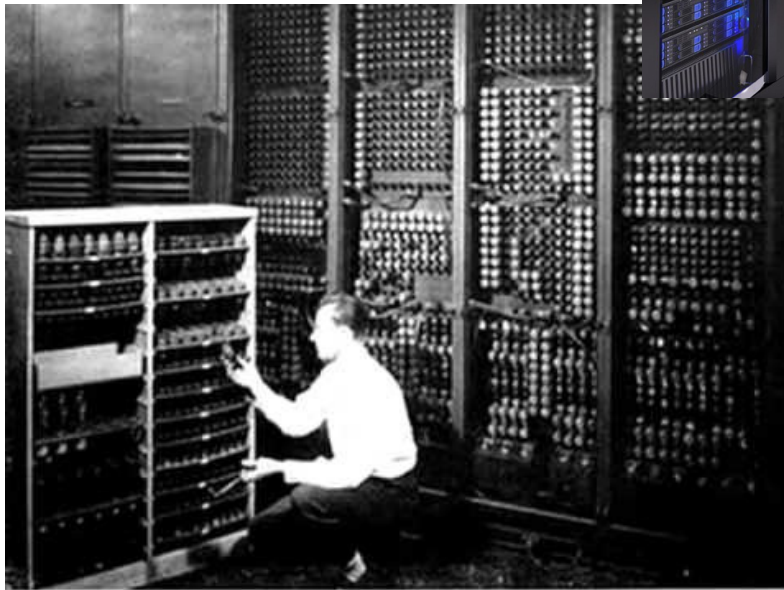


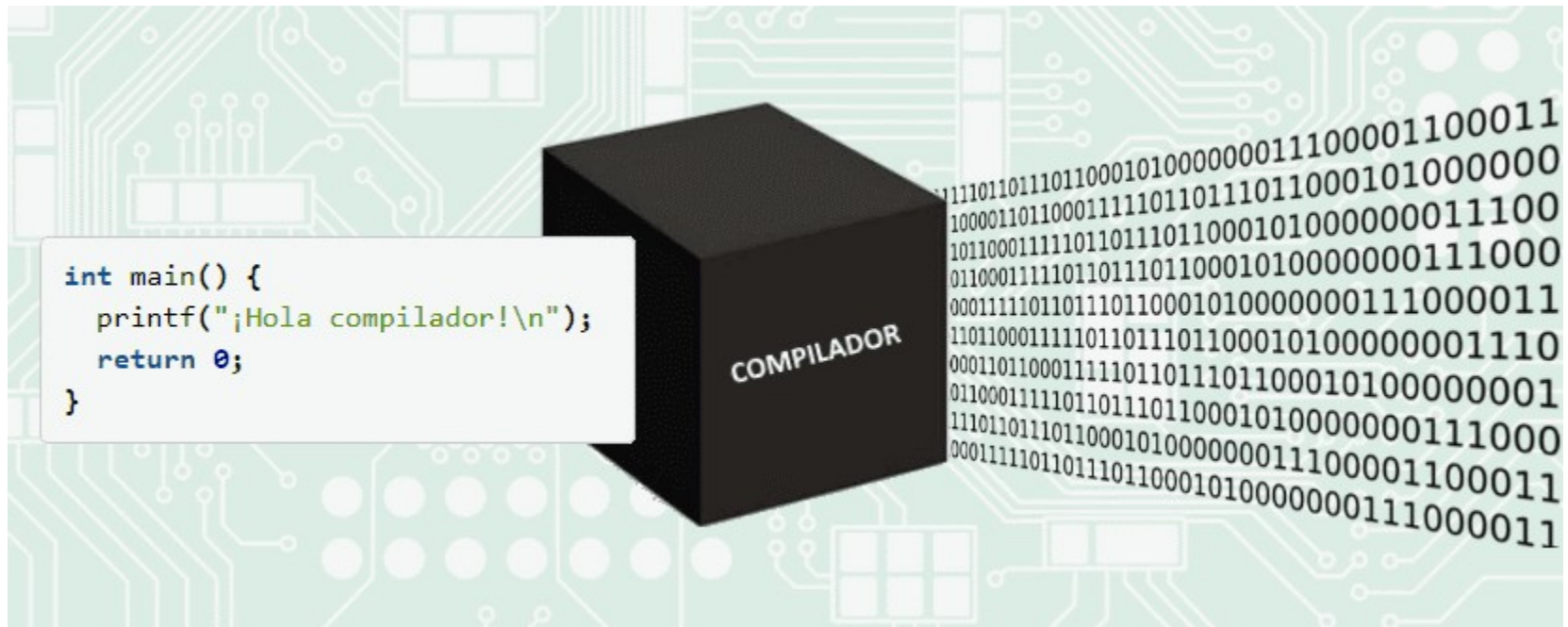
# **GPU. La unidad de procesamiento gráfico y su aplicación en patología**

