LAMPIRAN A

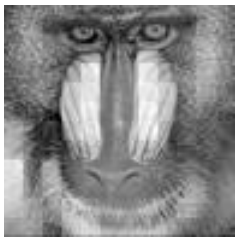
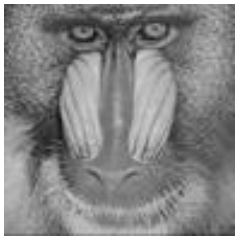
CITRA

A.1 Citra Pengujian Proses Penyisipan Pesan dan Ekstraksi Pesan

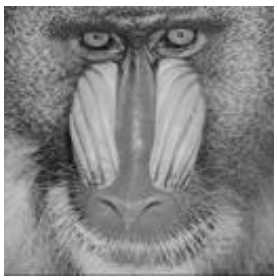
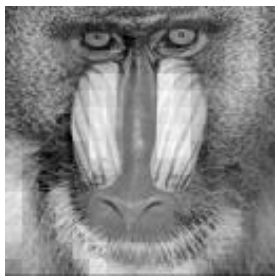
Cover Image	*Secret Image*	*Stego Image*	*Extract Image*
Barbara80.bmp 	Baboon80.bmp 	StegoBA80BA80.bmp  MSE=3,7341 PSNR=42,409 dB MOS=4,5	ExtBA80BA80.bmp  MSE=20,5973 PSNR=34,9927 dB MOS=2,8
Barbara80.bmp 	Boat80.bmp 	StegoBA80BO80.bmp  MSE=3,4958 PSNR=42,6954 dB MOS=4,3	ExtBA80BO80.bmp  MSE=129,8067 PSNR=26,9978 dB MOS=3,1
Barbara80.bmp 	Lena80.bmp 	StegoBA80LE80.bmp  MSE=3,6591 PSNR=42,4971 dB MOS=4,2	ExtBA80LE80.bmp  MSE=26,9709 PSNR=33,8218 dB MOS=2,5
Salesman80.bmp 	Baboon80.bmp 	StegoSA80BA80.bmp  MSE=3,9987 PSNR=42,1116 dB MOS=4,2	ExtSA80BA80.bmp  MSE=59,3142 PSNR=30,3992 dB MOS=3,6

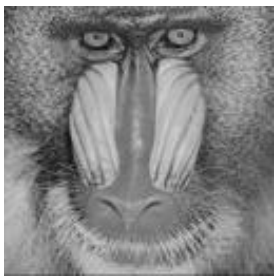
Salesman80.bmp 	Boat80.bmp 	StegoSA80BO80.bmp  MSE=4,0106 PSNR=42,0987 dB MOS=4,2	ExtSA80BO80.bmp  MSE=161,4298 PSNR=26,0510 dB MOS=3,6
Salesman80.bmp 	Lena80.bmp 	StegoSA80LE80.bmp  MSE=3,8247 PSNR=42,3048 dB MOS=4	ExtSA80LE80.bmp  MSE=65,9288 PSNR=29,9404 dB MOS=2,7
Peppers80.bmp 	Baboon80.bmp 	StegoPE80BA80.bmp  MSE=3,9389 PSNR=42,177 dB MOS=4,4	ExtPE80BA80.bmp  MSE=44,2197 PSNR=31,6746 dB MOS=1,6
Peppers80.bmp 	Boat80.bmp 	StegoPE80BO80.bmp  MSE=4,0684 PSNR=42,0365 dB MOS=4,3	ExtPE80BO80.bmp  MSE=133,9245 PSNR=26,8622 dB MOS=2,6

