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# Experiment - 1

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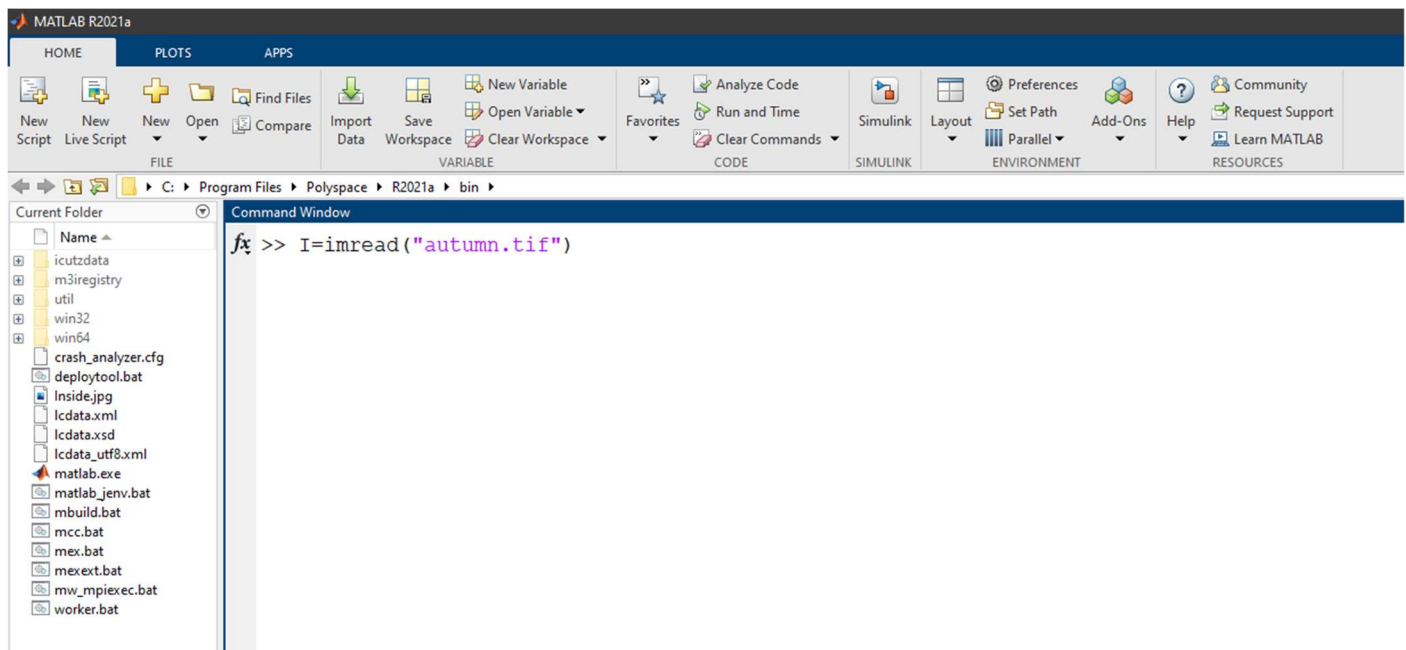
✚ What do you mean by an image? How to read and display image?

✓ **Solution:-**

*An image is a visual representation of something, while a digital image is a binary representation of visual data. These images can take the form of photographs, graphics and individual video frames. In MATLAB the image is read in the form of a 2D array. Each element of matrix is a pixel with a specific intensity level.*

