

6주차(3/3)

다층 퍼셉트론

파이썬으로 배우는 기계학습

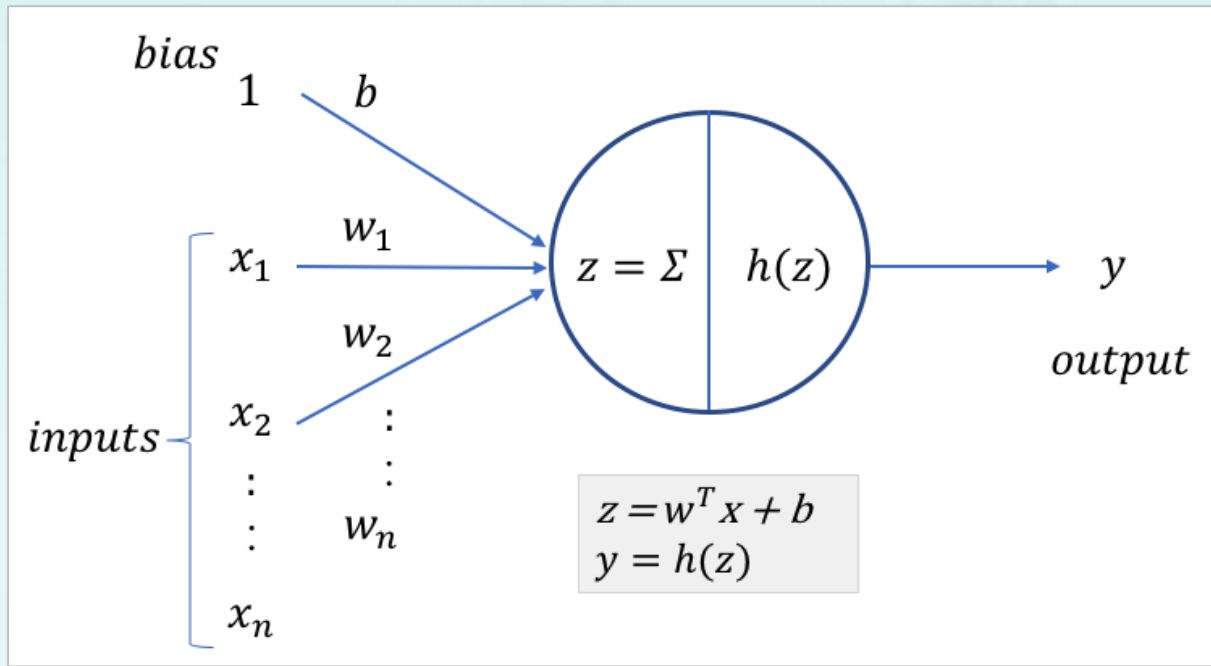
한동대학교
김영섭 교수

다층 퍼셉트론

- 학습 목표
 - 다층 퍼셉트론의 구조와 학습방법을 이해한다.
 - 생물학적 뉴런의 구조와 인공신경망을 비교한다.
- 학습 내용
 - 퍼셉트론 다시 보기
 - 다층 퍼셉트론
 - 생물학적 뉴런