Peppers80.bmp 	Lena80.bmp 	StegoPE80LE80.bmp  MSE=3,6694 PSNR=42,4495 dB MOS=4,2	ExtPE80LE80.bmp  MSE=46,3664 PSNR=31,4688 dB MOS=1,8
Barbara96.bmp 	Baboon96.bmp 	StegoBA96BA96.bmp  MSE=4,1855 PSNR=41,9133 dB MOS=4,4	ExtBA96BA96.bmp  MSE=4,4760 PSNR=41,6219 dB MOS=3,3
Barbara96.bmp 	Boat96.bmp 	StegoBA96BO96.bmp  MSE=4,2323 PSNR=41,865 dB MOS=4,2	ExtBA96BO96.bmp  MSE=1,6701 PSNR=45,9033 dB MOS=3,4
Barbara96.bmp 	Lena96.bmp 	StegoBA96LE96.bmp  MSE=4,0545 PSNR=42,0515 dB MOS=4,3	ExtBA96LE96.bmp  MSE=11,5803 PSNR=37,4936 dB MOS=2,8

Salesman96.bmp 	Baboon96.bmp 	StegoSA96BA96.bmp  MSE=4,8244 PSNR=41,2963 dB MOS=4,3	ExtSA96BA96.bmp  MSE=61,8606 PSNR=30,2167 dB MOS=3,4
Salesman96.bmp 	Boat96.bmp 	StegoSA96BO96.bmp  MSE=5,047 PSNR=41,1005 dB MOS=4,5	ExtSA96BO96.bmp  MSE=145,3037 PSNR=26,5080 dB MOS=3,2
Salesman96.bmp 	Lena96.bmp 	StegoSA96LE96.bmp  MSE=4,7948 PSNR=41,3231 dB MOS=4,1	ExtSA96LE96.bmp  MSE=66,1828 PSNR=29,9233 dB MOS=2,5
Peppers96.bmp 	Baboon96.bmp 	StegoPE96BA96.bmp  MSE=4,1725 PSNR=41,9268 dB MOS=4,2	ExtPE96BA96.bmp  MSE=19,2707 PSNR=35,2818 dB MOS=2

Peppers96.bmp 	Boat96.bmp 	StegoPE96BO96.bmp  MSE=4,504 PSNR=41,5948 dB MOS=4,3	ExtPE96BO96.bmp  MSE=15,1382 PSNR=36,3301 dB MOS=3
Peppers96.bmp 	Lena96.bmp 	StegoPE96LE96.bmp  MSE=4,3857 PSNR=41,7104 dB MOS=4,3	ExtPE96LE96.bmp  MSE=32,2092 PSNR=33,0510 dB MOS=2,1
Barbara128.bmp 	Baboon128.bmp 	StegoBA128BA128.bmp  MSE=5,7797 PSNR=40,5117 dB MOS=4,2	ExtBA128BA128.bmp  MSE=0,4099 PSNR=52,0039 dB MOS=3,9
Barbara128.bmp 	Boat128.bmp 	StegoBA128BO128.bmp 	ExtBA128BO128.bmp 

		MSE=5,7328 PSNR=40,5471 dB MOS=4,5	MSE=0,3069 PSNR=53,2062 dB MOS=3,7
Barbara128.bmp 	Lena128.bmp 	StegoBA128LE128.bmp  MSE=5,6622 PSNR=40,601 dB MOS=4,3	ExtBA128LE128.bmp  MSE=4,4323 PSNR=41,6645 dB MOS=3,3
Salesman128.bmp 	Baboon128.bmp 	StegoSA128BA128.bmp  MSE=6,2418 PSNR=40,1777 dB MOS=4,3	ExtSA128BA128.bmp  MSE=56,6924 PSNR=30,5956 dB MOS=3,7
Salesman128.bmp 	Boat128.bmp 	StegoSA128BO128.bmp  MSE=6,2462 PSNR=40,1746 dB MOS=4,2	ExtSA128BO128.bmp  MSE=130,2931 PSNR=26,9816 dB MOS=3,3

Salesman128.bmp 	Lena128.bmp 	StegoSA128LE128.bmp  MSE=6,2603 PSNR=40,1649 dB MOS=4	ExtSA128LE128.bmp  MSE=68,5855 PSNR=29,7685 dB MOS=2,8
Peppers128.bmp 	Baboon128.bmp 	StegoPE128BA128.bmp  MSE=5,7722 PSNR=40,5174 dB MOS=4,4	ExtPE128BA128.bmp  MSE=7,5240 PSNR=39,3663 dB MOS=2,2
Peppers128.bmp 	Boat128.bmp 	StegoPE128BO128.bmp  MSE=6,0173 PSNR=40,3368 dB MOS=4,4	ExtPE128BO128.bmp  MSE=3,9728 PSNR=42,1398 dB MOS=3,1

