

LAMPIRAN A
LIST PROGRAM PADA MATLAB

1. Program Pemrosesan Citra

```
clc;
clear;
close all;
imtool close all;

%=====
input1=imread('C:\Users\TOSHIBA\My
Documents\MATLAB\database\lr.jpg','jpg');
input2=imread('C:\Users\TOSHIBA\My
Documents\MATLAB\database\la1.jpg','jpg');

fullscreen = get(0,'ScreenSize');
figure('units','normalized','outerposition',[0 0 1 1]);

% Plot citra asli input 1
subplot(5, 2, 1); imshow(input1); title('Citra Bibir Diam');

% Plot citra asli input 2
subplot(5, 2, 2); imshow(input2); title('Citra Bibir Huruf Vokal');

%=====
%Mengubah Citra Asli Menjadi Citra Biner
%Filter image 1
intsc1=rgb2ntsc(input1);
z1=intsc1(:,:,3);
zn1=mean(z1(:));

vektor_z1=reshape(z1,size(z1,1)*size(z1,2),1);vektor_tes1=vektor_z1;
for l=1:length(vektor_tes1)
if vektor_tes1(l)>zn1
vektor_tes1(l)=1;
else
vektor_tes1(l)=0;
end;
end

vektor_tes1=reshape(vektor_tes1,200,300);

filteraveragel= fspecial ('average', [4 4]);
Ifilter1 = imfilter(vektor_tes1, filteraveragel, 'symmetric', 'conv');
Ibw1 = im2bw(Ifilter1);

%imfill
ifill1= imfill(Ibw1,'holes');

%Filter image 2
intsc2=rgb2ntsc(input2);
z2=intsc2(:,:,3);
zn2=mean(z2(:));

vektor_z2=reshape(z2,size(z2,1)*size(z2,2),1);vektor_tes2=vektor_z2;
for l=1:length(vektor_tes2)
if vektor_tes2(l)>zn2
vektor_tes2(l)=1;
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else
vektor_tes2(1)=0;
end;
end

vektor_tes2=reshape(vektor_tes2,200,300);

filteraverage2= fspecial ('average', [4 4]);
Ifilter2 = imfilter(vektor_tes2, filteraverage2, 'symmetric', 'conv');
Ibw2 = im2bw(Ifilter2);

%imfill
ifill12= imfill(Ibw2,'holes');

%=====
%Memperbaiki Citra Biner
%memperbaiki citra biner 1
SE1=strel('disk',17,0);
streldisk1=imopen(ifill1,SE1);
BinaryImage1 = bwareaopen(streldisk1, 6500);

% Plot image BW
subplot(5, 2, 3); imshow(BinaryImage1);
title('Citra Biner'); axis image;

%memperbaiki citra biner 2
SE2=strel('disk',17,0);
streldisk2=imopen(ifill2,SE2);
BinaryImage2 = bwareaopen(streldisk2, 6500);

% Plot image BW
subplot(5, 2, 4); imshow(BinaryImage2);
title('Citra Biner'); axis image;

%=====
%Mencari Area, Centroid, Diameter dari Citra Biner
% mencari semua properti dari citra biner 1 dengan fungsi regionprops()
objectMeasurements1 = regionprops(BinaryImage1, 'all');

objectArea1 = objectMeasurements1.Area;      % Mencari nilai area.
objectCentroid1 = objectMeasurements1.Centroid; % Mencari centroid
(titik tengah).
objectECD1 = sqrt(4 * objectArea1 / pi);      % Menghitung
ECD - Equivalent Circular Diameter.

%=====
% mencari semua properti dari citra biner 2 dengan fungsi regionprops()
objectMeasurements2 = regionprops(BinaryImage2, 'all');

objectArea2 = objectMeasurements2.Area;      % Mencari area.
objectCentroid2 = objectMeasurements2.Centroid; % Mencari centroid.
objectECD2 = sqrt(4 * objectArea2 / pi);      % Menghitung
ECD - Equivalent Circular Diameter.

%=====
%Mencari Titik-Titik Penting
% mencari titik-titik penting image 1
subplot(5, 2, 5); imagesc(BinaryImage1);

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title('Titik-Titik Penting Citra'); axis image;

centroidColumn1 = int32(objectCentroid1(1)); % nilai "X"
centroidRow1 = int32(objectCentroid1(2)); % nilai "Y"

% Mengambil nilai baris atau kolom dan menggunakan perintah find untuk
% mencari elemen pertama dan terakhir.

middleColumn1 = BinaryImage1(:, centroidColumn1);
middleRow1 = BinaryImage1(centroidRow1, :);
topRowY1 = find(middleColumn1, 1, 'first'); % Find top.
bottomRowY1 = find(middleColumn1, 1, 'last'); % Find bottom.
leftColumnX1 = find(middleRow1, 1, 'first'); % Find left.
