CSCI 631 Foundation of Computer Vision
HW 03

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1. Version
   a.

```
>> ver
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MATLAB Version: 9.13.0.2126072 (R2022b) Update 3
MATLAB License Number: 364896
Operating System: Microsoft Windows 11 Pro Version 10.0 (Build 22000)
Java Version: Java 1.8.0_202-b08 with Oracle Corporation Java HotSpot(TM) 64-Bit Server VM mixed mode
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MATLAB                                                Version 9.13        (R2022b)
Image Processing Toolbox                              Version 11.6        (R2022b)
>>
```
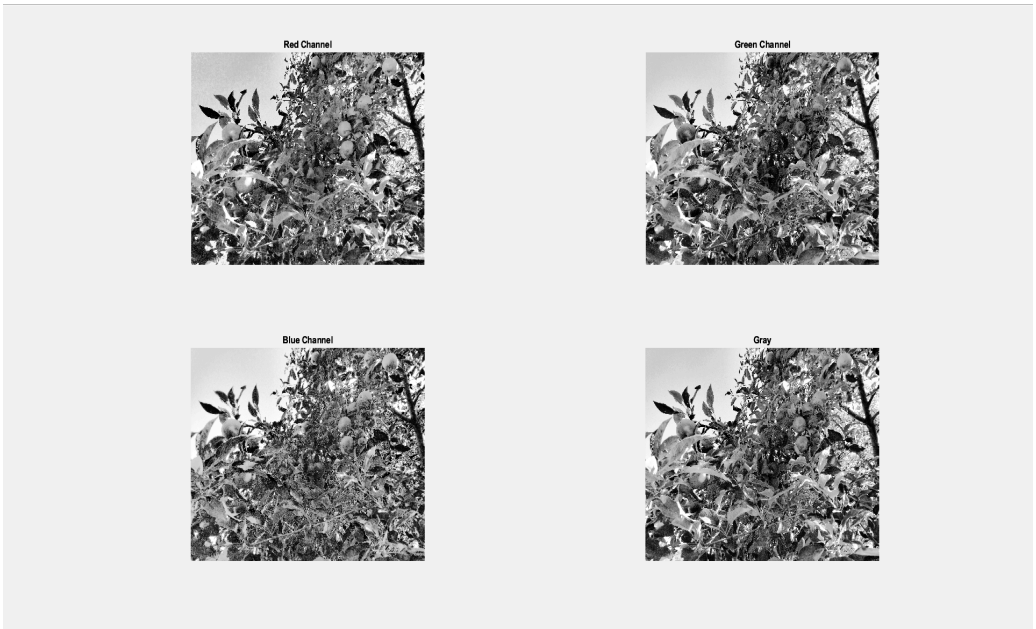

2. I tried using all the channels including rgb2gray(), using histeq and imadjust, but none of them worked.



3.

```
>> matilda.DigitalCamera

ans =

  struct with fields:

              ExposureTime: 0.0500
                   FNumber: 6.3000
            ExposureProgram: 'Manual'
          ISOSpeedRatings: 3200
               ExifVersion: [48 50 51 48]
          DateTimeOriginal: '2022:09:06 19:05:40'
         DateTimeDigitized: '2022:09:06 19:05:40'
    ComponentsConfiguration: 'YCbCr'
          ShutterSpeedValue: 4.3750
           ApertureValue: 5.3750
         ExposureBiasValue: 0
              MeteringMode: 'Pattern'
                     Flash: 'Flash fired, no strobe return detection function, compulsory flash firing, flash function present, no red-eye reduction mode or unknown.'
                FocalLength: 51
                  MakerNote: [42 0 1 0 3 0 49 0 0 0 140 5 0 0 2 0 3 0 4 0 0 0 238 5 0 0 3 0 3 0 4 0 … ]
                UserComment: [0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 … ]
                 SubsecTime: '10'
        SubsecTimeOriginal: '10'
       SubsecTimeDigitized: '10'
           FlashpixVersion: [48 49 48 48]
                ColorSpace: 'sRGB'
          CPixelXDimension: 3984
          CPixelYDimension: 2656
       InteroperabilityIFD: [1×1 struct]
     FocalPlaneXResolution: 4.4614e+03
     FocalPlaneYResolution: 4.4714e+03
   FocalPlaneResolutionUnit: 2
            CustomRendered: 'Normal process'
              ExposureMode: 'Manual exposure'
              WhiteBalance: 'Auto white balance'
          SceneCaptureType: 'Standard'
               UnknownTags: [7×1 struct]

fx >>
```

```
>> matilda = imfinfo("HW_03_Ashwathsreedhar_Halemane_DIR\IMG_2523_Matilda_STROOP_EFFECT.JPG");
>> disp(matilda)
             Filename: 'D:\RIT-Spring-2023\Computer Vision\HW_03_Ashwathsreedhar_Halemane_DIR\IMG_2523_Matilda_STROOP_EFFECT.JPG'
          FileModDate: '23-Feb-2023 21:07:52'
             FileSize: 4441607
               Format: 'jpg'
        FormatVersion: ''
                Width: 3984
               Height: 2656
             BitDepth: 24
            ColorType: 'truecolor'
      FormatSignature: ''
      NumberOfSamples: 3
         CodingMethod: 'Huffman'
        CodingProcess: 'Sequential'
              Comment: {}
                 Make: 'Canon'
                Model: 'Canon EOS Rebel T6i'
          Orientation: 1
          XResolution: 72
          YResolution: 72
       ResolutionUnit: 'Inch'
             DateTime: '2022:09:06 19:05:40'
               Artist: ''
     YCbCrPositioning: 'Co-sited'
            Copyright: ''
        DigitalCamera: [1×1 struct]
              GPSInfo: [1×1 struct]
        ExifThumbnail: [1×1 struct]

fx >>
```

The image was taken: DateTime2022:09:06 19:05:40.
FNumber = 6.30000
ISOSpeedRatings = 3200
ComponentsConfiguration = YCbCr
ColorSpace = sRGB
Flask = Yes

4. Given the image IMG_2523_Matilda_STROOP_EFFECT.jpg. What is the Stroop Effect? What is demonstrated here? Why does this complicate your homework?

a. Stroop effect is an effect where the reaction time to a particular task is affected by conflicting information. In the image provided, the Stroop effect is evident where the words written are in different colors than in the said colors, like the word red is written in yellow, green word written in blue, and so on. This creates a conflict between the word and the color, making it more difficult for the observer to identify the correct color. This could be a psychological phenomenon where humans are preconceived about the information, making it challenging to extract the right information from the image.

5. Conclusion:

This homework was more about understanding the limitations of certain techniques, why things behave how they behave and learning how image processing is more related to human psychology.
After applying histogram equalization on the color channels and tweaking with histeq, imadjust and imbinarize functions for a while I understood that we cannot separate color channels just by enhancing the dynamic range of the image and thus realized we need more advanced techniques like color filtering and others to achieve color segmentation.
I found this assignment really interesting as I understood more about histogram equalization, color filtering, and the Stroop effect. For me, the challenging part was that I spent too much time trying to segment image for Q2 by my limited knowledge of color segmentation and misunderstanding about histogram equalization. I think this assignment even though had less coding was very good to understand various concepts.
Overall, very happy about the assignment.