Peppers128.bmp	Lena128.bmp	StegoPE128LE128.bmp	ExtPE128LE128.bmp
		 MSE=5,6567 PSNR=40,6052 dB MOS=4,3	 MSE=19,0355 PSNR=35,3352 dB MOS=2,4

LAMPIRAN B

PENILAIAN SUBJEKTIF

B.1 Tabel Penilaian Subjektif Citra Hasil Penyisipan

Nama Gambar	Kevin	Yenni	Glen	Ellis	Richard	Febryan	Oskardy	Rafles	Andi	Dhani	MOS
stegoBa80Ba80	5	5	4	4	4	5	5	4	4	5	4.5
stegoBa80Bo80	5	4	3	4	4	5	5	4	4	5	4.3
stegoBa80Le80	5	4	3	4	4	5	5	4	3	5	4.2
stegoSa80Ba80	5	3	3	4	4	5	5	4	4	5	4.2
stegoSa80Bo80	5	4	4	4	4	5	4	4	3	5	4.2
stegoSa80Le80	5	4	3	4	3	5	4	4	3	5	4
stegoPe80Ba80	5	5	4	4	4	4	5	4	4	5	4.4
stegoPe80Bo80	5	4	4	4	4	4	5	4	4	5	4.3
stegoPe80Le80	4	5	4	4	4	4	5	4	3	5	4.2
stegoBa96Ba96	5	5	4	4	4	4	5	4	4	5	4.4
stegoBa96Bo96	5	4	3	4	4	4	5	4	4	5	4.2
stegoBa96Le96	4	5	4	4	4	4	5	4	4	5	4.3
stegoSa96Ba96	5	4	4	4	4	5	5	4	3	5	4.3
stegoSa96Bo96	5	4	5	4	4	5	5	4	4	5	4.5
stegoSa96Le96	4	3	4	4	4	5	5	4	3	5	4.1
stegoPe96Ba96	4	4	3	4	4	5	5	4	4	5	4.2
stegoPe96Bo96	5	4	4	4	4	4	5	4	4	5	4.3
stegoPe96Le96	4	4	5	4	4	4	5	4	4	5	4.3
stegoBa128Ba128	4	5	4	4	3	4	5	4	4	5	4.2
stegoBa128Bo128	5	5	4	4	4	5	5	4	4	5	4.5
stegoBa128Le128	5	4	4	4	3	5	5	4	4	5	4.3
stegoSa128Ba128	4	4	5	4	3	5	5	4	4	5	4.3
stegoSa128Bo128	5	3	4	4	4	4	5	4	4	5	4.2
stegoSa128Le128	4	3	4	4	4	4	5	4	3	5	4
stegoPe128Ba128	4	5	5	4	4	4	5	4	4	5	4.4
stegoPe128Bo128	4	4	5	4	4	5	5	4	4	5	4.4
stegoPe128Le128	4	4	5	4	4	4	5	4	4	5	4.3

