');
```

Display the images

figure, imshow(img_source);

figure, imshow(img_target);





Color Transfer: Recall

- Transfer to new color space
- Compute mean and standard deviation along each color axis
- Shift and scale the source image to have same statistics as the target image

Only one equation

$$C' = \frac{\sigma_t}{\sigma_s}(C_s - \mu_s) + \mu_t$$

- Where
  - C' = new color
  - C_s = old color
  - σ_t = SD of target image
  - σ_s = SD of source image
  - μ_t = mean of target image
  - μ_s = mean of source image

Transform RGB to LAB

```
img_source_lab = rgb2lab(img_source);
img_target_lab = rgb2lab(img_target);
```

Compute mean and sd of each color channel

```
for c = 1:3
   temp = img_source_lab(:,:,c);
   mean_source = mean(temp(:));
   sd_source = std(temp(:));

end
```

Compute mean and sd of each color channel

```
for c = 1:3
   temp = img_source_lab(:,:,c);
   mean_source = mean(temp(:));
   sd_source = std(temp(:));

   temp = img_target_lab(:,:,c);
   mean_target = mean(temp(:));
   sd_target = std(temp(:));

end
```

Color transfer

```
for c = 1:3
   temp = img_source_lab(:,:,c);
   mean_source = mean(temp(:));
   sd_source = std(temp(:));

   temp = img_target_lab(:,:,c);
   mean_target = mean(temp(:));
   sd_target = std(temp(:));

   img_source_lab(:,:,c) = (sd_target/sd_source)*(img_source_lab(:,:,c) - mean_source) +
mean_target;
end
```

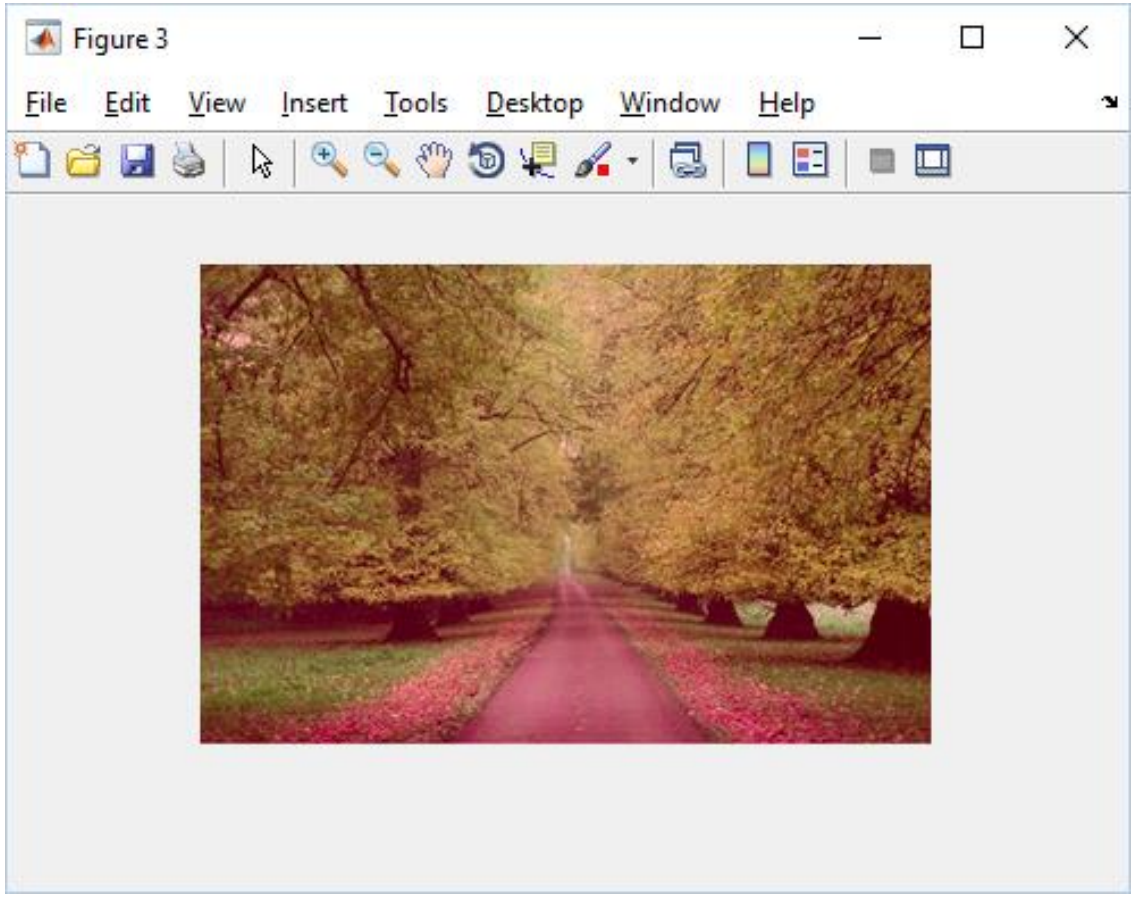
THIS IS A GLOBAL METHOD

Transform back to RGB

