

**LAPORAN UJIAN AKHIR SEMESTER
PENGOLAHAN CITRA DIGITAL**

Dosen Pengampu:
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**KELAS C
PROGRAM STUDI TEKNIK INFORMATIKA
FAKULTAS TEKNIK
UNIVERSITAS SAM RATULANGI**

KATA PENGANTAR

Puji syukur kami panjatkan kepada Tuhan Yang Maha Esa, karena atas limpahan rahmatnya penyusun dapat menyelesaikan laporan ini tepat waktu tanpa ada halangan yang berarti dan sesuai dengan harapan.

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Kami menyadari bahwa dalam penyusunan laporan ini masih banyak kekurangan karena keterbatasan kami. Semoga apa yang ditulis dapat bermanfaat bagi semua pihak yang membutuhkan.

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BAB I

PENDAHULUAN

1.1 Latar Belakang

Pemrosesan gambar adalah hal yang lumrah di internet sekarang. Jika kita melakukan pencarian di halaman internet, katakanlah Google, kita akan dapat menemukan banyak sekali website yang menyediakan jasa untuk melakukan pemrosesan gambar. Pemrosesan gambar sendiri adalah merupakan kumpulan teknik komputasi untuk menganalisis, meningkatkan, mengompresi dan merekonstruksi gambar. Image processing atau pemrosesan citra ini memiliki aplikasi ekstensif (khusus) di banyak bidang lainnya, termasuk astronomi, kedokteran, robotika industri dan penginderaan jauh (remote sensing) oleh satelit.

1.2 Tujuan Penulisan

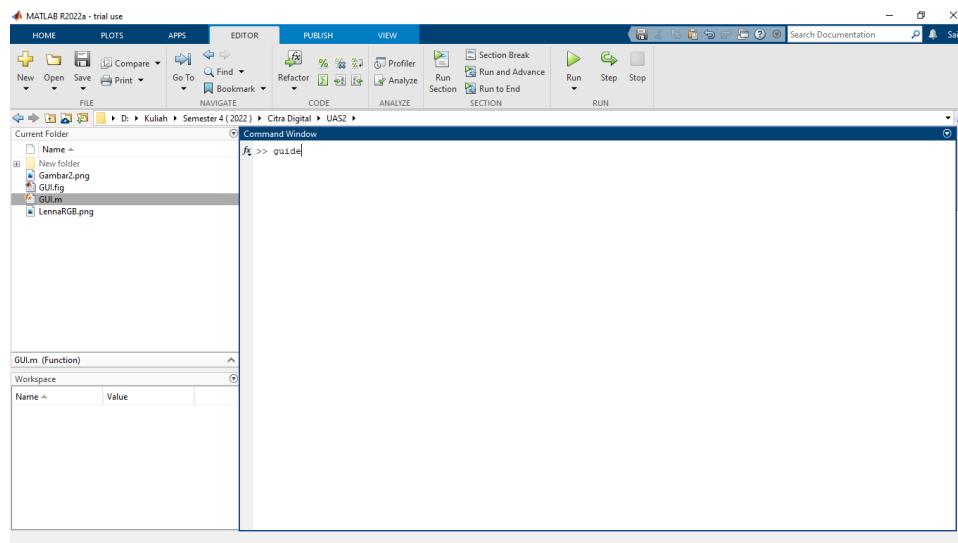
Tulisan ini bertujuan sebagai laporan yang akan dimasukan untuk tugas Ujian Akhir Semester matakuliah Pengolahan Citra Digital

BAB II

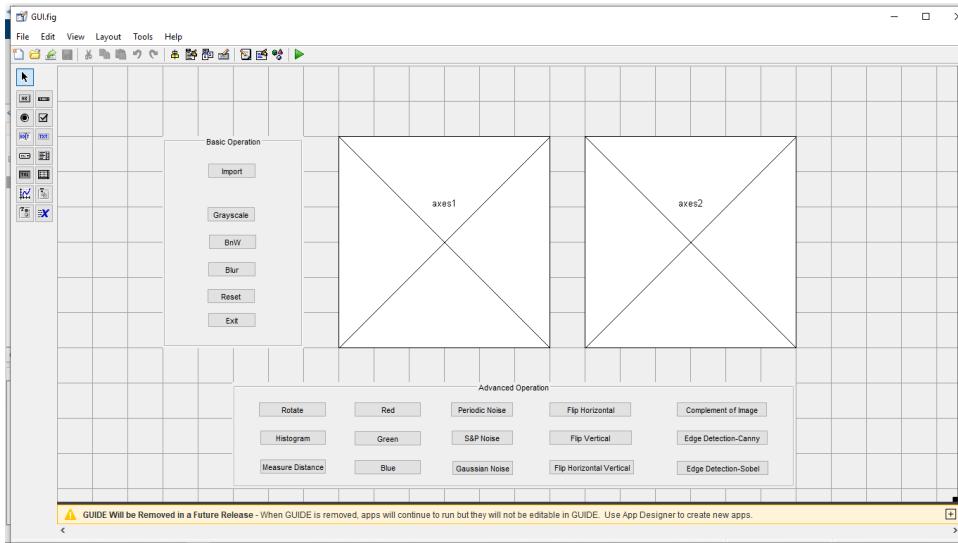
PEMBAHASAN

2.1 Penggunaan Aplikasi

Pada pembahasan ini, kelompok menggunakan aplikasi untuk mengolah citra yaitu MATLAB yang dapat di install secara gratis dengan free-trial selama 30 hari atau 1 bulan.



Disini kelompok dapat masuk ke bagian command windows dan mengetik “guide” agar dapat masuk ke menu guide dimana user dapat membuat GUI (Graphical User Interface).



Di atas adalah gambar GUI yang kelompok buat di aplikasi MATLAB ini, dengan 2 button group untuk menampung semua button, 2 buah axes untuk menampung output, dan 24 buah button dengan fungsinya masing masing.

2.2 Fungsi Button

- Import

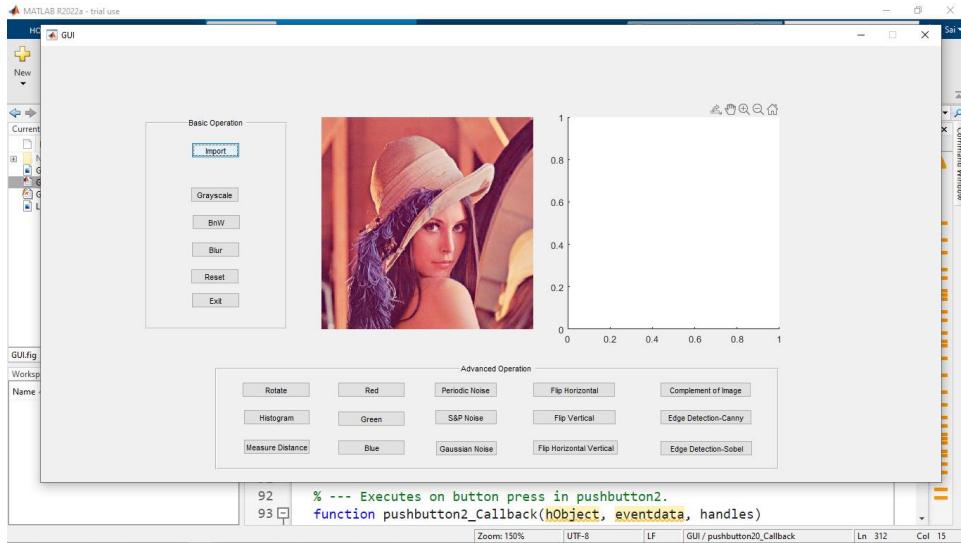
The screenshot shows the MATLAB Editor window with the file 'FilterBlur.m' open. The code in the editor is as follows:

```

73 L varargout{1} = handles.output;
74
75
76 % --- Executes on button press in pushbutton1.
77 function pushbutton1_Callback(hObject, eventdata, handles)
78 % hObject    handle to pushbutton1 (see GCBO)
79 % eventdata   reserved - to be defined in a future version of MATLAB
80 % handles    structure with handles and user data (see GUIDATA)
81 a=uigetfile();
82 filename=a;
83 setappdata(0,'filename',filename);
84 a=imread(a);
85 axes(handles.axes1);
86 imshow(a);
87 setappdata(0,'a',a);
88 setappdata(0,'filename',a);
89 plot(handles.axes1,a);
90
91
92 % --- Executes on button press in pushbutton2.
93 function pushbutton2_Callback(hObject, eventdata, handles)

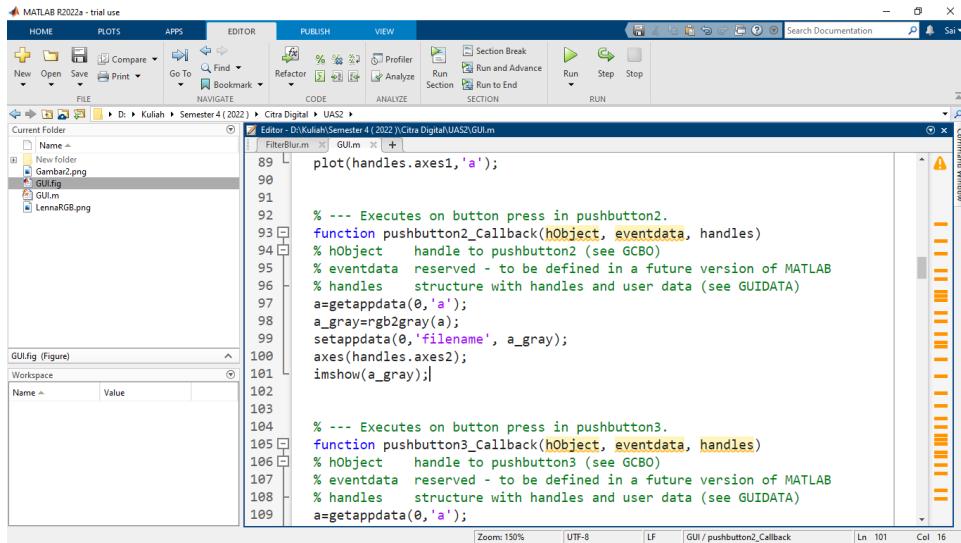
```