B.2 Tabel Penilaian Subjektif Citra Hasil Ekstraksi

Nama Gambar	Kevin	Yenni	Glen	Ellis	Richard	Febryan	Oskardy	Rafles	Andi	Dhani	MOS
extBa80Ba80	3	3	2	2	3	2	4	3	3	3	2.8
extBa80Bo80	4	3	2	2	3	3	5	3	3	3	3.1
extBa80Le80	3	2	2	2	3	2	4	3	2	2	2.5
extSa80Ba80	5	4	3	3	4	4	5	4	2	2	3.6
extSa80Bo80	5	4	2	3	4	4	4	4	3	3	3.6
extSa80Le80	3	3	2	2	2	3	5	3	2	2	2.7
extPe80Ba80	2	2	1	1	1	1	3	2	1	2	1.6
extPe80Bo80	3	2	3	2	2	2	4	4	1	3	2.6
extPe80Le80	2	2	1	1	2	2	4	2	1	1	1.8
extBa96Ba96	4	3	3	2	3	4	5	4	2	3	3.3
extBa96Bo96	3	3	3	3	3	4	5	4	3	3	3.4
extBa96Le96	3	2	2	2	4	3	5	3	2	2	2.8
extSa96Ba96	3	3	3	2	4	4	5	4	3	3	3.4
extSa96Bo96	3	3	3	2	3	4	5	4	3	2	3.2
extSa96Le96	3	2	2	2	2	3	4	3	2	2	2.5
extPe96Ba96	2	2	2	2	1	2	3	2	2	2	2
extPe96Bo96	4	3	2	2	3	4	4	3	2	3	3
extPe96Le96	2	2	1	1	2	3	4	2	2	2	2.1
extBa128Ba128	4	5	3	4	3	5	5	4	3	3	3.9
extBa128Bo128	4	3	3	4	4	4	5	4	3	3	3.7
extBa128Le128	4	2	3	3	3	4	4	4	3	3	3.3
extSa128Ba128	4	3	3	4	3	5	5	4	3	3	3.7
extSa128Bo128	4	3	2	3	2	4	5	4	3	3	3.3
extSa128Le128	3	2	3	3	2	3	4	3	2	3	2.8
extPe128Ba128	2	3	2	2	2	3	3	2	1	2	2.2
extPe128Bo128	4	3	2	3	3	4	4	3	2	3	3.1
extPe128Le128	2	2	2	2	3	3	4	3	1	2	2.4