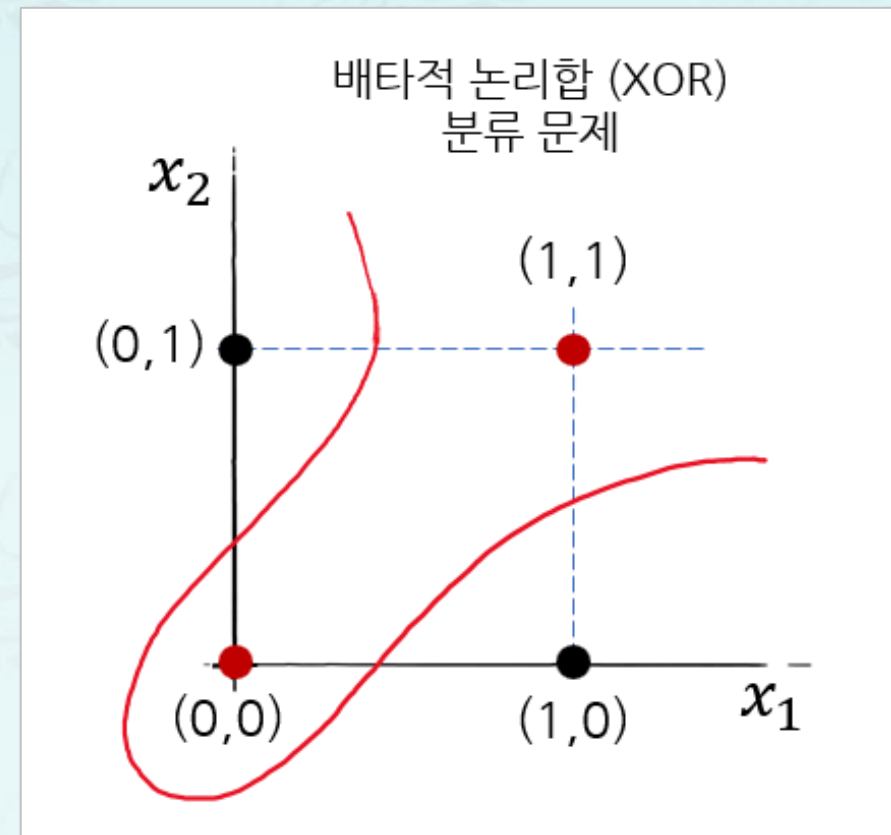
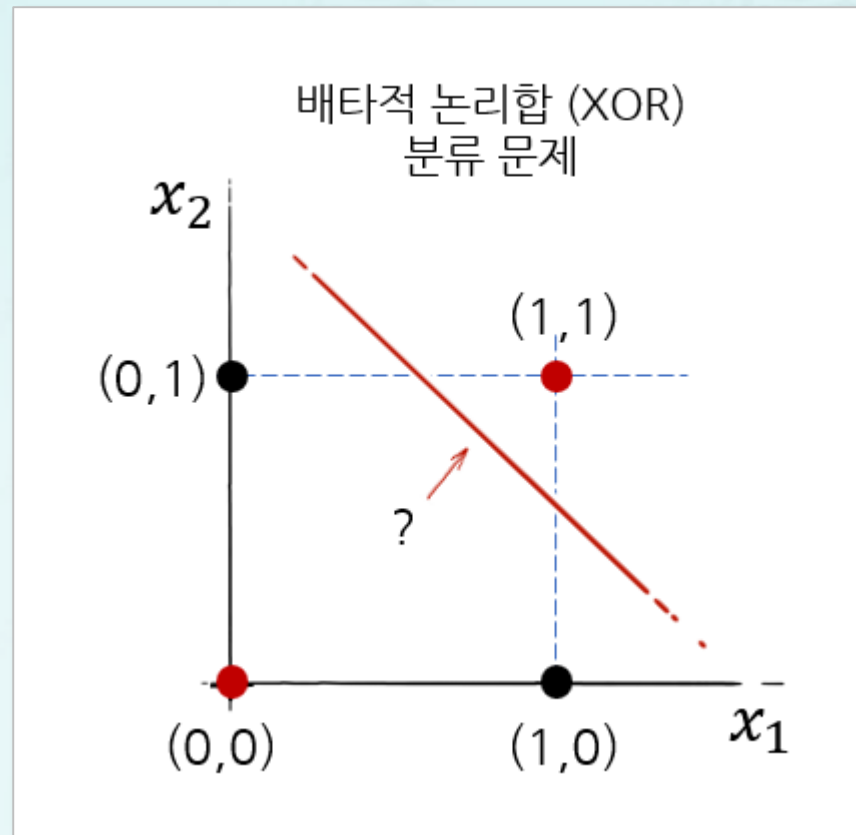
1.퍼셉트론 다시 보기 : 퍼셉트론이란?