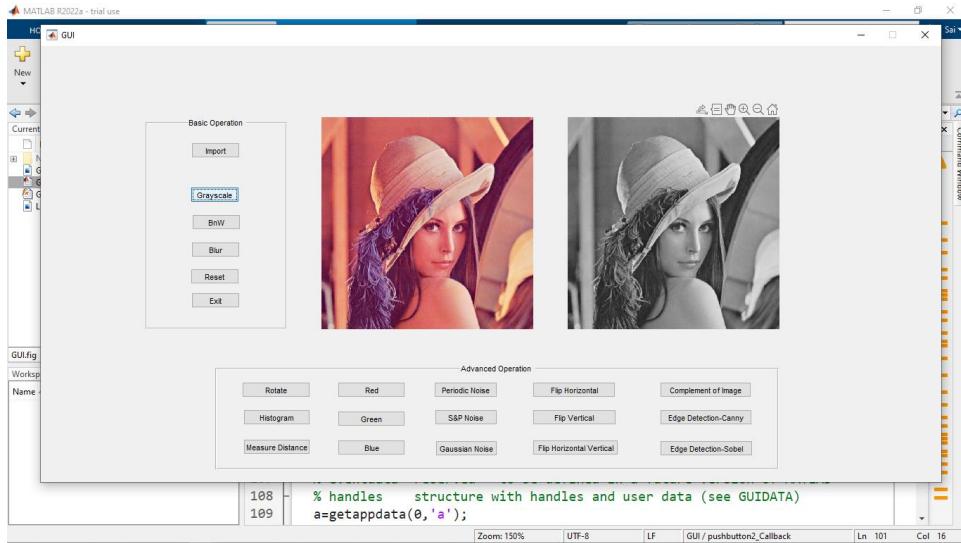
The code handles the 'Import' button press event. It uses the `uigetfile` function to prompt the user for a file, reads the image using `imread`, and then displays it in the first axes (`handles.axes1`). The image is stored in the variable `a` and its handle is stored in `setappdata`.



Berfungsi melakukan import gambar

- Grayscale





Berfungsi memfilter gambar RGB menjadi Grayscale

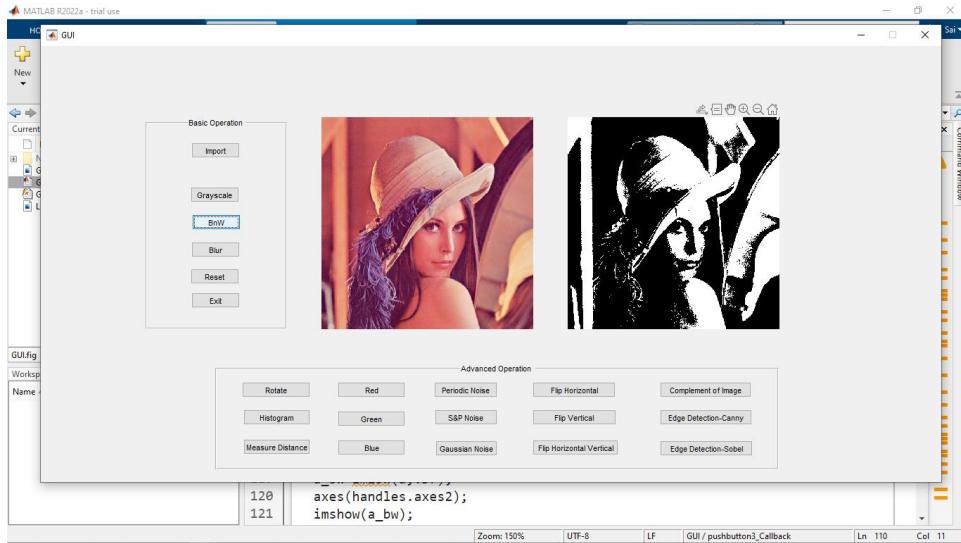
- Black and White

```

% --- Executes on button press in pushbutton4.
function pushbutton4_Callback(hObject, eventdata, handles)
% hObject    handle to pushbutton4 (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles   structure with handles and user data (see GUIDATA)
a=getappdata(hObject,'a');
a_bw=im2bw(a,.57);
axes(handles.axes2);
imshow(a_bw);
setappdata(hObject,'filename',a_bw);

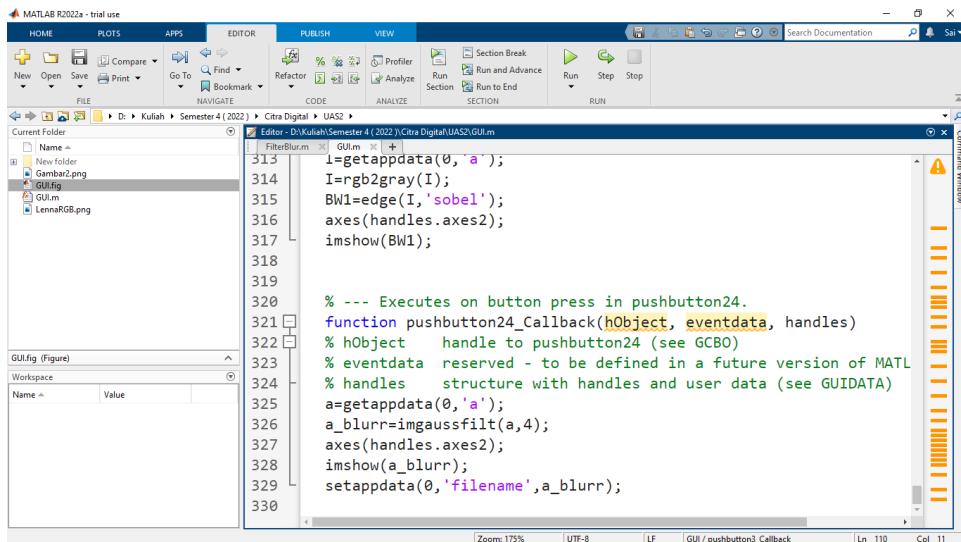
% --- Executes on button press in pushbutton5.
function pushbutton5_Callback(hObject, eventdata, handles)
% hObject    handle to pushbutton5 (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles   structure with handles and user data (see GUIDATA)

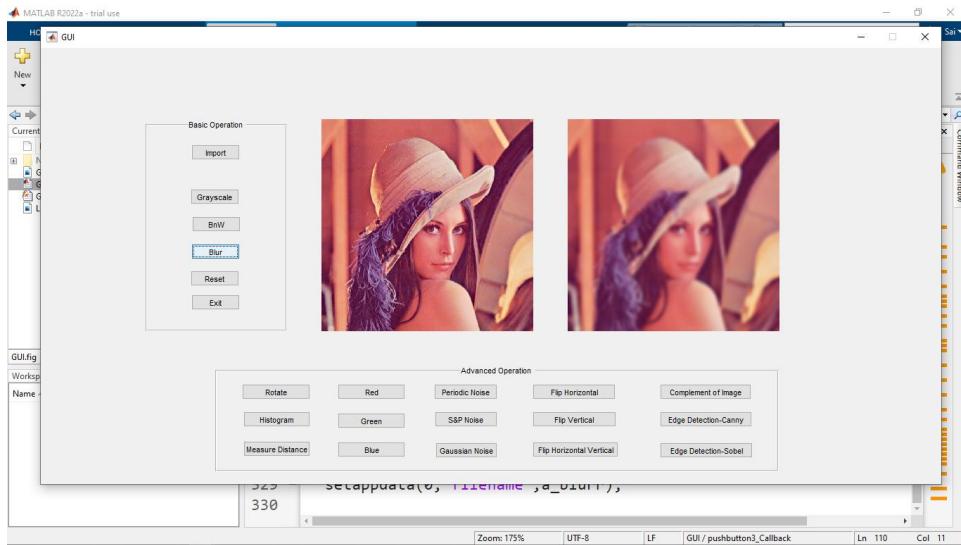
```