LAMPIRAN C

PERANGKAT LUNAK

```
function varargout = GUI64(varargin)
% GUI64 MATLAB code for GUI64.fig
%      GUI64, by itself, creates a new GUI64 or raises the existing
%      singleton*.
%
%      H = GUI64 returns the handle to a new GUI64 or the handle to
%      the existing singleton*.
%
%      GUI64('CALLBACK',hObject,eventData,handles,...) calls the local
%      function named CALLBACK in GUI64.M with the given input arguments.
%
%      GUI64('Property','Value',...) creates a new GUI64 or raises the
%      existing singleton*.  Starting from the left, property value pairs are
%      applied to the GUI before GUI64_OpeningFcn gets called.  An
%      unrecognized property name or invalid value makes property application
%      stop.  All inputs are passed to GUI64_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 GUI64

% Last Modified by GUIDE v2.5 02-Apr-2013 13:18:39

% Begin initialization code - DO NOT EDIT
gui_Singleton = 1;
gui_State = struct('gui_Name',       mfilename, ...
                   'gui_Singleton',  gui_Singleton, ...
                   'gui_OpeningFcn', @GUI64_OpeningFcn, ...
                   'gui_OutputFcn',  @GUI64_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 GUI64 is made visible.
function GUI64_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 GUI64 (see VARARGIN)

% Choose default command line output for GUI64
handles.output = hObject;

% Update handles structure
guidata(hObject, handles);

% UIWAIT makes GUI64 wait for user response (see UIRESUME)
% uiwait(handles.figure1);


% --- Outputs from this function are returned to the command line.
function varargout = GUI64_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_coverimage.
function pushbutton1_coverimage_Callback(hObject, eventdata, handles)
% hObject    handle to pushbutton1_coverimage (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    structure with handles and user data (see GUIDATA)
[filename, pathname] = uigetfile({'*.bmp','All Image Files';...
        '*.*','All Files' },'Select Cover Image');
    if isequal([filename,pathname],[0,0])
      return
    else
        handles.img=imread(fullfile(pathname, filename));
        guidata(hObject, handles);
        axes(handles.Axes_CoverImage);
        imshow(handles.img);
        CoverImage = handles.img;
```

```
        handles.CoverImage=CoverImage;
        guidata(hObject, handles);
    end


% --- Executes on button press in pushbutton2_secretimage.
function pushbutton2_secretimage_Callback(hObject, eventdata, handles)
% hObject    handle to pushbutton2_secretimage (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    structure with handles and user data (see GUIDATA)
[filename, pathname] = uigetfile({'*.bmp','All Image Files';...
        '*.*','All Files' },'Select Secret Image');
    if isequal([filename,pathname],[0,0])
      return
    else
        handles.img=imread(fullfile(pathname, filename));
        guidata(hObject, handles);
        axes(handles.Axes_SecretImage);
        imshow(handles.img);
        SecretImage = handles.img;
        handles.SecretImage = SecretImage;
        guidata(hObject, handles);
    end


% --- Executes on button press in pushbutton3_hideimage.
function pushbutton3_hideimage_Callback(hObject, eventdata, handles)
% hObject    handle to pushbutton3_hideimage (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    structure with handles and user data (see GUIDATA)
CoverImage=handles.CoverImage; %membaca variabel cover image
SecretImage=handles.SecretImage; %membaca variabel secret image


cover_image=imresize(CoverImage,[128 128]);
Y=im2double(cover_image);


secret_image=imresize(SecretImage,[128 128]);
secret_image=im2double(secret_image);


[m,n]=size(Y);
jbs=(((m-16)/4)+1)*16;
jbb=(((n-16)/4)+1)*16;
```

```
Temp=zeros([jbs jbb]);
samping=1;
bawah=1;