- 인공 뉴론
- 최초의 인공 신경망



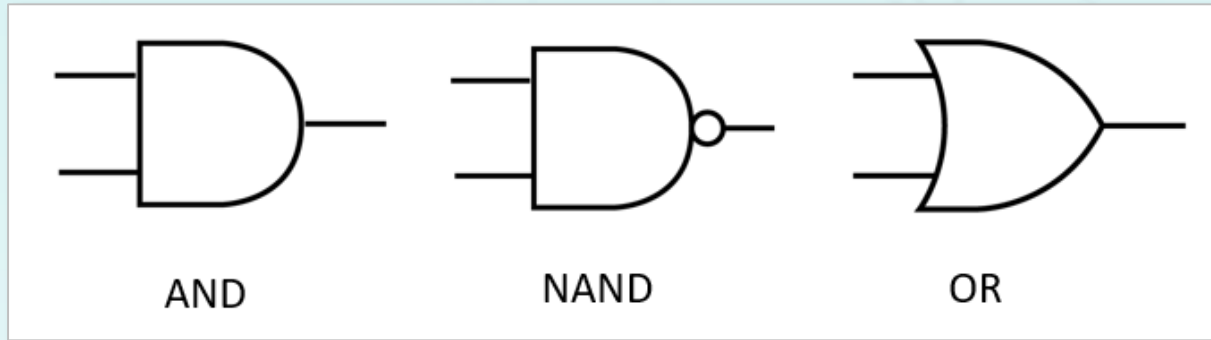
1. 퍼셉트론 다시 보기 : 배타적 논리합(XOR) 문제

- 단일 퍼셉트론은 풀 수 없음
- 다층 퍼셉트론(**MLP**)으로는 풀이 가능



2.다층 퍼셉트론 : 원리 설명

- 퍼셉트론 + 퍼셉트론 + ...



x_1	x_2	y
0	0	0
0	1	0
1	0	0
1	1	1

x_1	x_2	y
0	0	1
0	1	1
1	0	1
1	1	0

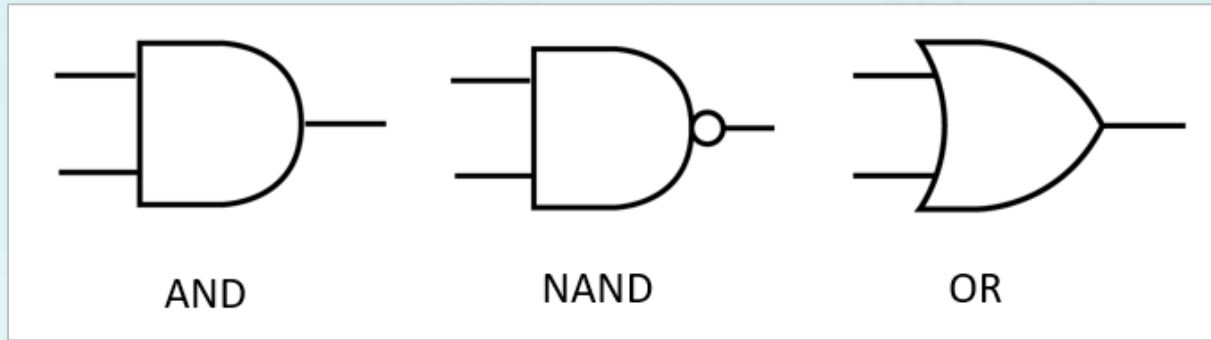
x_1	x_2	y
0	0	0
0	1	1
1	0	1
1	1	1



입력: x_1, x_2
출력: y

2.다층 퍼셉트론 : 원리 설명

- 퍼셉트론 + 퍼셉트론 + ...