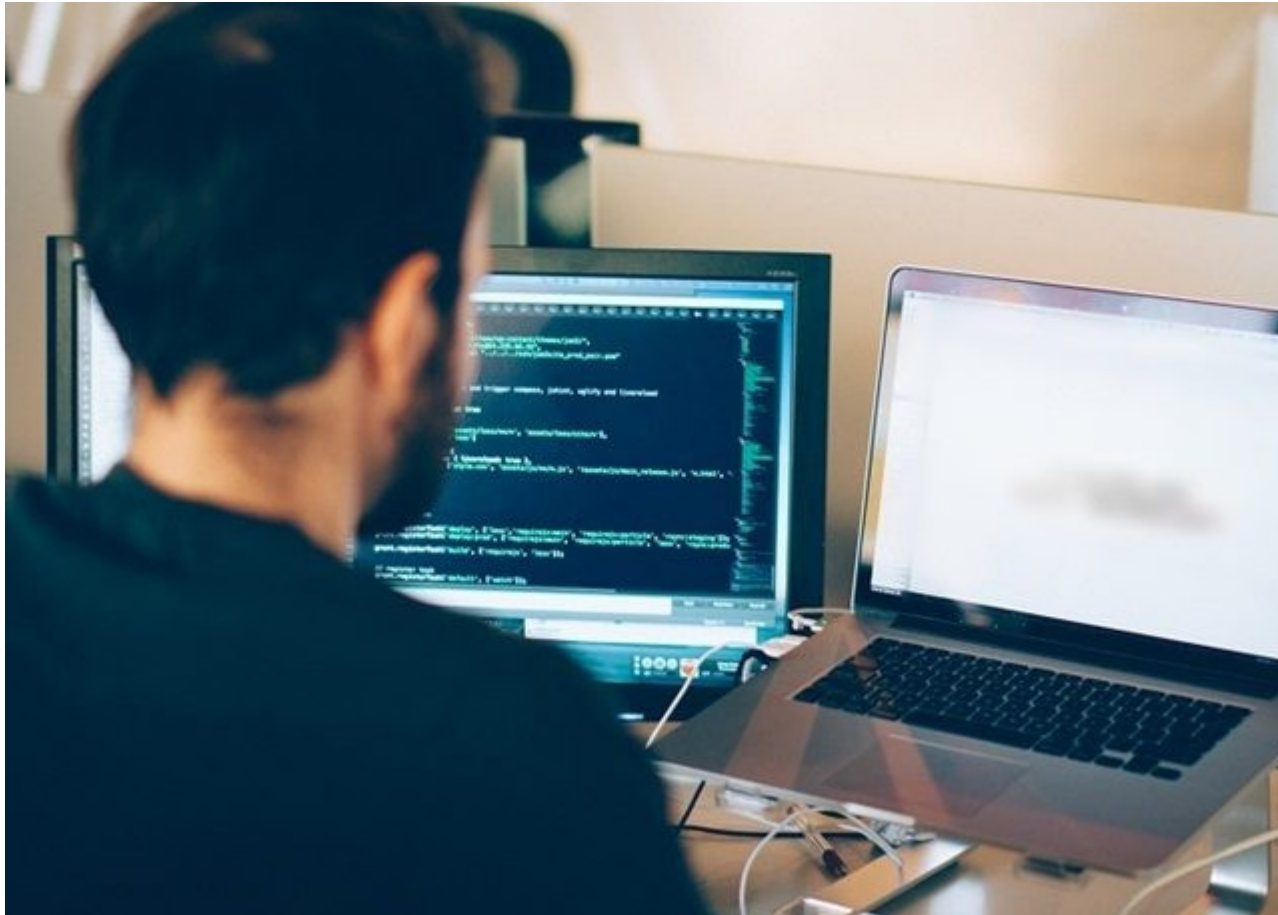




$$\begin{array}{r} 10100 \\ \times 1101 \\ \hline 10100 \\ 00000 \\ 10100 \\ 10100 \\ \hline 100000100 \end{array}$$



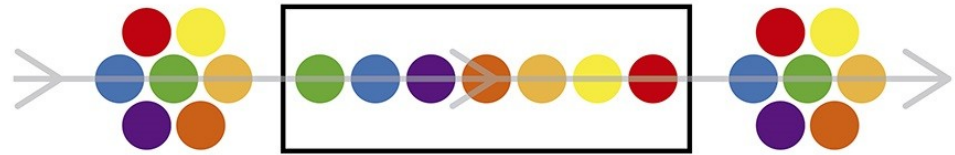




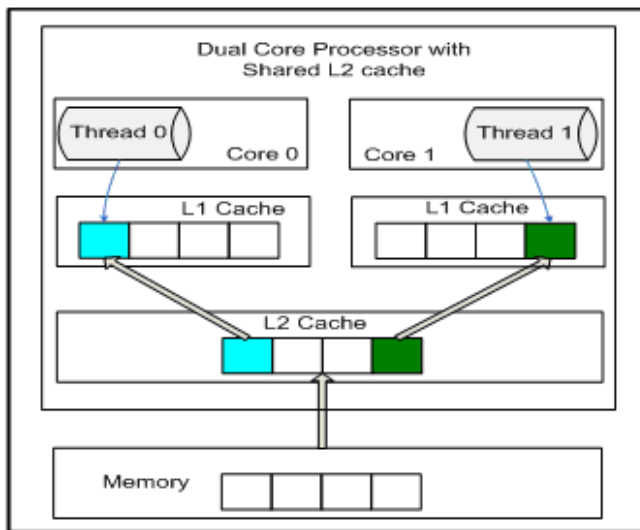
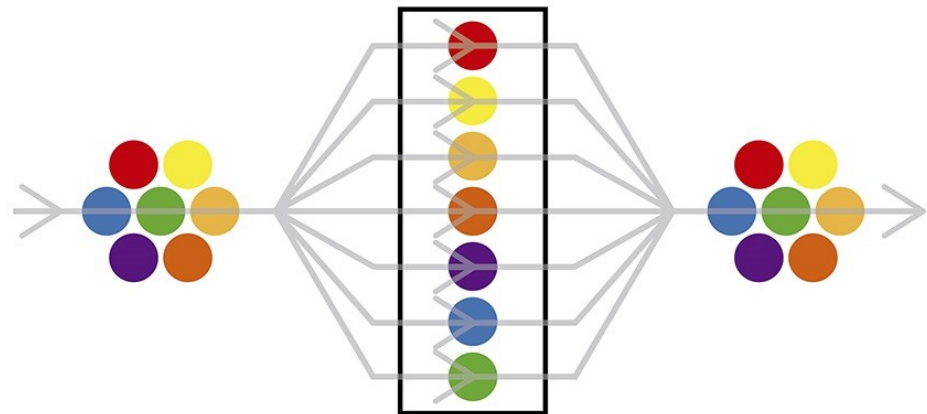
```
def add5(x):
    return x+5

def dotwrite(ast):
    nodename = getNodeName()
    label=symbol.sym_name.get(int(ast[0]), ast[0])
    print '    %s [label="%s' % (nodename, label),
    if isinstance(ast[1], str):
        if ast[1].strip():
            print '= %s'];' % ast[1]
        else:
            print '"]'
    else:
        print '"];'
        children = []
        for n, childenumerate(ast[1:]):
            children.append(dotwrite(child))
        print ', ' % ast -> {' % nodename
        for in :namechildren
            print '%s' % name,
```

