



**USER MANUAL DAN KODE PROGRAM
KOMPUTER:**

**ANALISIS PREDIKSI KELULUSAN
MAHASISWA PADA MODEL
PEMBELAJARAN HYBRID LEARNING
MENGUNAKAN JARINGAN SARAF
TIRUAN**

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Septi Andryana, S.Kom, MMSI
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Juni 2019

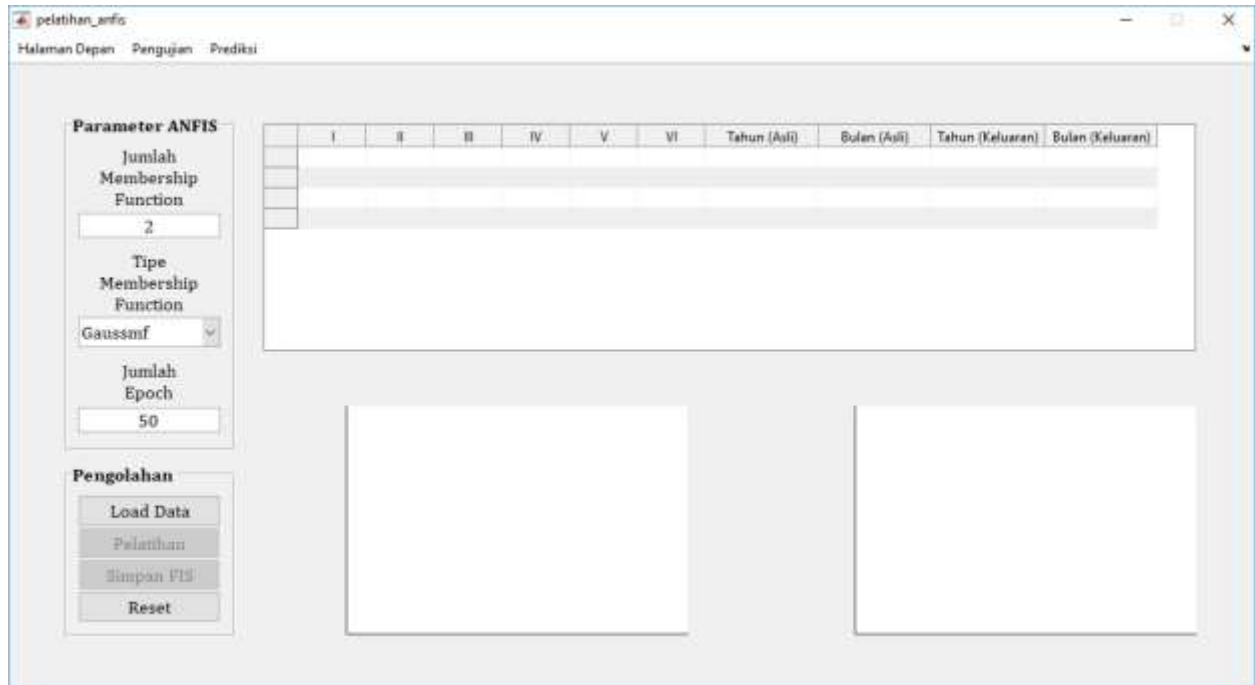
1. Membuka Halaman Depan



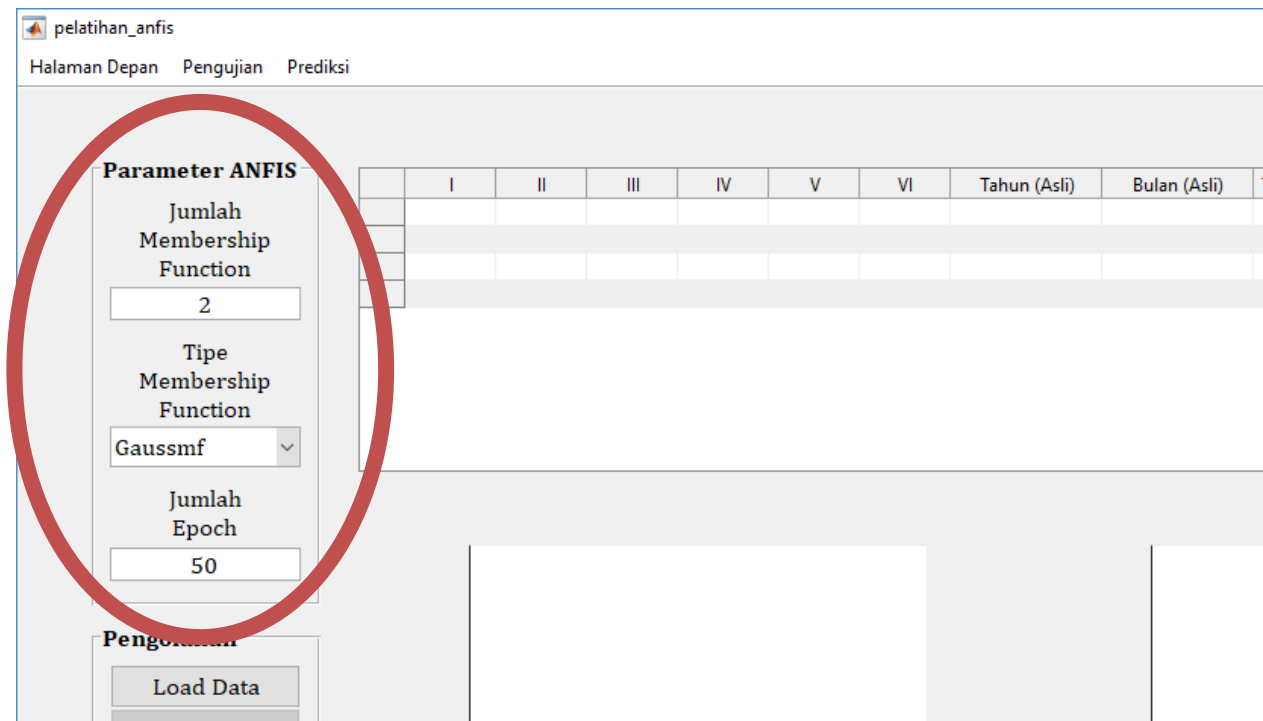
2. Membuka Halaman Pelatihan



3. Halaman Pelatihan



4. Setting Parameter ANFIS (jumlah *membership function*, tipe *membership function*, jumlah epoch)



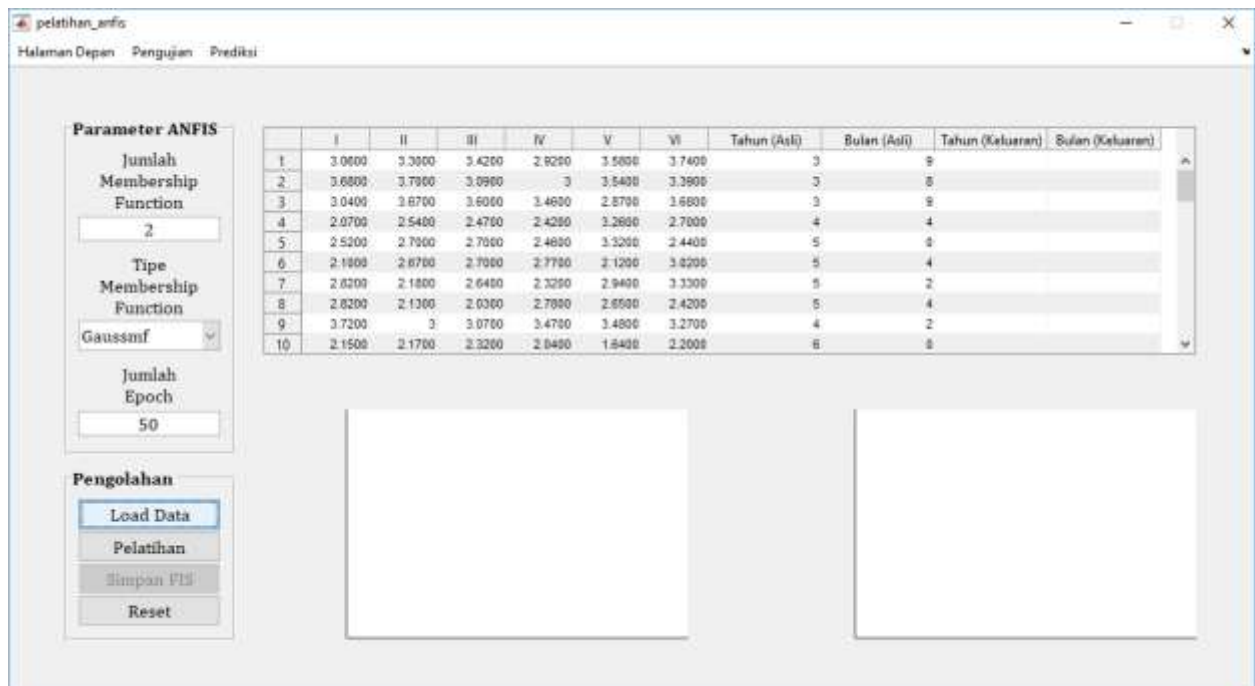
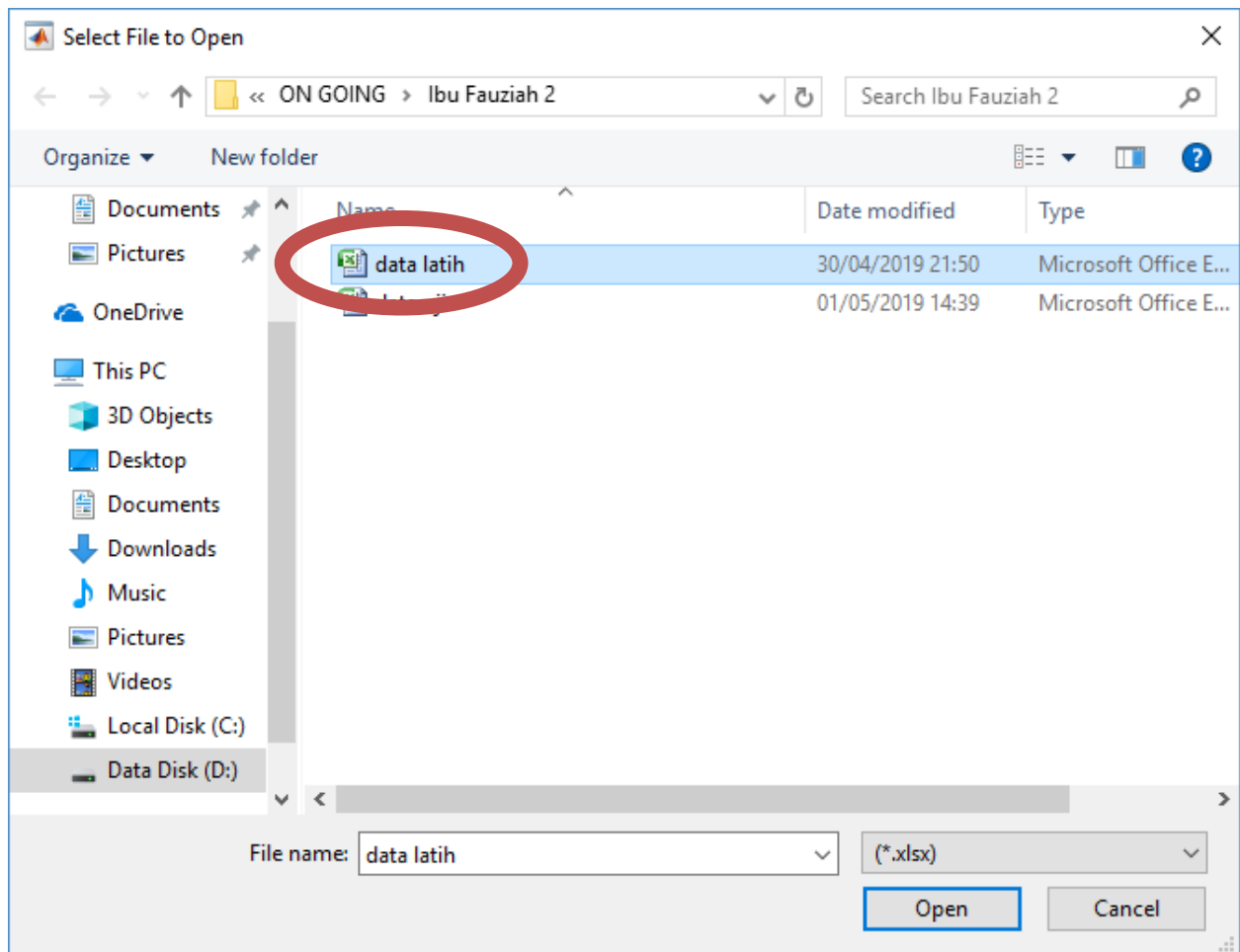
- Load Data Latih (input berupa IP mahasiswa dari semester I s.d VI, sedangkan output prediksi berupa lama studi)