rightColumnX1 = find(middleRow1, 1, 'last'); % Find right.

top1 = ([centroidColumn1, topRowY1]);
bottom1 = ([centroidColumn1, bottomRowY1]);
left1 = ([leftColumnX1, centroidRow1]);
right1 = ([rightColumnX1, centroidRow1]);

%memberi tanda pada titik-titik penting
line(centroidColumn1, centroidRow1, 'Marker', '*', 'MarkerEdgeColor', 'r')
line(centroidColumn1, topRowY1, 'Marker', '*', 'MarkerEdgeColor', 'r')
line(centroidColumn1, bottomRowY1, 'Marker', '*', 'MarkerEdgeColor', 'r')
line(leftColumnX1, centroidRow1, 'Marker', '*', 'MarkerEdgeColor', 'r')
line(rightColumnX1, centroidRow1, 'Marker', '*', 'MarkerEdgeColor', 'r')

%=====
%mencari titik-titik penting image 2
subplot(5, 2, 6); imagesc(BinaryImage2);
title('Titik-Titik Penting Citra'); axis image;

centroidColumn2 = int32(objectCentroid2(1)); % nilai "X"
centroidRow2 = int32(objectCentroid2(2)); % nilai "Y"

% Mengambil nilai baris atau kolom dan menggunakan perintah find untuk
% mencari elemen pertama dan terakhir.

middleColumn2 = BinaryImage2(:, centroidColumn2);
middleRow2 = BinaryImage2(centroidRow2, :);
topRowY2 = find(middleColumn2, 1, 'first'); % Find top.
bottomRowY2 = find(middleColumn2, 1, 'last'); % Find bottom.

leftColumnX2 = find(middleRow2, 1, 'first'); % Find left.
rightColumnX2 = find(middleRow2, 1, 'last'); % Find right.

top2 = ([centroidColumn2, topRowY2]);
bottom2 = ([centroidColumn2, bottomRowY2]);
left2 = ([leftColumnX2, centroidRow2]);
right2 = ([rightColumnX2, centroidRow2]);

%memberi tanda pada titik-titik penting
line(centroidColumn2, centroidRow2, 'Marker', '*', 'MarkerEdgeColor', 'r')
line(centroidColumn2, topRowY2, 'Marker', '*', 'MarkerEdgeColor', 'r')
line(centroidColumn2, bottomRowY2, 'Marker', '*', 'MarkerEdgeColor', 'r')
line(leftColumnX2, centroidRow2, 'Marker', '*', 'MarkerEdgeColor', 'r')
line(rightColumnX2, centroidRow2, 'Marker', '*', 'MarkerEdgeColor', 'r')

%=====

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%Menghitung Nilai Sudut
%Mencari sudut tinggi, lebar, beta1, beta2, beta3, beta4 pada image 1
im1tinggi1 = double(centroidRow1 - topRowY1);
im1tinggi2 = double(bottomRowY1 - centroidRow1);
im1lebar1 = double(centroidColumn1 - leftColumnX1);
im1lebar2 = double(rightColumnX1 - centroidColumn1);

im1Tinggi = (im1tinggi1+im1tinggi2);
im1Lebar = (im1lebar1+im1lebar2);

im1sisi1 = sqrt((im1tinggi1^2)+(im1lebar1^2));
im1sisi2 = sqrt((im1tinggi1^2)+(im1lebar2^2));
im1sisi3 = sqrt((im1tinggi2^2)+(im1lebar2^2));
im1sisi4 = sqrt((im1tinggi2^2)+(im1lebar1^2));

im1skiri1 = (im1tinggi1/im1lebar1);
im1skiri2 = (im1tinggi2/im1lebar1);
im1betala = atand(im1skiri1);
im1beta1b = atand(im1skiri2);
im1beta1 = (im1betala + im1beta1b);

im1satas1 = (im1lebar1/im1tinggi1);
im1satas2 = (im1lebar2/im1tinggi1);
im1beta2a = atand(im1satas1);
im1beta2b = atand(im1satas2);
im1beta2 = (im1beta2a + im1beta2b);

im1skanan1 = (im1tinggi1/im1lebar2);
im1skanan2 = (im1tinggi2/im1lebar2);
im1beta3a = atand(im1skanan1);
im1beta3b = atand(im1skanan2);
im1beta3 = (im1beta3a + im1beta3b);

im1sbawah1 = (im1lebar1/im1tinggi2);
im1sbawah2 = (im1lebar2/im1tinggi2);
im1beta4a = atand(im1sbawah1);
im1beta4b = atand(im1sbawah2);
im1beta4 = (im1beta4a + im1beta4b);

sudut_samping_image1 = im1beta1;
sudut_atas_image1 = im1beta2;
sudut_bawah_image1 = im1beta4;
luas_area_image1 = objectAreal;
diameter_image1 = objectECD1;

%=====
%Mencari sudut tinggi, lebar, beta1, beta2, beta3, beta4 pada image 2
im2tinggi1 = double(centroidRow2 - topRowY2);
im2tinggi2 = double(bottomRowY2 - centroidRow2);
im2lebar1 = double(centroidColumn2 - leftColumnX2);
im2lebar2 = double(rightColumnX2 - centroidColumn2);