### Procesamiento en serie



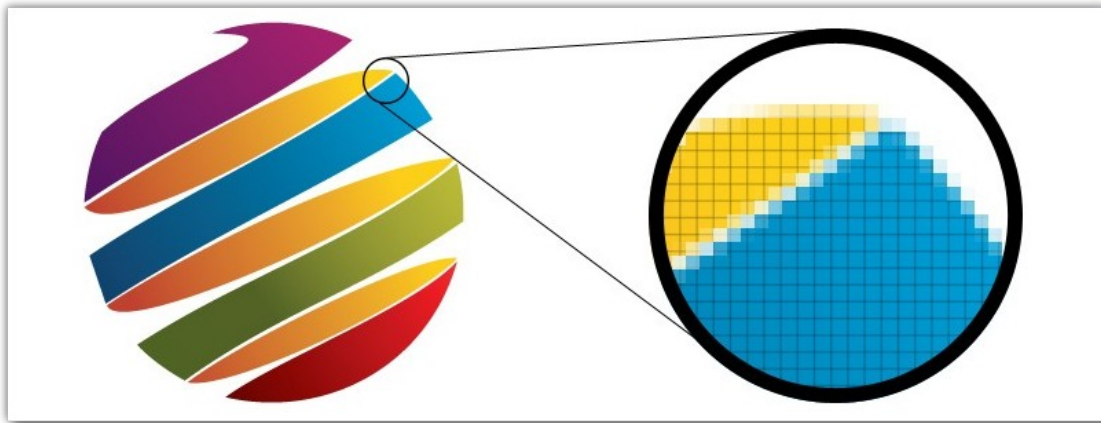
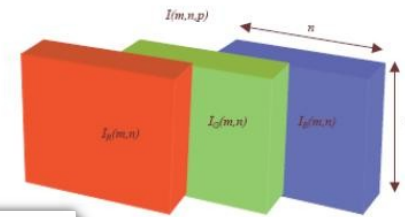
### Procesamiento en paralelo

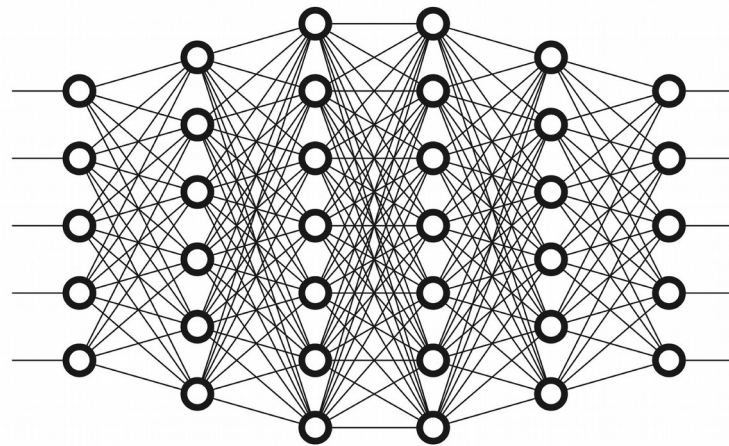
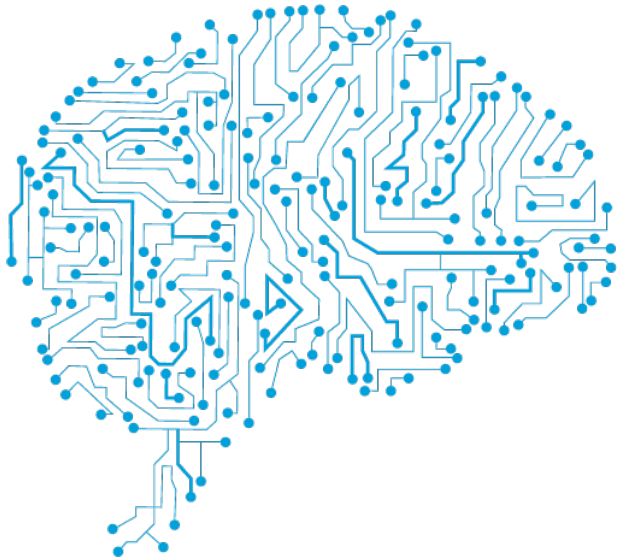


