In [2]:
```
using FileIO, TestImages, Images, PyPlot

ImageT = Array{ColorTypes.Gray{FixedPointNumbers.Normed{UInt8,8}},2
}
ArrT = Array{Float64,2}

x = 243; y=320; l = x*y
the_dir = "../data/yalefaces/"

function load_faces(the_dir, l)
    img_names = readdir(the_dir)[2:end]
    n = length(img_names)
    X = zeros((n,l))
    for i in 1:n
        X[i,:] = reshape(convert(ArrT, convert(ImageT, load(the_dir
* img_names[i]))), 243*320)
    end
    return X
end
```

Out[2]:
```
load_faces (generic function with 1 method)
```

In [2]:
```
lena = testimage("lena_gray_512.tif")
lena_mat = convert(ArrT, lena)
ll=convert(ImageT, lena_mat)
```

Out[2]:

Question 1

- Compute the SVD of Lena
- Display approximations to the original image with rank r = 10, 50, 80, 100 ...
- Compute the error of the approximations
- Compare error against singular values of Lena. Discuss

In [3]:
```
X = load_faces(the_dir, 1);
```

Question 2

- Download yalefaces from http://vision.ucsd.edu/content/yale-face-database (http://vision.ucsd.edu/content/yale-face-database)
- Compute SVD of yalefaces
- Display approximations to some of the original faces of various ranks
- Compute the error
- Compare against singular values of X. Discuss

Question 3

- What is the relationship between performing SVD on X and performing PCA on the covariance matrix of X?

Question 4

- Do all the exercises at the back of the handout on SVD.

In [ ]:

In [ ]:

In [ ]:

In [ ]: