To display the image undistanted and to just fully fit within a square open by window by mapping it conto a rectangle, we note that the left and right rider would touch the edge of the open by window. The x value of the 4 coursers would be either ! or -1. We use the width to height ratio of the image to determine the y coordinate of the 4 correct Since the 3648 pixels fit within 2 units of the Open a window, we compare the ratios to get

 $\frac{2437}{3648} = \frac{2}{2}$

Solving for z, which represents the height of the tricingle, we note that it is equal to 4/3. If we content the rectangle, the (x,y) normalized device coordinates of the four corners would be

(-1, 2/3), (-1, -2/3), (1, 2/3), (1, -2/3)

Hilberry

The second secon	B. To determine the coordinates after a 30° counterclarkwise
	rotation around the center, we first note the distance of
	each point to the center of rectangle remains constant as
The state of the s	we rotale
	we we pythagaseon Theorem to find length from centre of each
	mertex.
(Barth) of the analysis of a contract behavior and and any	1= 7(1)2 + (4/6)2
and the second s	= 113/3
	≈ 1.20
ter som et a manuface a som man fill a conservance	
1 M. N 1 S. Mar M. Allacado e Adapado de La Applicación y agreca.	the the was area to find that the areas are interest will
	we then we arctom to find that the angles essociated with
make a fingal mana manananan ing mpamagan na mpamagan mpagal at dan pangan mpagal at dan sa sa sa sa sa sa sa	each vertex are approximately 33-7, 146.3, 213.7° and 326.3°
	_320.3.
	1 1 described of 30° as before letter means addi-
the state of the s	A transformation of 30° counterdockwise rotation means adding
	30° to each of Here value, giving new angles of
1999 Marie de Labora (1994) Allen de Labora (1994)	(7 7 1717 2977) 3513
	63.7°, 176.3°, 243.7° and 356.3°.
	We now are there angle and the length (hypotenuse) to
Marie Secretaries en estados e como un menor en escala e	find the associated x and y coordinates wing six and cas.
COM CONTRACTOR OF THE CONTRACT	Doing this, we get the new courdinates
	(-533, 1.077), (-1.199, .077), (533, -1.077), (1.199,077)

TO PER LOS PERSONALISMOS EN LOS COMPONENTS AND COMP	

All Reserve

<u> </u>	A. To achieve the same perceived intensity by the average homon
	observer, we note the following value corresponding to
	the relative sensitivity of the human vivual bystem to light
	stimulus of blue, green and red light from the provided graph
	Red (620 hm) : 0.375 \(\bar{y}(\lambda)\)
	(nream (530 nr.): 0.860 7(X)
	Blue (470 nm): 0.090 y()
	The ratio of "pure red" to "pure green" needed is
	therefore around 0.860/0.375 = 172/75.
	That is, 172 parts of red to 75 parts of green revell in
	Same pencived intensity
	The restio of pure green to pure blue needled is
	proud 0.090/0.860 = 9/86.
	Around 9 parts of green to 86 parts of blue result in
	same perceived intensity
	B. If an image encoded in RGB with the above primary
,	colour, Hem a reasonable function to convert to prejucate
	would take into account the relative sensitivity of human
	perception. We would need to keep the natios in part 2A
	the same. Adding 0.375 + 0.860+ 0.090, we get
	1325. Dividing each value by 1.325, we get
	the function
	1.22 1.230(1.01)
	L= 15/53 R + 172/265 G + 18/265 B
	€ 0.283 R + 0.649 G + 0.0679 B

Hilroy

3. A. To display the photo in 1A to fit in a 1000 x 1000 pixel window, there would be were image pixel for every display pixel, since the original image is larger

We thus howe to fit a 3648 x 2432 pixel wide image into 1000 x 667 pixels to not distort. This means that the width and height of original image home 3648/1000 = 3.648 times more pixels. Fitting it to 1000 × 1000 window means that 3.648 × 3.648 = 13.30794 image pixels. Fit into every display pixel.

The above discrepancy does affect the autput of the Subet edge filter on the program. That is, it we resumple the same photo to a size of 1200 x 667 pixels, then apply the Subet edge filter to it, this means that we are applying Subet to an image that has lost some of the original data. For instance consider a black edge of pixels with white an both side:

	white	Black	White	
	White	Blade	while	
	White	Black	white	
	white	Black	white	
·	white	Black	<i>ખે</i> નીય	
	While	Black	91110	
	white	Black	white	

By resampling, these pixels are collapsed that losing an edge which was oxiginally present. Sobel would then not be able to detect an edge which was originally present.

of 3648x2432 pixels Sobel filter to the original mage Hillory

If we then display it on the Open at window, we would know that it would be scaled to fit the window after the subol filter has been applied. Depending on the image originally used, this may produce an image that differ from the one obtained by rescaling first them wing sobel.

For intance, it we applied the above effects to an image composed of pixels all of value 0, we would see no difference at all. If we applied the effects to a more complex image however, we may notice minute differences due to the application of sobel before fitting to Open all windows versus recompling to a size of 1000x 667 before applying sobel

By applying the unsharp mask filter twice on an image, the effect is enhanced. When wing the unsharp mark filter on the inneque the second time, the effect is applied on top of the already modified image, thus compounding the first application of the unsharp mask

A 2D convolution knowed that would except the same effect as applying the 3x3 uncharp mark bessel twice could be found by noting that convolution is associative. We can therefore apply the convolution knowld to itself.

We recall that convolition is the process of multiplying each element of the image with its local neighbours weighted by the termel. To accomplish this, we flip both the rows and columns of kernel, multiply locationally similar entries and take the sum

we note that after flipping the rows and columns of unsharp mark, we still have the vurbarp mark. We then pad around the image (of unsharp mark) with O'c-and apply convolution-

ngar, İspanisasının ayarında en elektrisi de elektrisi de elektrisi elektris	A COLUMN AND THE PROPERTY OF T
	Thus, we have 10-107 70-107
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nastera e a constalar e a sua reconstala della del	We note for instance that entry
	[0,0] = (0x5) + (-1x-1) + (5x0) + (-1x-1) = 2
and the second s	[2,1] = (0x-1)+(-1x0)+(5x-1)+(-1x0)+(0x-1)+(-1x5)=-10
· man and controlled the second secon	[1,1] = (0x0) + (-1x-1) + (0x0) + (-1x-1) + (5x5) + (-1x-1) + (0x0) + (-1x-1) + (0x0)
	= 29
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	with symmetric entries in the other locations. Thu, 12-102]
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	-2-10 2
antiani assulain saha si asu ni su sasuni ni sahi a fabri umu sasuh su sahi si kamunini.	
than committee and the state against the color of the state of the sta	is the 2D convolution kernel that would apply the same effect or
rtuun oo to baad oo bo'i oo kaasaa oo ka baad baad ka waxaa ka dhada ah oo ah badkaa waxaa ka badkaa baada ka b	applying the 3x3 unhap mark kernel fuire. If we do not
	remon the edge data and considered the image padded by
	an edge of 0's, then we note we would obtain instead the
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and the second s	[00]
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and the state of t	

Ч. А.	At 0 = 1.4, the G	auction Function by (x) ev	alvater to
•		select values of x	
	Q		
		(1(x)	
	X	(A)	
		01050	
		0.284959	
· · · · · · · · · · · · · · · · · · ·		0.220797	
	2	0.102713	,
	3	0,0286865	
Β,	To find the value of	o that was used to gen	nerate the
	5- point Gaussian Ke	rnel, we note that at x=c	(a)
		o, we get + 5/(2/2	
	which is approximately		
	9	,	
	was not that at v	=0, G(0)=0.4. Thus,	<i>1</i> /v°
	equation becomes		
	Cyda tor WCCANAS	•	
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	=	± 21211	Hillion

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C. To describe the procedure for creating a one-dimensional discrete
n-point Gaurian Jeernel, we note that as o increases,
the bell curve flattens. Thus, as n increases, our value of
o would similarly have to increase so that the directe
Gaussian kernel accurately approximates the continuous Gaussian
kernel.
We know from question 4A, that compaising these revolts with
the approximation of 7-point discrete Gaussian in Part IV of programming
assignment, 0=1.4 concepted to 7 point discrete Gaussian. From 4R, we know 0 = 1 concepted to 5 point a By solving
for or of 3-point Ganvian Kernel of Part IV by letting
x=0, G(x)=0.6, ve get o=5/(3/211) 2 0.66.
From these value, we note that for an n-point Gaussan formel,
the or is around (1/5) n. This choice of o provides
an appropriate Gausian kernel of the specified size, since it
seems to provide discrete points for which the continuous
eurve closely approximates. By wing this method, and
taking the discrete value to (1 significant digit for with GCO) equally whatever is lost
least greatest x, and 2 significant digits for all other xx), we
<i>J.</i>
±4 inthis care
get the following value for a 9-point Gaussian Kernel-
he use 5 = 1-0 to get
x -4 -3 -2 -1 0 1 2 3 4
G(x) 0.02 0.055 0.12 0.19 0.12 0.055 0.02
Thus, the general procedure would be to find of (15 of n), then
use this to calculate $G(x)$ for $x = -(n-1)/2$ to $(n-1)/2$ with
G(x) for least greates x being to I sig dig, the set being 2 six dig, and G(0) being