Rojas Neural Networks Chapter 3

1.

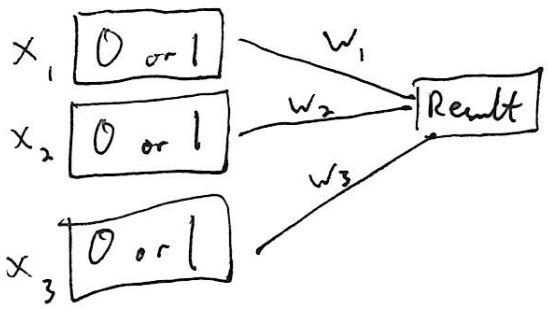
Linear separability:

Two sets of points A and B are linearly separable iff $n+1$ real numbers exist $w_1 \dots w_{n+1}$ such that every point $x_1 \dots x_n \in A$ satisfies $\sum_{i=1}^{n} w_i x_i \geq w_{n+1}$ and every point $x_1, x_2 \dots x_n \in B$ satisfies $\sum_{i=1}^{n} w_i x_i < w_{n+1}$

$\Rightarrow$ No rule has been established/found to give the number of linearly separable functions of n binary arguments

Possible solution: **Randomized perceptron**

for $n=3$:



$\Rightarrow$ weights in w are randomized

x_1	x_2	x_3	f_n
0	0	0	r_1
0	0	1	r_2
.	.	.	.
1	1	1	r_W

$W = 2^{2^n}$

Each function f_n describes an output pattern for each input possibility

To test for computability of an output pattern, generate random weights and see if each r_i is greater than each 0_x where output value r_i is 1, where output value is 0_i