x_1	x_2	y
0	0	0
0	1	0
1	0	0
1	1	1

x_1	x_2	y
0	0	1
0	1	1
1	0	1
1	1	0

x_1	x_2	y
0	0	0
0	1	1
1	0	1
1	1	1

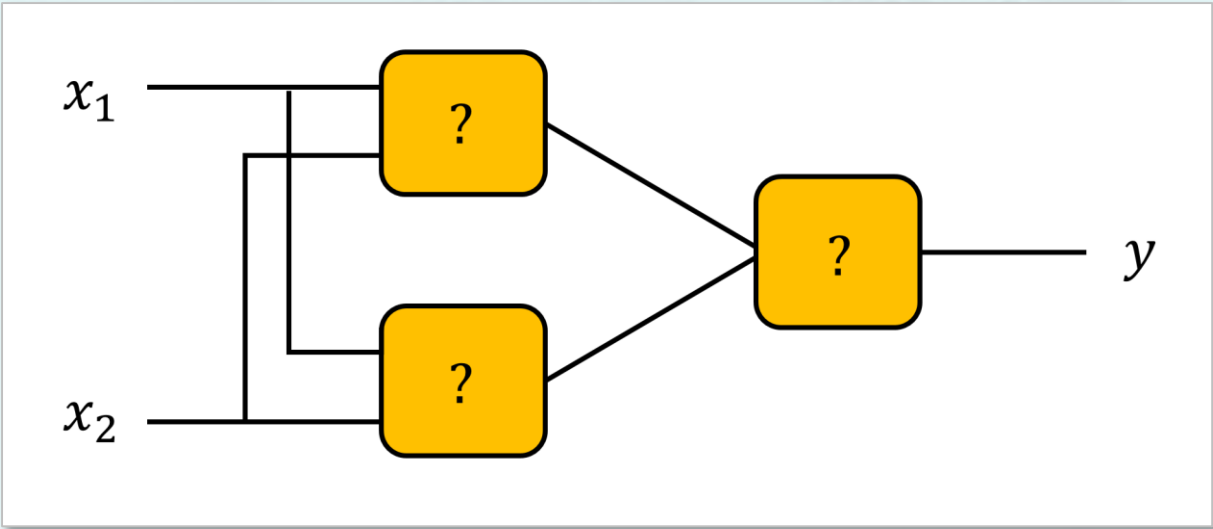
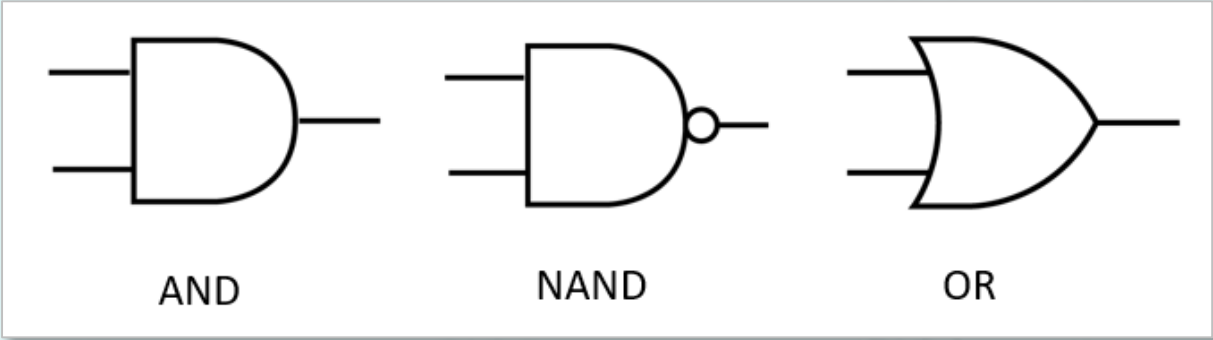


XOR 진리표

x_1	x_2	y
0	0	0
0	1	1
1	0	1
1	1	0

2.다층 퍼셉트론 : 원리 설명

- 퍼셉트론 + 퍼셉트론 + ...