```
img_result = lab2rgb(img_source_lab);
```

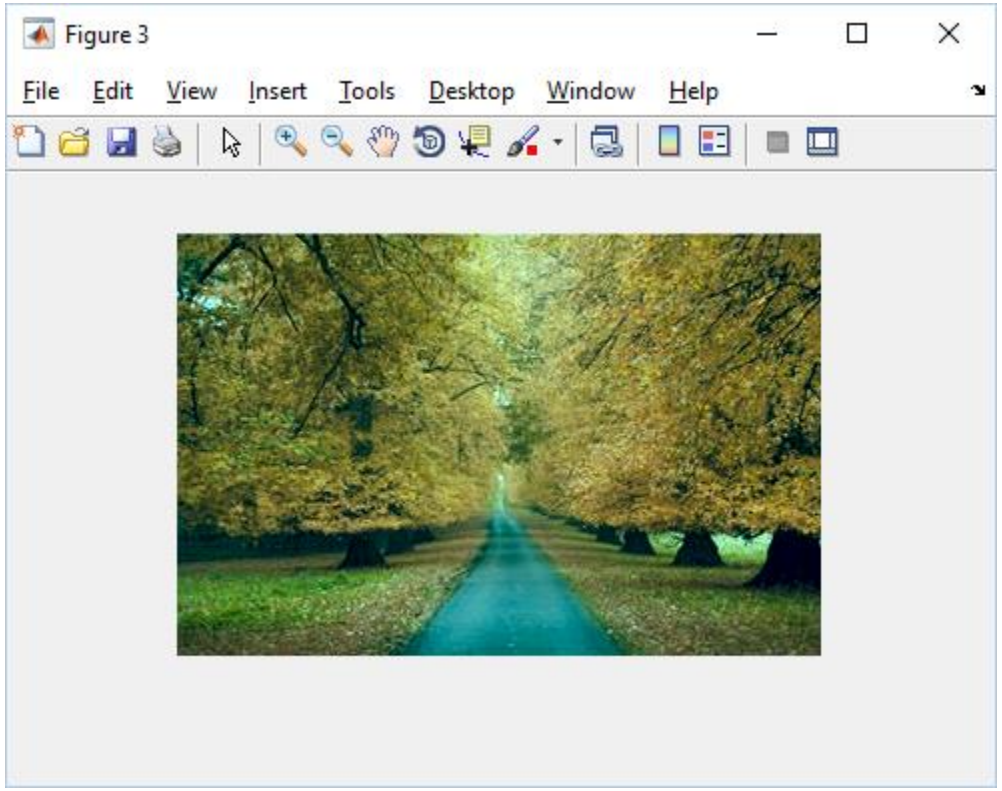
Display the result

figure, imshow(img_result,[]);



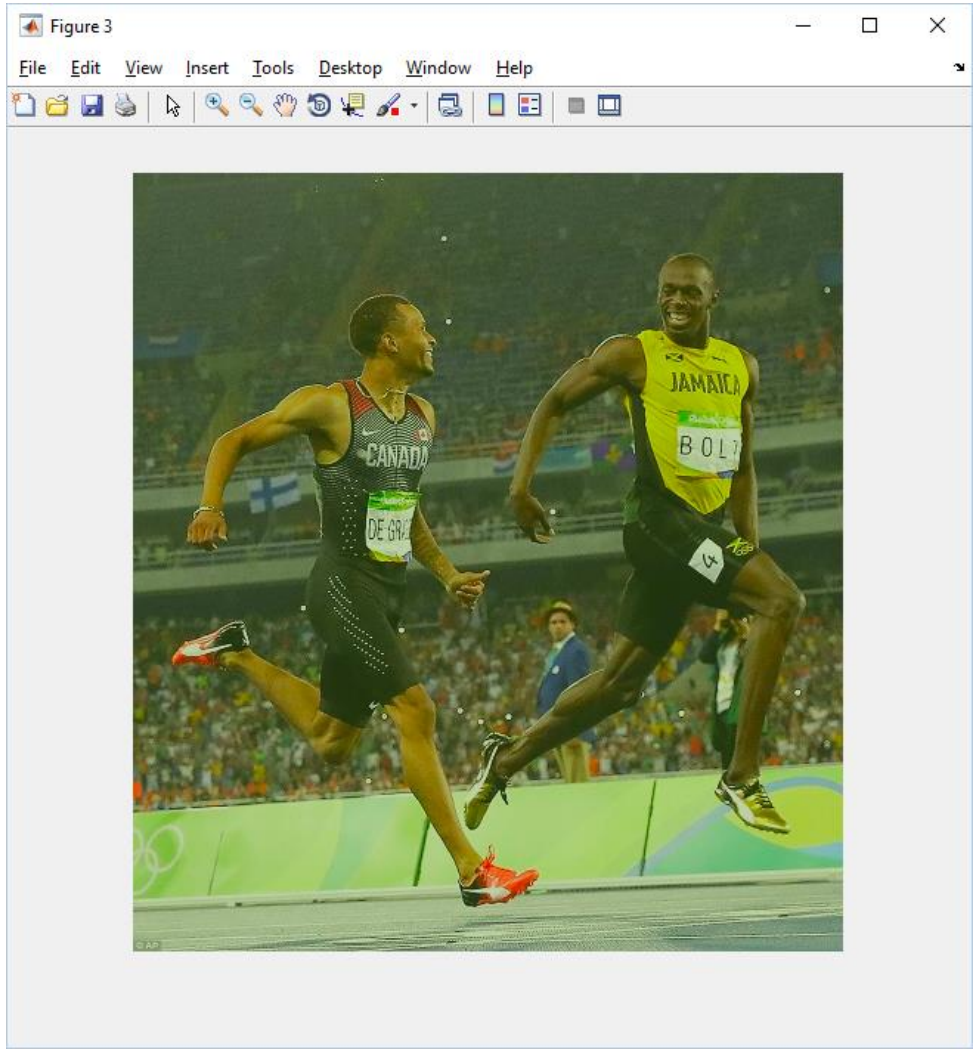
Swap the images and check the result

```
img_source = imread('autumn.jpg');
img_target = imread('spring.jpg');
```



Change the input image to something else

```
img_source = imread('bolt.jpg');
img_target = imread('spring.jpg');
```



Q&A