im2Tinggi = (im2tinggi1+im2tinggi2);
im2Lebar = (im2lebar1+im2lebar2);

im2sisi1 = sqrt((im2tinggi1^2)+(im2lebar1^2));
im2sisi2 = sqrt((im2tinggi1^2)+(im2lebar2^2));
im2sisi3 = sqrt((im2tinggi2^2)+(im2lebar2^2));
im2sisi4 = sqrt((im2tinggi2^2)+(im2lebar1^2));

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im2skiri1 = (im2tinggi1/im2lebar1);
im2skiri2 = (im2tinggi2/im2lebar1);
im2betala = atand(im2skiri1);
im2betalb = atand(im2skiri2);
im2beta1 = (im2betala + im2betalb);

im2satas1 = (im2lebar1/im2tinggi1);
im2satas2 = (im2lebar2/im2tinggi1);
im2beta2a = atand(im2satas1);
im2beta2b = atand(im2satas2);
im2beta2 = (im2beta2a + im2beta2b);

im2skanan1 = (im2tinggi1/im2lebar2);
im2skanan2 = (im2tinggi2/im2lebar2);
im2beta3a = atand(im2skanan1);
im2beta3b = atand(im2skanan2);
im2beta3 = (im2beta3a + im2beta3b);

im2sbawah1 = (im2lebar1/im2tinggi2);
im2sbawah2 = (im2lebar2/im2tinggi2);
im2beta4a = atand(im2sbawah1);
im2beta4b = atand(im2sbawah2);
im2beta4 = (im2beta4a + im2beta4b);

sudut_samping_image2 = im2beta1;
sudut_atas_image2 = im2beta2;
sudut_bawah_image2 = im2beta4;
luas_area_image2 = objectArea2;
diameter_image2 = objectECD2;

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%=====
%Menghitung Selisih Nilai Sudut, Area, Diameter Citra Input 1 dan Citra
%Input 2
%perbandingan image huruf vokal dengan diam(referensi)

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sudut_samping = (im2beta1-im1beta1)
sudut_atas = (im2beta2-im1beta2)
sudut_bawah = (im2beta4-im1beta4)

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luas_area = (objectArea2/objectArea1)
diameter = (objectECD2/objectECD1)

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%=====

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2. Program Pengujian

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%Program Pengenalan

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%Membandingkan Input Dengan Range

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%range sudut ke-1

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if (19.2151 < sudut_samping) && (sudut_samping < 49.9198) && (-45.6032 <
sudut_atas) && (sudut_atas < -19.8896) && ...

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    (-45.8584 < sudut_bawah) && (sudut_bawah < -16.9490) && ...

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    (1.5421 < luas_area) && (luas_area < 1.9948) && ...

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    (1.2418 < diameter) && (diameter < 1.4124)

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    hasil_ujil = 'A';

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elseif (-2.5991 < sudut_samping) && (sudut_samping < 10.6986) && (-14.6884
< sudut_atas) && (sudut_atas < 8.8099) && ...

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        (-12.7962 < sudut_bawah) && (sudut_bawah < 7.5086) && ...
        (0.8796 < luas_area) && (luas_area < 1.4850) && ...
        (0.9378 < diameter) && (diameter < 1.2187)
    hasil_uji1 = 'I';
elseif (12.8863 < sudut_samping) && (sudut_samping < 26.5768) && (-32.0118
< sudut_atas) && (sudut_atas < -9.1808) && ...
    (-24.4186 < sudut_bawah) && (sudut_bawah < -5.9305) && ...
    (0.6266 < luas_area) && (luas_area < 1.2705) && ...
    (0.7916 < diameter) && (diameter < 1.1272)
    hasil_uji1 = 'U';
elseif (5.2320 < sudut_samping) && (sudut_samping < 16.3774) && (-18.0881
< sudut_atas) && (sudut_atas < -1.1416) && ...
    (-20.5697 < sudut_bawah) && (sudut_bawah < -2.4154) && ...
    (1.4365 < luas_area) && (luas_area < 2.2617) && ...
