

Image processing Task 1



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Task Requirements (by using MATLAB):

1. Change the most common color in the image to black.
2. Change the color of a specific part of the image into any other color.

The original image:



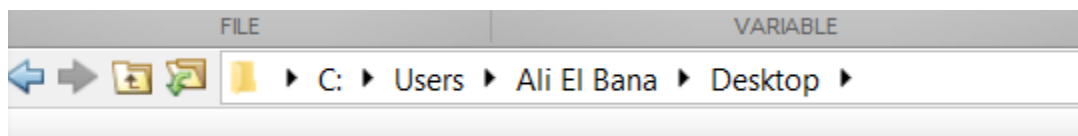
The first requirement:

Step1: Identifying the most common color in the image

→ It's clear that the most common color in the above image is **White**.

Step2: Reading the image from my device and storing it on a Matrix to be capable to access its pixels and modifying them

→ We can do that by identifying the right path of the image working directory



```
fig1 = imread('faces.jpg');
```

→ **Result:** fig1 150x300x3 uint8

Step3: Showing the pixel region of the image to know their RGB percentage

→ We do that by calling this function: `impixelregion()`

→ And passing our image matrix as an input argument to this function:
`impixelregion(imshow(fig1))`


→ **Result:**

1	30	R: 23	B: 32	B: 24	R: 26	R: 29	G: 25	B: 31	R: 27	R: 30	R1251	R1252	R1253	R1254	R1255	R1256	R1257	R1258	R1259	R1260	R1261	R1262	R1263	R1264	R1265	R1266	R1267	R1268	R1269	R1270
2	31	R: 28	R: 34	R: 26	R: 34	R: 26	R: 26	R: 27	R: 31	R1134	R1255	R1249	R1255	R1253	R1255	R1255	R1255	R1255	R1255	R1255	R1255	R1255	R1255	R1255	R1255	R1255	R1255	R1255	R1255	R1255
3	32	R: 28	R: 34	R: 26	R: 34	R: 26	R: 26	R: 27	R: 31	R1134	R1255	R1249	R1255	R1253	R1255	R1255	R1255	R1255	R1255	R1255	R1255	R1255	R1255	R1255	R1255	R1255	R1255	R1255	R1255	R1255
4	29	R: 26	B: 32	R: 24	B: 32	B: 24	B: 24	B: 25	B: 29	R1332	R1253	R1249	R1255	R1253	R1255	R1255	R1251	R1251	R1251	R1251	R1251	R1251	R1251	R1251	R1251	R1251	R1251	R1251	R1251	R1251
5	26	R: 29	R: 29	R: 28	R: 29	R: 29	R: 29	R: 28	R: 24	R1177	R1255	R1251	R1255	R1252	R1250	R1255	R1254	R1251	R1246	R1242	R1238	R1234	R1234	R1234	R1234	R1234	R1234	R1234	R1234	R1234
6	26	R: 29	G: 29	R: 28	R: 29	G: 29	G: 29	R: 28	R: 24	G1177	G1255	G1251	G1255	G1252	G1250	G1248	G1246	G1241	G1235	G1228	G1222	G1218	G1216	G1216	G1216	G1216	G1216	G1216	G1216	G1216
7	24	R: 27	R: 27	R: 26	R: 27	R: 26	R: 27	R: 26	R: 22	R1175	R1253	R1251	R1253	R1252	R1250	R1245	R1243	R1238	R1233	R1227	R1222	R1218	R1216	R1216	R1216	R1216	R1216	R1216	R1216	R1216
8	27	R: 28	R: 29	R: 28	R: 33	R: 28	R: 28	R: 20	R: 18	R1164	R1234	R1234	R1227	R1220	R1214	R1222	R1222	R1220	R1219	R1219	R1218	R1218	R1218	R1218	R1218	R1218	R1218	R1218	R1218	R1218
9	27	G: 30	G: 27	G: 24	G: 33	G: 29	G: 30	G: 35	G: 19	G1145	G1187	G1187	G1183	G1183	G1183	G1176	G1174	G1172	G1171	G1170	G1170	G1170	G1170	G1170	G1170	G1170	G1170	G1170	G1170	G1170
10	25	R: 28	R: 28	R: 25	B: 31	B: 29	B: 29	R: 28	R: 13	R1138	R1188	R1179	R1174	R1173	R1178	R1172	R1172	R1170	R1169	R1169	R1168	R1168	R1168	R1168	R1168	R1168	R1168	R1168	R1168	R1168
11	26	R: 29	R: 32	R: 30	R: 31	R: 27	R: 27	R: 24	R: 24	R1148	R1226	R1222	R1221	R1215	R1213	R1216	R1216	R1215	R1214	R1213	R1213	R1213	R1213	R1213	R1213	R1213	R1213	R1213	R1213	R1213
12	27	R: 34	R: 32	R: 28	G: 31	G: 29	G: 29	G: 33	G: 24	G1125	G1185	G1172	G1171	G1172	G1173	G1173	G1173	G1172	G1171	G1170	G1170	G1170	G1170	G1170	G1170	G1170	G1170	G1170	G1170	G1170
13	22	R: 30	B: 32	R: 29	B: 30	B: 30	B: 26	B: 30	B: 20	R1119	R1179	R1165	R1164	R1162	R1165	R1169	R1164	R1164	R1163	R1162	R1161	R1161	R1161	R1161	R1161	R1161	R1161	R1161	R1161	R1161