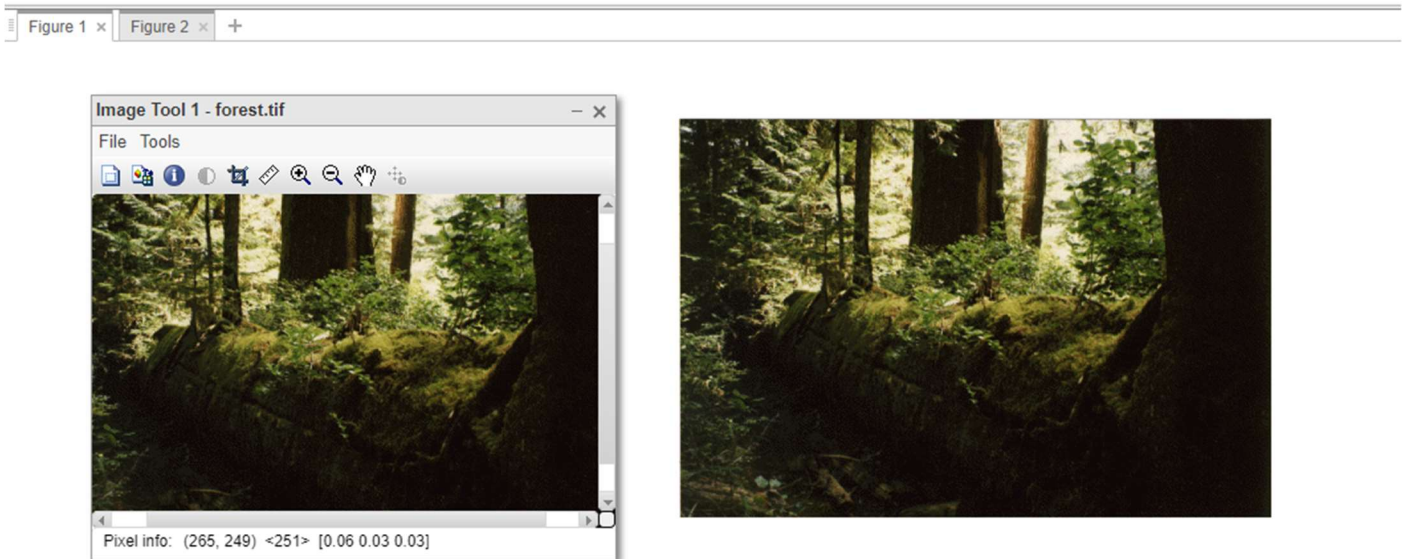
➤ **MATLAB Command & Implementation:-**

- *Reading Image*



25	25	25	27	35	44	37	68	87	106	105	112	121	116	109	101	101	103	106	114
22	25	25	30	30	25	25	27	35	37	37	40	44	37	42	44	40	46	56	68
25	30	46	75	94	86	78	80	108	107	119	128	125	119	119	132	138	150	158	159
109	126	144	148	140	148	158	161	163	160	156	156	158	157	158	164	163	164	163	162
37	40	56	94	121	132	128	129	128	128	129	131	127	126	128	114	97	94	91	64
37	37	35	35	37	37	40	44	44	44	44	44	51	60	55	42	40	37	37	44
137	132	123	121	107	109	125	129	134	138	132	128	134	144	148	143	137	134	143	144
101	94	95	109	133	126	122	150	157	160	162	159	152	145	148	143	139	105	121	134
25	27	30	35	40	30	30	46	56	68	77	82	80	77	82	94	107	113	122	106
25	25	25	25	27	25	25	27	27	27	25	25	27	30	25	27	27	27	27	30
25	25	25	30	25	25	27	27	27	25	27	27	27	27	27	25	25	25	25	27
22	22	22	25	25	27	44	63	77	101	94	82	56	30	37	53	44	46	61	75
22	22	22	25	25	25	27	25	30	37	35	35	49	40	68	108	102	103	112	125
25	25	25	30	27	30	35	44	56	102	119	114	105	86	72	37	53	63	61	55
86	95	107	114	123	128	134	128	137	159	150	151	134	103	68	35	30	30	35	35
27	37	35	40	74	93	102	86	101	147	157	143	127	125	128	122	123	128	129	129
86	97	98	116	155	157	155	156	156	161	159	154	156	156	154	154	150	150	155	150
150	150	151	154	156	154	159	158	159	160	160	156	156	156	156	154	154	156	159	160
91	89	94	101	107	120	135	138	145	148	152	154	155	154	154	134	138	149	159	160
27	25	27	27	30	30	35	37	42	46	49	51	56	55	55	40	35	51	75	110
25	25	25	27	27	25	35	46	44	44	35	35	30	30	30	25	25	25	30	30
25	27	22	25	22	25	25	35	30	37	42	49	56	60	51	40	37	37	42	42
93	94	80	64	75	77	93	121	131	138	143	146	149	147	148	146	145	146	147	148
146	145	140	135	140	139	139	139	145	149	150	152	148	154	156	159	160	158	156	158
145	144	138	138	138	143	139	138	138	143	143	140	139	143	143	147	147	154	154	158
143	137	139	139	143	138	143	138	138	140	140	140	140	138	139	139	140	143	143	146
139	140	143	143	146	147	150	148	149	149	146	148	147	146	147	146	148	151	151	150
51	53	61	63	64	64	72	77	97	112	102	94	80	74	68	64	63	75	113	138
27	25	27	27	25	27	30	25	30	35	30	30	27	27	30	27	30	30	35	42
25	25	27	27	25	25	25	27	27	37	35	37	40	44	63	68	68	67	63	63
61	67	68	77	80	78	75	89	103	127	133	138	143	147	152	155	149	148	150	150
74	87	122	150	150	156	155	152	156	156	157	154	154	156	157	157	154	154	152	154
137	143	152	157	154	154	157	158	158	155	158	157	157	157	160	162	160	155	155	157