Berfungsi memfilter gambar menjadi hitam putih

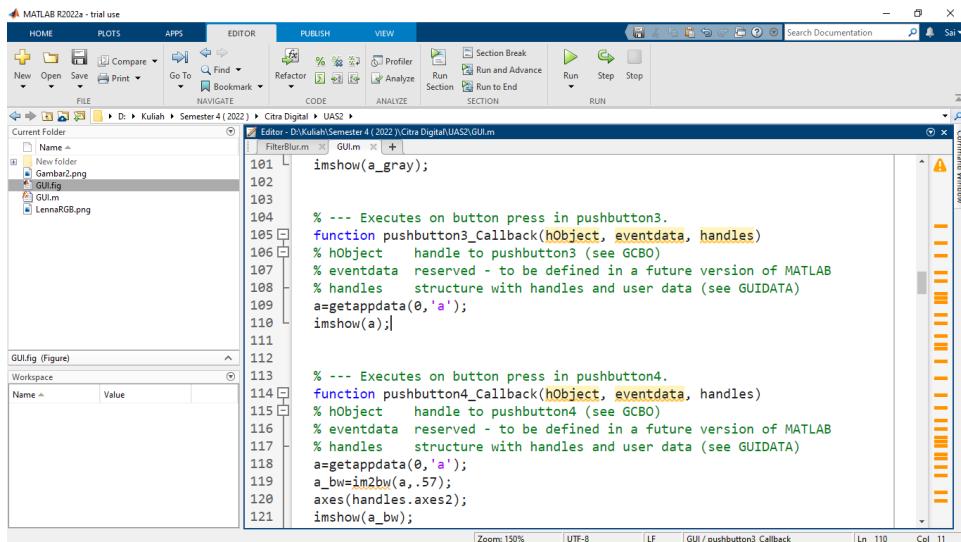
- Blur

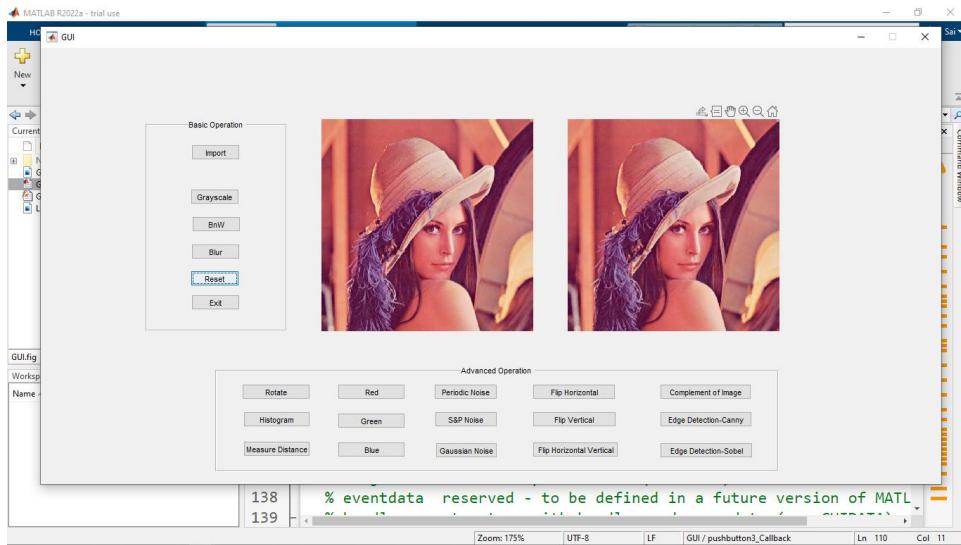




Berfungsi memberikan blur pada gambar

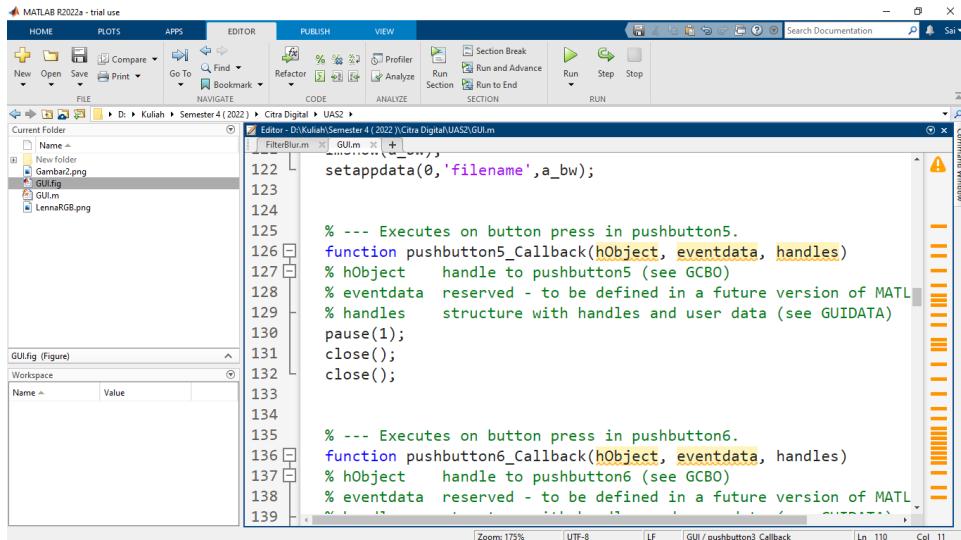
- Reset



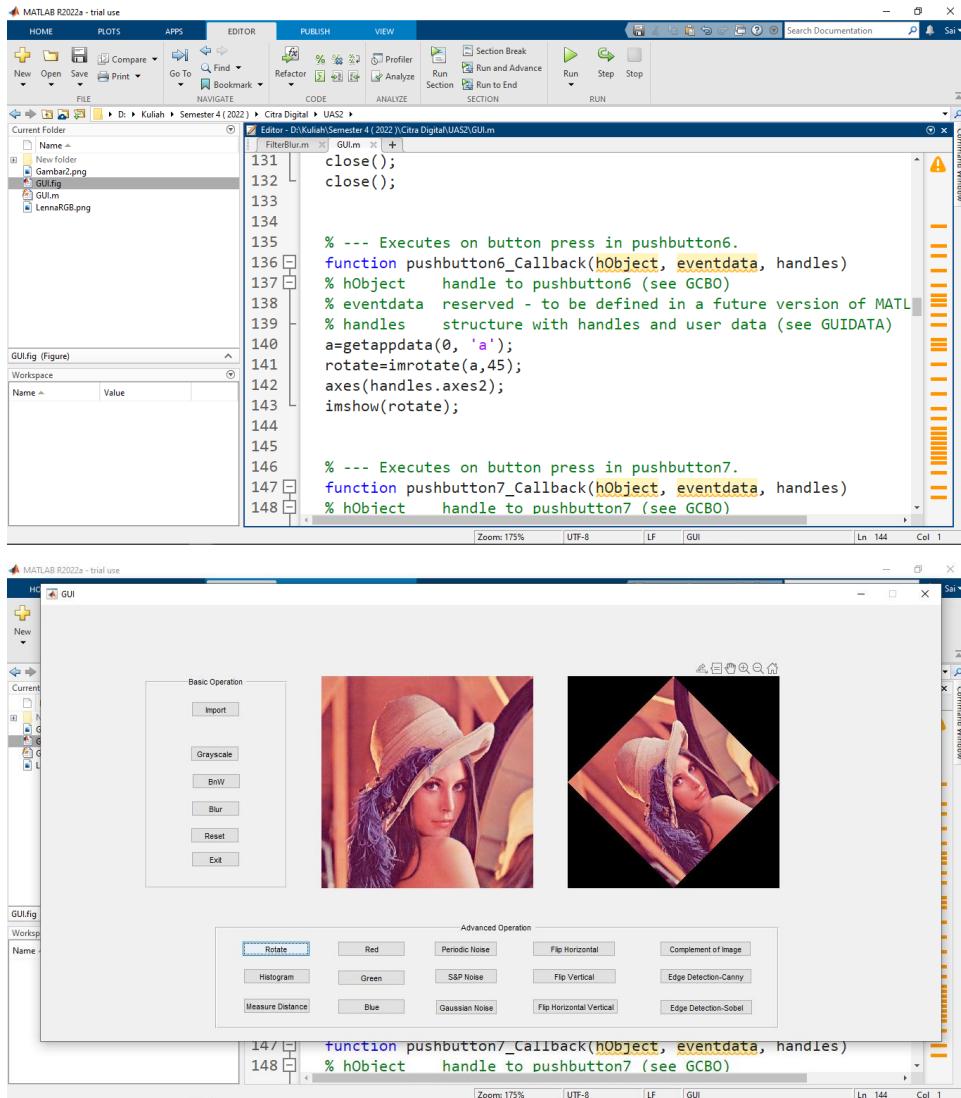


Berfungsi meng-reset semua filter yang diterapkan ke gambar menjadi semula

- Exit

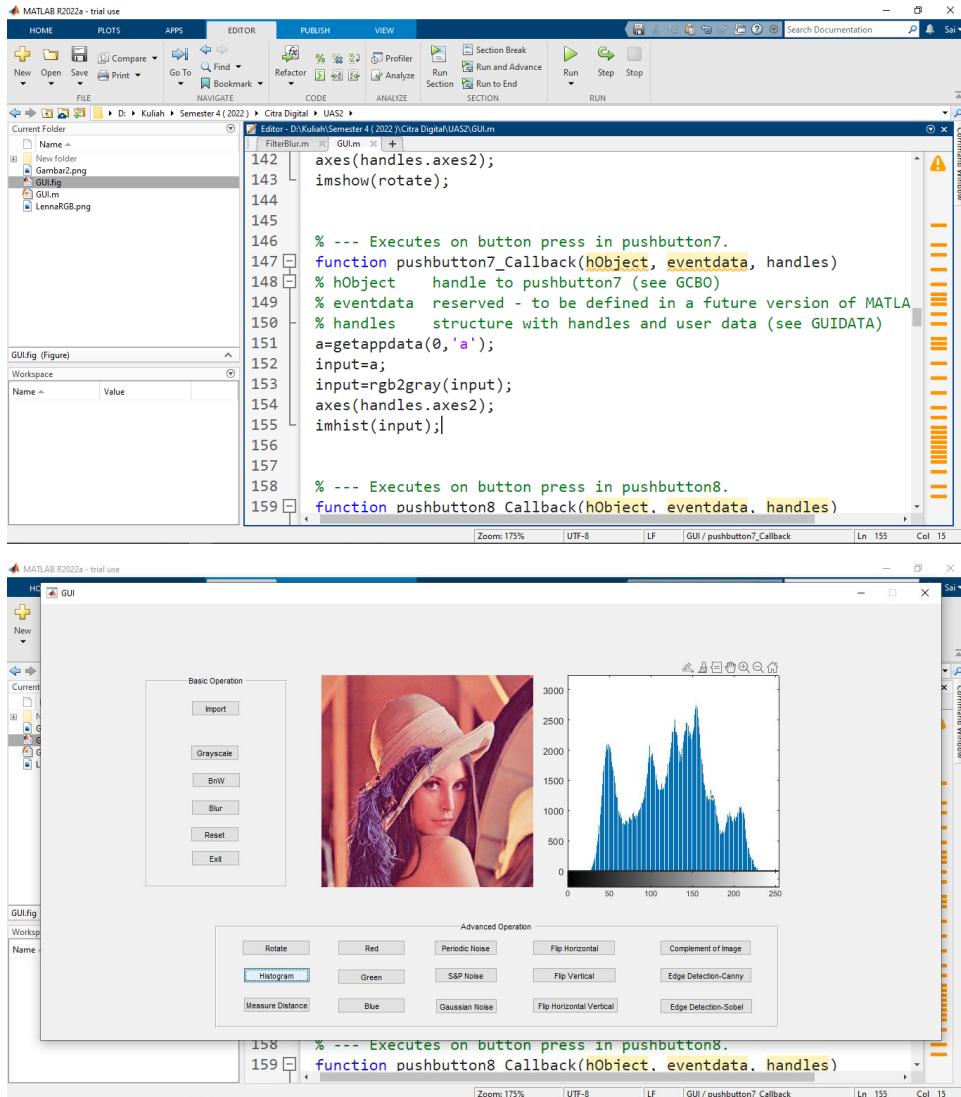


- Rotate



Memutar gambar sebanyak 45 derajat

- Histogram



The screenshot shows the MATLAB R2022a interface. The code editor window displays the following MATLAB script:

```

% --- Executes on button press in pushbutton7.
function pushbutton7_Callback(hObject, eventdata, handles)
% hObject    handle to pushbutton7 (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    structure with handles and user data (see GUIDATA)