14	25	R: 22	R: 24	R: 30	R: 30	R: 30	R: 31	R: 24	R: 30	R1136	R1220	R1188	R1222	R1219	R1217	R1219	R1218	R1218	R1217	R1217	R1217	R1217	R1217	R1217	R1217	R1217	R1217	R1217	R1217	R1217
15	25	R: 29	R: 29	R: 30	G: 28	G: 29	G: 29	R: 26	G: 19	G1108	G1176	G1168	G1169	G1170	G1172	G1176	G1175	G1175	G1174	G1174	G1174	G1174	G1174	G1174	G1174	G1174	G1174	G1174	G1174	G1174
16	17	R: 22	B: 25	B: 30	R: 28	R: 30	R: 30	R: 25	R: 19	R1105	R1173	R1161	R1163	R1163	R1166	R1160	R1159	R1159	R1158	R1158	R1158	R1158	R1158	R1158	R1158	R1158	R1158	R1158	R1158	R1158
17	23	R: 25	R: 31	R: 31	R: 26	R: 29	R: 29	R: 27	R: 23	R1115	R1217	R1217	R1217	R1217	R1211	R1218	R1218	R1218	R1218	R1218	R1218	R1218	R1218	R1218	R1218	R1218	R1218	R1218	R1218	R1218
18	32	R: 32	G: 30	R: 31	R: 26	R: 27	R: 27	R: 28	R: 15	G1104	G1182	G1171	G1172	G1174	G1174	G1171	G1171	G1171	G1171	G1171	G1171	G1171	G1171	G1171	G1171	G1171	G1171	G1171	G1171	G1171
19	11	R: 24	R: 26	B: 31	R: 27	B: 28	B: 28	B: 13	R: 91	R1178	R1168	R1166	R1166	R1167	R1163	R1163	R1163	R1163	R1163	R1163	R1163	R1163	R1163	R1163	R1163	R1163	R1163	R1163	R1163	R1163
20	22	R: 32	R: 26	R: 29	R: 26	R: 31	R: 31	R: 32	R: 23	R: 74	R1226	R1224	R1219	R1223	R1218	R1222	R1223	R1223	R1223	R1223	R1223	R1223	R1223	R1223	R1223	R1223	R1223	R1223	R1223	R1223
21	22	R: 37	G: 31	G: 27	R: 26	G: 29	G: 29	G: 36	G: 22	G1164	G1207	G1299	G1192	G1196	G1194	G1191	G1192	G1192	G1192	G1192	G1192	G1192	G1192	G1192	G1192	G1192	G1192	G1192	G1192	G1192
22	14	R: 31	R: 27	R: 28	R: 27	R: 30	R: 30	R: 35	R: 18	R: 62	G1203	G1194	R1185	R1187	R1184	R1186	R1189	R1189	R1189	R1189	R1189	R1189	R1189	R1189	R1189	R1189	R1189	R1189	R1189	R1189
23	24	R: 27	R: 27	R: 33	R: 31	R: 29	R: 29	R: 23	R: 28	R: 39	R1221	R1255	R1255	R1255	R1255	R1255	R1255	R1255	R1255	R1255	R1255	R1255	R1255	R1255	R1255	R1255	R1255	R1255	R1255	R1255
24	25	G: 29	G: 27	G: 29	G: 30	G: 31	G: 31	G: 29	G: 30	R: 38	G1216	G1250	G1249	G1253	G1253	G1253	G1250	G1250	G1251	G1254	G1254	G1254	G1254	G1254	G1254	G1254	G1254	G1254	G1254	G1254
25	20	R: 26	R: 27	R: 30	R: 28	R: 28	R: 28	R: 25	R: 34	R: 34	R1212	R1248	R1244	R1248	R1246	R1246	R1246	R1246	R1251	R1251	R1251	R1251	R1251	R1251	R1251	R1251	R1251	R1251	R1251	R1251
26	37	R: 25	R: 34	R: 37	R: 27	R: 20	R: 20	R: 27	R: 31	R: 27	R1135	R1254	R1255	R1253	R1255	R1251	R1251	R1251	R1251	R1251	R1251	R1251	R1251	R1251	R1251	R1251	R1251	R1251	R1251	R1251
27	38	R: 25	G: 28	G: 31	G: 27	G: 27	G: 27	R: 28	R: 31	G: 27	R1135	R1254	R1255	R1253	R1255	R1255	R1255	R1255	R1255	R1255	R1255	R1255	R1255	R1255	R1255	R1255	R1255	R1255	R1255	R1255
28	40	R: 27	R: 32	R: 33	R: 25	R: 20	R: 20	R: 22	R: 26	R: 25	R1135	R1254	R1255	R1253	R1255	R1255	R1255	R1255	R1255	R1255	R1255	R1255	R1255	R1255	R1255	R1255	R1255	R1255	R1255	R1255
29	64	R: 33	R: 35	R: 33	R: 27	R: 26	R: 26	R: 36	R: 27	R: 34	R: 239	R1254	R1249	R1252	R1255	R1255	R1255	R1255	R1255	R1255	R1255	R1255	R1255	R1255	R1255	R1255	R1255	R1255	R1255	R1255
30	61	R: 31	G: 25	G: 24	G: 28	G: 38	G: 38	G: 31	G: 23	G: 33	G: 37	R1240	G1255	G1252	G1255	G1255	G1255	G1255	G1255	G1255	G1255	G1255	G1255	G1255	G1255	G1255	G1255	G1255	G1255	G1255
31	71	R: 36	R: 33	R: 27	R: 23	R: 28	R: 28	R: 27	R: 20	R: 31	R: 39	R1244	R1255	R1255	R1255	R1255	R1255	R1255	R1255	R1255	R1255	R1255	R1255	R1255	R1255	R1255	R1255	R1255	R1255	R1255
32	146	R: 28	R: 29	R: 27	R: 32	R: 27	R: 29	R: 29	R: 31	R: 27	R: 26	R1116	R1252	R1255	R1253	R1251	R1255	R1255	R1255	R1255	R1255	R1255	R1255	R1255	R1255	R1255	R1255	R1255	R1255	R1255