data latih - Microsoft Ex

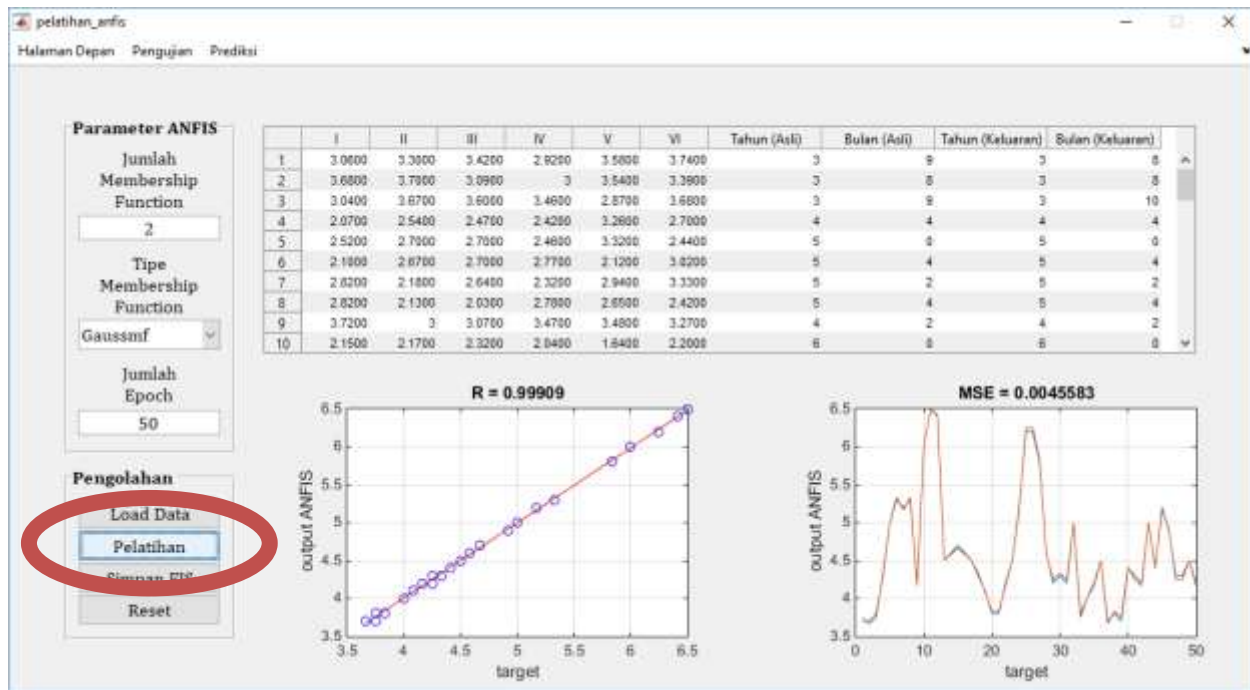
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2		No	IP SEMESTER						Lama Studi		
3			I	II	III	IV	V	VI	Tahun	Bulan	
4		1	3,06	3,30	3,42	2,92	3,58	3,74	3	9	
5		2	3,68	3,70	3,09	3,00	3,54	3,39	3	8	
6		3	3,04	3,67	3,60	3,46	2,87	3,68	3	9	
7		4	2,07	2,54	2,47	2,42	3,26	2,70	4	4	
8		5	2,52	2,70	2,70	2,46	3,32	2,44	5	0	
9		6	2,10	2,67	2,70	2,77	2,12	3,02	5	4	
10		7	2,82	2,18	2,64	2,32	2,94	3,33	5	2	
11		8	2,82	2,13	2,03	2,78	2,65	2,42	5	4	
12		9	3,72	3,00	3,07	3,47	3,48	3,27	4	2	
13		10	2,15	2,17	2,32	2,04	1,64	2,20	6	0	
14		11	2,66	2,03	1,53	2,18	2,54	1,82	6	6	
15		12	2,52	2,56	2,65	2,72	2,65	2,43	6	5	
16		13	2,97	2,88	3,41	3,47	3,54	2,89	4	6	
17		14	2,65	2,67	2,82	3,15	2,72	3,39	4	7	
18		15	2,80	3,19	2,72	2,34	2,52	2,77	4	8	
19		16	2,45	3,37	2,97	2,61	2,99	3,40	4	7	
20		17	2,43	2,46	2,53	3,19	3,22	2,81	4	6	
21		18	2,83	2,98	2,33	2,74	3,11	2,76	4	4	
22		19	3,08	3,16	3,11	3,24	3,11	3,38	4	1	
23		20	3,13	3,86	3,61	3,92	3,06	3,22	3	10	
24		21	3,17	3,64	3,78	3,27	3,40	3,79	3	10	
25		22	2,39	2,38	2,42	2,77	3,45	2,95	4	2	

