Solution (a)

Min		A # 3	
Max	B-163	C-25 10	D=6
	4/11/1 55	d/2 ×	7/2
	Ext Fire Giral	H+0 Z+0	T-566
	Shift dat 1/1	11	
Max	J K L M N 5 3 2 4 1	0 P &	Rys Sysb
Μin			u v ×
<b>Σν(</b> ( II	we cont prune (	/, due to V	5 6 13 has 2 parents
	and need to	search -th	ne Node V
Cili	) not examinate	nodes	
	MZPQ	X	

unitj	Net input net;	output	0;
		1	
2	0.8X   + 0.2X   = 1	J	
3	0.4×1+0.6×1=1	1	
4	x1+0,5x[+0.3x]+0.2x1=2	2	
5	05x1+0.2x1+0.1x1-0.9x1=-0.1	D	
6	0.3×2+0.2×0-[X1=-0.4	0	
7	0.2×2+0.5 XD +0.8 X1 = 1.2	1.2	

cii) 
$$S_j = \sigma'(net_j) \sum_k S_k W_{kj}$$
  
 $S_k = \sigma'(net_k) (t_k - 0_k)$   
 $\sigma'(x) = \begin{cases} 1 & x > 6 \\ 0 & x < 0 \end{cases}$ 

(iii) 
$$S_6 = \frac{1}{2} (net_6) (t_6 - 0_6)$$
  
= 0 × (0.8-0)  
=0

$$S_7 = \sigma'(net_7)(t_7 - 0_7)$$
  
= [x(0.2 - 1.2)  
= -1

$$S_{4} = \sigma'(\text{net}_{4}) \left( S_{6} \times W_{bu} + S_{7} \times W_{74} \right)$$
  
=  $[\times (0 \times 0.3 + (-1) \times 0.2)$   
=  $-0.2$ 

$$(iV) \oplus \triangle W_{ji} = 98j0i$$
  
 $\triangle W_{41} = 98401$   
 $= 0.1 \times (-0.2) \times 1$   
 $= -0.02$ 

(c) (i) a Gradients shrink exponentially while BP through many layer, because of (x) < 0.31 for a sigmoid.

Products of many six terms drive & toward zero, so earlier layers learn exerently stouty or stop learning altogether.

(ii) O use ReLu /Leaky-Relu to keep o'(x)=1,x>0

- maintain variance of activation and gradients by proper weight initialization
- 3 Batch/Layor Mormalization rescales activations keeping them in regions with healthy derivative

1 Use Residual connection

Que Cradient-clipping or adaptive optimizer eg. Adam, RMSProp prevent tiny update after many layers.