- *Reading Image by Tool command*



```

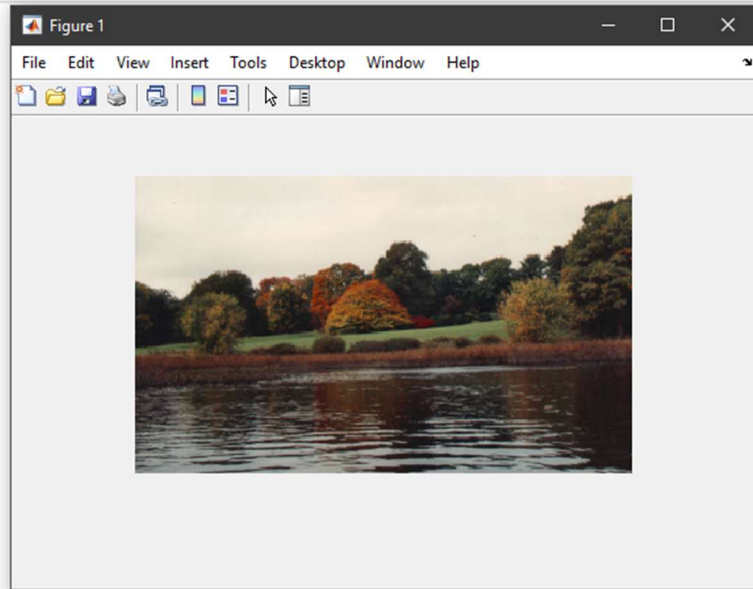
Command Window
>> imshow('forest.tif');
>> figure; imtool('forest.tif')
>>

```

- *Displaying Image*

Command Window

```
>> I=imread("autumn.tif");  
>> imshow(I);  
fx >>
```



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## Experiment - 2

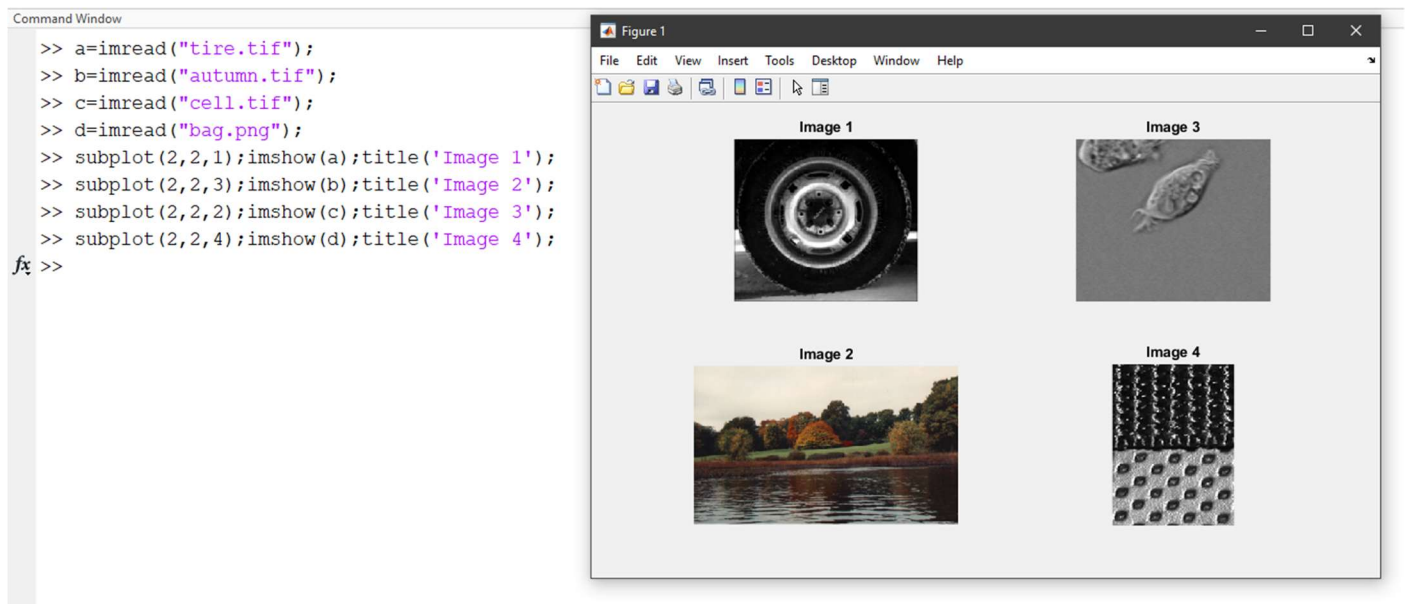
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✚ Display multiple image in the figure using subplot.