    (1.1985 < diameter) && (diameter < 1.5040)
    hasil_uji1 = 'E';
elseif (24.5398 < sudut_samping) && (sudut_samping < 37.2053) && (-39.8648
< sudut_atas) && (sudut_atas < -18.0523) && ...
    (-35.0197 < sudut_bawah) && (sudut_bawah < -19.2840) && ...
    (1.0574 < luas_area) && (luas_area < 1.551) && ...
    (1.0282 < diameter) && (diameter < 1.2273)
    hasil_uji1 = 'O';
else
    hasil_uji1 = 'X';
end

%range sudut ke-2
if (-2.5991 < sudut_samping) && (sudut_samping < 10.6986) && (-14.6884 <
sudut_atas) && (sudut_atas < 8.8099) && ...
    (-12.7962 < sudut_bawah) && (sudut_bawah < 7.5086) && ...
    (0.8796 < luas_area) && (luas_area < 1.4850) && ...
    (0.9378 < diameter) && (diameter < 1.2187)
    hasil_uji2 = 'I';
elseif (12.8863 < sudut_samping) && (sudut_samping < 26.5768) && (-32.0118
< sudut_atas) && (sudut_atas < -9.1808) && ...
    (-24.4186 < sudut_bawah) && (sudut_bawah < -5.9305) && ...
    (0.6266 < luas_area) && (luas_area < 1.2705) && ...
    (0.7916 < diameter) && (diameter < 1.1272)
    hasil_uji2 = 'U';
elseif (5.2320 < sudut_samping) && (sudut_samping < 16.3774) && (-18.0881
< sudut_atas) && (sudut_atas < -1.1416) && ...
    (-20.5697 < sudut_bawah) && (sudut_bawah < -2.4154) && ...
    (1.4365 < luas_area) && (luas_area < 2.2617) && ...
    (1.1985 < diameter) && (diameter < 1.5040)
    hasil_uji2 = 'E';
elseif (24.5398 < sudut_samping) && (sudut_samping < 37.2053) && (-39.8648
< sudut_atas) && (sudut_atas < -18.0523) && ...
    (-35.0197 < sudut_bawah) && (sudut_bawah < -19.2840) && ...
    (1.0574 < luas_area) && (luas_area < 1.551) && ...
    (1.0282 < diameter) && (diameter < 1.2273)
    hasil_uji2 = 'O';
elseif (19.2151 < sudut_samping) && (sudut_samping < 49.9198) && (-45.6032
< sudut_atas) && (sudut_atas < -19.8896) && ...
    (-45.8584 < sudut_bawah) && (sudut_bawah < -16.9490) && ...
    (1.5421 < luas_area) && (luas_area < 1.9948) && ...
    (1.2418 < diameter) && (diameter < 1.4124)
    hasil_uji2 = 'A';
else
    hasil_uji2 = 'X';
end

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%range sudut ke-3
if (12.8863 < sudut_samping) && (sudut_samping < 26.5768) && (-32.0118 <
sudut_atas) && (sudut_atas < -9.1808) && ...
    (-24.4186 < sudut_bawah) && (sudut_bawah < -5.9305) && ...
    (0.6266 < luas_area) && (luas_area < 1.2705) && ...
    (0.7916 < diameter) && (diameter < 1.1272)
    hasil_uji3 = 'U';
elseif (5.2320 < sudut_samping) && (sudut_samping < 16.3774) && (-18.0881
< sudut_atas) && (sudut_atas < -1.1416) && ...
    (-20.5697 < sudut_bawah) && (sudut_bawah < -2.4154) && ...
    (1.4365 < luas_area) && (luas_area < 2.2617) && ...
    (1.1985 < diameter) && (diameter < 1.5040)
    hasil_uji3 = 'E';
elseif (24.5398 < sudut_samping) && (sudut_samping < 37.2053) && (-39.8648
< sudut_atas) && (sudut_atas < -18.0523) && ...
    (-35.0197 < sudut_bawah) && (sudut_bawah < -19.2840) && ...
    (1.0574 < luas_area) && (luas_area < 1.551) && ...
    (1.0282 < diameter) && (diameter < 1.2273)
    hasil_uji3 = 'O';
elseif (19.2151 < sudut_samping) && (sudut_samping < 49.9198) && (-45.6032
< sudut_atas) && (sudut_atas < -19.8896) && ...
    (-45.8584 < sudut_bawah) && (sudut_bawah < -16.9490) && ...
    (1.5421 < luas_area) && (luas_area < 1.9948) && ...
    (1.2418 < diameter) && (diameter < 1.4124)
    hasil_uji3 = 'A';
elseif (-2.5991 < sudut_samping) && (sudut_samping < 10.6986) && (-14.6884
< sudut_atas) && (sudut_atas < 8.8099) && ...
    (-12.7962 < sudut_bawah) && (sudut_bawah < 7.5086) && ...
    (0.8796 < luas_area) && (luas_area < 1.4850) && ...
    (0.9378 < diameter) && (diameter < 1.2187)
