

527) We want to rotate the picture in question 92) 45° in clockwise direction. The new picture is C, Calculate C(3,4), C(4,5)

A is a 7x10 matrix as follows.

$$A = \begin{bmatrix} 12 & 34 & 11 & 0 & 1 & 5 & 7 & 43 & 4 & 22 \\ 54 & 6 & 67 & 13 & 34 & 34 & 31 & 6 & 23 & 8 \\ 22 & 43 & 61 & 21 & 7 & 8 & 11 & 0 & 49 & 29 \\ 81 & 38 & 32 & 21 & 7 & 8 & 57 & 7 & 25 & 39 \\ 7 & 43 & 4 & 22 & 7 & 8 & 11 & 7 & 8 & 11 \\ 34 & 31 & 6 & 23 & 7 & 54 & 6 & 7 & 8 & 34 \\ 8 & 3 & 0 & 49 & 22 & 43 & 61 & 21 & 7 & 8 & 23 \end{bmatrix}$$

$$45^\circ \rightarrow \begin{bmatrix} C1 \\ C2 \end{bmatrix} = \begin{bmatrix} \cos(\theta) & -\sin(\theta) \\ \sin(\theta) & \cos(\theta) \end{bmatrix} \begin{bmatrix} A1 \\ A2 \end{bmatrix} \quad \begin{bmatrix} C1 \\ C2 \end{bmatrix} = \begin{bmatrix} \cos(45) & -\sin(45) \\ \sin(45) & \cos(45) \end{bmatrix} \begin{bmatrix} A1 \\ A2 \end{bmatrix}$$

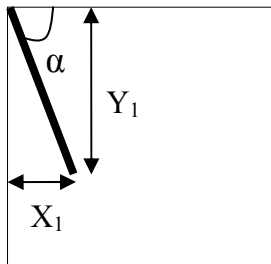
$$\begin{bmatrix} 3 \\ 4 \end{bmatrix} = \begin{bmatrix} 0.707 & -0.707 \\ 0.707 & 0.707 \end{bmatrix} \begin{bmatrix} A1 \\ A2 \end{bmatrix} \rightarrow \begin{bmatrix} A1 \\ A2 \end{bmatrix} = \begin{bmatrix} 4.9 \\ 0.7 \end{bmatrix} \approx \begin{bmatrix} 5 \\ 1 \end{bmatrix}$$

Result: C(3,4)=A(5,1)=7

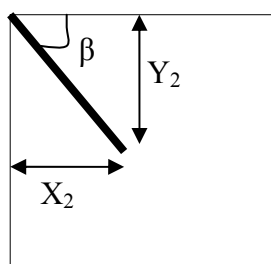
Similarly C(4,5)=A(6,1)=34,

C(2,6)=A(6,3)=6

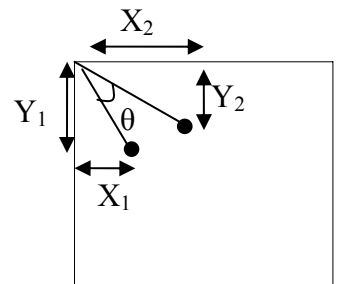
605) Figure A is given. Rotate the figure 45° clockwise, so that you obtain figure B. Do not use imrotate function, write your own code.



a)Figure A



a)Figure B



$$X_1 = L \cos(\alpha), \quad Y_1 = L \sin(\alpha), \quad X_2 = L \cos(\beta), \quad Y_2 = L \sin(\beta), \quad \theta = \alpha - \beta$$

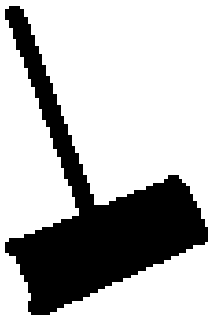
$$\begin{bmatrix} X_2 \\ Y_2 \end{bmatrix} = \begin{bmatrix} \cos(\theta) & -\sin(\theta) \\ \sin(\theta) & \cos(\theta) \end{bmatrix} \begin{bmatrix} X_1 \\ Y_1 \end{bmatrix}$$

```

teta=30*pi/180;
rr=[cos(teta) -sin(teta); sin(teta) cos(teta)]
aa=ones(100,100);
for kk=1:40, aa(kk,kk)=0; end;
[ysize xsize]=size(aa)
bb=ones(200,200);
for kk=1:ysize
    for jj=1:xsize
        qq=rr*[kk jj]'; qq=round(qq);
        ykk=qq(1); yjj=qq(2);
        if ykk>0 & yjj>0, bb(ykk,yjj)=aa(kk,jj);
        else ykkjj=[ykk yjj]; end;
    end;
end;
imshow(bb)

```

607) Figure A is given. Rotate the figure 45° clockwise, so that you obtain figure B. Do not use `imrotate` function, write your own code.



a) Figure A



b) Figure B

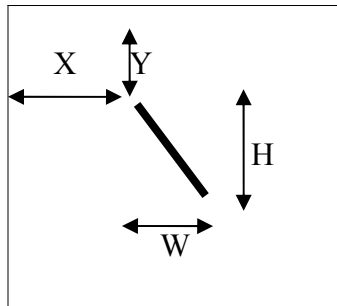
```

teta=45*pi/180;
rr=[cos(teta) -sin(teta); sin(teta) cos(teta)]
aa=imread('sek605.bmp');
aa=rgb2gray(aa);
[ysize xsize]=size(aa)
imshow(aa);
bb=uint8(ones(300,300)*255);
for kk=1:ysize
    for jj=1:xsize
        qq=rr*[kk jj]'; qq=round(qq);
        ykk=qq(1); yjj=qq(2);
        if ykk>0 & yjj>0, bb(ykk,yjj)=aa(kk,jj);
        else ykkjj=[ykk yjj]; end;
    end;
end;

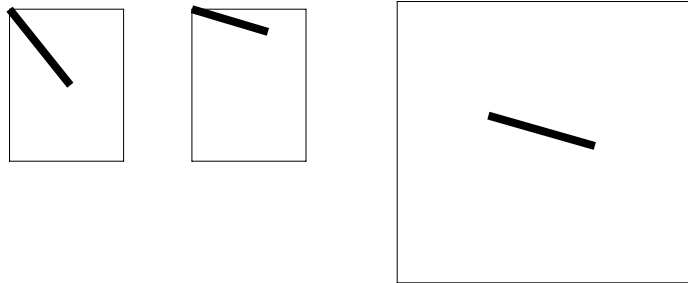
```

imshow(bb)

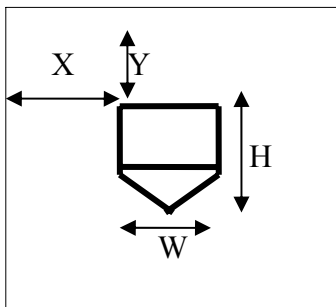
611)Figure A is given. Rotate the figure 45° clockwise, so that you obtain figure B. Do not use imrotate function, write your own code. Picture size, X,Y,W,H are all given. For this example X=58, Y=27, W=65, H=71. picture size is 163x212 (163:height 212 width). You must bring the picture to the origin, rotate it and then push to the original place.



a)Figure A



615)Figure A is given. Rotate the figure 45° clockwise, so that you obtain figure B. Do not use imrotate function, write your own code. Picture size, X,Y,W,H are all given. For this example X=58, Y=27, W=65, H=71. picture size is 163x212 (163:height 212 width)



a)Figure A