a=getappdata(0,'a');
input=a;
input=rgb2gray(input);
axes(handles.axes2);
imhist(input);|
```

% --- Executes on button press in pushbutton8.

```

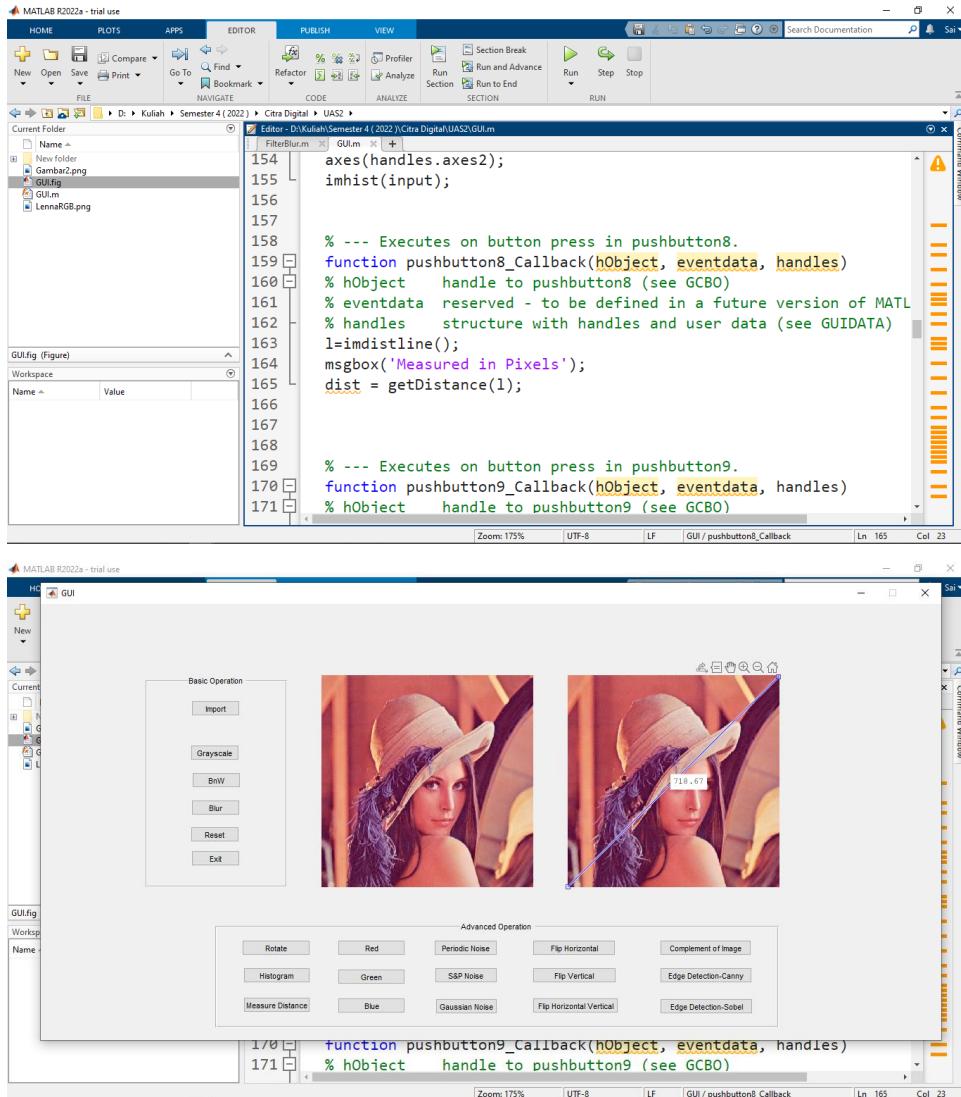
function pushbutton8_Callback(hObject, eventdata, handles)
```

The workspace browser shows variables: `GUIfg` (Figure), `FilterBlur.m`, `GUIm`, and `LennaRGB.png`. The command window on the right shows several warning messages.

The figure window displays a histogram of a grayscale image of a woman wearing a hat. The histogram has a maximum value of approximately 3000 at the peak around 150.

Menampilkan histogram dari gambar

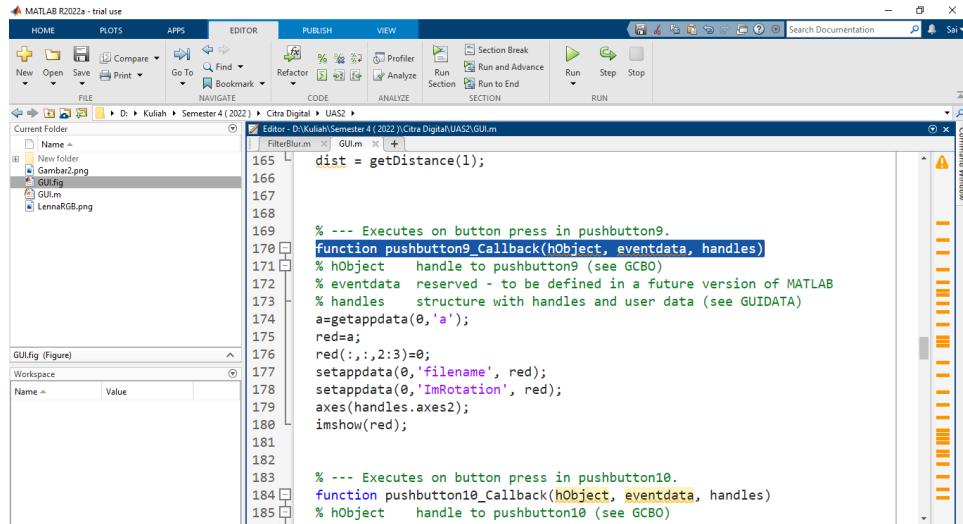
- Measure Distance



Menampilkan garis bantu yang dapat digunakan mengukur ukuran gambar dalam satuan pixel.