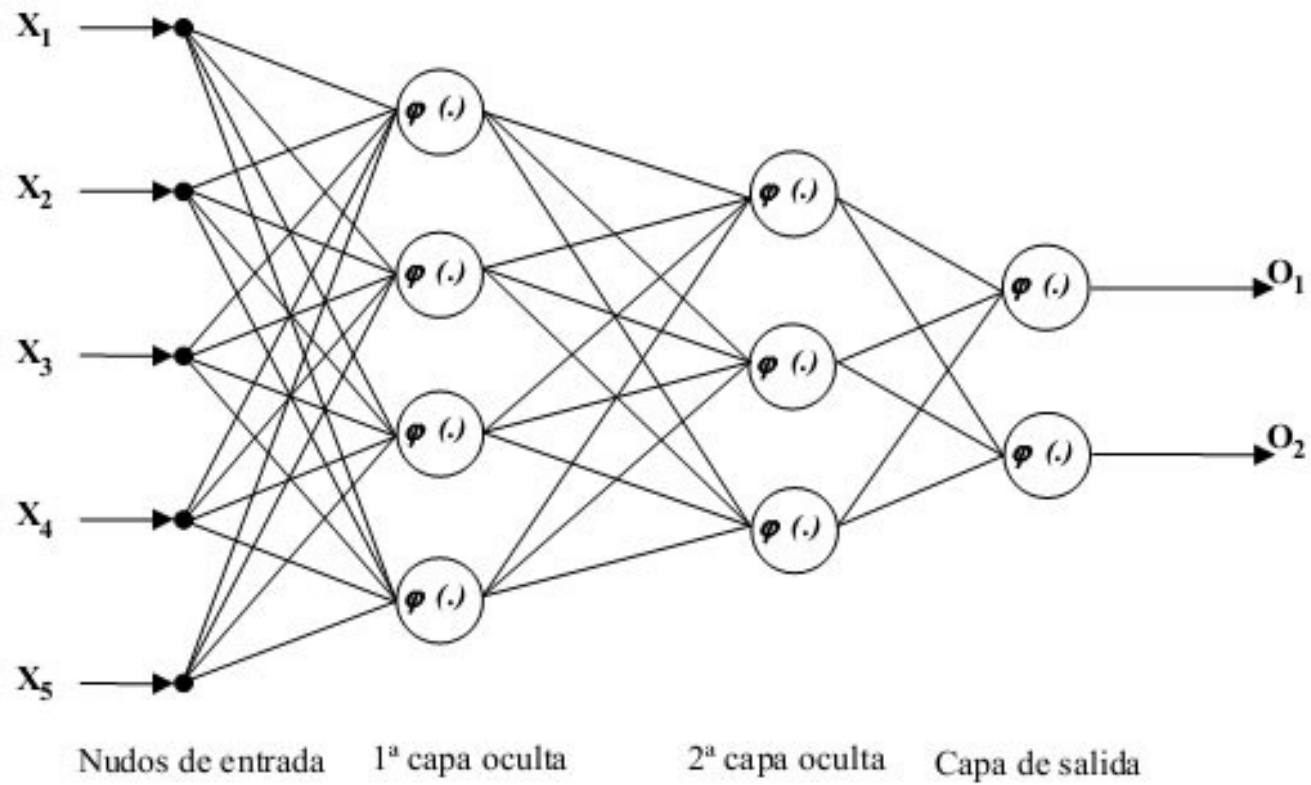


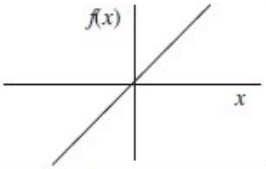
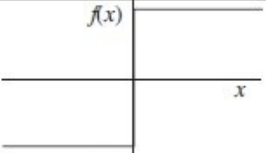
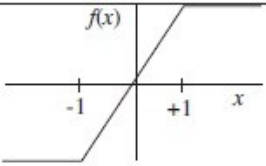
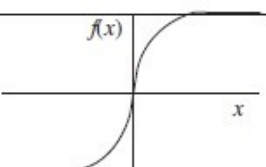
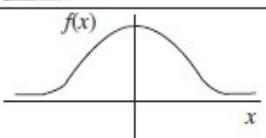
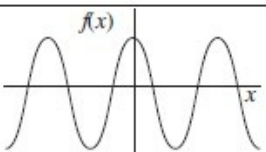


$$I_R(m, n, 1) = \begin{bmatrix} r_{11} & \dots & r_{1n} \\ \vdots & \ddots & \vdots \\ r_{m1} & \dots & r_{mn} \end{bmatrix} \quad I_G(m, n, 2) = \begin{bmatrix} g_{11} & \dots & g_{1n} \\ \vdots & \ddots & \vdots \\ g_{m1} & \dots & g_{mn} \end{bmatrix} \quad I_B(m, n, 3) = \begin{bmatrix} b_{11} & \dots & b_{1n} \\ \vdots & \ddots & \vdots \\ b_{m1} & \dots & b_{mn} \end{bmatrix}$$