Sheet1 Sheet2 Sheet3

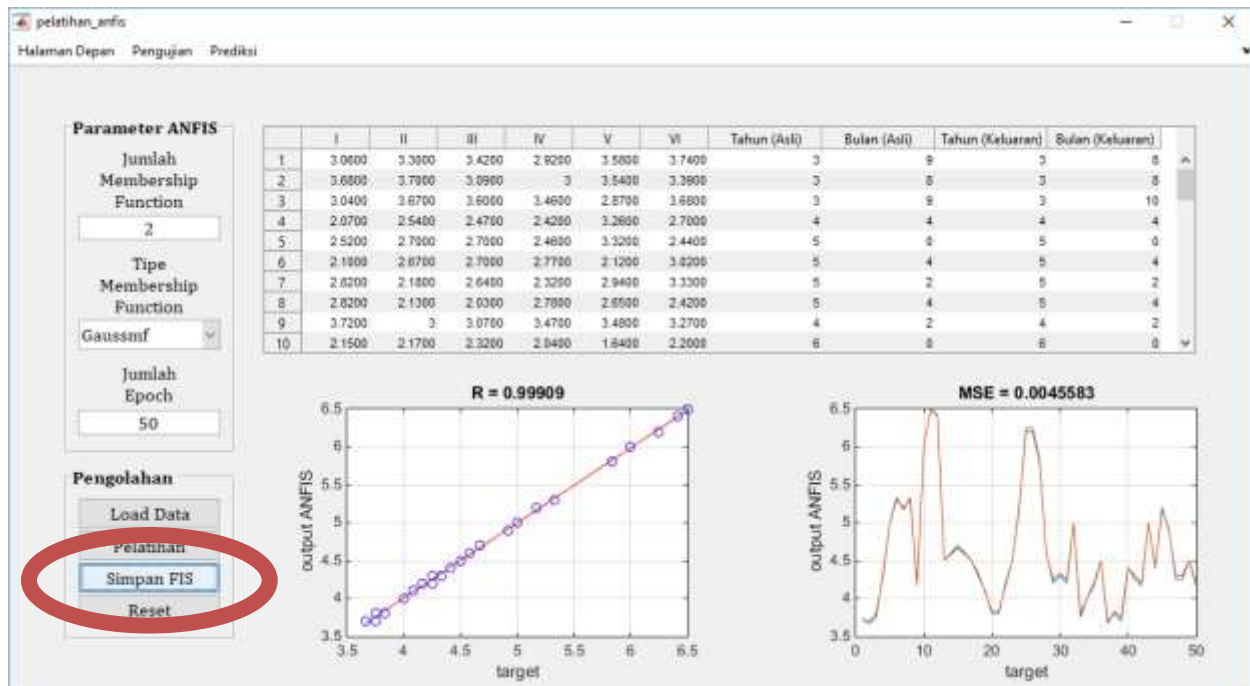
Ready

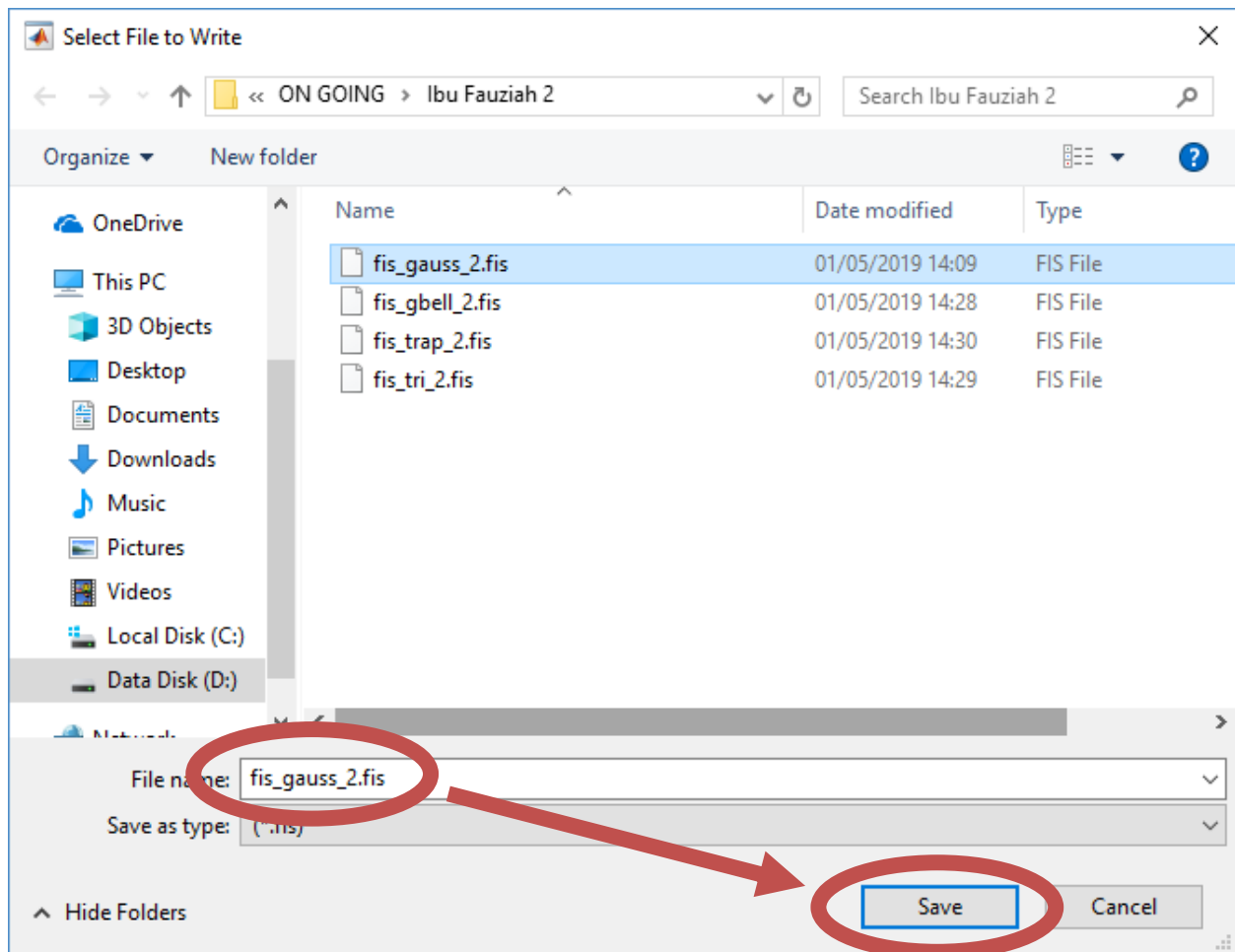


6. Melakukan pelatihan ANFIS

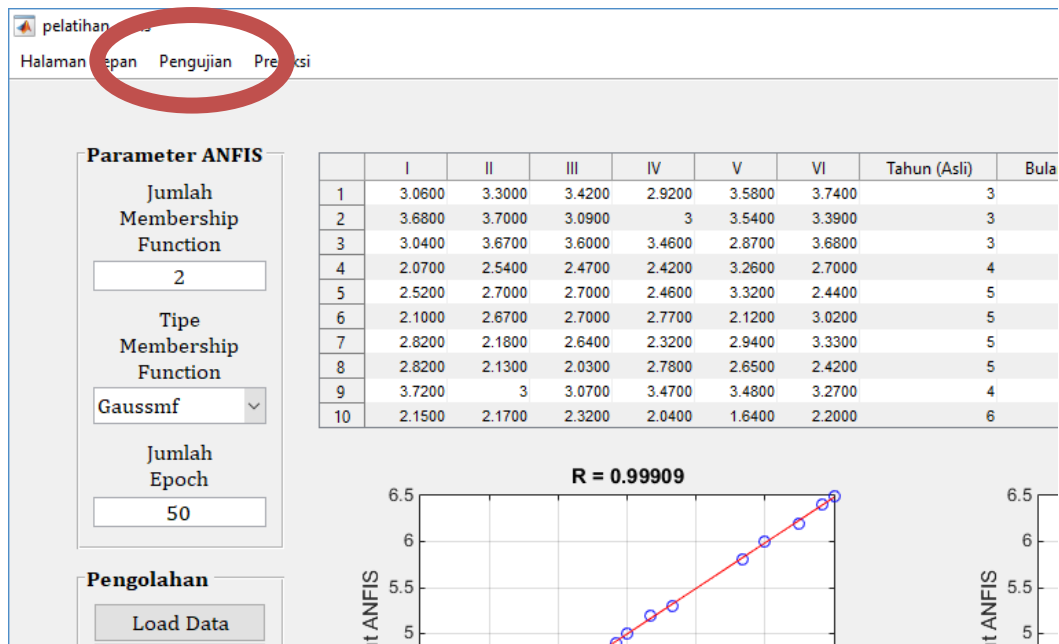


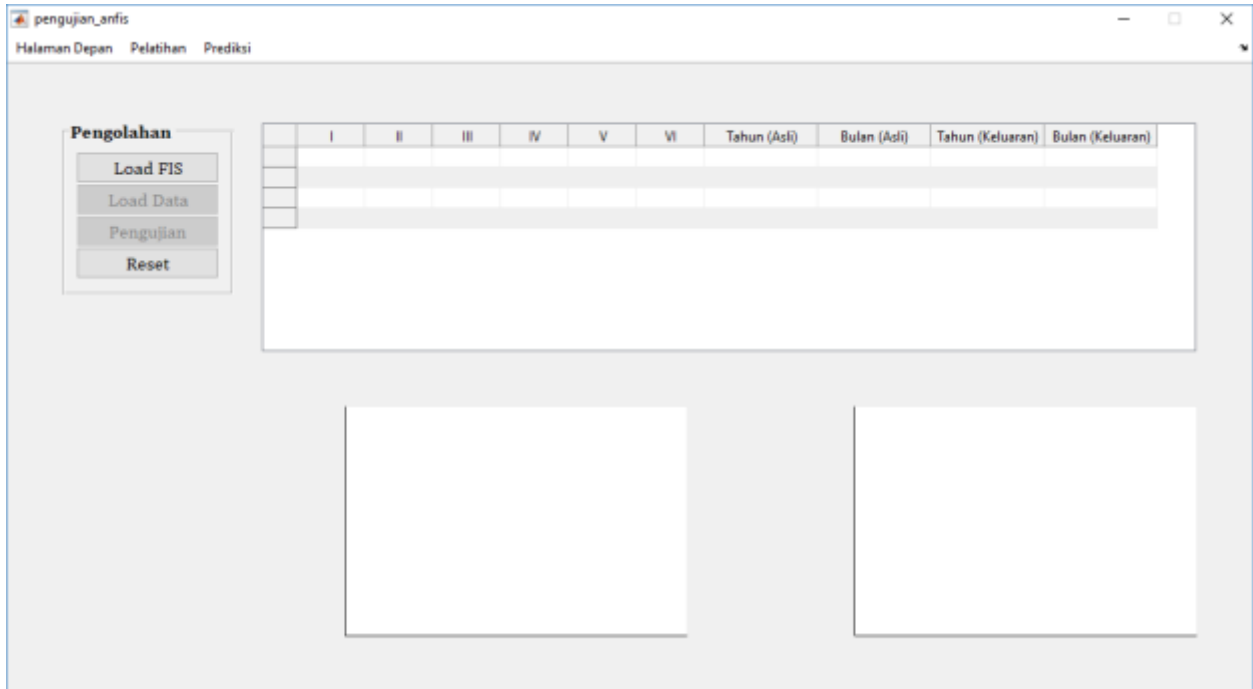
7. Menyimpan variable FIS (Fuzzy Inference System)