- Red, Green, Blue

MATLAB R2022a - trial use



```

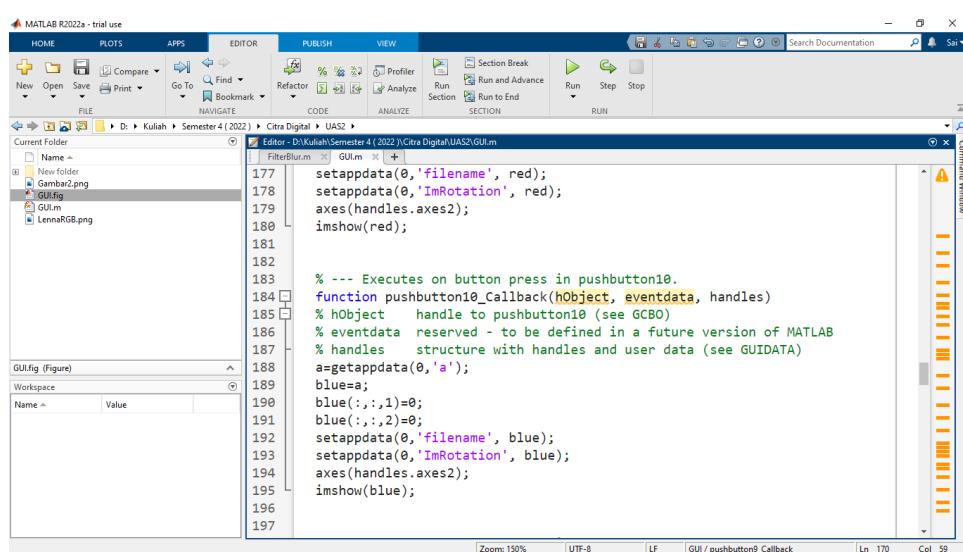
dist = getDistance(1);

% --- Executes on button press in pushbutton9.
function pushbutton9_Callback(hObject, eventdata, handles)
% hObject    handle to pushbutton9 (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    structure with handles and user data (see GUIDATA)
a=getappdata(hObject,'a');
red=a;
red(:, :, 2:3)=0;
setappdata(hObject,'filename', red);
setappdata(hObject,'ImRotation', red);
axes(handles.axes2);
imshow(red);

% --- Executes on button press in pushbutton10.
function pushbutton10_Callback(hObject, eventdata, handles)
% hObject    handle to pushbutton10 (see GCBO)