→ After we know the RGB percentage of the colors of the image, now we can move forward to the next step.

Step4: Building an Algorithm to change the color of the white to black

- **Firstly:** We need to search on all the image matrix
- **Then:** Make a condition using The RGB percentage from step2 to turn the percentage of the white RGB into [0,0,0]



Shades of Black and Grey				
Color Name	RGB Dec	RGB Hex	CSS	Swatch
Grey	84;84;84	545454		
Grey, Silver	192;192;192	C0C0C0		
grey	190;190;190	BEBEBE		
LightGray	211;211;211	D3D3D3		
LightSlateGrey	119;136;153	778899	789	
SlateGray	112;128;144	708090		
SlateGray1	198;226;255	C6E2FF		
SlateGray2	185;211;238	B9D3EE		
SlateGray3	159;182;205	9FB6CD		
SlateGray4	108;123;139	6C7B8B		
black	0;0;0	000000	000	
grey0	0;0;0	000000	000	
grey1	3;3;3	030303		
grey2	5;5;5	050505		

After that: We should handle the condition if of the other colors beside the white one, we should store the original RGB percentages of the image.

Then: We should store these changes on the original image matrix to a new one, to be able to show it and compare it with the original one.

After that: End the condition and the looping on the image matrix.

Finally: Showing the new image after these changes.

Step5: Converting this Algorithm into a MATLAB code

```
>> for r = 1:150

    for c = 1:300

        if( fig1(r,c,1) > 250 )

            fig2(r,c,1:3) = 0 ;

        else

            fig2(r,c,1:3) = fig1(r,c,1:3) ;

        end

    end

end
```


→ **Result:**








The second requirement: (Changing the color of وجوه from pink to green)

Step1: Building an Algorithm to change the color of وجوه from pink to green:

- **Firstly:** We need to search on all the image matrix
- **Then:** Make a condition using The RGB percentage to turn the percentage of the Pink RGB into the Green one.



Pale Green	143;188;143	8FBC8F		
Sea Green	35;142;104	238E68		
Spring Green	0;255;127	00FF7F		
Free Speech Green	9;249;17	09F911		
Free Speech Aquamarine	2;157;116	029D74		

After that: We should handle the condition if of the other colors beside the white one, we should store the original RGB percentages of the image.

Then: We should store these changes on the original image matrix to a new one, to be able to show it and compare it with the original one.

After that: End the condition and the looping on the image matrix.

Finally: Showing the new image after these changes.

Step2: Converting this Algorithm into a MATLAB code

```
>> for r = 1:150

    for c = 1:300

        if( fig1(r,c,1) < 240 && fig1(r,c,1) > 200 )

            fig3(r,c,1:3) = [ 9 249 17 ] ;

        else

            fig3(r,c,1:3) = fig1(r,c,1:3) ;

        end

    end

end
```

→ **Result:**



TASK DONE