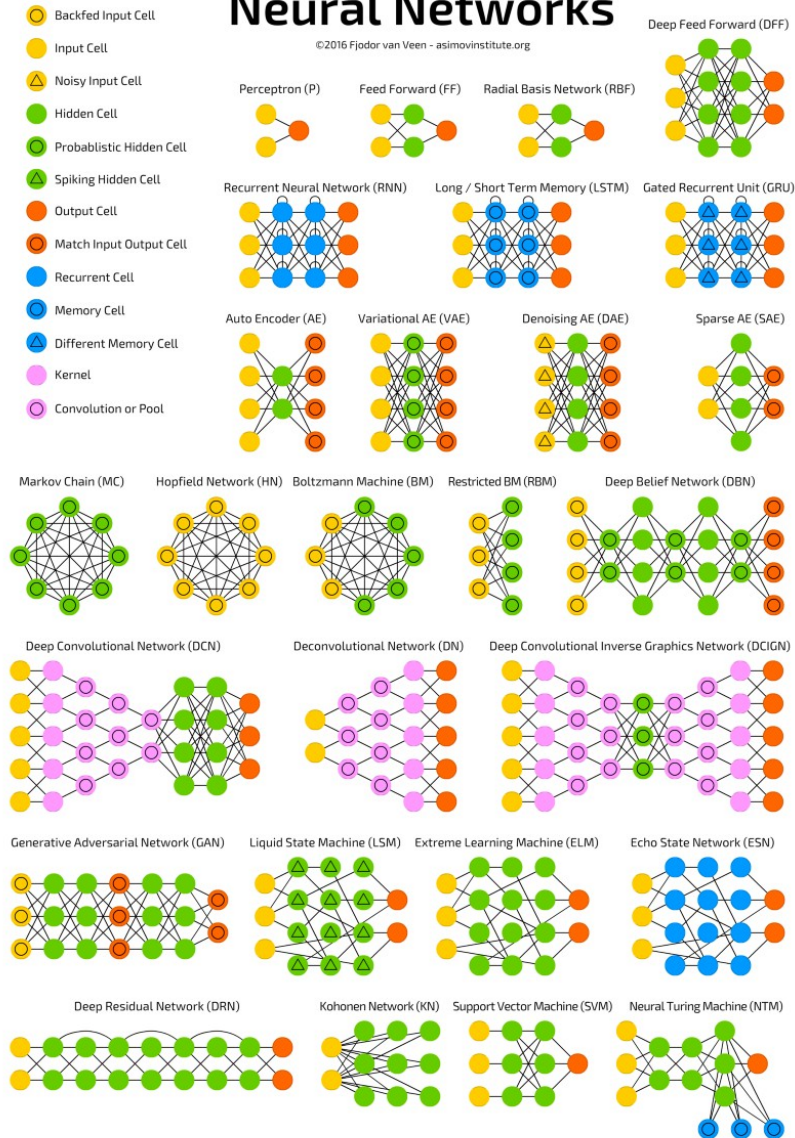


	Función	Rango	Gráfica
Identidad	$y = x$	$[-\infty, +\infty]$	
Escalón	$y = \text{sign}(x)$ $y = H(x)$	$\{-1, +1\}$ $\{0, +1\}$	
Lineal a tramos	$y = \begin{cases} -1, & \text{si } x < -l \\ x, & \text{si } -l \leq x \leq +l \\ +1, & \text{si } x > +l \end{cases}$	$[-1, +1]$	
Sigmoidea	$y = \frac{1}{1 + e^{-x}}$ $y = \text{tgh}(x)$	$[0, +1]$ $[-1, +1]$	
Gaussiana	$y = Ae^{-Bx^2}$	$[0, +1]$	
Sinusoidal	$y = A \text{sen}(\omega x + \varphi)$	$[-1, +1]$	



A mostly complete chart of  
**Neural Networks**

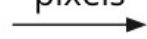
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0	1	2	3	4	5	6	7	8	9
0	1	2	3	4	5	6	7	8	9
0	1	2	3	4	5	6	7	8	9
0	1	2	3	4	5	6	7	8	9
0	1	2	3	4	5	6	7	8	9
0	1	2	3	4	5	6	7	8	9
0	1	2	3	4	5	6	7	8	9
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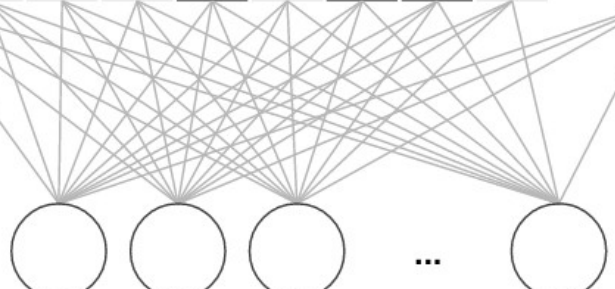
28x28  
pixels