```

MATLAB R2022a - trial use

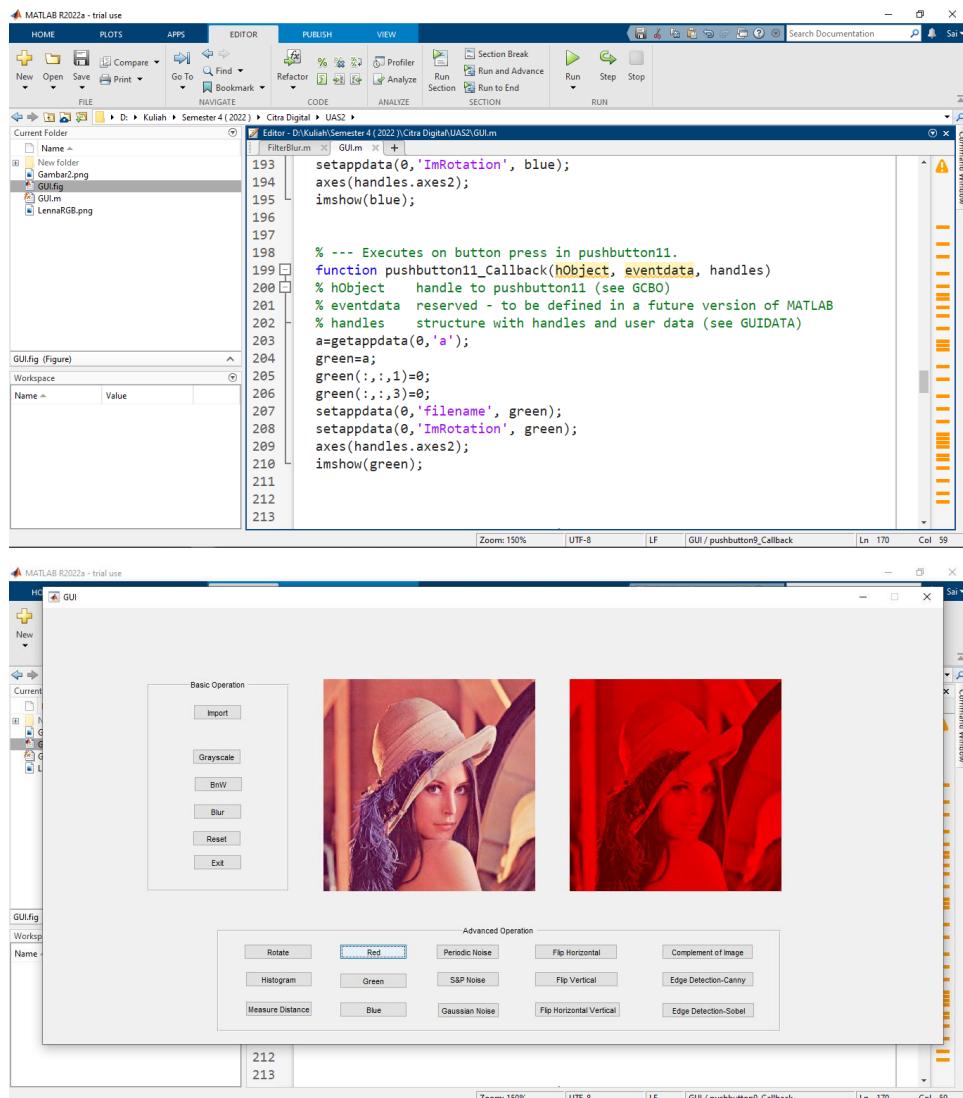


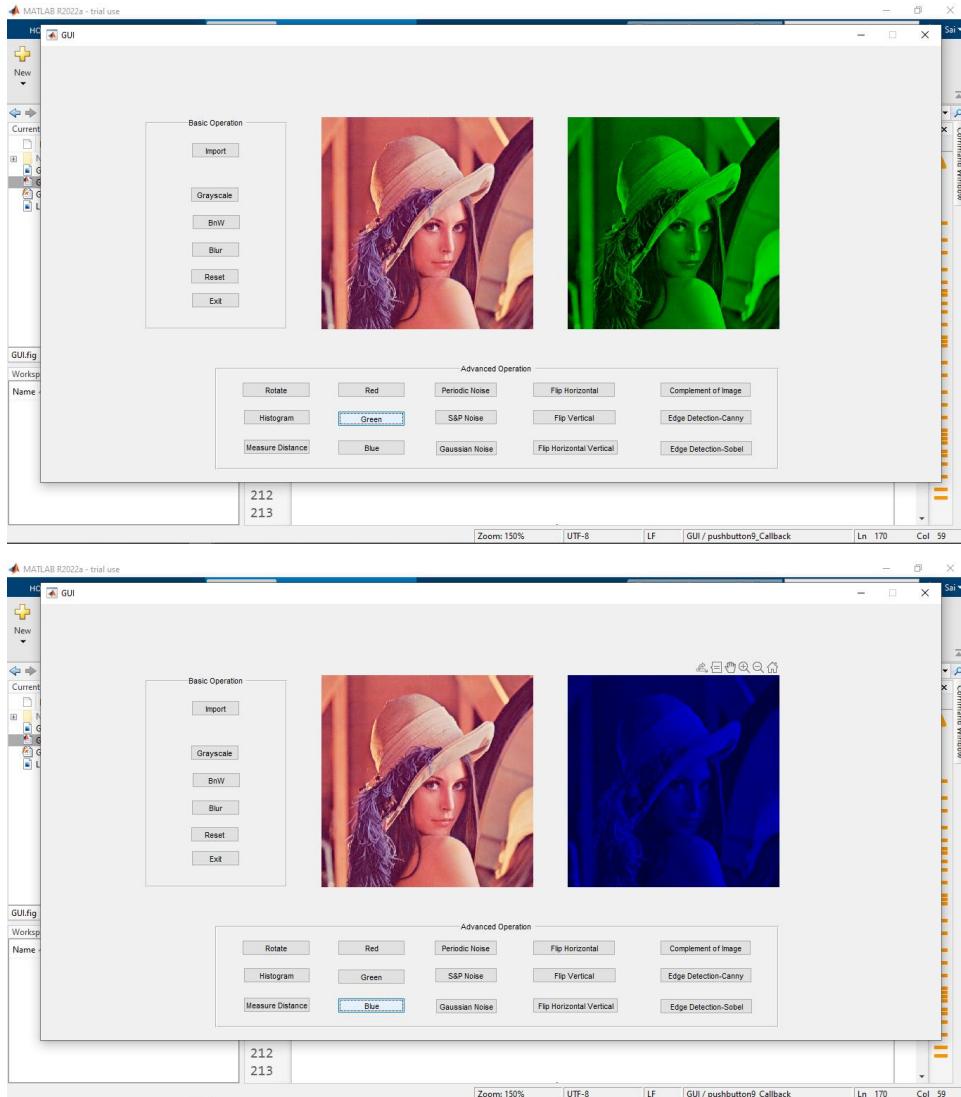
```

setappdata(hObject,'filename', red);
setappdata(hObject,'ImRotation', red);
axes(handles.axes2);
imshow(red);

% --- Executes on button press in pushbutton10.
function pushbutton10_Callback(hObject, eventdata, handles)
% hObject    handle to pushbutton10 (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    structure with handles and user data (see GUIDATA)
a=getappdata(hObject,'a');
blue=a;
blue(:, :, 1)=0;
blue(:, :, 2)=0;
setappdata(hObject,'filename', blue);
setappdata(hObject,'ImRotation', blue);
axes(handles.axes2);
imshow(blue);

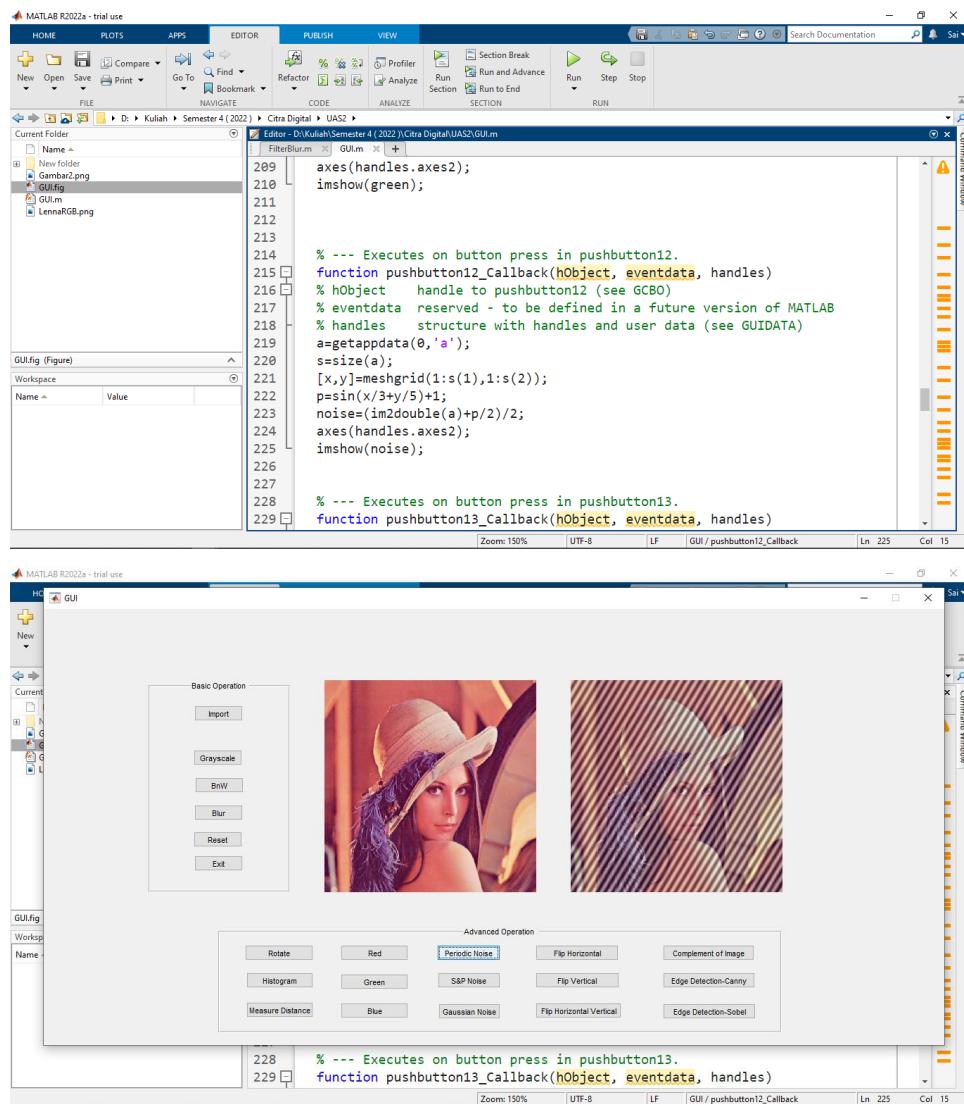
```