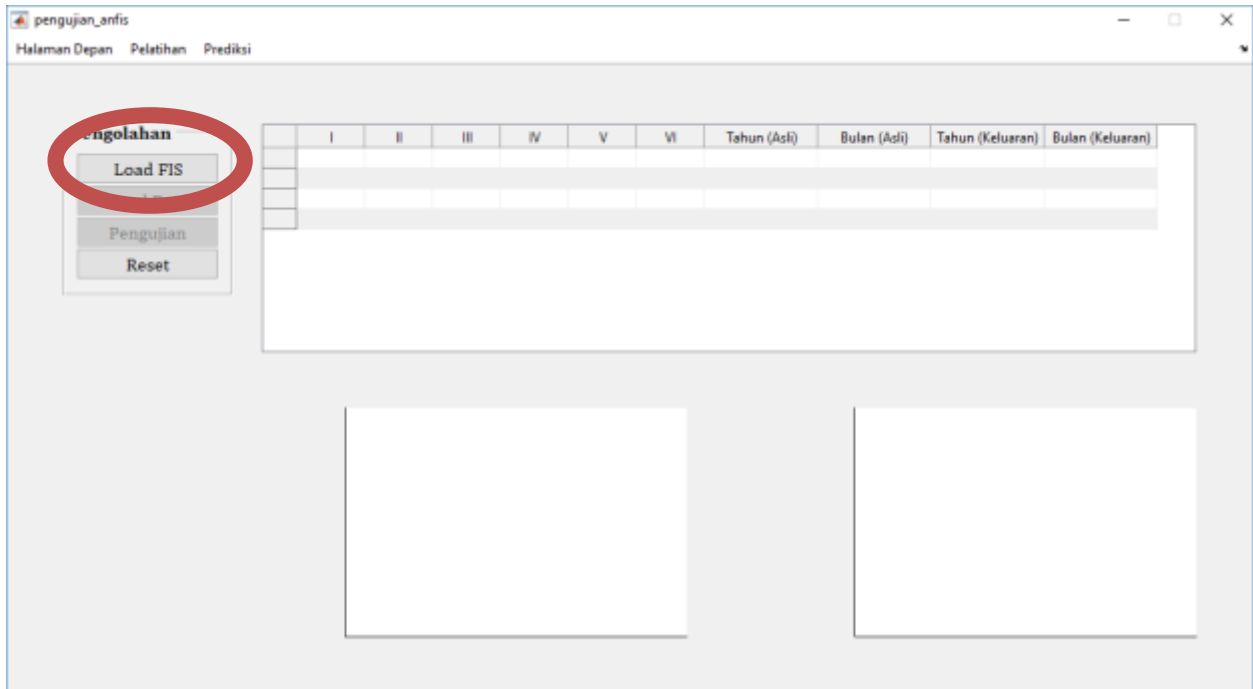


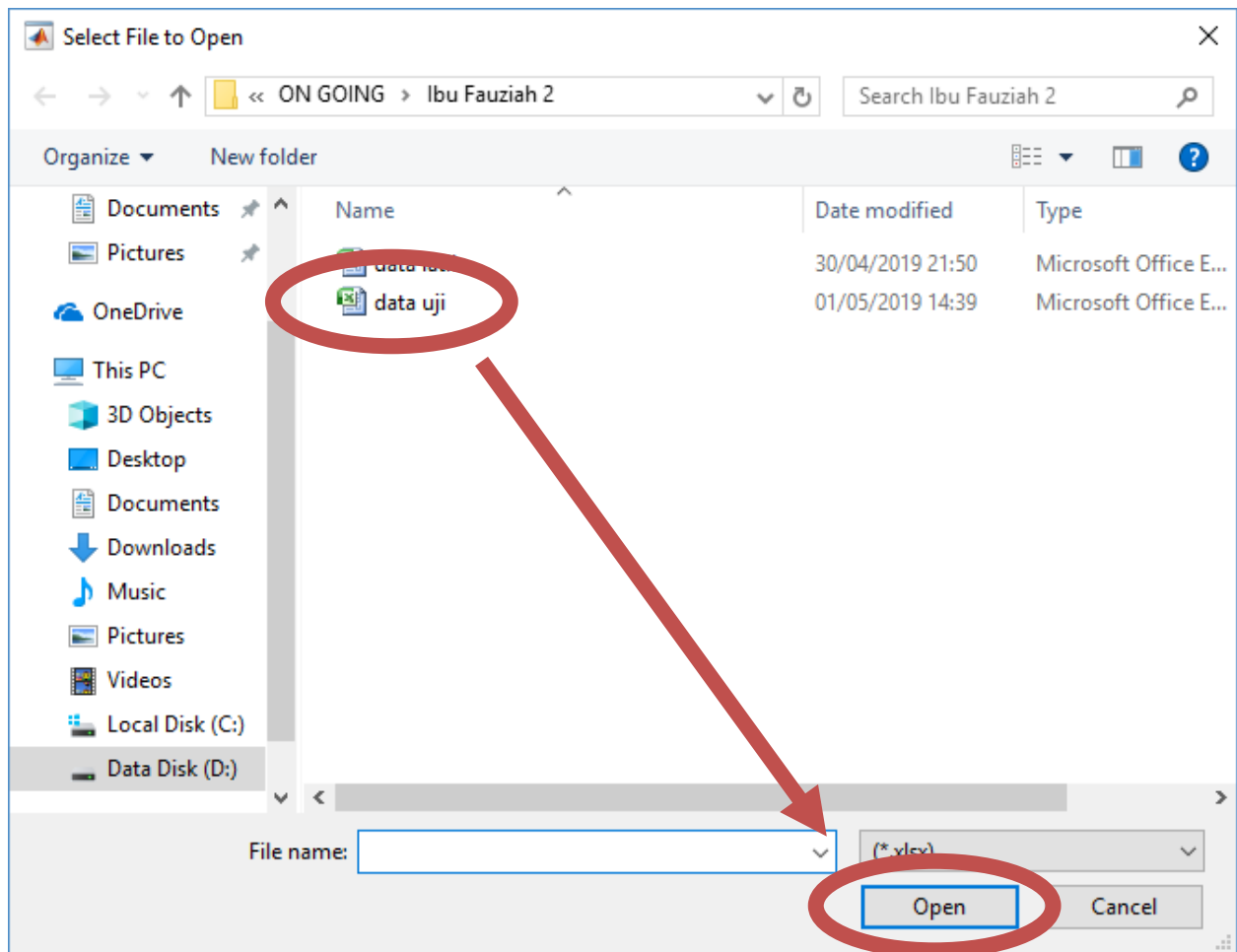
8. Membuka halaman pengujian



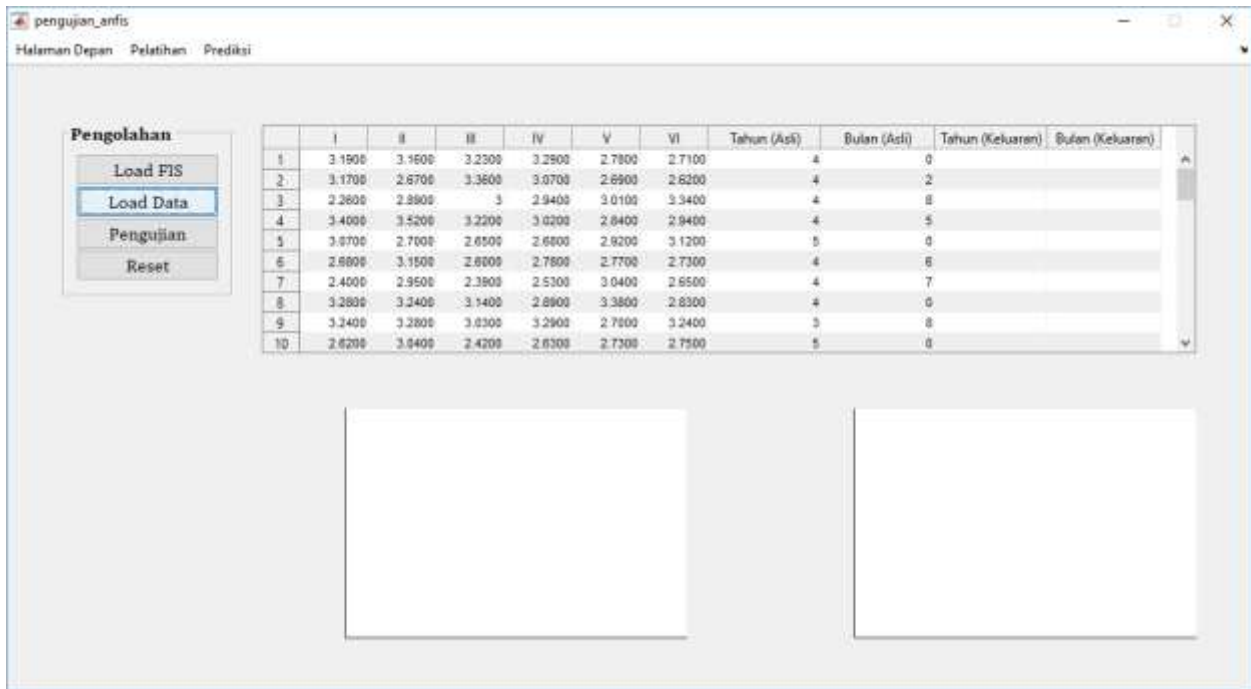


9. Load FIS hasil pelatihan

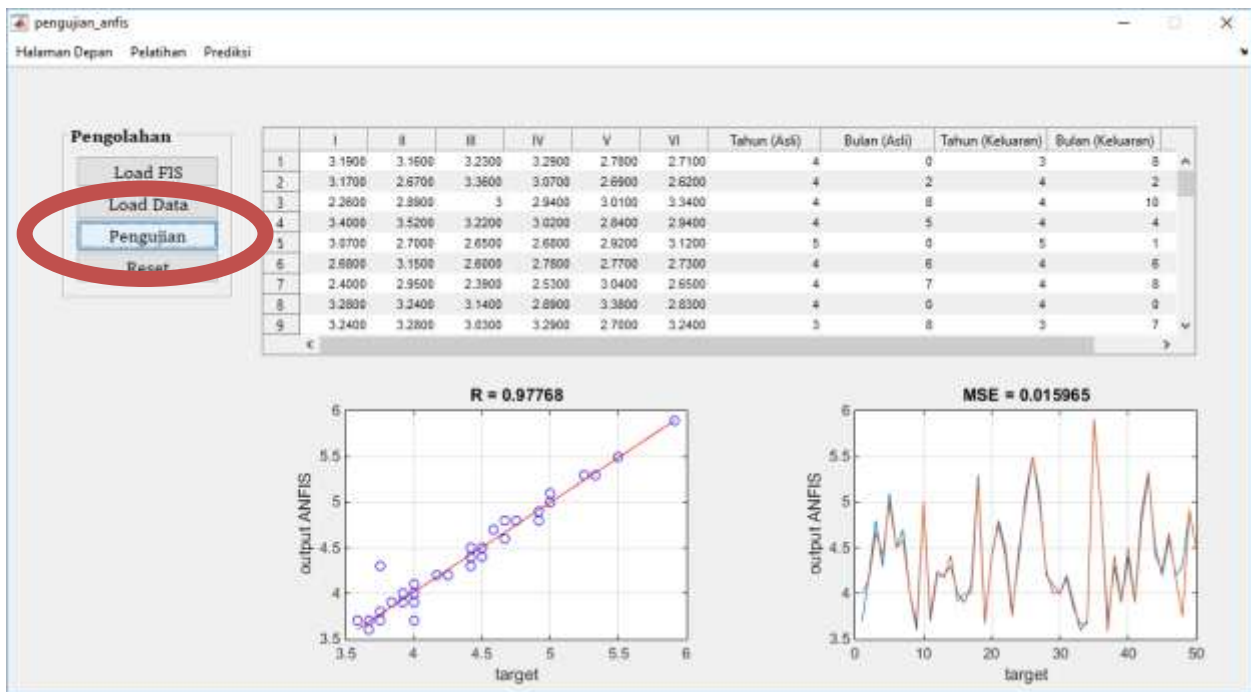




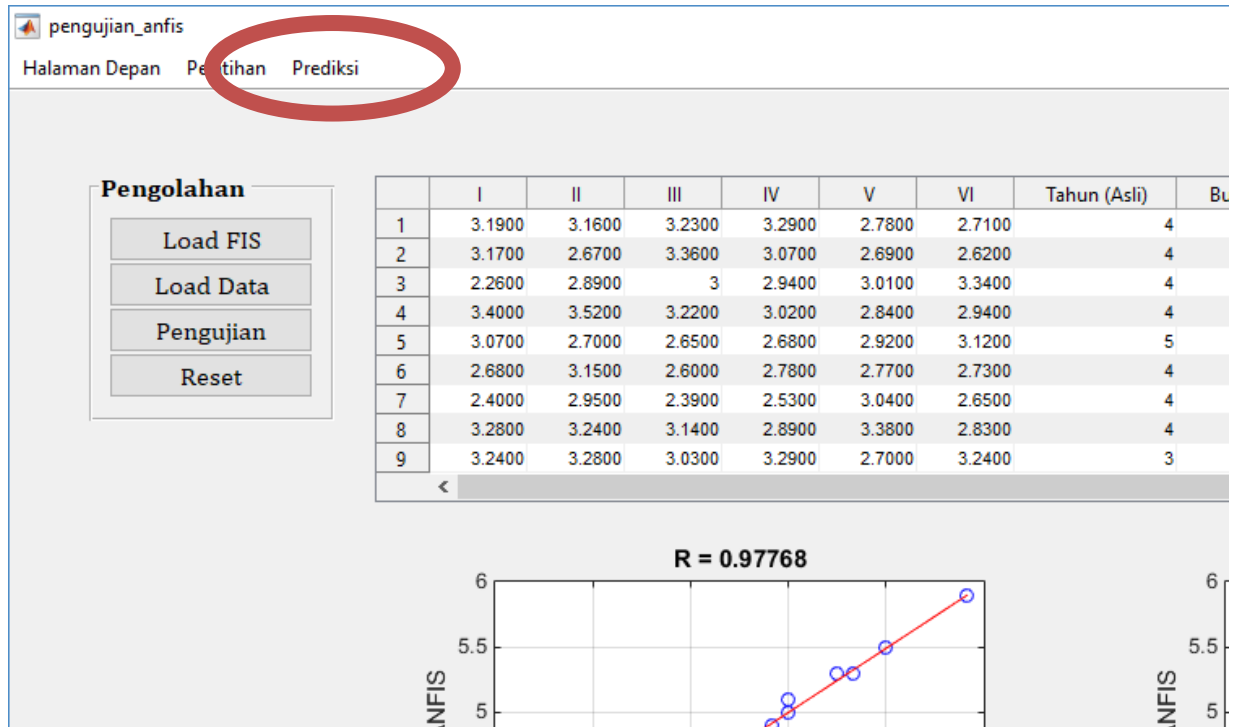
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1										
2		IP SEMESTER						Lama Studi		
3	No	I	II	III	IV	V	VI	Tahun	Bulan	
4	1	3,19	3,16	3,23	3,29	2,78	2,71	4	0	
5	2	3,17	2,67	3,36	3,07	2,69	2,62	4	2	
6	3	2,26	2,89	3,00	2,94	3,01	3,34	4	8	
7	4	3,40	3,52	3,22	3,02	2,84	2,94	4	5	
8	5	3,07	2,70	2,65	2,68	2,92	3,12	5	0	
9	6	2,68	3,15	2,60	2,78	2,77	2,73	4	6	
10	7	2,40	2,95	2,39	2,53	3,04	2,65	4	7	
11	8	3,28	3,24	3,14	2,89	3,38	2,83	4	0	
12	9	3,24	3,28	3,03	3,29	2,70	3,24	3	8	
13	10	2,62	3,04	2,42	2,63	2,73	2,75	5	0	
14	11	3,15	2,81	3,18	3,14	3,22	2,84	3	9	
15	12	3,38	3,75	3,73	3,22	3,27	3,32	4	3	
16	13	3,16	3,12	3,37	3,18	3,67	3,55	4	2	
17	14	3,16	3,53	3,14	3,04	3,48	2,98	4	5	
18	15	2,87	3,33	2,93	3,11	2,62	2,95	3	11	
19	16	3,35	3,55	3,57	3,62	3,24	3,33	4	0	
20	17	3,29	3,24	3,18	2,94	3,18	3,32	4	0	
21	18	3,29	3,42	2,96	2,35	2,83	3,36	5	3	
22	19	3,13	3,18	3,27	3,41	2,77	2,76	3	8	
23	20	2,83	3,26	2,92	2,98	2,93	3,41	4	5	
24	21	2,60	3,02	3,22	2,95	3,11	3,49	4	9	
25	22	3,34	2,92	2,37	2,68	3,18	2,69	4	5	