    hasil_uji3 = 'I';
else
    hasil_uji3 = 'X';
end

%range sudut ke-4
if (5.2320 < sudut_samping) && (sudut_samping < 16.3774) && (-18.0881 <
sudut_atas) && (sudut_atas < -1.1416) && ...
    (-20.5697 < sudut_bawah) && (sudut_bawah < -2.4154) && ...
    (1.4365 < luas_area) && (luas_area < 2.2617) && ...
    (1.1985 < diameter) && (diameter < 1.5040)
    hasil_uji4 = 'E';
elseif (24.5398 < sudut_samping) && (sudut_samping < 37.2053) && (-39.8648
< sudut_atas) && (sudut_atas < -18.0523) && ...
    (-35.0197 < sudut_bawah) && (sudut_bawah < -19.2840) && ...
    (1.0574 < luas_area) && (luas_area < 1.551) && ...
    (1.0282 < diameter) && (diameter < 1.2273)
    hasil_uji4 = 'O';
elseif (19.2151 < sudut_samping) && (sudut_samping < 49.9198) && (-45.6032
< sudut_atas) && (sudut_atas < -19.8896) && ...
    (-45.8584 < sudut_bawah) && (sudut_bawah < -16.9490) && ...
    (1.5421 < luas_area) && (luas_area < 1.9948) && ...
    (1.2418 < diameter) && (diameter < 1.4124)
    hasil_uji4 = 'A';
elseif (-2.5991 < sudut_samping) && (sudut_samping < 10.6986) && (-14.6884
< sudut_atas) && (sudut_atas < 8.8099) && ...
    (-12.7962 < sudut_bawah) && (sudut_bawah < 7.5086) && ...
    (0.8796 < luas_area) && (luas_area < 1.4850) && ...
    (0.9378 < diameter) && (diameter < 1.2187)
    hasil_uji4 = 'I';

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elseif (12.8863 < sudut_samping) && (sudut_samping < 26.5768) && (-32.0118
< sudut_atas) && (sudut_atas < -9.1808) && ...
    (-24.4186 < sudut_bawah) && (sudut_bawah < -5.9305) && ...
    (0.6266 < luas_area) && (luas_area < 1.2705) && ...
    (0.7916 < diameter) && (diameter < 1.1272)
    hasil_uji4 = 'U';
else
    hasil_uji4 = 'X';
end

%range sudut ke-5
if (24.5398 < sudut_samping) && (sudut_samping < 37.2053) && (-39.8648 <
sudut_atas) && (sudut_atas < -18.0523) && ...
    (-35.0197 < sudut_bawah) && (sudut_bawah < -19.2840) && ...
    (1.0574 < luas_area) && (luas_area < 1.551) && ...
    (1.0282 < diameter) && (diameter < 1.2273)
    hasil_uji5 = 'O';
elseif (19.2151 < sudut_samping) && (sudut_samping < 49.9198) && (-45.6032
< sudut_atas) && (sudut_atas < -19.8896) && ...
    (-45.8584 < sudut_bawah) && (sudut_bawah < -16.9490) && ...
    (1.5421 < luas_area) && (luas_area < 1.9948) && ...
    (1.2418 < diameter) && (diameter < 1.4124)
    hasil_uji5 = 'A';
elseif (-2.5991 < sudut_samping) && (sudut_samping < 10.6986) && (-14.6884
< sudut_atas) && (sudut_atas < 8.8099) && ...
    (-12.7962 < sudut_bawah) && (sudut_bawah < 7.5086) && ...
    (0.8796 < luas_area) && (luas_area < 1.4850) && ...
    (0.9378 < diameter) && (diameter < 1.2187)
    hasil_uji5 = 'I';
elseif (12.8863 < sudut_samping) && (sudut_samping < 26.5768) && (-32.0118
< sudut_atas) && (sudut_atas < -9.1808) && ...
    (-24.4186 < sudut_bawah) && (sudut_bawah < -5.9305) && ...
    (0.6266 < luas_area) && (luas_area < 1.2705) && ...
    (0.7916 < diameter) && (diameter < 1.1272)
    hasil_uji5 = 'U';
elseif (5.2320 < sudut_samping) && (sudut_samping < 16.3774) && (-18.0881
< sudut_atas) && (sudut_atas < -1.1416) && ...
    (-20.5697 < sudut_bawah) && (sudut_bawah < -2.4154) && ...
    (1.4365 < luas_area) && (luas_area < 2.2617) && ...
    (1.1985 < diameter) && (diameter < 1.5040)
    hasil_uji5 = 'E';
else
    hasil_uji5 = 'X';
end

hasil_uji = [hasil_uji1; hasil_uji2; hasil_uji3; hasil_uji4; hasil_uji5]

% Untuk mencari tau dikenalnya sebagai apa saja
n=1;
vokal(n) = hasil_uji(1);
for j =1 : length (hasil_uji)
    if hasil_uji(j) ~= vokal(n)
        m=n+1; vokal(m)= hasil_uji(j);
    end;
end
end