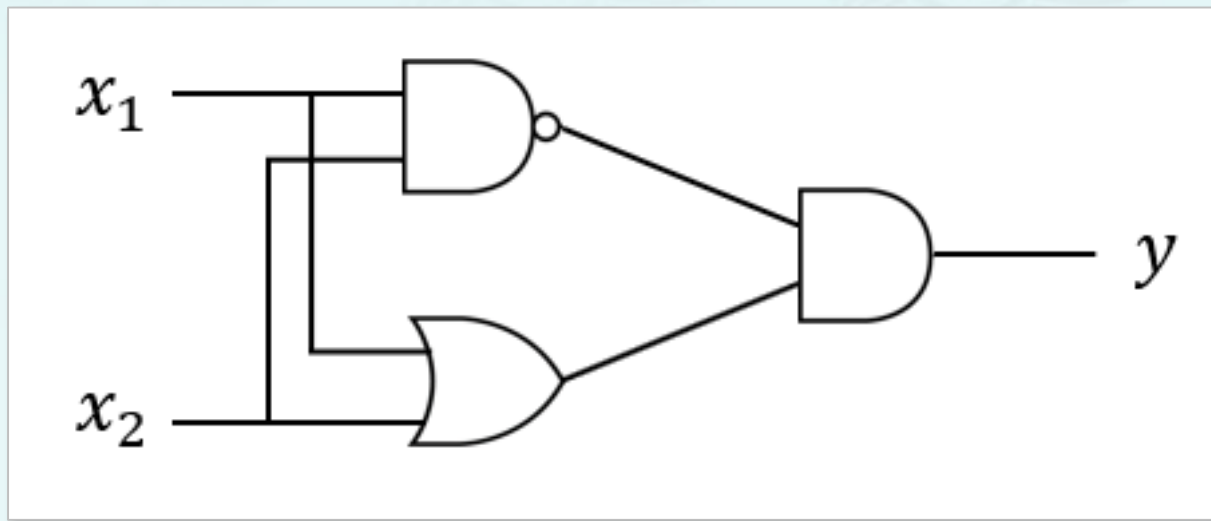
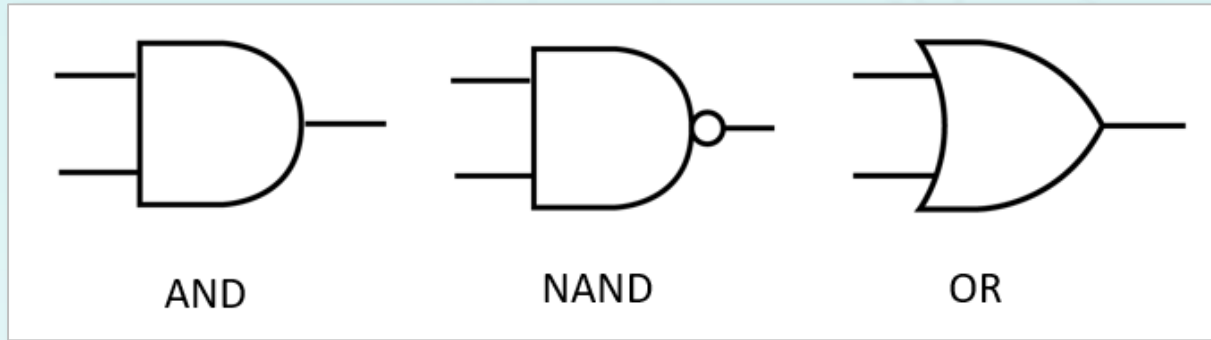


XOR 진리표

x_1	x_2	y
0	0	0
0	1	1
1	0	1
1	1	0

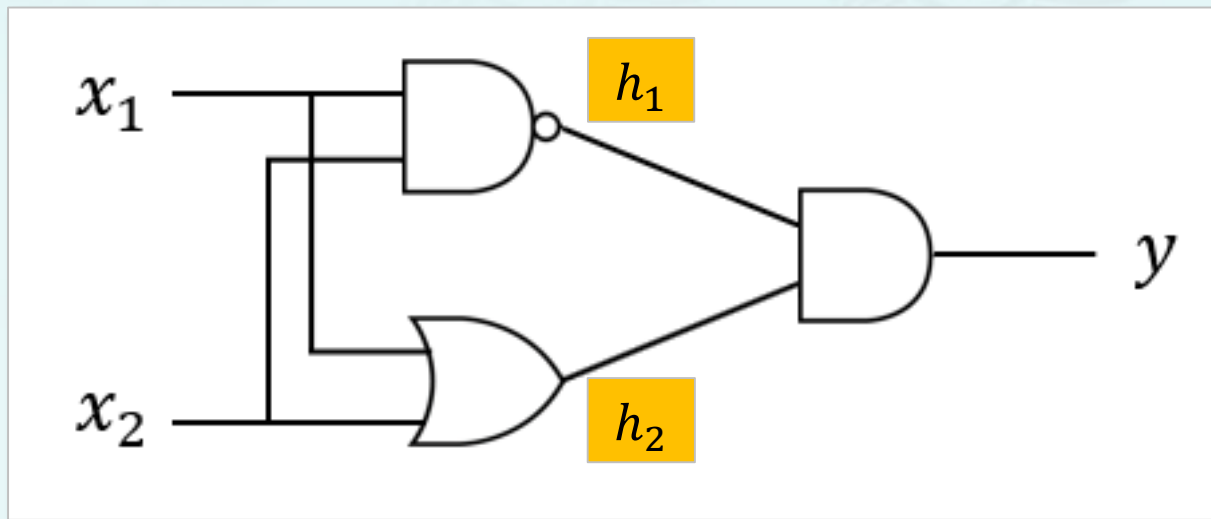
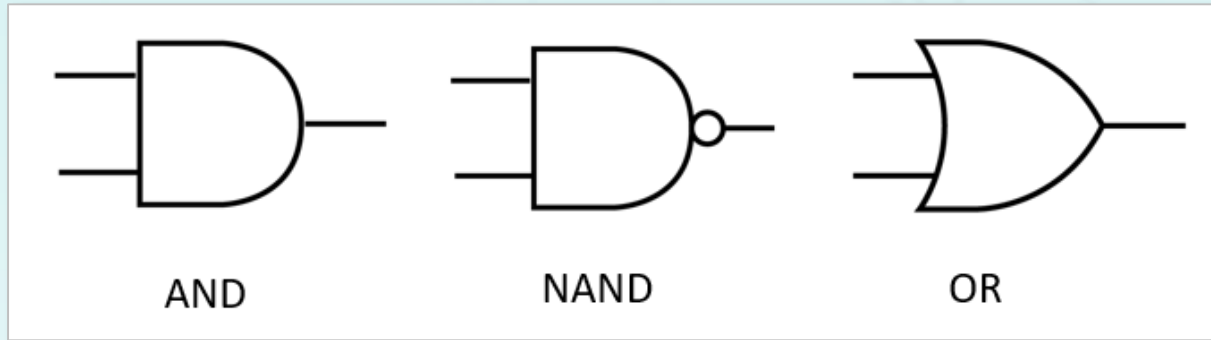
2.다층 퍼셉트론 : 원리 설명