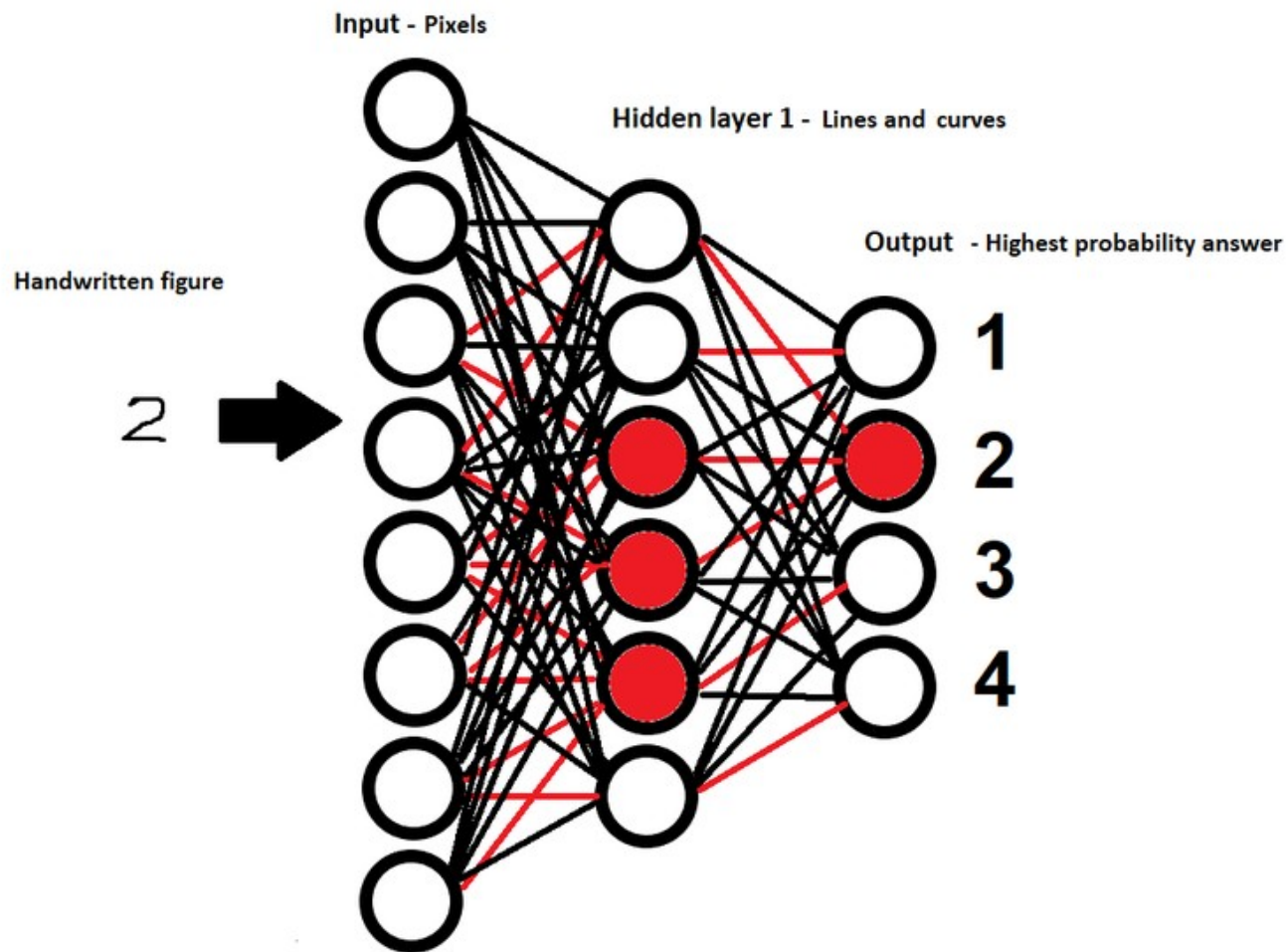
784 pixels



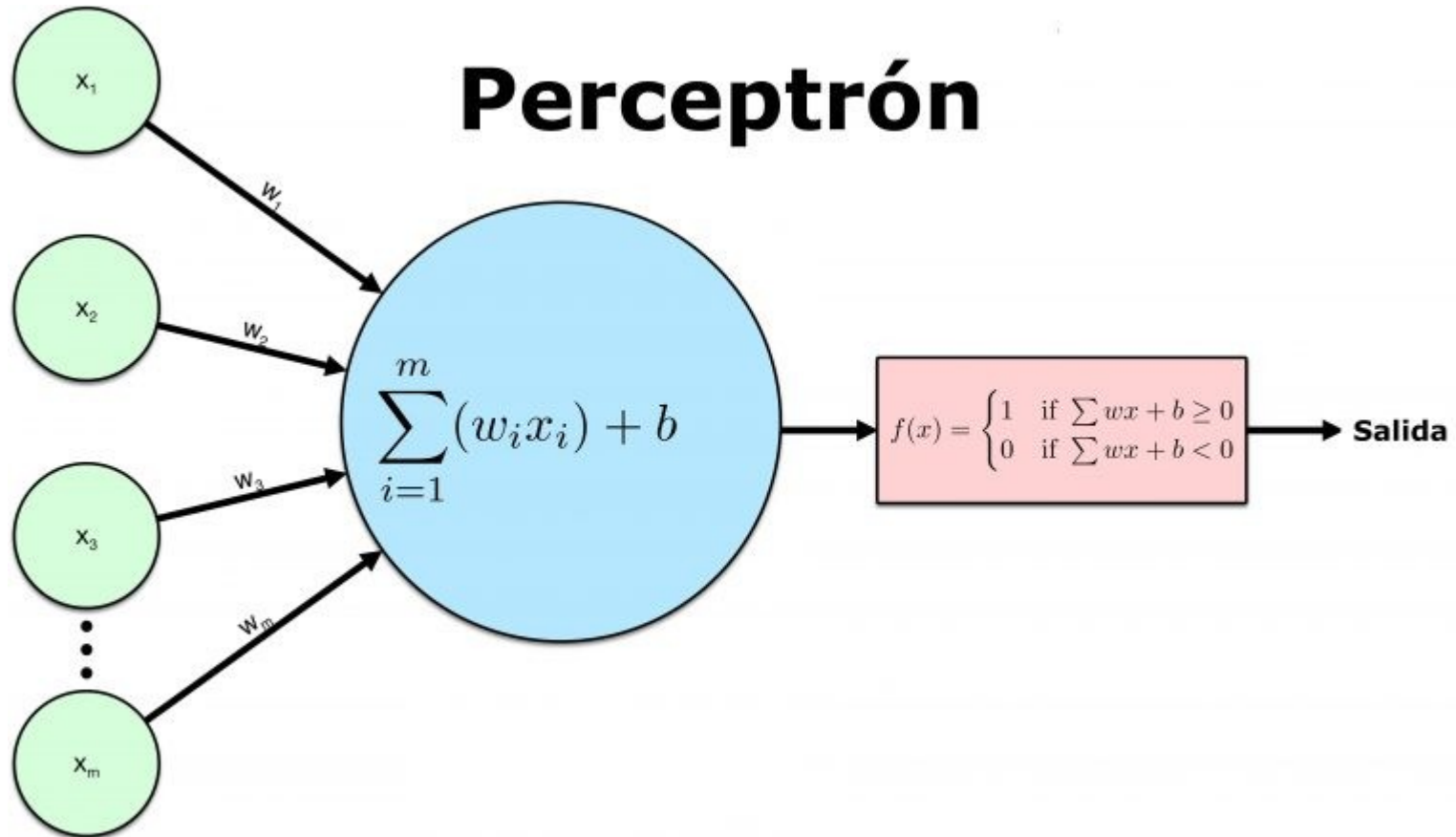
"neurons"