hitung=1;hit=1;
for k=1:jbs
   for o=1:jbb
      if (bawah <= m) & (samping <= n)
         Temp(k,o)=Y(bawah,samping);
      end
      if hitung < 16
        samping = samping+1;
        hitung = hitung+1;
      else
         hitung = 1;
         samping = samping-11;
      end
   end
   samping=1;
   if hit < 16
      bawah = bawah+1;
      hit = hit+1;
   else
      hit = 1;
      bawah = bawah-11;
   end
end

c = mat2cell(Temp, [16 16 16 16 16 16 16 16 16 16 16 16 16 16 16 16 16 16 16 16 16 16 16 16 16 16 16 16 16 16] , ...
   [16 16 16 16 16 16 16 16 16 16 16 16 16 16 16 16 16 16 16 16 16 16 16 16 16 16 16 16 16 16 16 16 16 16 16 16]);

e = mat2cell(secret_image, [8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8] , [8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8]);


for cc=1:29
   for dd=1:29
      d{cc,dd}=rata(c{cc,dd});
   end
end

[X2, Y2, X1, Y1] = ndgrid(1:size(c,1), 1:size(c,2), 1:size(e,1), 1:size(e,2));
EE = X1 - X2./2;
FF = Y1 - Y2./2;
```

```
ei = squeeze(mat2cell(EE, size(c,1), size(c,2), ones(1,size(e,1)), ones(1,size(e,2))));
fi = squeeze(mat2cell(FF, size(c,1), size(c,2), ones(1,size(e,1)), ones(1,size(e,2))));

 for yy=1:29
   for zz=1:29
      for aa=1:16
         for bb=1:16
di{yy,zz}=((sum(sum(d{yy,zz}))));
ri{aa,bb}=((sum(sum(e{aa,bb}))));
si{yy,zz,aa,bb}=(64*(sum(sum(d{yy,zz}.*e{aa,bb})))-
(di{yy,zz}.*ri{aa,bb}))/((64*(sum(sum((d{yy,zz}).^2))))-(di{yy,zz}).^2);
oi{yy,zz,aa,bb}=((ri{aa,bb})-(si{yy,zz,aa,bb}.*di{yy,zz}))/64;
         end
      end
   end
 end

   for mmm=1:16
   for nnn=1:16
      for ggg=1:29
      for hhh=1:29

kurang{ggg,hhh,mmm,nnn}=d{ggg,hhh}-e{mmm,nnn};
rms{ggg,hhh,mmm,nnn}=(sqrt((sum(sum((kurang{ggg,hhh,mmm,nnn}))))^2))/64;
mintemp(ggg,hhh,mmm,nnn)=rms{ggg,hhh,mmm,nnn};

      end
      end
   end
   end

[ii1,ii2,ii3,ii4]=size(mintemp);
count=0;
id=zeros(ii3*ii4,4);
for k=1:ii3
for p=1:ii4
  count=count+1;
  v=mintemp(:,:,k,p);
  [val,idx]=min(v(:));
  [id1,id2]=ind2sub(size(v),idx);
  minval(count)=val;
  idx1(count)=id1;
  idx2(count)=id2;
  idx3(count)=k;
  idx4(count)=p;
```

```
   id(count,:)=[id1 id2 k p];
end
end

for iii=1:256
jjj=1;
  idd1=id(iii,jjj);
  idd2=id(iii,jjj+1);
  idd3=id(iii,jjj+2);
  idd4=id(iii,jjj+3);

  EEi(iii)=EE(idd1,idd2,idd3,idd4);
  FFi(iii)=FF(idd1,idd2,idd3,idd4);
  SSi(iii)=si(idd1,idd2,idd3,idd4);
  SSii=cell2mat(SSi);
  OOi(iii)=oi(idd1,idd2,idd3,idd4);
  OOii=cell2mat(OOi);
end

ggg=[EEi; FFi; SSii; OOii];
ggg1=ggg';
hhh1=reshape(ggg1,1,1024);

for ppp=1:1024
if hhh1(ppp)<0
    hhh1(ppp)=abs(hhh1(ppp));
    tanda=dec2bin(1);
else tanda=dec2bin(0);
end
jjj1=hhh1(ppp)*1000;
kkk1=dec2bin(jjj1,15);
lll1{ppp}=[tanda,kkk1];
end
biner=reshape(lll1,256,4);

for qqq=1:256
    for rrr=1:4
biner1=biner{qqq,rrr};
biner2{qqq,rrr}=uint8(biner1);
biner3{qqq,rrr}=bitget(biner2{qqq,rrr},1);
    end
end

biner4=cell2mat(biner3);
biner4=reshape(biner4,128,128);
```

```
Mc=size(biner4,1);
Nc=size(biner4,2);

cover1_image=dec2bin(cover_image,8);
cover2_image=str2num(cover1_image);

for rr=1:Mc
   for ru=1:Nc
     stego128_image(rr,ru)=bitset(cover_image(rr,ru),1,biner4(rr,ru));
         end
end
   axes(handles.Axes_StegoImage);
   imshow(stego128_image);
MSE=sum(sum(stego128_image-cover_image).^2)/(Mc*Nc);
PSNR=10*(log10 ((255^2)/MSE));
   MSE=num2str(MSE);
   PSNR=num2str(PSNR);
   set(handles.MSEhasil,'string',MSE);
   set(handles.PSNRhasil, 'string', PSNR);

 handles.secret_image=secret_image;
 handles.stego128_image=stego128_image;
 handles.kurang=kurang;
 guidata(hObject, handles);



% --- Executes on button press in pushbutton4_extractimage.
function pushbutton4_extractimage_Callback(hObject, eventdata, handles)
% hObject    handle to pushbutton4_extractimage (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    structure with handles and user data (see GUIDATA)