11. Melakukan pengujian



12. Melakukan prediksi



prediksi_anfis

Halaman Depan **Pelatihan** **Pengujian**

Pengolahan

- Load FIS
- Prediksi**
- Reset

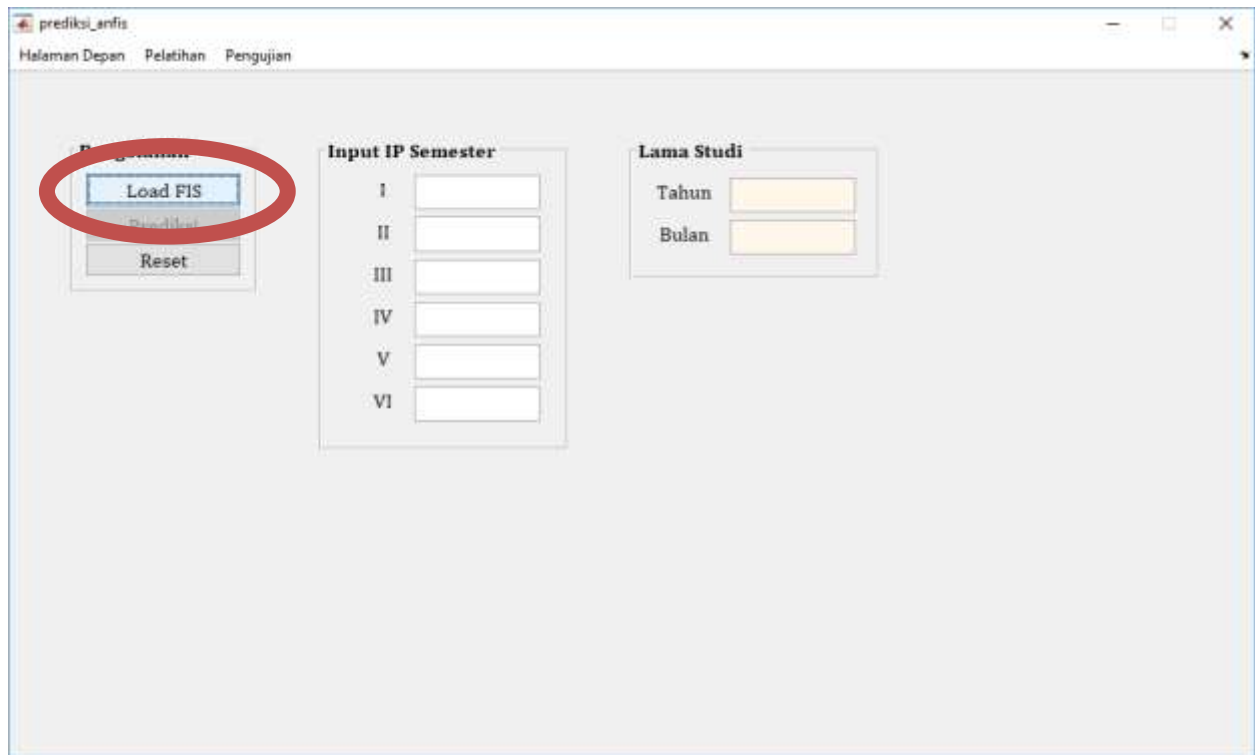
Input IP Semester

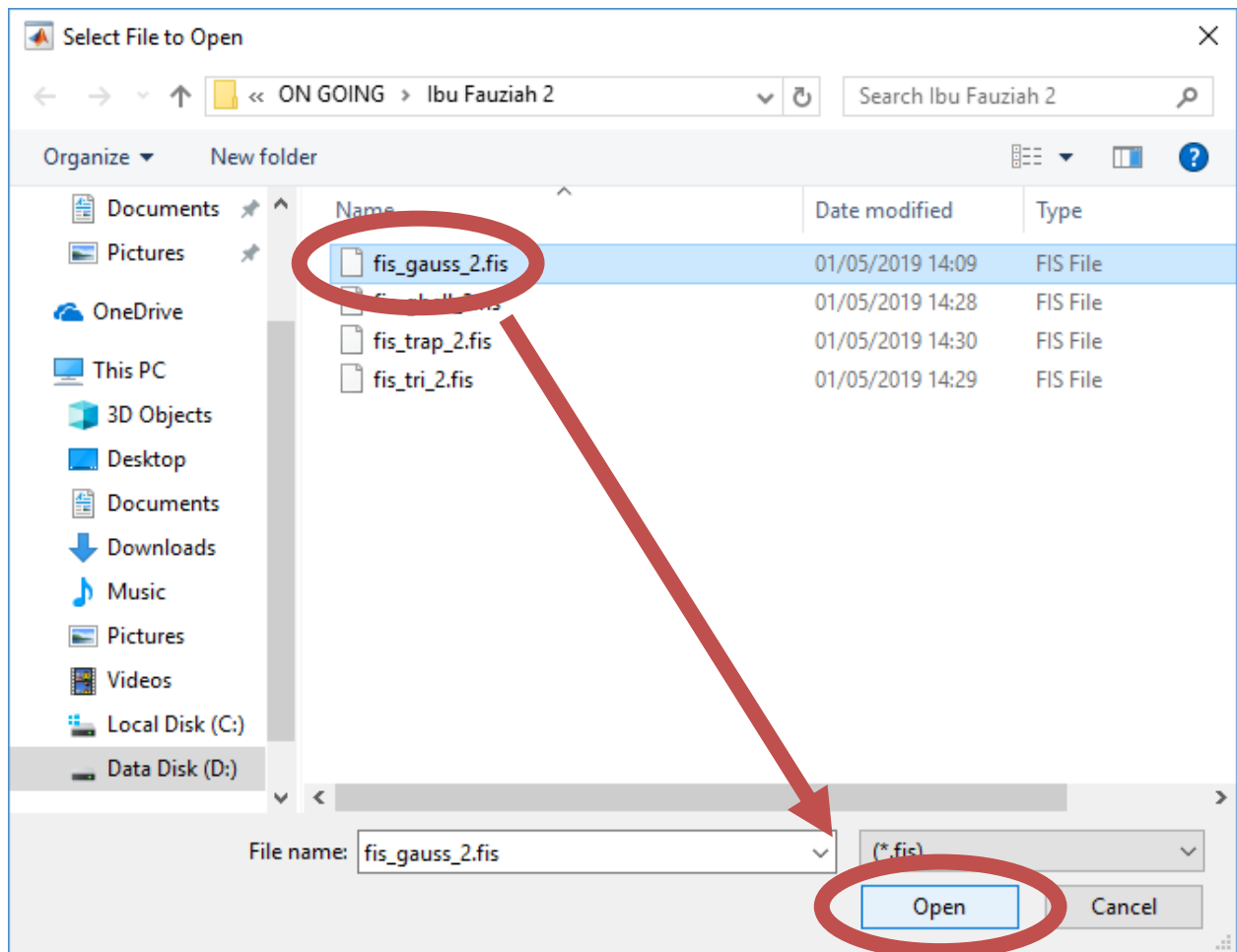
- I
- II
- III
- IV
- V
- VI

Lama Studi

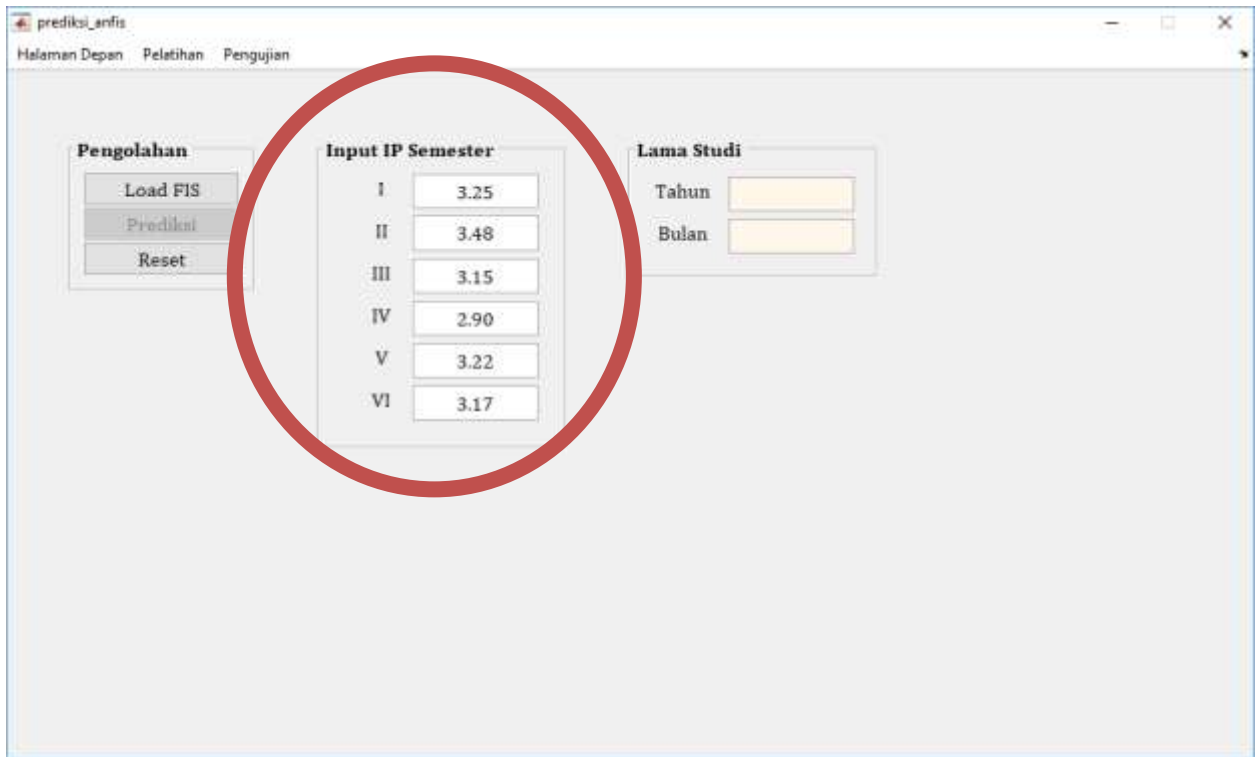
- Tahun
- Bulan

13. Load FIS hasil pelatihan

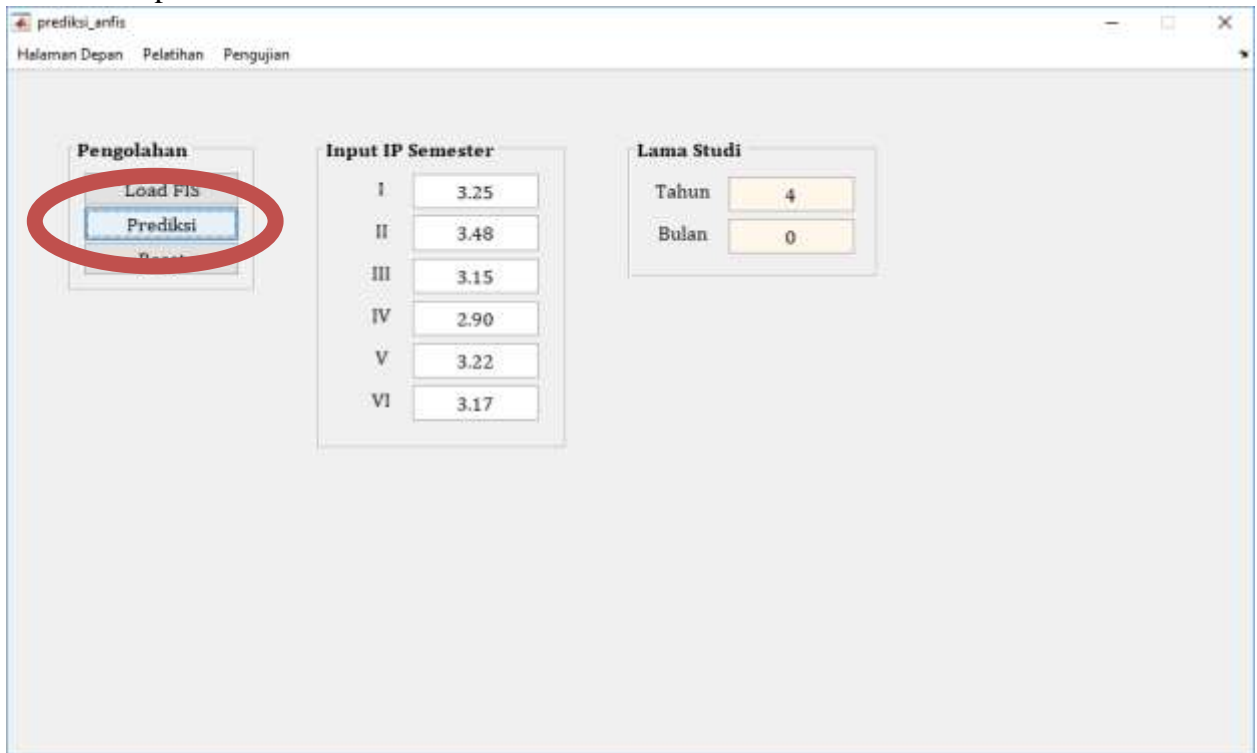




14. Input IP mahasiswa semester I s.d VI



15. Melakukan prediksi



```

function varargout = halaman_depan(varargin)
% HALAMAN_DEPAN MATLAB code for halaman_depan.fig
%     HALAMAN_DEPAN, by itself, creates a new HALAMAN_DEPAN or raises the
existing
%     singleton*.
%
%     H = HALAMAN_DEPAN returns the handle to a new HALAMAN_DEPAN or the
handle to
%     the existing singleton*.
%
%     HALAMAN_DEPAN('CALLBACK',hObject,eventData,handles,...) calls the
local
%     function named CALLBACK in HALAMAN_DEPAN.M with the given input
arguments.
%
%     HALAMAN_DEPAN('Property','Value',...) creates a new HALAMAN_DEPAN or
raises the
%     existing singleton*. Starting from the left, property value pairs are
%     applied to the GUI before halaman_depan_OpeningFcn gets called. An
%     unrecognized property name or invalid value makes property application
%     stop. All inputs are passed to halaman_depan_OpeningFcn via varargin.
%
%     *See GUI Options on GUIDE's Tools menu. Choose "GUI allows only one
%     instance to run (singleton)".
%
% See also: GUIDE, GUIDATA, GUIHANDLES

% Edit the above text to modify the response to help halaman_depan

% Last Modified by GUIDE v2.5 01-May-2019 17:29:09

% Begin initialization code - DO NOT EDIT
gui_Singleton = 1;
gui_State = struct('gui_Name',       mfilename, ...
                  'gui_Singleton',   gui_Singleton, ...
                  'gui_OpeningFcn', @halaman_depan_OpeningFcn, ...
                  'gui_OutputFcn',  @halaman_depan_OutputFcn, ...
                  'gui_LayoutFcn',   [], ...
                  'gui_Callback',    []);
if nargin && ischar(varargin{1})
    gui_State.gui_Callback = str2func(varargin{1});
end

if nargout
    [varargout{1:nargout}] = gui_mainfcn(gui_State, varargin{:});
else
    gui_mainfcn(gui_State, varargin{:});
end
% End initialization code - DO NOT EDIT

% --- Executes just before halaman_depan is made visible.
function halaman_depan_OpeningFcn(hObject, eventdata, handles, varargin)