```

```

% Mencari Nilai Tengah Range
MidSdtSamping_A= 19.2152 + (49.9197-19.2152)/2;
MidSdtSamping_I= -2.599 + (10.6985-(-2.599))/2;
MidSdtSamping_U= 12.8864 + (27.5171-12.8864)/2;
MidSdtSamping_E= 5.2321 + (16.3773-5.2321)/2;
MidSdtSamping_O= 24.5399 + (37.2052-24.5399)/2;

MidSdtAtas_A= -45.6031 + ((-19.8897)-(-45.6031))/2;
MidSdtAtas_I= -14.6883 + (8.8098-(-14.6883))/2;
MidSdtAtas_U= -32.0117+ ((-9.1809)-(-32.0117))/2;
MidSdtAtas_E= -18.088+ ((-1.1417)-(-18.088))/2;
MidSdtAtas_O= -39.8647+ ((-18.0524)-(-39.8647))/2;

MidSdtBawah_A= -45.8583+ ((-16.9491)- (-45.8583))/2;
MidSdtBawah_I= -12.7961+ (7.5085-(-12.7961))/2;
MidSdtBawah_U= -27.1501+ ((-5.9306)- (-27.1501))/2;
MidSdtBawah_E= -20.5696+ ((-2.4155)-(-20.5696))/2;
MidSdtBawah_O= -35.0196+ ((-19.2841)- (-35.0196))/2;

MidArea_A= 1.5422+ (1.9947- 1.5422)/2;
MidArea_I= 0.8797+ (1.4849-0.8797)/2;
MidArea_U= 0.6267+ (1.2704- 0.6267)/2;
MidArea_E= 1.4366+ (2.2616-1.4366)/2;
MidArea_O= 1.0575+ (1.55- 1.0575)/2;

MidDiameter_A= 1.2419+ (1.4123- 1.2419)/2;
MidDiameter_I= 0.9379+ (1.2186-0.9379)/2;
MidDiameter_U= 0.7917+ (1.1271- 0.7917)/2;
MidDiameter_E= 1.1986+ (1.5039-1.1986)/2;
MidDiameter_O= 1.0283+ (1.2272- 1.0283)/2;

Mid_A= [MidSdtSamping_A MidSdtAtas_A MidSdtBawah_A MidArea_A
MidDiameter_A];
Mid_I= [MidSdtSamping_I MidSdtAtas_I MidSdtBawah_I MidArea_I
MidDiameter_I];
Mid_U= [MidSdtSamping_U MidSdtAtas_U MidSdtBawah_U MidArea_U
MidDiameter_U];
Mid_E= [MidSdtSamping_E MidSdtAtas_E MidSdtBawah_E MidArea_E
MidDiameter_E];
Mid_O= [MidSdtSamping_O MidSdtAtas_O MidSdtBawah_O MidArea_O
MidDiameter_O];

% Mencari Nilai Tengah Range Yang Paling Mendekati Nilai Input
for u = 1 : length(vokal)
    if vokal (u) == 'A'
        NilaiRataArea(u)=abs(MidArea_A-luas_area);
        NilaiRataDiameter(u)=abs(MidDiameter_A-diameter);
    elseif vokal (u) == 'I'
        NilaiRataArea(u)=abs(MidArea_I-luas_area);
        NilaiRataDiameter(u)=abs(MidDiameter_I-diameter);
    elseif vokal (u) == 'U'
        NilaiRataArea(u)=abs(MidArea_U-luas_area);
        NilaiRataDiameter(u)=abs(MidDiameter_U-diameter);
    elseif vokal (u) == 'E'
        NilaiRataArea(u)=abs(MidArea_E-luas_area);
        NilaiRataDiameter(u)=abs(MidDiameter_E-diameter);
    elseif vokal (u) == 'O'
        NilaiRataArea(u)=abs(MidArea_O-luas_area);
        NilaiRataDiameter(u)=abs(MidDiameter_O-diameter);
    else