StegoImage=handles.StegoImage; %membaca variabel secret image
kurang=handles.kurang;
secret_image=handles.secret_image;
stego1=reshape(StegoImage,256,64);
stego_bit1=bitget(stego1,1);
Y=im2double(StegoImage);

for i=1:256
   m=0;
   for j=1:16:64
      x=stego_bit1(i,j:j+15);
```

```
        if (x(1,1)==1)
            y=x(1,2:16);
            y2=bin2dec( char(y + '0') );
            y2=-(y2/1000);
        else
            y=x(1,2:16);
            y2=bin2dec( char(y + '0') )/1000;

        end
    m=m+1;
   z(i,m)=y2;
    end
end
z=z;

a=repmat(1:16,16,[]);
b=a';
a=a(:)';
b=b(:)';
a1=reshape(a,256,1);
b1=reshape(b,256,1);

posisi=(a1-z(:,1))*2;
posisi1=(b1-z(:,2))*2;

id=[posisi  posisi1  a1  b1];

[m,n]=size(Y);
jbs=(((m-16)/4)+1)*16;
jbb=(((n-16)/4)+1)*16;
Temp=zeros([jbs jbb]);
samping=1;
bawah=1;
hitung=1;hit=1;
for k=1:jbs
    for o=1:jbb
        if (bawah <= m) & (samping <= n)
            Temp(k,o)=Y(bawah,samping);
        end
        if hitung < 16
           samping = samping+1;
           hitung = hitung+1;
        else
            hitung = 1;
            samping = samping-11;
```

```
        end
    end
    samping=1;
    if hit < 16
        bawah = bawah+1;
        hit = hit+1;
    else
        hit = 1;
        bawah = bawah-11;
    end
end

c = mat2cell(Temp, [16 16 16 16 16 16 16 16 16 16 16 16 16 16 16 16 16 16 16 16
16 16 16 16 16 16 16 16] , ...
    [16 16 16 16 16 16 16 16 16 16 16 16 16 16 16 16 16 16 16 16 16 16 16 16 16
16 16 16]);

for cc=1:29
    for dd=1:29
        d{cc,dd}=rata(c{cc,dd});
    end
end

for i1=1:256

j1=1;
  idd1=id(i1,j1);
  idd2=id(i1,j1+1);
  idd3=id(i1,j1+2);
  idd4=id(i1,j1+3);

 si{idd1,idd2,idd3,idd4}=z(i1,3);
oi{idd1,idd2,idd3,idd4}=z(i1,4);
d1{idd1,idd2}=(d{idd1,idd2}.*si{idd1,idd2,idd3,idd4})+oi{idd1,idd2,idd3,idd4};
d2{idd3,idd4}=d1{idd1,idd2}-kurang{idd1,idd2,idd3,idd4};
end

 d5=cell2mat(d2);
handles.d5 = d5;
    guidata(hObject, handles);
      axes(handles.Axes_ExtractImage);
    imshow(d5);
    MSE1=sum(sum(d5-secret_image).^2)/(128*128);
    PSNR1=10*(log10 ((255^2)/MSE1));
    MSE1=num2str(MSE1);
```

```
    PSNR1=num2str(PSNR1);
    set(handles.MSEextract,'string',MSE1);
    set(handles.PSNRextract, 'string', PSNR1);

% --- Executes on button press in pushbutton5_SaveImageStego.
function pushbutton5_SaveImageStego_Callback(hObject, eventdata, handles)
% hObject    handle to pushbutton5_SaveImageStego (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    structure with handles and user data (see GUIDATA)
stego128_image=handles.stego128_image;
[FileName,PathName]=uiputfile('*.bmp','Save As Stego Image')
imwrite(stego128_image,FileName,'bmp');

% --- Executes on button press in pushbutton6_StegoImage.
function pushbutton6_StegoImage_Callback(hObject, eventdata, handles)
% hObject    handle to pushbutton6_StegoImage (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    structure with handles and user data (see GUIDATA)
[filename, pathname] = uigetfile({'*.bmp','All Image Files';...
        '*.*','All Files' },'Select Stego Image');
    if isequal([filename,pathname],[0,0])
      return
    else
        handles.img=imread(fullfile(pathname, filename));
        guidata(hObject, handles);
        axes(handles.Axes_StegoImage);
        imshow(handles.img);
        StegoImage = handles.img;
        handles.StegoImage = StegoImage;
        guidata(hObject, handles);
    end

% --- Executes on button press in pushbutton7_SaveImageExtract.
function pushbutton7_SaveImageExtract_Callback(hObject, eventdata, handles)
% hObject    handle to pushbutton7_SaveImageExtract (see GCBO)
% eventdata  reserved - to be defined in a future version of MATLAB
% handles    structure with handles and user data (see GUIDATA)
d5=handles.d5;
[FileName,PathName]=uiputfile('*.bmp','Save extract Image')
imwrite(d5,FileName,'bmp');
```