- 퍼셉트론 + 퍼셉트론 + ...



2.다층 퍼셉트론 : 원리 설명

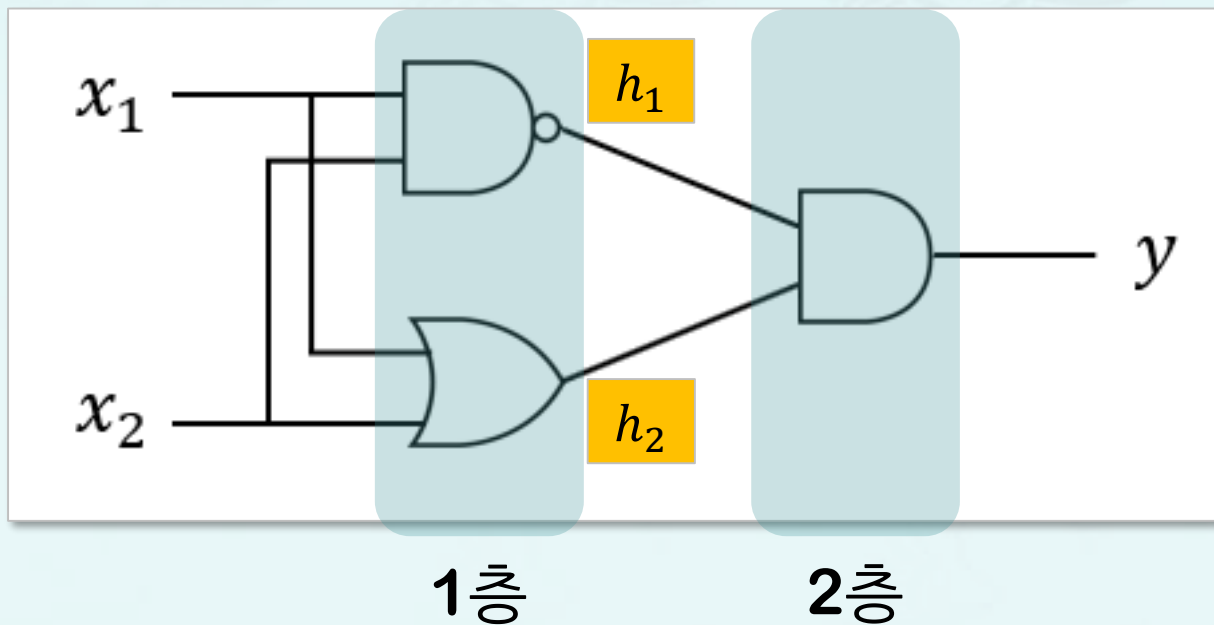
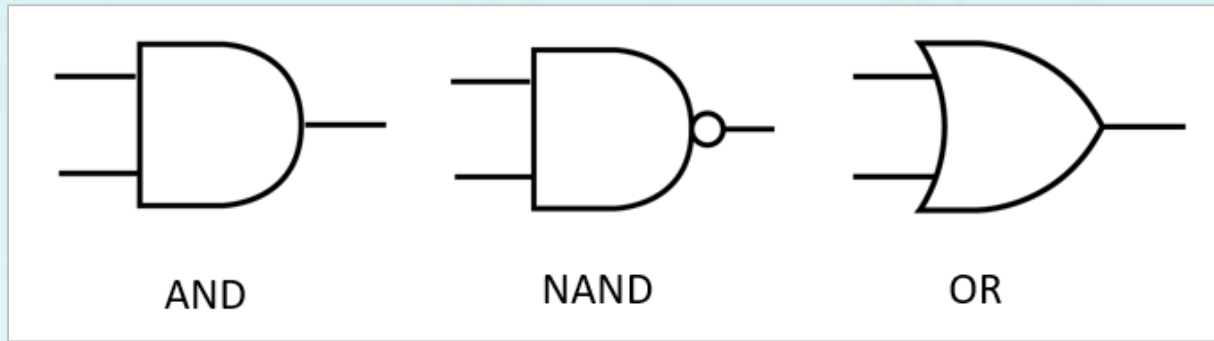
- 퍼셉트론 + 퍼셉트론 + ...