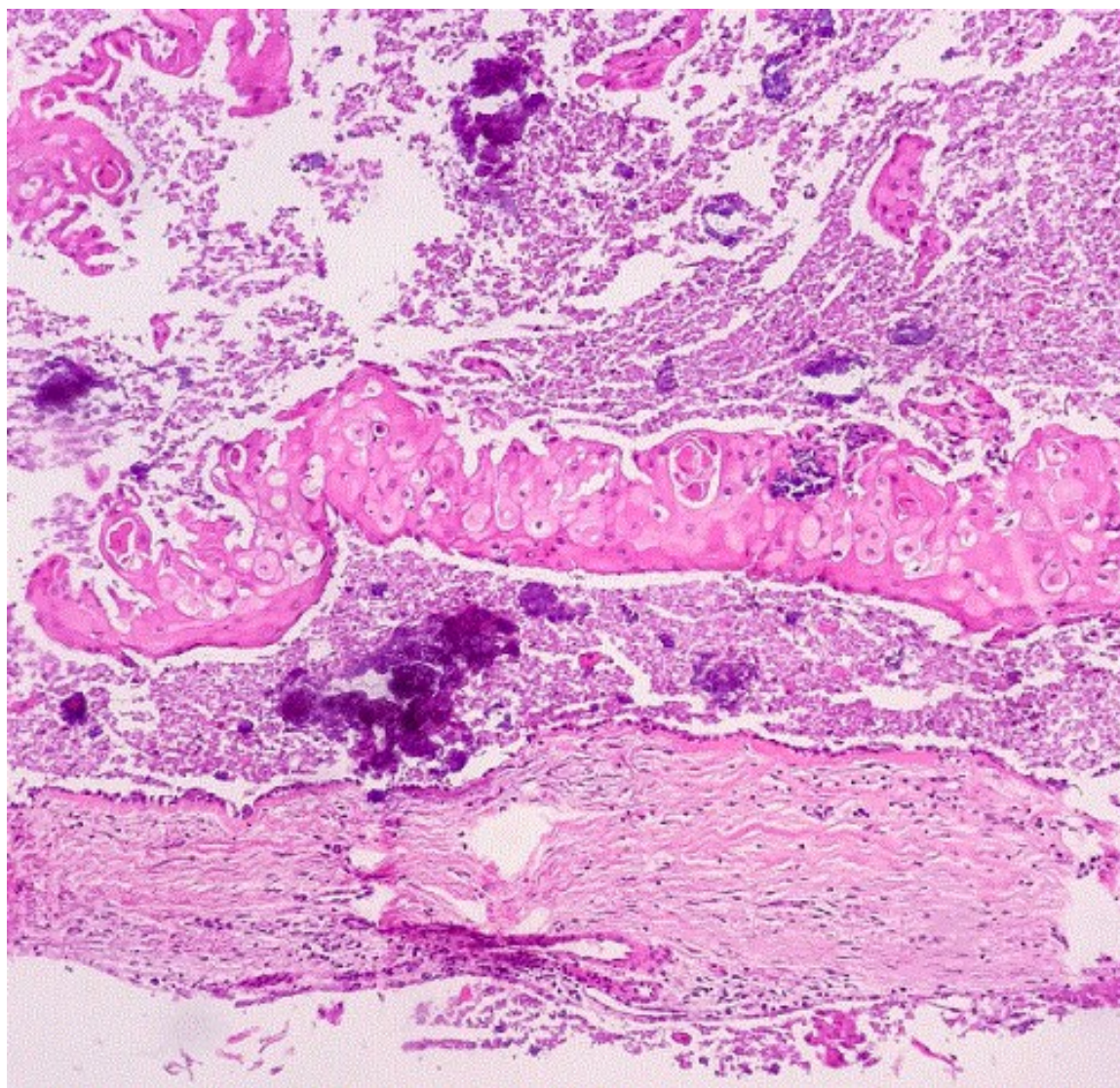
0      1      2      ...      9



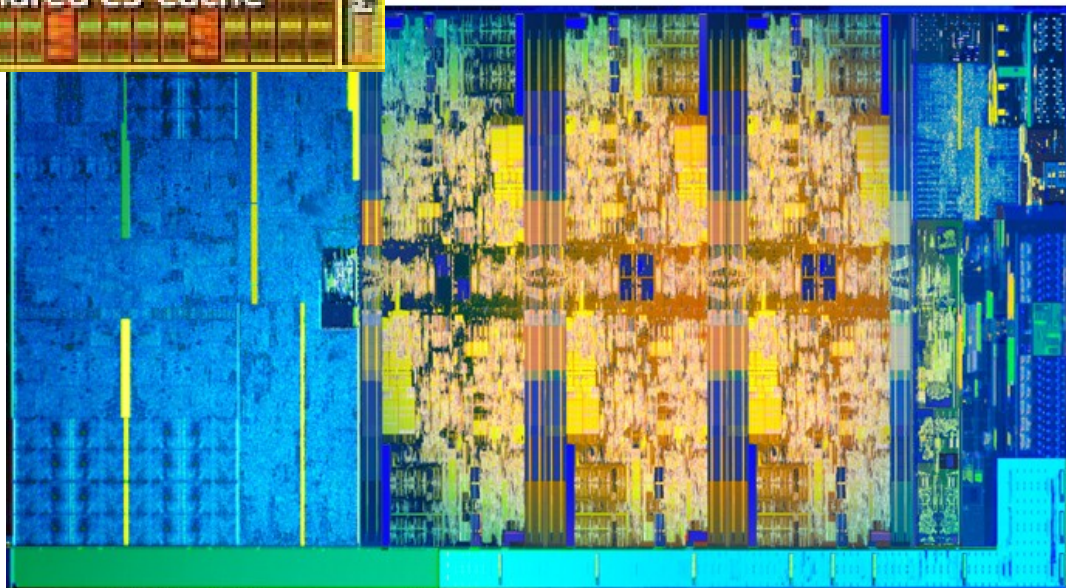
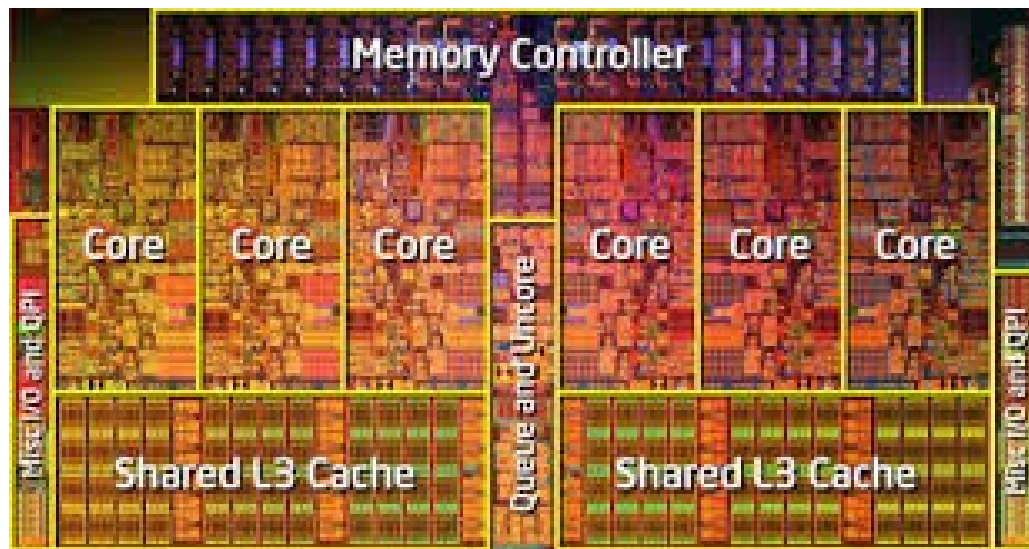
# Perceptrón