```

```

% This function has no output args, see OutputFcn.
% hObject    handle to figure
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    structure with handles and user data (see GUIDATA)
% varargin   command line arguments to halaman_depan (see VARARGIN)

% Choose default command line output for halaman_depan
handles.output = hObject;

% Update handles structure
guidata(hObject, handles);
movegui(hObject, 'center');

axes(handles.axes1)
I = imread('logo', 'jpg');
imshow(I)

% UIWAIT makes halaman_depan wait for user response (see UIRESUME)
% uiwait(handles.figure1);

% --- Outputs from this function are returned to the command line.
function varargout = halaman_depan_OutputFcn(hObject, eventdata, handles)
% varargout  cell array for returning output args (see VARARGOUT);
% hObject    handle to figure
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    structure with handles and user data (see GUIDATA)

% Get default command line output from handles structure
varargout{1} = handles.output;

% -----
function Pelatihan_Callback(hObject, eventdata, handles)
% hObject    handle to Pelatihan (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    structure with handles and user data (see GUIDATA)

% menutup halaman depan
close all;
% membuka halaman pelatihan anfis
guidata(pelatihan_anfis);

% -----
function Pengujian_Callback(hObject, eventdata, handles)
% hObject    handle to Pengujian (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    structure with handles and user data (see GUIDATA)

% menutup halaman depan
close all;
% membuka halaman pengujian anfis
guidata(pengujian_anfis);

```

```
% -----  
function Prediksi_Callback(hObject, eventdata, handles)  
% hObject    handle to Prediksi (see GCBO)  
% eventdata  reserved - to be defined in a future version of MATLAB  
% handles    structure with handles and user data (see GUIDATA)  
  
% menutup halaman depan  
close all;  
% membuka halaman prediksi anfis  
guidata(prediksi_anfis);
```

```

function varargout = pelatihan_anfis(varargin)
% PELATIHAN_ANFIS MATLAB code for pelatihan_anfis.fig
%     PELATIHAN_ANFIS, by itself, creates a new PELATIHAN_ANFIS or raises
the existing
%     singleton*.
%
%     H = PELATIHAN_ANFIS returns the handle to a new PELATIHAN_ANFIS or the
handle to
%     the existing singleton*.
%
%     PELATIHAN_ANFIS('CALLBACK',hObject,eventData,handles,...) calls the
local
%     function named CALLBACK in PELATIHAN_ANFIS.M with the given input
arguments.
%
%     PELATIHAN_ANFIS('Property','Value',...) creates a new PELATIHAN_ANFIS
or raises the
%     existing singleton*. Starting from the left, property value pairs are
%     applied to the GUI before pelatihan_anfis_OpeningFcn gets called. An
%     unrecognized property name or invalid value makes property application
%     stop. All inputs are passed to pelatihan_anfis_OpeningFcn via
varargin.
%
%     *See GUI Options on GUIDE's Tools menu. Choose "GUI allows only one
%     instance to run (singleton)".
%
% See also: GUIDE, GUIDATA, GUIHANDLES

% Edit the above text to modify the response to help pelatihan_anfis

% Last Modified by GUIDE v2.5 01-May-2019 17:40:26

% Begin initialization code - DO NOT EDIT
gui_Singleton = 1;
gui_State = struct('gui_Name',       mfilename, ...
    'gui_Singleton',  gui_Singleton, ...
    'gui_OpeningFcn', @pelatihan_anfis_OpeningFcn, ...
    'gui_OutputFcn',  @pelatihan_anfis_OutputFcn, ...
    'gui_LayoutFcn',  [] , ...
    'gui_Callback',   []);
if nargin && ischar(varargin{1})
    gui_State.gui_Callback = str2func(varargin{1});
end

if nargout

```

```

        [varargout{1:nargout}] = gui_mainfcn(gui_State, varargin{:});
else
    gui_mainfcn(gui_State, varargin{:});
end
% End initialization code - DO NOT EDIT

% --- Executes just before pelatihan_anfis is made visible.
function pelatihan_anfis_OpeningFcn(hObject, eventdata, handles, varargin)
% This function has no output args, see OutputFcn.
% hObject    handle to figure
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    structure with handles and user data (see GUIDATA)
% varargin   command line arguments to pelatihan_anfis (see VARARGIN)

% Choose default command line output for pelatihan_anfis
handles.output = hObject;

% Update handles structure
guidata(hObject, handles);
movegui(hObject, 'center');
warning off all;

% UIWAIT makes pelatihan_anfis wait for user response (see UIRESUME)
% uiwait(handles.figure1);

% --- Outputs from this function are returned to the command line.
function varargout = pelatihan_anfis_OutputFcn(hObject, eventdata, handles)
% varargout  cell array for returning output args (see VARARGOUT);
% hObject    handle to figure
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    structure with handles and user data (see GUIDATA)

% Get default command line output from handles structure
varargout{1} = handles.output;

% --- Executes on button press in pushbutton1.
function pushbutton1_Callback(hObject, eventdata, handles)
% hObject    handle to pushbutton1 (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    structure with handles and user data (see GUIDATA)

% menampilkan menu browse file
[nama_file, nama_path] = uigetfile('*.xlsx');

% jika ada file yg dipilih maka akan mengeksekusi perintah di bawahnya
if ~isequal(nama_file,0)
    % mereset button2
    axes(handles.axes1)
    cla reset
    set(gca, 'XTick', [])
    set(gca, 'YTick', [])

```

```

axes(handles.axes2)
cla reset
set(gca,'XTick',[])
set(gca,'YTick',[])

set(handles.pushbutton2,'Enable','on')
set(handles.pushbutton3,'Enable','off')

% membaca nama file, sheet, dan range dari file yang dipilih
filename = fullfile(nama_path, nama_file);
sheet = 1;
xlRange = 'C4:J53';
data = xlsread(filename, sheet, xlRange);
% menampilkan data pada tabel
set(handles.uitable1,'Data',data,'RowName',1:size(data,1))
% menyimpan variabel data pada lokasi handles supaya dapat dipanggil
% oleh pushbutton yg lain
handles.data = data;
guidata(hObject, handles)
else
% jika tidak ada file yg dipilih maka akan kembali
return
end

% --- Executes on button press in pushbutton2.
function pushbutton2_Callback(hObject, eventdata, handles)
% hObject    handle to pushbutton2 (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    structure with handles and user data (see GUIDATA)

% mereset button2
set(handles.pushbutton3,'Enable','on')

% membaca variabel data yg ada di lokasi handles
data = handles.data;
% membaca jumlah data
jumlah_data = size(data,1);
% memilah data sebagai input dan target
input = data(:,1:6);
tahun = data(:,7);
bulan = data(:,8);
bulan = bulan/12;
target = tahun+bulan;
% menggabungkan input dan target
trnData = [input target];
% membaca parameter ANFIS yg dipilih
numMFs = str2double(get(handles.edit1,'String'));
val = get(handles.popupmenu1,'Value');
switch val
case 1
mfType = 'gaussmf';
case 2
mfType = 'gbellmf';

```

```

    case 3
        mfType = 'trimf';
    case 4
        mfType = 'trapmf';
end
epoch_n = str2double(get(handles.edit2, 'String'));
% setting parameter ANFIS
in_fis = genfis1(trnData, numMFs, mfType);
% pelatihan ANFIS
out_fis = anfis(trnData, in_fis, epoch_n);
% membaca hasil keluaran ANFIS
output = round(evalfis(input, out_fis), 1);
% menghitung jumlah tahun dan bulan berdasarkan hasil keluaran ANFIS
output_str = cell(size(data, 1), 1);
for n = 1:jumlah_data
    % membatasi nilai output (lama studi) adalah 3,5 s.d 7 tahun
    if output(n) > 7
        output(n) = 7;
    elseif output(n) < 3.5
        output(n) = 3.5;
    end
    % mengkonversi tahun menjadi bulan
    output_str{n} = num2str(output(n));
    str = output_str{n};
    tahun(n) = str2double(str(1));
    bulan_dec = output(n) - tahun(n);
    bulan(n) = round(bulan_dec * 12);
end

% menampilkan data hasil keluaran ANFIS pada tabel
data = [data, tahun, bulan];
set(handles.uitable1, 'Data', data, 'RowName', 1:jumlah_data)

% menampilkan grafik hasil keluaran ANFIS pada axes
axes(handles.axes1)
R = corr(output, target);
p = polyfit(target, output, 1);
y = p(1) * target + p(2);
plot(target, output, 'bo', target, y, 'r-')
grid on
title(['R = ', num2str(R)])
xlabel('target')
ylabel('output ANFIS')

axes(handles.axes2)
error = target - output;
nilai_mse = (1/jumlah_data) * sqrt(sum(error.^2));
plot(output)
hold on
plot(target)
hold off
grid on
title(['MSE = ', num2str(nilai_mse)])
xlabel('target')
ylabel('output ANFIS')

```



```

% menyimpan variabel out_fis pada lokasi handles agar dapat dipanggil oleh
% pushbutton yg lain
handles.out_fis = out_fis;
guidata(hObject, handles)

function edit1_Callback(hObject, eventdata, handles)
% hObject    handle to edit1 (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    structure with handles and user data (see GUIDATA)

% Hints: get(hObject,'String') returns contents of edit1 as text
%        str2double(get(hObject,'String')) returns contents of edit1 as a
double

% --- Executes during object creation, after setting all properties.
function edit1_CreateFcn(hObject, eventdata, handles)
% hObject    handle to edit1 (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    empty - handles not created until after all CreateFcns called

% Hint: edit controls usually have a white background on Windows.
%        See ISPC and COMPUTER.
if ispc && isequal(get(hObject,'BackgroundColor'),
get(0,'defaultUiControlBackgroundColor'))
    set(hObject,'BackgroundColor','white');
end

% --- Executes on selection change in popupmenu1.
function popupmenu1_Callback(hObject, eventdata, handles)
% hObject    handle to popupmenu1 (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    structure with handles and user data (see GUIDATA)

% Hints: contents = cellstr(get(hObject,'String')) returns popupmenu1
contents as cell array
%        contents{get(hObject,'Value')} returns selected item from popupmenu1

% --- Executes during object creation, after setting all properties.
function popupmenu1_CreateFcn(hObject, eventdata, handles)
% hObject    handle to popupmenu1 (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    empty - handles not created until after all CreateFcns called

% Hint: popupmenu controls usually have a white background on Windows.
%        See ISPC and COMPUTER.
if ispc && isequal(get(hObject,'BackgroundColor'),
get(0,'defaultUiControlBackgroundColor'))
    set(hObject,'BackgroundColor','white');
end