```

```

        NilaiRataArea(u)=0; NilaiRataDiameter(u)=0;
    end
end

NilaiArea_Terdekat = NilaiRataArea(1);indeks_Area=1;
NilaiDiameter_Terdekat = NilaiRataDiameter(1);indeks_Diameter=1;
for f = 1 : length(vokal)
    if NilaiArea_Terdekat > NilaiRataArea(f)
        NilaiArea_Terdekat = NilaiRataArea(f);indeks_Area=f;
    end;
    if NilaiDiameter_Terdekat > NilaiRataDiameter(f)
        NilaiDiameter_Terdekat = NilaiRataDiameter(f);indeks_Diameter=f;
    end;
end

% Mencari Nilai Yang Paling Banyak Keluar
indeks_semua = [indeks_Area, indeks_Diameter];
indeks_terbanyak = mode(indeks_semua);
hasil_pengenalan = vokal(indeks_terbanyak)

% Menampilkan gambar hasil pengenalan huruf vokal
if hasil_pengenalan == 'A'
    gambar_vokal=imread('C:\Users\TOSHIBA\My
Documents\MATLAB\huruf\A.jpg','jpg');
    subplot(5, 2, 10); imagesc(gambar_vokal); title('Hasil Pengenalan Huruf
Vokal');

elseif hasil_pengenalan == 'I'
    gambar_vokal=imread('C:\Users\TOSHIBA\My
Documents\MATLAB\huruf\I.jpg','jpg');
    subplot(5, 2, 10); imagesc(gambar_vokal); title('Hasil Pengenalan Huruf
Vokal');

elseif hasil_pengenalan == 'U'
    gambar_vokal=imread('C:\Users\TOSHIBA\My
Documents\MATLAB\huruf\U.jpg','jpg');
    subplot(5, 2, 10); imagesc(gambar_vokal); title('Hasil Pengenalan Huruf
Vokal');

elseif hasil_pengenalan == 'E'
    gambar_vokal=imread('C:\Users\TOSHIBA\My
Documents\MATLAB\huruf\E.jpg','jpg');
    subplot(5, 2, 10); imagesc(gambar_vokal); title('Hasil Pengenalan Huruf
Vokal');
















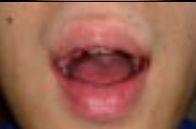
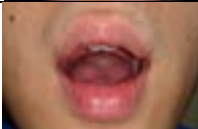






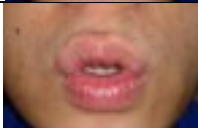
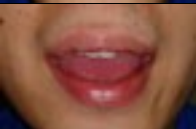


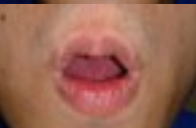








elseif hasil_pengenalan == 'O'
    gambar_vokal=imread('C:\Users\TOSHIBA\My
Documents\MATLAB\huruf\O.jpg','jpg');
    subplot(5, 2, 10); imagesc(gambar_vokal); title('Hasil Pengenalan Huruf
Vokal');





































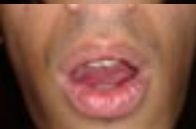


else
    gambar_vokal=imread('C:\Users\TOSHIBA\My
Documents\MATLAB\huruf\X.jpg','jpg');
    subplot(5, 2, 10); imagesc(gambar_vokal); title('Hasil Pengenalan Huruf
Vokal');
end
end

