Robert Gross - Robotics & Computer Vision

Project 1

```
% Problem 1
img = imread('brad_pitt_perfume_billboard.jpg');
img = im2double(img);
img = rgb2gray(img);
figure(1);
imshow(img);
[x,y] = ginput(4);      % original billboard image
img2 = imread('rob.jpg');
img2 = im2double(img2);
img2 = rgb2gray(img2);
img2 = imresize(img2, [250, 350]);  %just for a cleaner look
 figure(2);
imshow(img2);
 [xp,yp] = ginput(4);    % my pic

i=1;
A = [];
while (i<5)
    A1 = [x(i), y(i), 1, 0, 0, 0, -x(i)*xp(i), -y(i)*xp(i), -xp(i);
    0, 0, 0, x(i), y(i), 1, -x(i)*yp(i), -y(i)*yp(i), -yp(i)];
    A = [A;A1];
    i = i+1;
end
 [u,sig,v] = svd(A);
 v1 =  v(:,9);           % the 9th column forms the null space from n-
r
 figure(3);
 changed = homogwarp(img2, img, v1);
 imshow(changed);
 [length,height] = size(changed);
 for a = 1:length
     for b = 1:height
         check = inpolygon(a,b,[y;y(1)],[x;x(1)]);  %check if each
 pixel is
         % in the boundary- if so, submit that pixel to replace
 billboard
         % image's pixel
         if check == true
            img(a,b) = changed(a,b);
         end
     end
 end

 figure(4);
 imshow(img);   %final image
```

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Warning: Image is too big to fit on
screen; displaying at 67%
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