```

```

function edit2_Callback(hObject, eventdata, handles)
% hObject      handle to edit2 (see GCBO)
% eventdata    reserved - to be defined in a future version of MATLAB
% handles      structure with handles and user data (see GUIDATA)

% Hints: get(hObject,'String') returns contents of edit2 as text
%          str2double(get(hObject,'String')) returns contents of edit2 as a
double

% --- Executes during object creation, after setting all properties.
function edit2_CreateFcn(hObject, eventdata, handles)
% hObject      handle to edit2 (see GCBO)
% eventdata    reserved - to be defined in a future version of MATLAB
% handles      empty - handles not created until after all CreateFcns called

% Hint: edit controls usually have a white background on Windows.
%          See ISPC and COMPUTER.
if ispc && isequal(get(hObject,'BackgroundColor'),
get(0,'defaultUicontrolBackgroundColor'))
    set(hObject,'BackgroundColor','white');
end

% --- Executes on button press in pushbutton3.
function pushbutton3_Callback(hObject, eventdata, handles)
% hObject      handle to pushbutton3 (see GCBO)
% eventdata    reserved - to be defined in a future version of MATLAB
% handles      structure with handles and user data (see GUIDATA)

% membaca variabel out_fis yg ada di lokasi handles
out_fis = handles.out_fis;

% menampilkan menu save file
[nama_file, nama_path] = uiputfile('*.fis');

% jika ada file yg disimpan maka akan mengeksekusi perintah di bawahnya
if ~isequal(nama_file,0)
    % menyimpan variabel out_fis
    writefis(out_fis,fullfile(nama_path,nama_file));
else
    return
end

% --- 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)

% mereset button2
axes(handles.axes1)

```

```

cla reset
set(gca,'XTick',[])
set(gca,'YTick',[])

axes(handles.axes2)
cla reset
set(gca,'XTick',[])
set(gca,'YTick',[])

set(handles.pushbutton2,'Enable','off')
set(handles.pushbutton3,'Enable','off')
set(handles.uitable1,'Data',[])
set(handles.edit1,'String','2')
set(handles.edit2,'String','50')
set(handles.popupmenu1,'Value',1)

% -----
function Pengujian_Callback(hObject, eventdata, handles)
% hObject    handle to Pengujian (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    structure with handles and user data (see GUIDATA)

% menutup halaman pelatihan
close all;
% membuka halaman pengujian anfis
guidata(pengujian_anfis);

% -----
function Prediksi_Callback(hObject, eventdata, handles)
% hObject    handle to Prediksi (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    structure with handles and user data (see GUIDATA)

% menutup halaman pelatihan
close all;
% membuka halaman prediksi anfis
guidata(prediksi_anfis);

% -----
function Halaman_Depan_Callback(hObject, eventdata, handles)
% hObject    handle to Halaman_Depan (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    structure with handles and user data (see GUIDATA)

% menutup halaman pelatihan
close all;
% membuka halaman depan
guidata(halaman_depan);

```

```

function varargout = penguajian_anfis(varargin)
% PENGUJIAN_ANFIS MATLAB code for penguajian_anfis.fig
%     PENGUJIAN_ANFIS, by itself, creates a new PENGUJIAN_ANFIS or raises
the existing
%     singleton*.
%
%     H = PENGUJIAN_ANFIS returns the handle to a new PENGUJIAN_ANFIS or the
handle to
%     the existing singleton*.
%
%     PENGUJIAN_ANFIS('CALLBACK',hObject,eventData,handles,...) calls the
local
%     function named CALLBACK in PENGUJIAN_ANFIS.M with the given input
arguments.
%
%     PENGUJIAN_ANFIS('Property','Value',...) creates a new PENGUJIAN_ANFIS
or raises the
%     existing singleton*. Starting from the left, property value pairs are
%     applied to the GUI before penguajian_anfis_OpeningFcn gets called. An
%     unrecognized property name or invalid value makes property application
%     stop. All inputs are passed to penguajian_anfis_OpeningFcn via
varargin.
%
%     *See GUI Options on GUIDE's Tools menu. Choose "GUI allows only one
%     instance to run (singleton)".
%
% See also: GUIDE, GUIDATA, GUIHANDLES

% Edit the above text to modify the response to help penguajian_anfis

% Last Modified by GUIDE v2.5 01-May-2019 17:28:27

% Begin initialization code - DO NOT EDIT
gui_Singleton = 1;
gui_State = struct('gui_Name',       mfilename, ...
    'gui_Singleton',  gui_Singleton, ...
    'gui_OpeningFcn', @penguajian_anfis_OpeningFcn, ...
    'gui_OutputFcn',  @penguajian_anfis_OutputFcn, ...
    'gui_LayoutFcn',  [] , ...
    'gui_Callback',   []);
if nargin && ischar(varargin{1})
    gui_State.gui_Callback = str2func(varargin{1});
end

```

```

if nargin
    [varargout{1:nargout}] = gui_mainfcn(gui_State, varargin{:});
else
    gui_mainfcn(gui_State, varargin{:});
end
% End initialization code - DO NOT EDIT

% --- Executes just before penguajian_anfis is made visible.
function penguajian_anfis_OpeningFcn(hObject, eventdata, handles, varargin)
% This function has no output args, see OutputFcn.
% hObject    handle to figure
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    structure with handles and user data (see GUIDATA)
% varargin   command line arguments to penguajian_anfis (see VARARGIN)

% Choose default command line output for penguajian_anfis
handles.output = hObject;

% Update handles structure
guidata(hObject, handles);
movegui(hObject, 'center');
warning off all;

% UIWAIT makes penguajian_anfis wait for user response (see UIRESUME)
% uiwait(handles.figure1);

% --- Outputs from this function are returned to the command line.
function varargout = penguajian_anfis_OutputFcn(hObject, eventdata, handles)
% varargout  cell array for returning output args (see VARARGOUT);
% hObject    handle to figure
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    structure with handles and user data (see GUIDATA)

% Get default command line output from handles structure
varargout{1} = handles.output;

% --- Executes on button press in pushbutton1.
function pushbutton1_Callback(hObject, eventdata, handles)
% hObject    handle to pushbutton1 (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    structure with handles and user data (see GUIDATA)

% menampilkan menu browse file
[nama_file, nama_path] = uigetfile('*.fis');

% jika ada file yg dipilih maka akan mengeksekusi perintah di bawahnya
if ~isequal(nama_file,0)
    % mereset button2
    axes(handles.axes1)
    cla reset

```

```

set(gca, 'XTick', [])
set(gca, 'YTick', [])

axes(handles.axes2)
cla reset
set(gca, 'XTick', [])
set(gca, 'YTick', [])

set(handles.pushbutton2, 'Enable', 'on')
set(handles.pushbutton3, 'Enable', 'off')
set(handles.uitable1, 'Data', [])

% membaca FIS
out_fis = readfis(fullfile(nama_path, nama_file));
% menyimpan variabel out_fis pada lokasi handles agar dapat dipanggil
oleh
% pushbutton yg lain
handles.out_fis = out_fis;
guidata(hObject, handles)
else
% jika tidak ada file yg dipilih maka akan kembali
return
end

% --- Executes on button press in pushbutton2.
function pushbutton2_Callback(hObject, eventdata, handles)
% hObject      handle to pushbutton2 (see GCBO)
% eventdata    reserved - to be defined in a future version of MATLAB
% handles      structure with handles and user data (see GUIDATA)

% menampilkan menu browse file
[nama_file, nama_path] = uigetfile('*.xlsx');

% jika ada file yg dipilih maka akan mengeksekusi perintah di bawahnya
if ~isequal(nama_file, 0)
% mereset button2
axes(handles.axes1)
cla reset
set(gca, 'XTick', [])
set(gca, 'YTick', [])

axes(handles.axes2)
cla reset
set(gca, 'XTick', [])
set(gca, 'YTick', [])

set(handles.pushbutton3, 'Enable', 'on')

% membaca nama file, sheet, dan range dari file yang dipilih
filename = fullfile(nama_path, nama_file);
sheet = 1;
xlRange = 'C4:J53';
data = xlsread(filename, sheet, xlRange);
% menampilkan data pada tabel
set(handles.uitable1, 'Data', data, 'RowName', 1:size(data, 1))

```

```

    % menyimpan variabel data pada lokasi handles supaya dapat dipanggil
    % oleh pushbutton yg lain
    handles.data = data;
    guidata(hObject, handles)
else
    % jika tidak ada file yg dipilih maka akan kembali
    return
end

% --- Executes on button press in pushbutton3.
function pushbutton3_Callback(hObject, eventdata, handles)
% hObject      handle to pushbutton3 (see GCBO)
% eventdata    reserved - to be defined in a future version of MATLAB
% handles      structure with handles and user data (see GUIDATA)

% membaca variabel out_fis dan data yg ada di lokasi handles
out_fis = handles.out_fis;
data = handles.data;

% membaca jumlah data
jumlah_data = size(data,1);
% memilah data sebagai input dan target
input = data(:,1:6);
tahun = data(:,7);
bulan = data(:,8);
bulan = bulan/12;
target = tahun+bulan;

% membaca hasil keluaran ANFIS
output = round(evalfis(input,out_fis),1);
% menghitung jumlah tahun dan bulan berdasarkan hasil keluaran ANFIS
output_str = cell(size(data,1),1);
for n = 1:jumlah_data
    % membatasi nilai output (lama studi) adalah 3,5 s.d 7 tahun
    if output(n) > 7
        output(n) = 7;
    elseif output(n) < 3.5
        output(n) = 3.5;
    end
    % mengkonversi tahun menjadi bulan
    output_str{n} = num2str(output(n));
    str = output_str{n};
    tahun(n,1) = str2double(str(1));
    bulan_dec = output(n)-tahun(n);
    bulan(n,1) = round(bulan_dec*12);
end

% menampilkan data hasil keluaran ANFIS pada tabel
data = [data, tahun, bulan,output];
set(handles.uitable1, 'Data', data, 'RowName', 1:jumlah_data)

% menampilkan grafik hasil keluaran ANFIS pada axes
axes(handles.axes1)
R = corr(output,target);
p = polyfit(target,output,1);
y = p(1)*target+p(2);

```

```

plot(target,output,'bo',target,y,'r-')
grid on
title(['R = ',num2str(R)])
xlabel('target')
ylabel('output ANFIS')

axes(handles.axes2)
error = target-output;
nilai_mse = (1/jumlah_data)*sqrt(sum(error.^2));
plot(output)
hold on
plot(target)
hold off
grid on
title(['MSE = ',num2str(nilai_mse)])
xlabel('target')
ylabel('output ANFIS')

% --- 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)

% mereset button2
axes(handles.axes1)
cla reset
set(gca,'XTick',[])
set(gca,'YTick',[])

axes(handles.axes2)
cla reset
set(gca,'XTick',[])
set(gca,'YTick',[])

set(handles.pushbutton2,'Enable','off')
set(handles.pushbutton3,'Enable','off')
set(handles.uitable1,'Data',[])

% -----
function Pelatihan_Callback(hObject, eventdata, handles)
% hObject    handle to Pelatihan (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    structure with handles and user data (see GUIDATA)

% menutup halaman pengujian
close all;
% membuka halaman pelatihan anfis
guidata(pelatihan_anfis);

% -----
function Prediksi_Callback(hObject, eventdata, handles)
% hObject    handle to Prediksi (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB

```



```
% handles      structure with handles and user data (see GUIDATA)

% menutup halaman pengujian
close all;
% membuka halaman prediksi anfis
guidata(prediksi_anfis);

% -----
function Halaman_Depan_Callback(hObject, eventdata, handles)
% hObject      handle to Halaman_Depan (see GCBO)
% eventdata    reserved - to be defined in a future version of MATLAB
% handles      structure with handles and user data (see GUIDATA)

% menutup halaman pengujian
close all;
% membuka halaman depan
guidata(halaman_depan);
```

```

function varargout = prediksi_anfis(varargin)
% PREDIKSI_ANFIS MATLAB code for prediksi_anfis.fig
%     PREDIKSI_ANFIS, by itself, creates a new PREDIKSI_ANFIS or raises the
existing
%     singleton*.
%
%     H = PREDIKSI_ANFIS returns the handle to a new PREDIKSI_ANFIS or the
handle to
%     the existing singleton*.
%
%     PREDIKSI_ANFIS('CALLBACK',hObject,eventData,handles,...) calls the
local
%     function named CALLBACK in PREDIKSI_ANFIS.M with the given input
arguments.
%
%     PREDIKSI_ANFIS('Property','Value',...) creates a new PREDIKSI_ANFIS or
raises the
%     existing singleton*. Starting from the left, property value pairs are
%     applied to the GUI before prediksi_anfis_OpeningFcn gets called. An
%     unrecognized property name or invalid value makes property application
%     stop. All inputs are passed to prediksi_anfis_OpeningFcn via
varargin.
%
%     *See GUI Options on GUIDE's Tools menu. Choose "GUI allows only one
%     instance to run (singleton)".
%
% See also: GUIDE, GUIDATA, GUIHANDLES

% Edit the above text to modify the response to help prediksi_anfis

% Last Modified by GUIDE v2.5 01-May-2019 17:40:35

% Begin initialization code - DO NOT EDIT
gui_Singleton = 1;
gui_State = struct('gui_Name',       mfilename, ...
                  'gui_Singleton',   gui_Singleton, ...