✓ **Solution** :-

➤ *MATLAB Command & Implementation:-*

- *Displaying Multiple Image by Subplot*



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## Experiment - 3

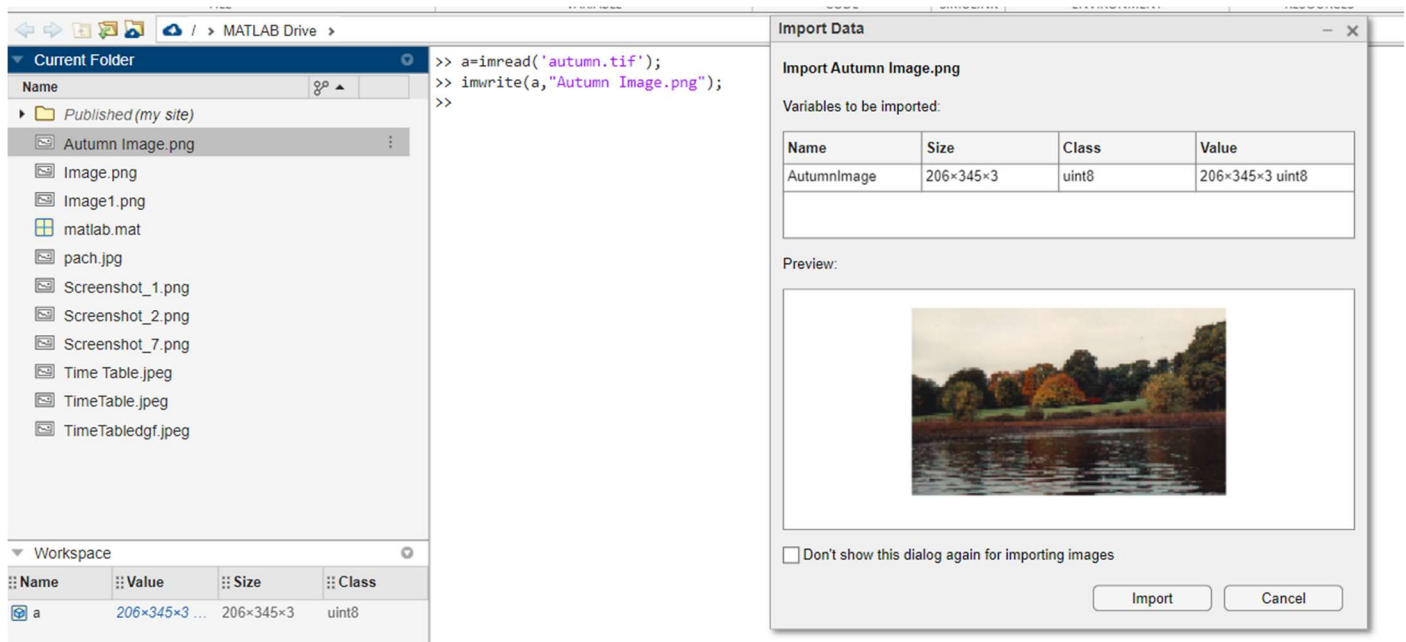
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✚ How to save an image in the folder and how to provide title of figure?

✓ **Solution:-**

➤ *MATLAB Command & Implementation:-*

- *Saving Image & Providing Title*



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## Experiment - 4

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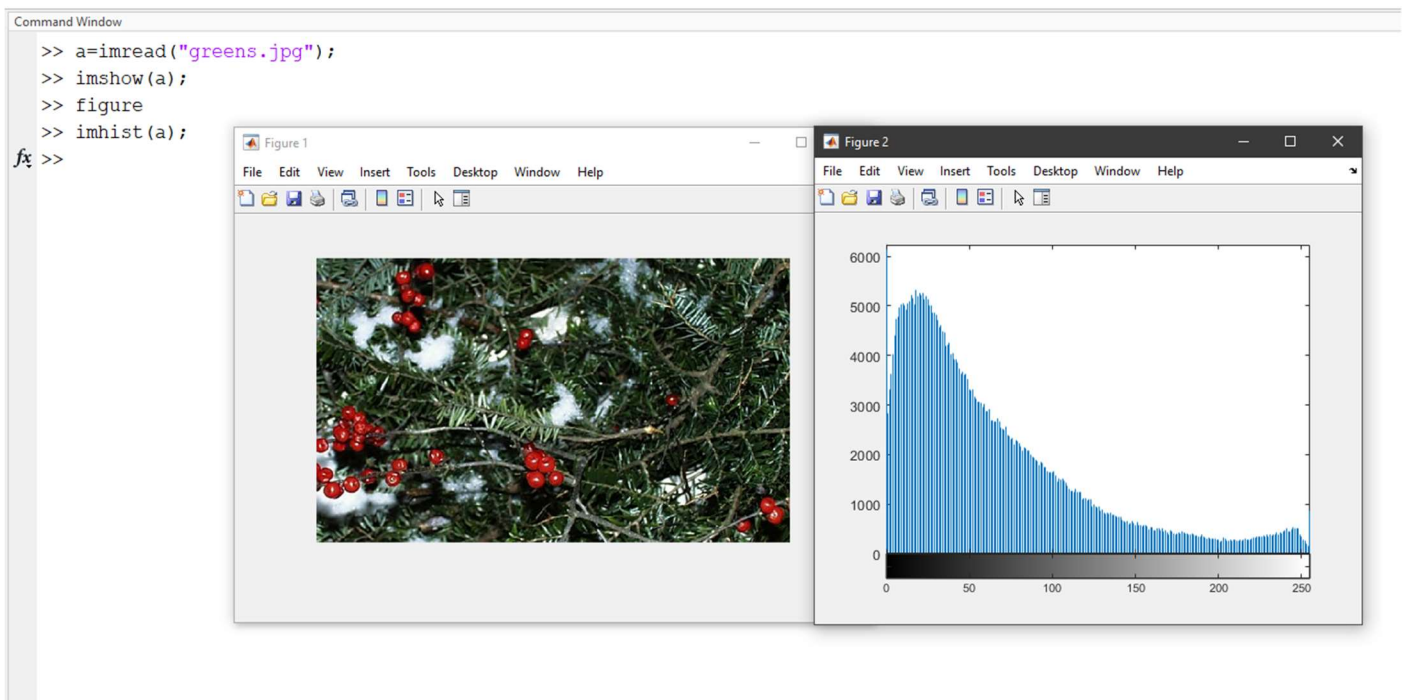
✚ What do you mean by histogram and how to display histogram of an image?