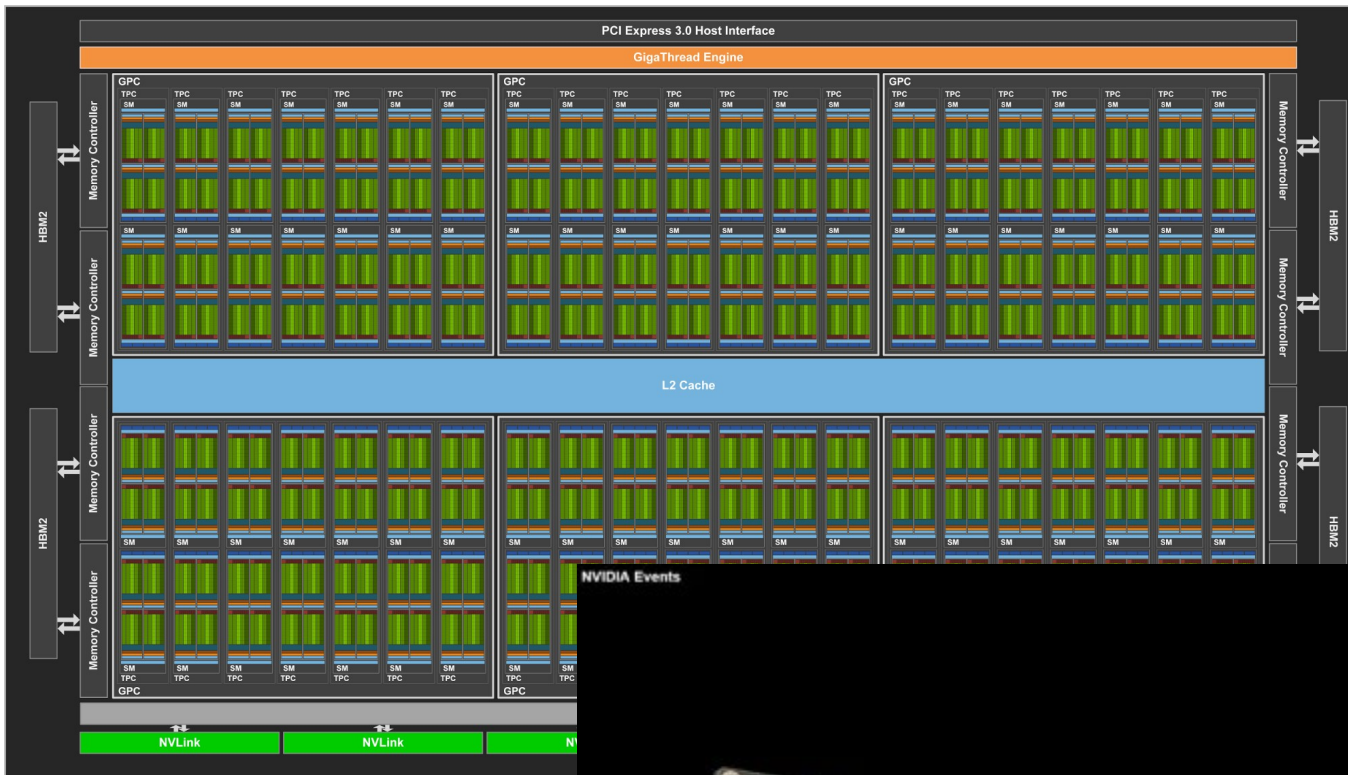




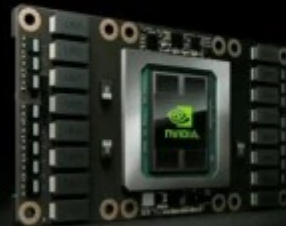








NVIDIA Events

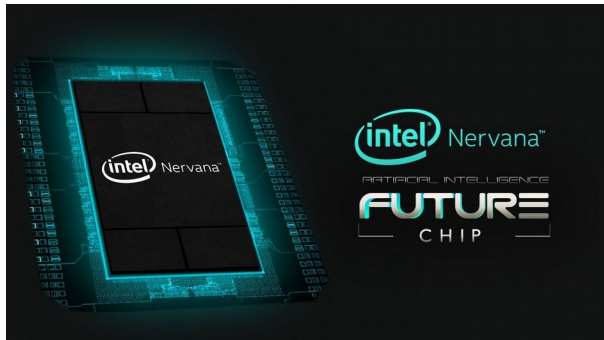
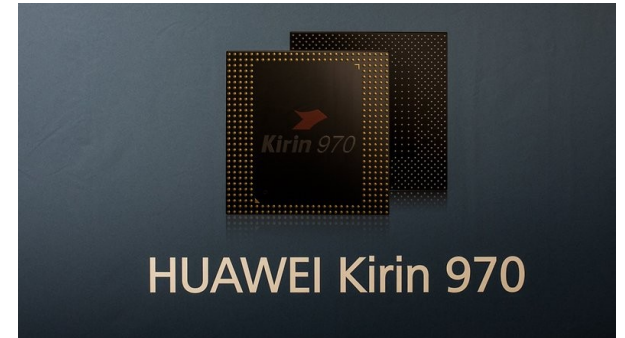
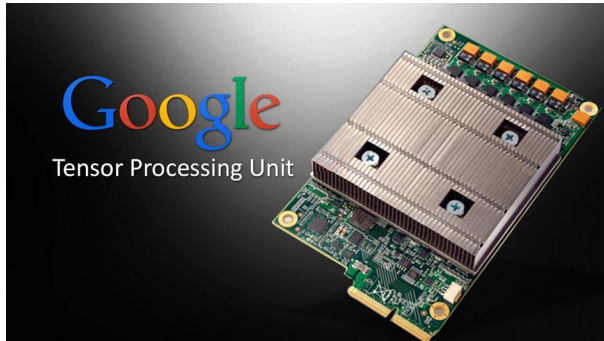


## TESLA P100

THE MOST ADVANCED  
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130B XTORS | 5.3TF FP64 | 10.6TF FP32 | 21.3TF FP16 | 14MB SM RP | 4MB L2 Cache









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