```

```

    'gui_OpeningFcn', @prediksi_anfis_OpeningFcn, ...
    'gui_OutputFcn', @prediksi_anfis_OutputFcn, ...
    'gui_LayoutFcn', [], ...
    'gui_Callback', []);
if nargin && ischar(varargin{1})
    gui_State.gui_Callback = str2func(varargin{1});
end

if nargout
    [varargout{1:nargout}] = gui_mainfcn(gui_State, varargin{:});
else
    gui_mainfcn(gui_State, varargin{:});
end
% End initialization code - DO NOT EDIT

% --- Executes just before prediksi_anfis is made visible.
function prediksi_anfis_OpeningFcn(hObject, eventdata, handles, varargin)
% This function has no output args, see OutputFcn.
% hObject    handle to figure
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    structure with handles and user data (see GUIDATA)
% varargin   command line arguments to prediksi_anfis (see VARARGIN)

% Choose default command line output for prediksi_anfis
handles.output = hObject;

% Update handles structure
guidata(hObject, handles);
movegui(hObject, 'center');
warning off all;

% UIWAIT makes prediksi_anfis wait for user response (see UIRESUME)
% uiwait(handles.figure1);

% --- Outputs from this function are returned to the command line.
function varargout = prediksi_anfis_OutputFcn(hObject, eventdata, handles)
% varargout  cell array for returning output args (see VARARGOUT);
% hObject    handle to figure
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    structure with handles and user data (see GUIDATA)

% Get default command line output from handles structure
varargout{1} = handles.output;

function edit7_Callback(hObject, eventdata, handles)
% hObject    handle to edit7 (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    structure with handles and user data (see GUIDATA)

% Hints: get(hObject, 'String') returns contents of edit7 as text

```

```

%         str2double(get(hObject,'String')) returns contents of edit7 as a
double

% --- Executes during object creation, after setting all properties.
function edit7_CreateFcn(hObject, eventdata, handles)
% hObject    handle to edit7 (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    empty - handles not created until after all CreateFcns called

% Hint: edit controls usually have a white background on Windows.
%         See ISPC and COMPUTER.
if ispc && isequal(get(hObject,'BackgroundColor'),
get(0,'defaultUicontrolBackgroundColor'))
    set(hObject,'BackgroundColor','white');
end

function edit8_Callback(hObject, eventdata, handles)
% hObject    handle to edit8 (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    structure with handles and user data (see GUIDATA)

% Hints: get(hObject,'String') returns contents of edit8 as text
%         str2double(get(hObject,'String')) returns contents of edit8 as a
double

% --- Executes during object creation, after setting all properties.
function edit8_CreateFcn(hObject, eventdata, handles)
% hObject    handle to edit8 (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    empty - handles not created until after all CreateFcns called

% Hint: edit controls usually have a white background on Windows.
%         See ISPC and COMPUTER.
if ispc && isequal(get(hObject,'BackgroundColor'),
get(0,'defaultUicontrolBackgroundColor'))
    set(hObject,'BackgroundColor','white');
end

function edit1_Callback(hObject, eventdata, handles)
% hObject    handle to edit1 (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    structure with handles and user data (see GUIDATA)

% Hints: get(hObject,'String') returns contents of edit1 as text
%         str2double(get(hObject,'String')) returns contents of edit1 as a
double

```

```

% --- Executes during object creation, after setting all properties.
function edit1_CreateFcn(hObject, eventdata, handles)
% hObject    handle to edit1 (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    empty - handles not created until after all CreateFcns called

% Hint: edit controls usually have a white background on Windows.
%         See ISPC and COMPUTER.
if ispc && isequal(get(hObject,'BackgroundColor'),
get(0,'defaultUiControlBackgroundColor'))
    set(hObject,'BackgroundColor','white');
end

function edit2_Callback(hObject, eventdata, handles)
% hObject    handle to edit2 (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    structure with handles and user data (see GUIDATA)

% Hints: get(hObject,'String') returns contents of edit2 as text
%         str2double(get(hObject,'String')) returns contents of edit2 as a
double

% --- Executes during object creation, after setting all properties.
function edit2_CreateFcn(hObject, eventdata, handles)
% hObject    handle to edit2 (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    empty - handles not created until after all CreateFcns called

% Hint: edit controls usually have a white background on Windows.
%         See ISPC and COMPUTER.
if ispc && isequal(get(hObject,'BackgroundColor'),
get(0,'defaultUiControlBackgroundColor'))
    set(hObject,'BackgroundColor','white');
end

function edit3_Callback(hObject, eventdata, handles)
% hObject    handle to edit3 (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    structure with handles and user data (see GUIDATA)

% Hints: get(hObject,'String') returns contents of edit3 as text
%         str2double(get(hObject,'String')) returns contents of edit3 as a
double

% --- Executes during object creation, after setting all properties.
function edit3_CreateFcn(hObject, eventdata, handles)
% hObject    handle to edit3 (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB

```

```

% handles    empty - handles not created until after all CreateFcns called

% Hint: edit controls usually have a white background on Windows.
%       See ISPC and COMPUTER.
if ispc && isequal(get(hObject,'BackgroundColor'),
get(0,'defaultUicontrolBackgroundColor'))
    set(hObject,'BackgroundColor','white');
end

```

```

function edit4_Callback(hObject, eventdata, handles)
% hObject    handle to edit4 (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    structure with handles and user data (see GUIDATA)

% Hints: get(hObject,'String') returns contents of edit4 as text
%       str2double(get(hObject,'String')) returns contents of edit4 as a
double

```

```

% --- Executes during object creation, after setting all properties.
function edit4_CreateFcn(hObject, eventdata, handles)
% hObject    handle to edit4 (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    empty - handles not created until after all CreateFcns called

% Hint: edit controls usually have a white background on Windows.
%       See ISPC and COMPUTER.
if ispc && isequal(get(hObject,'BackgroundColor'),
get(0,'defaultUicontrolBackgroundColor'))
    set(hObject,'BackgroundColor','white');
end

```

```

function edit5_Callback(hObject, eventdata, handles)
% hObject    handle to edit5 (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    structure with handles and user data (see GUIDATA)

% Hints: get(hObject,'String') returns contents of edit5 as text
%       str2double(get(hObject,'String')) returns contents of edit5 as a
double

```

```

% --- Executes during object creation, after setting all properties.
function edit5_CreateFcn(hObject, eventdata, handles)
% hObject    handle to edit5 (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    empty - handles not created until after all CreateFcns called

% Hint: edit controls usually have a white background on Windows.
%       See ISPC and COMPUTER.

```

```

if ispc && isequal(get(hObject,'BackgroundColor'),
get(0,'defaultUicontrolBackgroundColor'))
    set(hObject,'BackgroundColor','white');
end

function edit6_Callback(hObject, eventdata, handles)
% hObject    handle to edit6 (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    structure with handles and user data (see GUIDATA)

% Hints: get(hObject,'String') returns contents of edit6 as text
%        str2double(get(hObject,'String')) returns contents of edit6 as a
double

% --- Executes during object creation, after setting all properties.
function edit6_CreateFcn(hObject, eventdata, handles)
% hObject    handle to edit6 (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    empty - handles not created until after all CreateFcns called

% Hint: edit controls usually have a white background on Windows.
%        See ISPC and COMPUTER.
if ispc && isequal(get(hObject,'BackgroundColor'),
get(0,'defaultUicontrolBackgroundColor'))
    set(hObject,'BackgroundColor','white');
end

% --- Executes on button press in pushbutton1.
function pushbutton1_Callback(hObject, eventdata, handles)
% hObject    handle to pushbutton1 (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    structure with handles and user data (see GUIDATA)

% menampilkan menu browse file
[nama_file, nama_path] = uigetfile('*.fis');

% jika ada file yg dipilih maka akan mengeksekusi perintah di bawahnya
if ~isequal(nama_file,0)
    % mereset button2
    set(handles.pushbutton2,'Enable','on')

    % membaca FIS
    out_fis = readfis(fullfile(nama_path,nama_file));
    % menyimpan variabel out_fis pada lokasi handles agar dapat dipanggil
oleh
    % pushbutton yg lain
    handles.out_fis = out_fis;
    guidata(hObject, handles)
else
    % jika tidak ada file yg dipilih maka akan kembali

```

```

        return
    end

% --- Executes on button press in pushbutton2.
function pushbutton2_Callback(hObject, eventdata, handles)
% hObject    handle to pushbutton2 (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    structure with handles and user data (see GUIDATA)

% membaca variabel out_fis yg ada di lokasi handles
out_fis = handles.out_fis;

% membaca input dari edit text
ip1 = str2double(get(handles.edit1,'String'));
ip2 = str2double(get(handles.edit2,'String'));
ip3 = str2double(get(handles.edit3,'String'));
ip4 = str2double(get(handles.edit4,'String'));
ip5 = str2double(get(handles.edit5,'String'));
ip6 = str2double(get(handles.edit6,'String'));

% menggabungkan nilai ip1 s.d ip6
input = [ip1,ip2,ip3,ip4,ip5,ip6];

% membaca hasil keluaran ANFIS
output = round(evalfis(input,out_fis),1);
% menghitung jumlah tahun dan bulan berdasarkan hasil keluaran ANFIS
% membatasi nilai output (lama studi) adalah 3,5 s.d 7 tahun
if output > 7
    output = 7;
elseif output < 3.5
    output = 3.5;
end

if ~isnan(output)
    % mengkonversi tahun menjadi bulan
    output_str = num2str(output);
    str = output_str;
    tahun = str2double(str(1));
    bulan_dec = output-tahun;
    bulan = round(bulan_dec*12);

    % menampilkan jumlah lama studi pada edit text
    set(handles.edit7,'String',tahun)
    set(handles.edit8,'String',bulan)
else
    warndlg('pastikan proses input data sudah benar!')
    return
end

% --- Executes on button press in pushbutton3.
function pushbutton3_Callback(hObject, eventdata, handles)
% hObject    handle to pushbutton3 (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB

```



```

% handles      structure with handles and user data (see GUIDATA)

% mereset button2
set(handles.edit1, 'String', [])
set(handles.edit2, 'String', [])
set(handles.edit3, 'String', [])
set(handles.edit4, 'String', [])
set(handles.edit5, 'String', [])
set(handles.edit6, 'String', [])
set(handles.edit7, 'String', [])
set(handles.edit8, 'String', [])
set(handles.pushbutton2, 'Enable', 'off')

% -----
function Pelatihan_Callback(hObject, eventdata, handles)
% hObject      handle to Pelatihan (see GCBO)
% eventdata    reserved - to be defined in a future version of MATLAB
% handles      structure with handles and user data (see GUIDATA)

% menutup halaman prediksi
close all;
% membuka halaman pelatihan anfis
guidata(pelatihan_anfis);

% -----
function Pengujian_Callback(hObject, eventdata, handles)
% hObject      handle to Pengujian (see GCBO)
% eventdata    reserved - to be defined in a future version of MATLAB
% handles      structure with handles and user data (see GUIDATA)

% menutup halaman prediksi
close all;
% membuka halaman pengujian anfis
guidata(pengujian_anfis);

% -----
function Halaman_Depan_Callback(hObject, eventdata, handles)
% hObject      handle to Halaman_Depan (see GCBO)
% eventdata    reserved - to be defined in a future version of MATLAB
% handles      structure with handles and user data (see GUIDATA)

% menutup halaman prediksi
close all;
% membuka halaman depan
guidata(halaman_depan);

```