✓ **Solution** :-

*A histogram is an approximate representation of the distribution of numerical data. It shows the intensity distribution and number of pixels over the dynamic range.*

➤ **MATLAB Command & Implementation:-**

- *Displaying a Histogram*





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## Experiment - 5

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✚ Perform various techniques to change the histogram and explain their application.

i). Histogram equalization

ii). Histogram stretching

iii). Histogram sliding

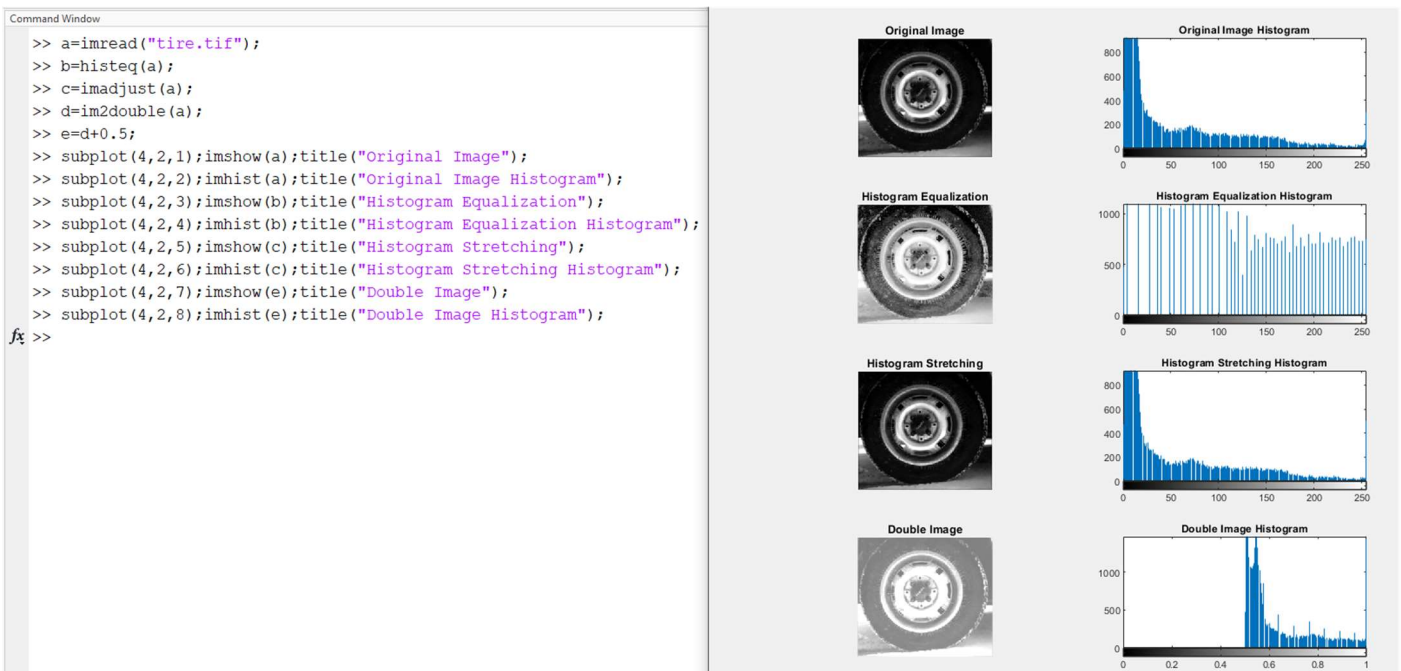
✓ **Solution:-**

i). **Histogram equalization** :- *It is used to increase the contrast of image by equalizing the histogram.*

ii). **Histogram stretching** :- *It is used to increase the contrast of image without changing the shape of the histogram.*

iii). **Histogram sliding** :- *It is used to change the brightness of image by sliding the histogram.*

➤ **MATLAB Command & Implementation:-**



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## Experiment - 6

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✚ Extract the RGB plane of an image and display them in figure using subplot.