```


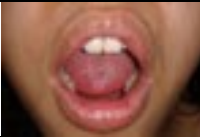


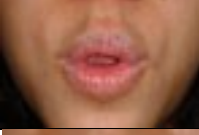
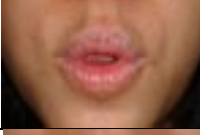
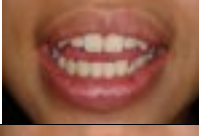
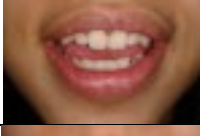
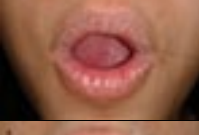
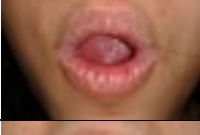














LAMPIRAN B
KUMPULAN CITRA





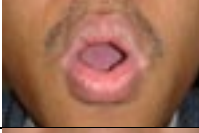
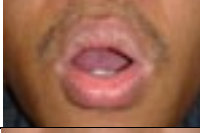


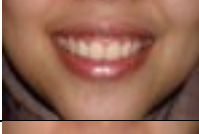
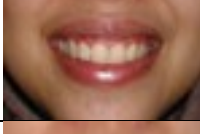




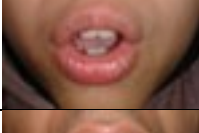









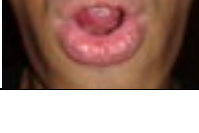
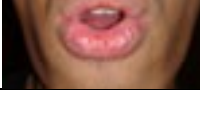
1. Citra Database Range

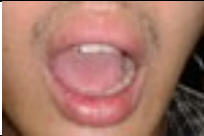













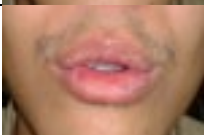


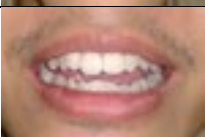
Orang Ke	Huruf	Citra ke		
		1	2	3
1	A			
	I			
	U			
	E			
	O			
2	A			
	I			
	U			
	E			
	O			
3	A			
	I			

	U			
	E			
	O			
4	A			
	I			
	U			
	E			
	O			
5	A			
	I			
	U			
	E			
	O			

2. Citra Uji

Orang Ke	Huruf	Citra ke	
		1	2
1	A		
	I		
	U		
	E		
	O		
2	A		
	I		
	U		
	E		
	O		
3	A		
	I		

	U				
	E				
	O				
4	A				
	I				
	U				
	E				
	O				
5	A				
	I				
	U				
	E				
	O				

6	A		
	I		
	U		
	E		
	O		
7	A		
	I		
	U		
	E		
	O	