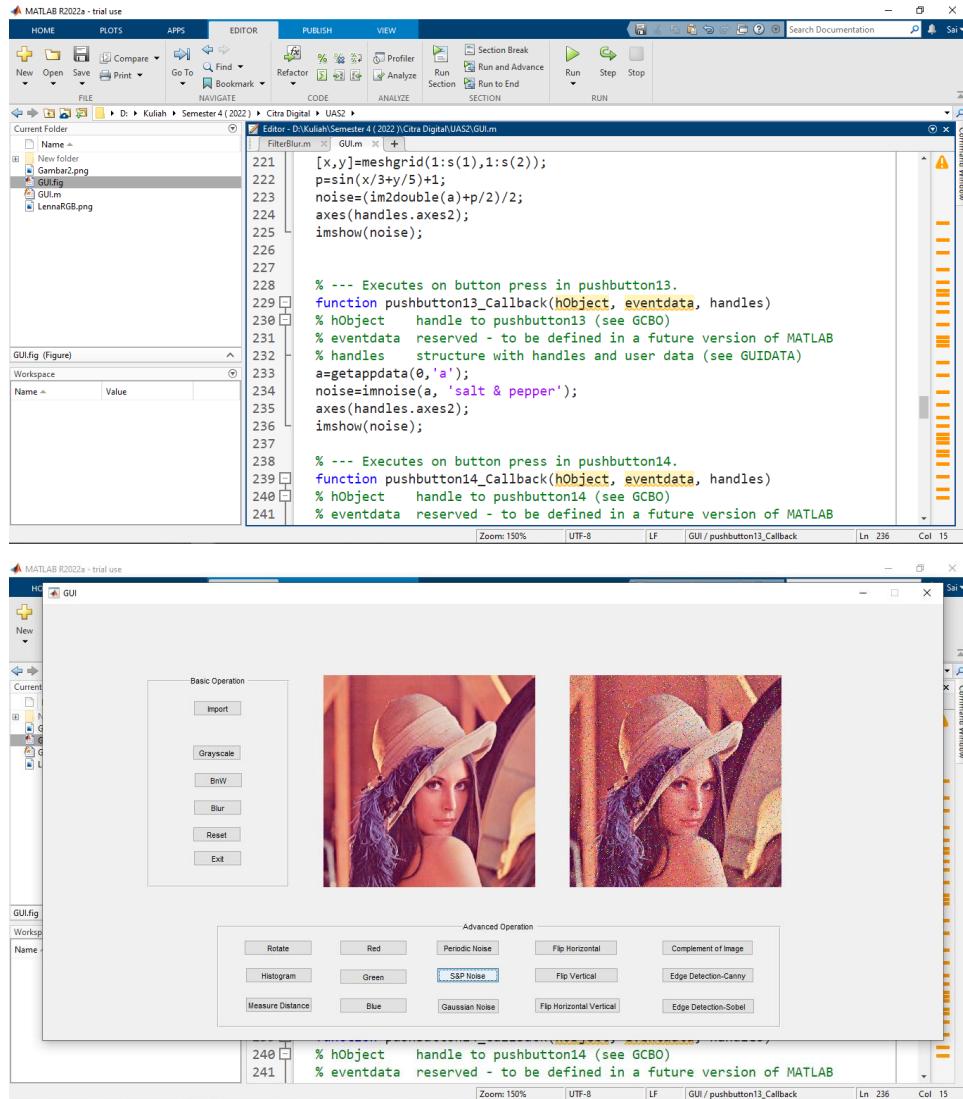


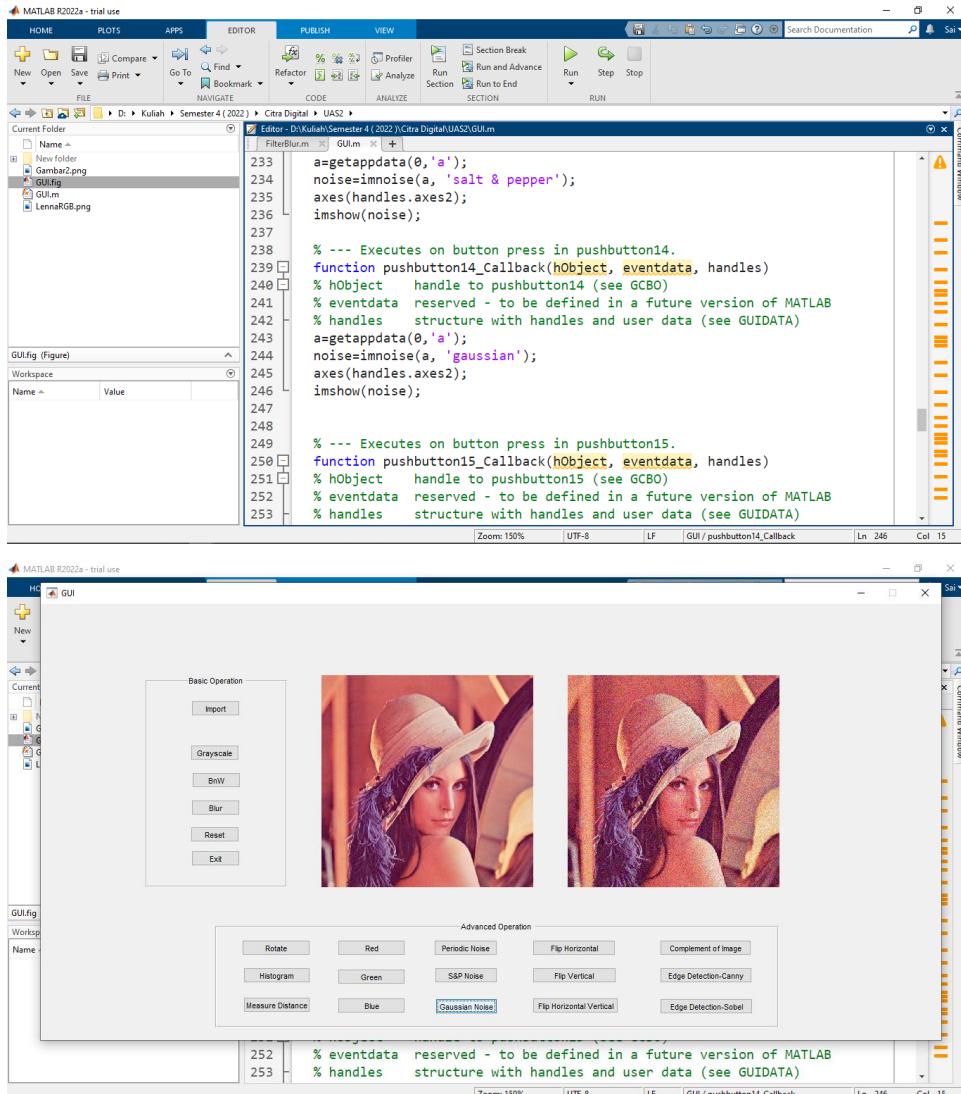


Mengambil pixel warna merah, hijau, atau biru saja untuk di tampilkan

- Noise







```

% MATLAB R2022a - trial use
%
% --- Executes on button press in pushbutton14.
function pushbutton14_Callback(hObject, eventdata, handles)
% hObject    handle to pushbutton14 (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    structure with handles and user data (see GUIDATA)
a=getappdata(hObject,'a');
noise=imnoise(a, 'salt & pepper');
axes(handles.axes2);
imshow(noise);

% --- Executes on button press in pushbutton15.
function pushbutton15_Callback(hObject, eventdata, handles)
% hObject    handle to pushbutton15 (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    structure with handles and user data (see GUIDATA)
a=getappdata(hObject,'a');
noise=imnoise(a, 'gaussian');
axes(handles.axes2);
imshow(noise);

% eventdata reserved - to be defined in a future version of MATLAB
% handles structure with handles and user data (see GUIDATA)

```

Menerapkan filter Periodic noise, salt & pepper noise atau gaussian noise ke gambar

- Flip

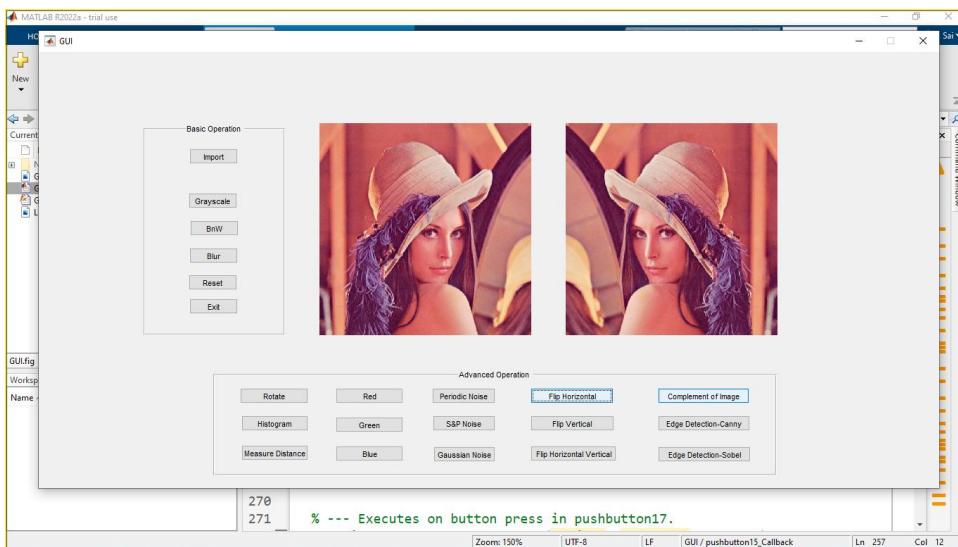
MATLAB R2022a - trial use

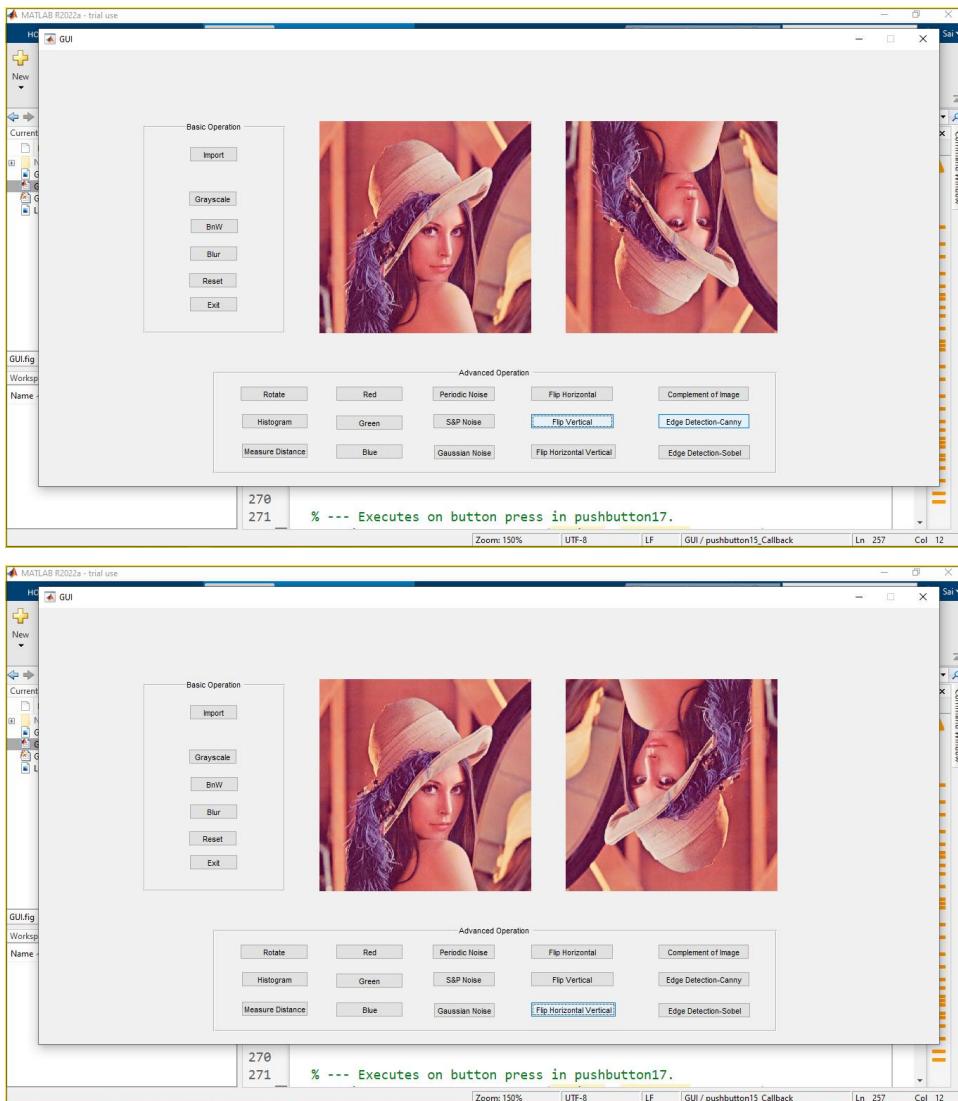
```

HOME PLOTS APPS EDITOR
FILE NAVIGATE CODE ANALYZE
New Open Save Print Go To Find Refactor Run Section Break
Run and Advance Run Section Run to End Run Step Stop
RUN SECTION
Editor - D:\Kuliah\Semester 4 (2022)\Citra Digital\UAS2\GUI.m
Current Folder
Name ~
New folder Gambar2.png
GUIfg GUI.m LennaRGB.png
253 % handles structure with handles and user data (see GUIDATA)
254 Igetapdata(0,'a');
255 I2=flipdim(I,2);
256 axes(handles.axes2);
257 imshow(I2);
258
259 % --- Executes on button press in pushbutton16.
260 function pushbutton16_Callback(hObject, eventdata, handles)
261 % hObject handle to pushbutton16 (see GCBO)
262 % eventdata reserved - to be defined in a future version of MATLAB
263 % handles structure with handles and user data (see GUIDATA)
264 Igetapdata(0,'a');
265 I3=flipdim(I,1);
266 axes(handles.axes2);
267 imshow(I3);
268
269 % --- Executes on button press in pushbutton17_Callback(hObject, eventdata, handles)
270 function pushbutton17_Callback(hObject, eventdata, handles)
271 % hObject handle to pushbutton17 (see GCBO)
272 % eventdata reserved - to be defined in a future version of MATLAB
273 % handles structure with handles and user data (see GUIDATA)
274 Igetapdata(0,'a');
275 I4=flipdim(I,2);
276 I3=flipdim(I,1);
277 I4=flipdim(I3,2);
278 axes(handles.axes2);
279 imshow(I4);
280
281 L
282
283

