1.Load file ảnh đầu tiên lên màn hình

```
AllImage=loadMNISTImages('train-images.idx3-ubyte');
% 60.000 anh.
Image00001=reshape(AllImage(:,1),28,28);
imshow(Image00001);
```

2.Nạp dữ liệu train và dữ liệu test của bài toán nhận dạng chữ viết tay

```
function Reconition001_digits()
    fprintf('\n Load du lieu train');
    imgTrainAll=loadMNISTImages('train-images.idx3-ubyte');
    lblTrainAll=loadMNISTLabels('train-labels.idx1-ubyte');
    fprintf('\n Load du lieu test');
    imgTestAll=loadMNISTImages('t10k-images.idx3-ubyte');
    lblTestAll=loadMNISTLabels('t10k-labels.idx1-ubyte');
    fprintf('\n Ket thuc \n');
end
```

3.Số lượng ảnh train, số lượng ảnh test

```
function Reconition002_digits()
    fprintf('\n Load du lieu train');
    imgTrainAll=loadMNISTImages('train-images.idx3-ubyte');
    lblTrainAll=loadMNISTLabels('train-labels.idx1-ubyte');
    fprintf('\n Load du lieu test');
    imgTestAll=loadMNISTImages('t10k-images.idx3-ubyte');
    lblTestAll=loadMNISTLabels('t10k-labels.idx1-ubyte');

    nTrainImages=size(imgTrainAll,2);
    nTrainLabels=size(lblTrainAll,1);

    nTestImages=size(imgTestAll,2);
    nTestLabels=size(lblTestAll,1);

    nSizeofImage=size(imgTrainAll,1);

    fprintf('\n So luong anh train: [%d].',nTrainImages);
    fprintf('\n So luong nhan train: [%d].',nTrainLabels);
    fprintf('\n So luong anh test: [%d].',nTestImages);
    fprintf('\n So luong nhan test: [%d].',nTestLabels);
    fprintf('\n Kich thuoc cua mot anh: [%d].',nSizeofImage);

end
```

4.Hiển thị ảnh đầu, ảnh cuối

```
   function Reconition003_digits()
       fprintf('\n Load du lieu train');
       imgTrainAll=loadMNISTImages('train-images.idx3-ubyte');
```

```
        lblTrainAll=loadMNISTLabels('train-labels.idx1-ubyte');
        fprintf('\n Load du lieu test');
        imgTestAll=loadMNISTImages('t10k-images.idx3-ubyte');
        lblTestAll=loadMNISTLabels('t10k-labels.idx1-ubyte');

        nTrainImages=size(imgTrainAll,2);
        figure;
        img=imgTrainAll(:,1);
        img2D=reshape(img,28,28);
        strLabelImage=num2str(lblTrainAll(1));
       imshow(img2D);
       title(strLabelImage);

       figure;
       imgLast=imgTrainAll(:,nTrainImages);
       img2DLast=reshape(imgLast,28,28);
       strLabelImage=num2str(lblTrainAll(nTrainImages));
       imshow(img2DLast);
       title(strLabelImage);
   end
```

5. Hiển thị ảnh ngẫu nhiên

```
function Reconition004_digits()
    imgTrainAll=loadMNISTImages('train-images.idx3-ubyte');
    lblTrainAll=loadMNISTLabels('train-labels.idx1-ubyte');

    imgTestAll=loadMNISTImages('t10k-images.idx3-ubyte');
    lblTestAll=loadMNISTLabels('t10k-labels.idx1-ubyte');

    nTrainImages=size(imgTrainAll,2);
    nNumber=randi([1 nTrainImages]);
    figure;
    img=imgTrainAll(:,nNumber);
    img2D=reshape(img,28,28);
    strLabelImage=num2str(lblTrainAll(nNumber));
    strLabelImage=[strLabelImage,'(',num2str(nNumber),')'];
    imshow(img2D);
    title(strLabelImage);

    nTestImgs=size(imgTestAll,2);
    nNumber=randi([1 nTestImgs]);
    figure;
    img=imgTestAll(:,nNumber);
    img2D=reshape(img,28,28);
    strLabelImage=num2str(lblTestAll(nNumber));
    strLabelImage=[strLabelImage,'(',num2str(nNumber),')'];
    imshow(img2D);
    title(strLabelImage);

end
```

6. Xây dựng model từ tập dữ liệu train bằng thuật toán kNN, nạp dữ liệu test. Kiểm tra kết quả tiên đoán.

```
function Reconition005_Digits_kNN()
    imgTrainAll=loadMNISTImages('train-images.idx3-ubyte');
    lblTrainAll=loadMNISTLabels('train-labels.idx1-ubyte');

    Mdl=fitcknn(imgTrainAll',lblTrainAll); %L?u ý ch? này.

    imgTestAll=loadMNISTImages('t10k-images.idx3-ubyte');
    lblTestAll=loadMNISTLabels('t10k-labels.idx1-ubyte');

    nTestImgs=size(imgTestAll,2);
    nNumber=randi([1 nTestImgs]);
    imgTest=imgTestAll(:,nNumber);
    lblPredictTest=predict(Mdl,imgTest'); %L?u ý ch? này.
    lblImageTest=lblTestAll(nNumber);
    figure;

    img2D=reshape(imgTest,28,28);
    imshow(img2D);

    strLabelImage='Ban dau';
    strLabelImage=[strLabelImage,num2str(lblTestAll(nNumber)),'.']; %L?u ý
ch? này.
    strLabelImage=[strLabelImage,'Du doan: '];
    strLabelImage=[strLabelImage,num2str(lblPredictTest),'.'];

    if(lblPredictTest==lblImageTest)
        strLabelImage=[strLabelImage,'Ket qua dung '];
    else
        strLabelImage=[strLabelImage,'Ket qua sai '];
end
```