✓ **Solution:-**

➤ *MATLAB Command & Implementation:-*

C:\Program Files\Polyspace\R2021a\bin

Command Window

```
>> q=imread("autumn.tif");
>> R=q(:,:,1);
>> G=q(:,:,2);
>> B=q(:,:,3);
>> a=zeros(size(q,1),size(q,2));
>> red=cat(3,R,a,a);
>> green=cat(3,a,G,a);
>> blue=cat(3,a,a,B);
>> subplot(4,1,1);imshow(q);
>> subplot(4,1,2);imshow(red);
>> subplot(4,1,3);imshow(green);
>> subplot(4,1,4);imshow(blue);
fx >>
```





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## Experiment - 7

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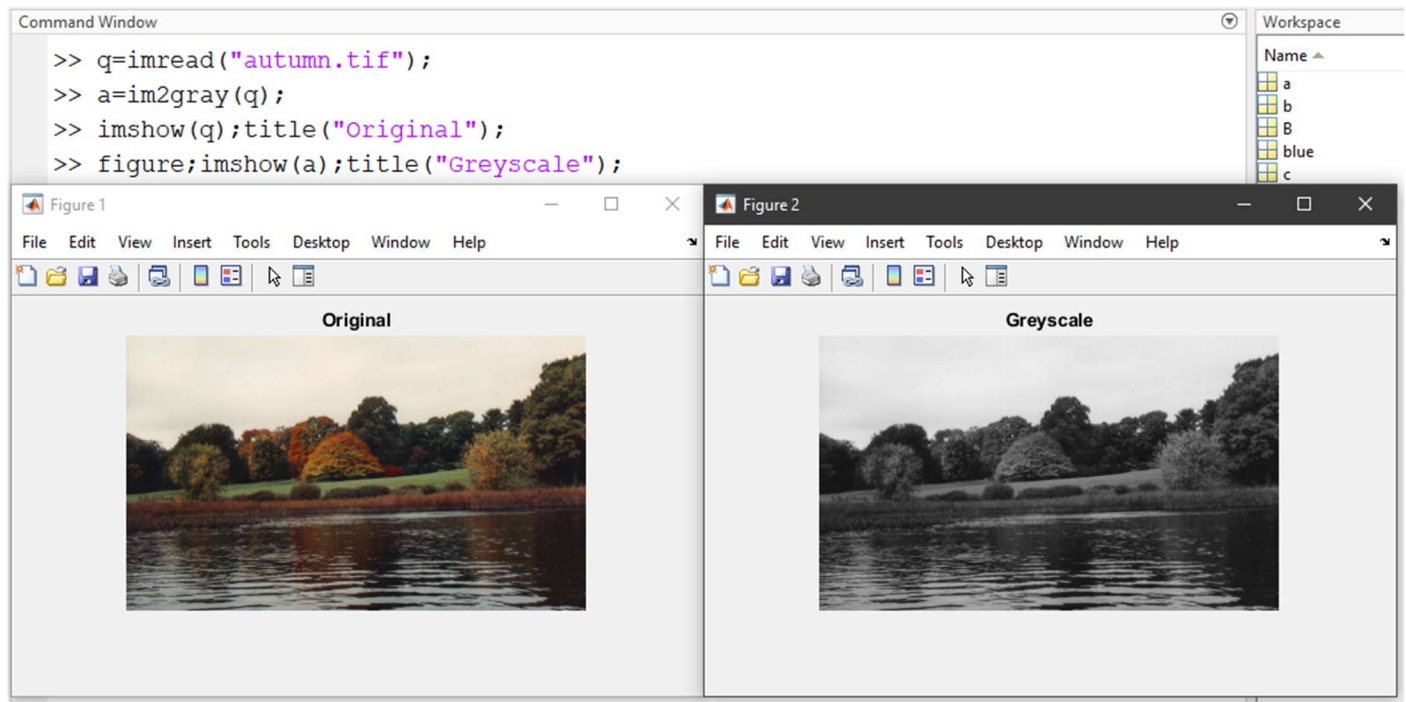
✚ Apply the following conversion to an image:-