```

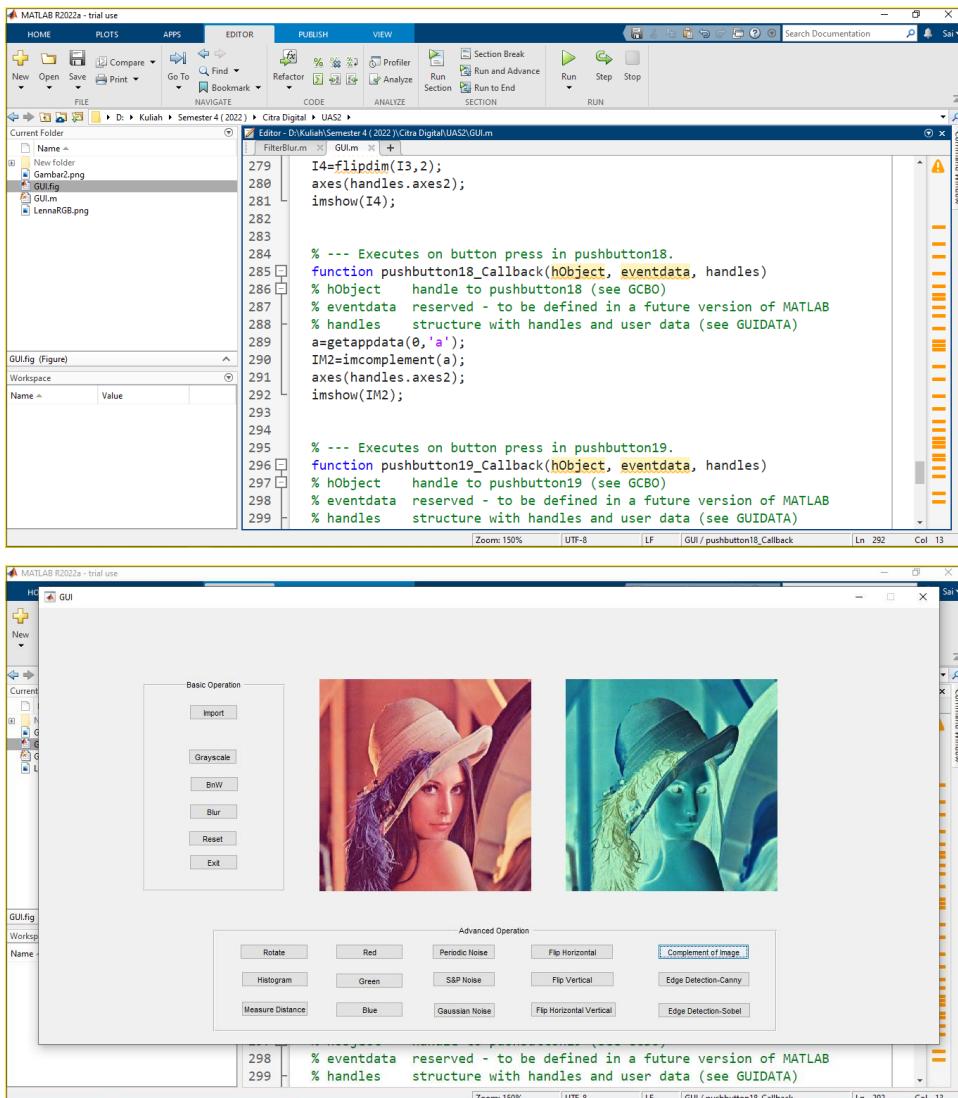
Zoom: 100% | UTF-8 | LF | GUI / pushbutton15_Callback | Ln 257 Col 12





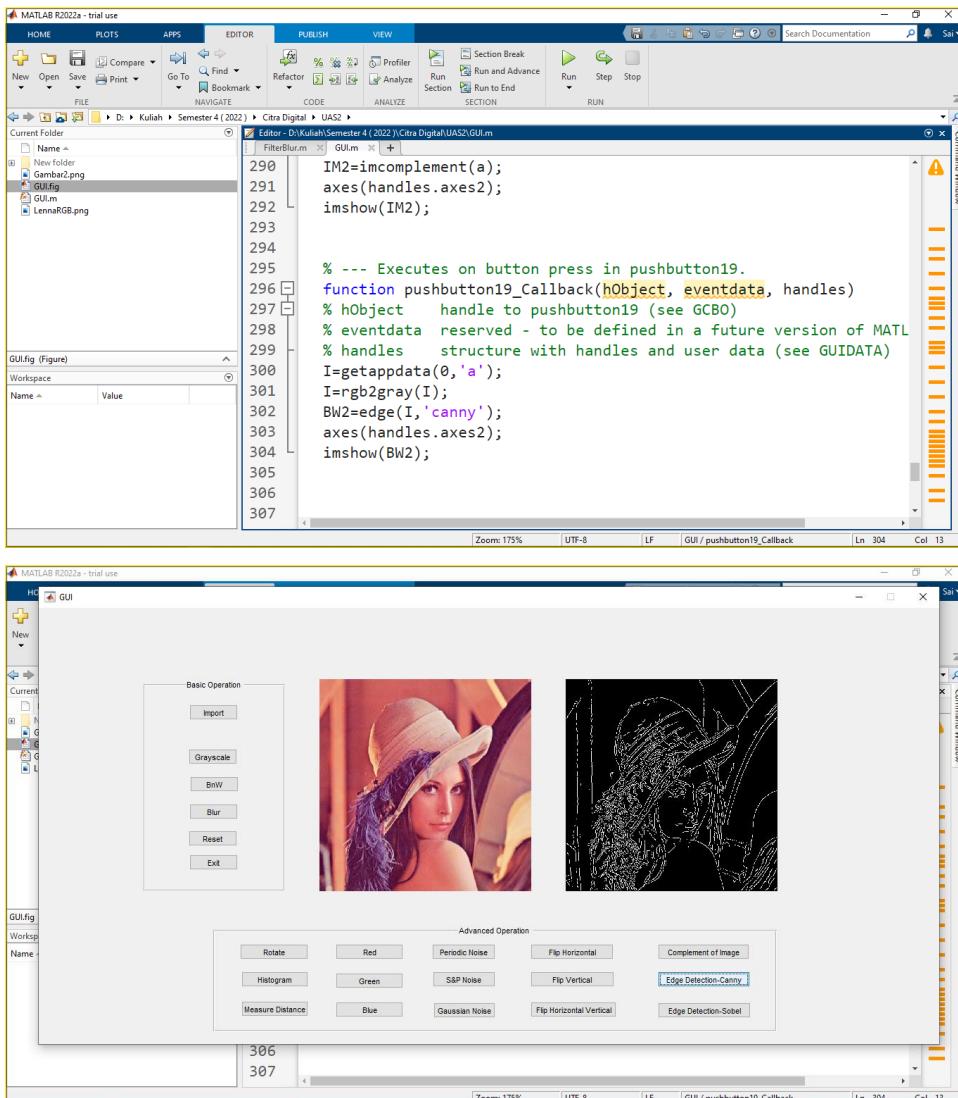
Melakukan flip pada gambar secara horizontal, vertikal, dan horizontal-vertikal (horizontal sebanyak 1 kali kemudian vertikal 1 kali)

- Complement of Image



Memberikan efek complement of image atau yang kita kenal efek negatif.

- Edge Detection-Canny



Menerapkan edge detection-canny untuk mengambil tepi pada gambar secara hitam putih

- Edge Detection-Sobel

```

% --- Executes on button press in pushbutton20.
function pushbutton20_Callback(hObject, eventdata, handles)
% hObject    handle to pushbutton20 (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    structure with handles and user data (see GUIDATA)
I=getappdata(0,'a');
I=rgb2gray(I);
BW1=edge(I,'sobel');
axes(handles.axes2);
imshow(BW1);

% --- Executes on button press in pushbutton24.
function pushbutton24_Callback(hObject, eventdata, handles)

```

Menerapkan edge-detection sobel, mirip seperti canny yaitu untuk mencari tepi garis pada gambar, tapi ini lebih halus dan mungkin beberapa tepi tidak dapat terjangkau

BAB III

PENUTUP

3.1 Kesimpulan

Kesimpulan dari tulisan ini adalah kelompok dapat berhasil menyelesaikan tugas ini, dengan menggunakan aplikasi MATLAB yang dapat memudahkan user dalam pembuatan GUI khusunya dalam melakukan pengolahan pada citra.

DAFTAR PUSTAKA

<https://www.mathworks.com/>