- i). rgb to grey
- ii). rgb to hsv
- iii). Binary
- iv). Double

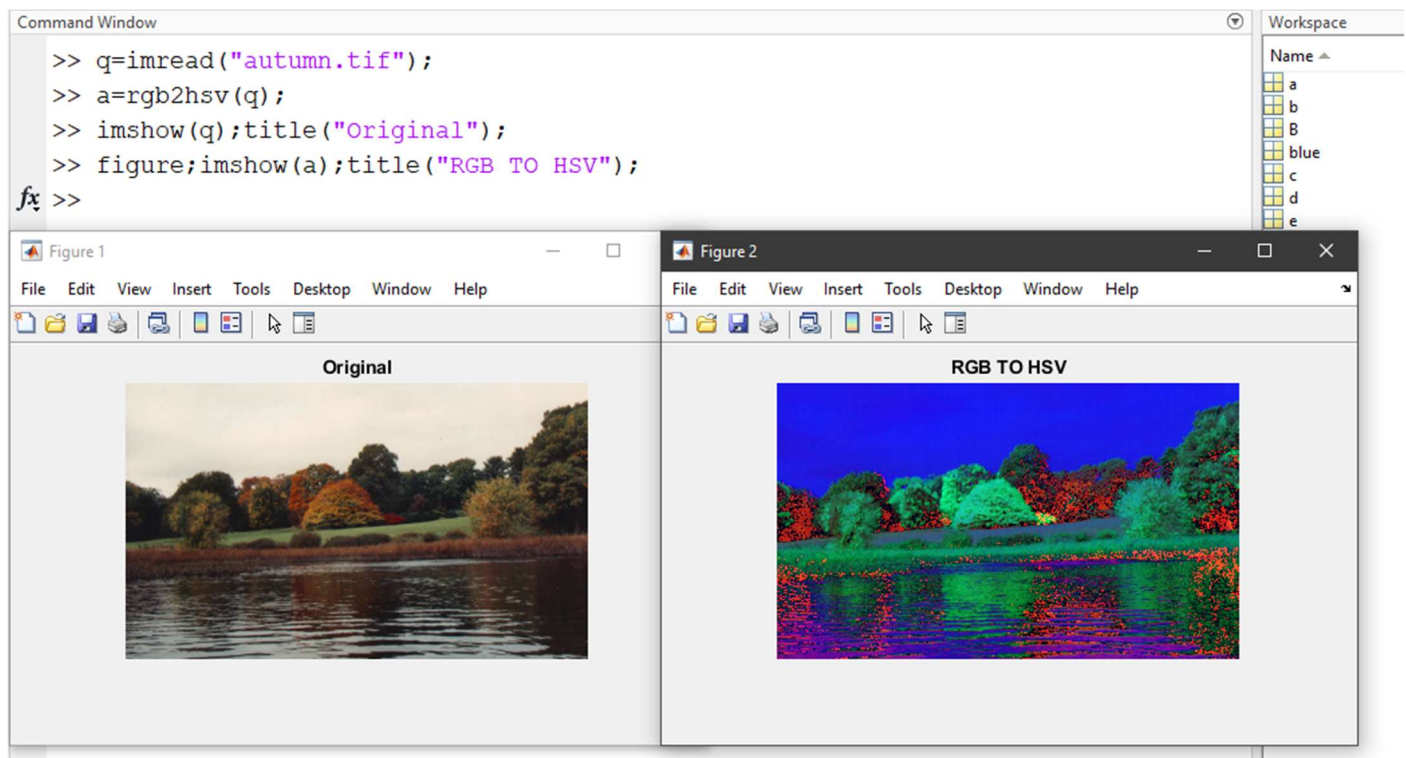
✓ **Solution:-**

➤ *MATLAB Command & Implementation:-*

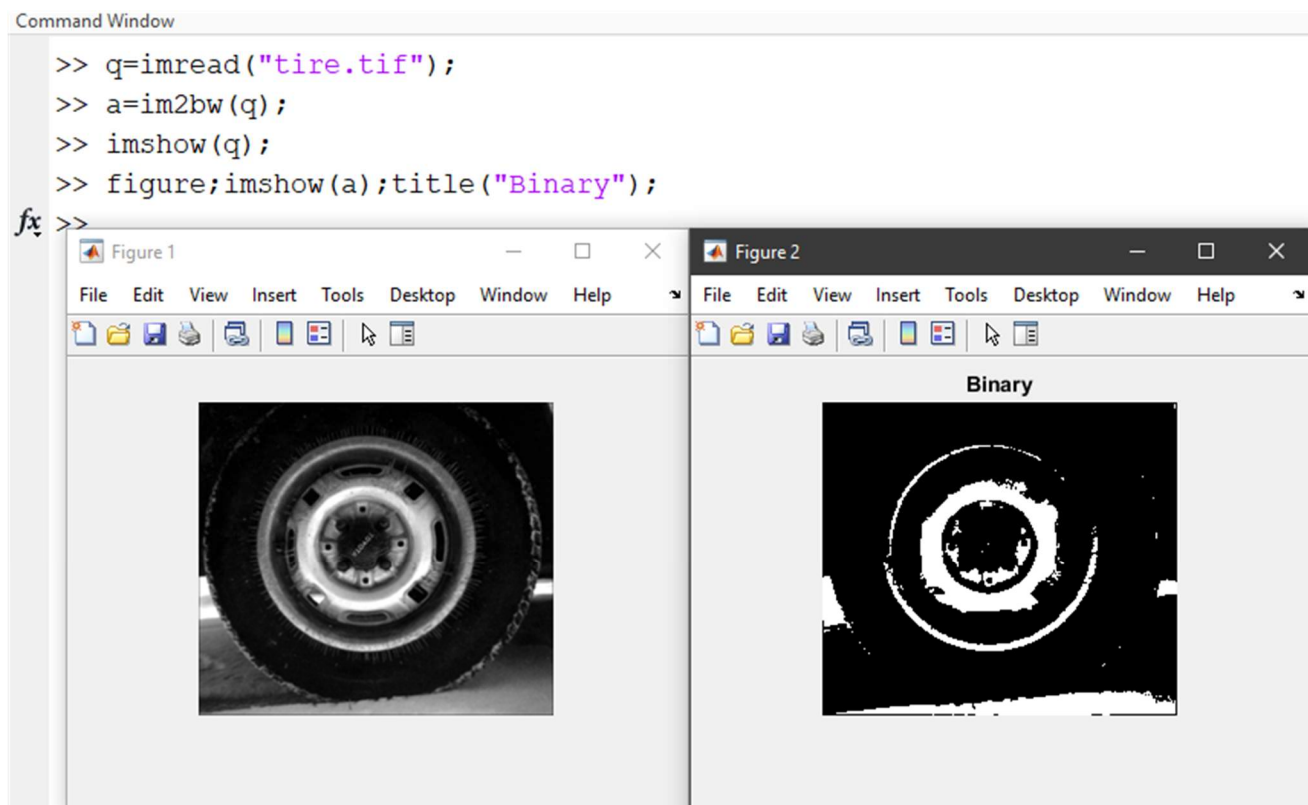
- *RGB to grey*



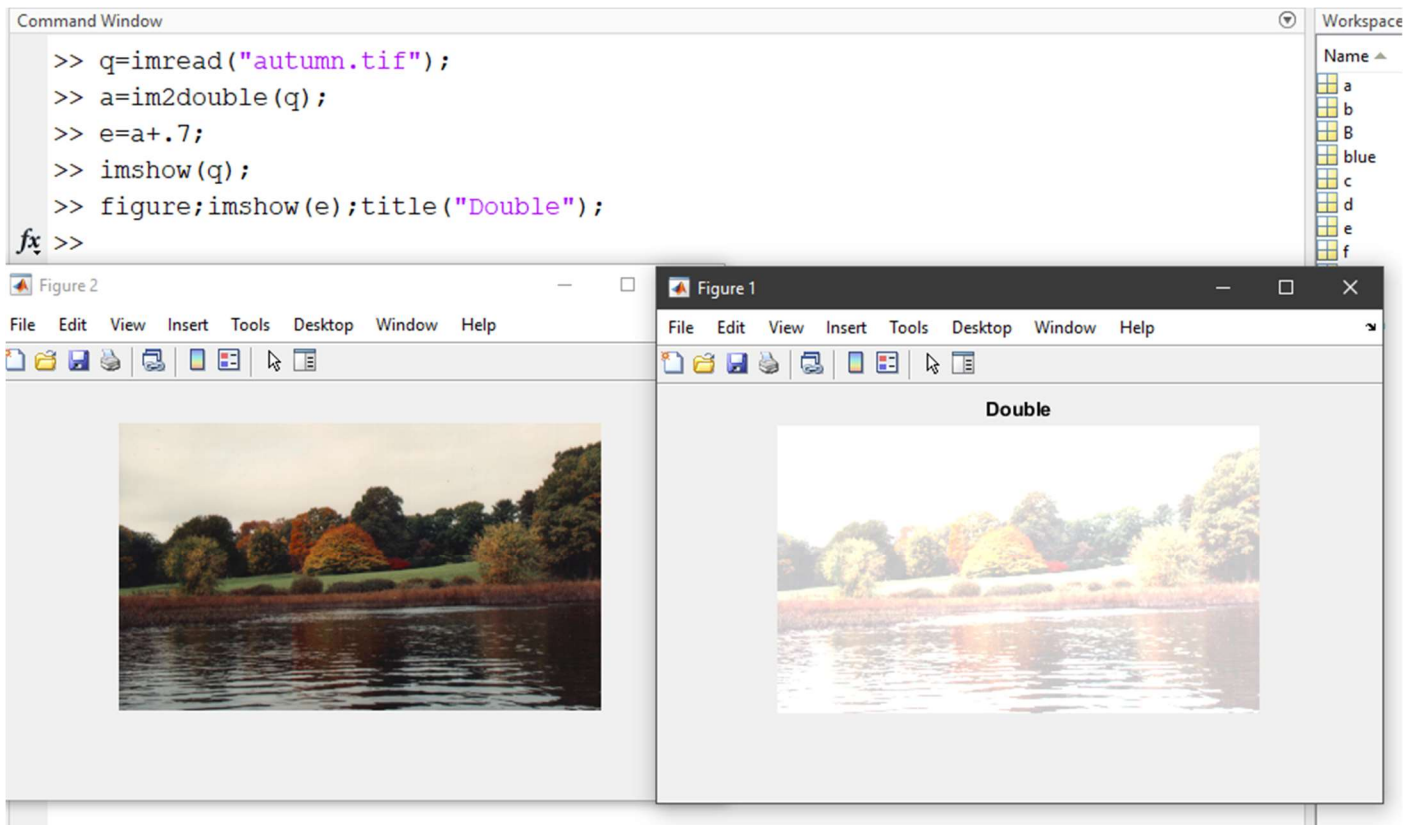
- *RGB to HSV*



- *Image to Binary*



- *Double Image*



## Experiment - 8

What do you mean by basic transformations? Perform basic transformations using MATLAB commands.

✓ **Solution:-**

- **Translation:-** This is the translation of the image by a certain displacement in each axis.
- **Rotation:-** This is the rotation of the image by a certain angle  $\theta$ .
- **Scaling:-** This is the resizing of the image by a certain scaling factor in each axis.

➤ **MATLAB Command & Implementation:-**