		NAND	OR	XOR
x_1	x_2	h_1	h_2	y
0	0	1	0	0
0	1	1	1	1
1	0	1	1	1
1	1	0	1	0

2.다층 퍼셉트론 : 원리 설명

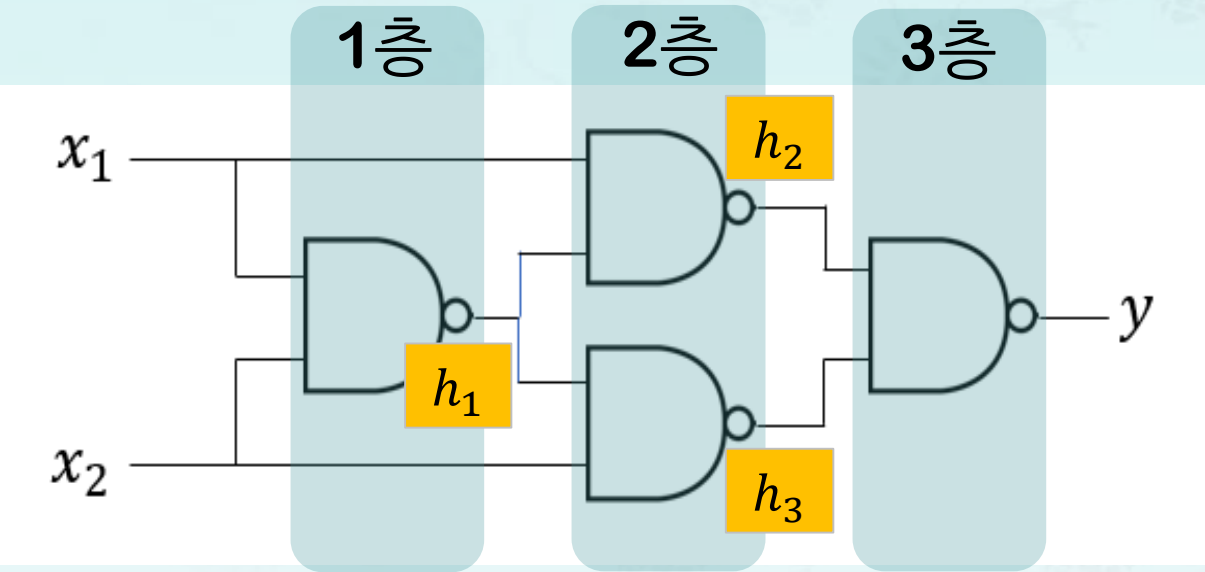
- 퍼셉트론 + 퍼셉트론 + ...



		NAND	OR	XOR
x_1	x_2	h_1	h_2	y
0	0	1	0	0
0	1	1	1	1
1	0	1	1	1
1	1	0	1	0

2.다층 퍼셉트론 : 원리 설명

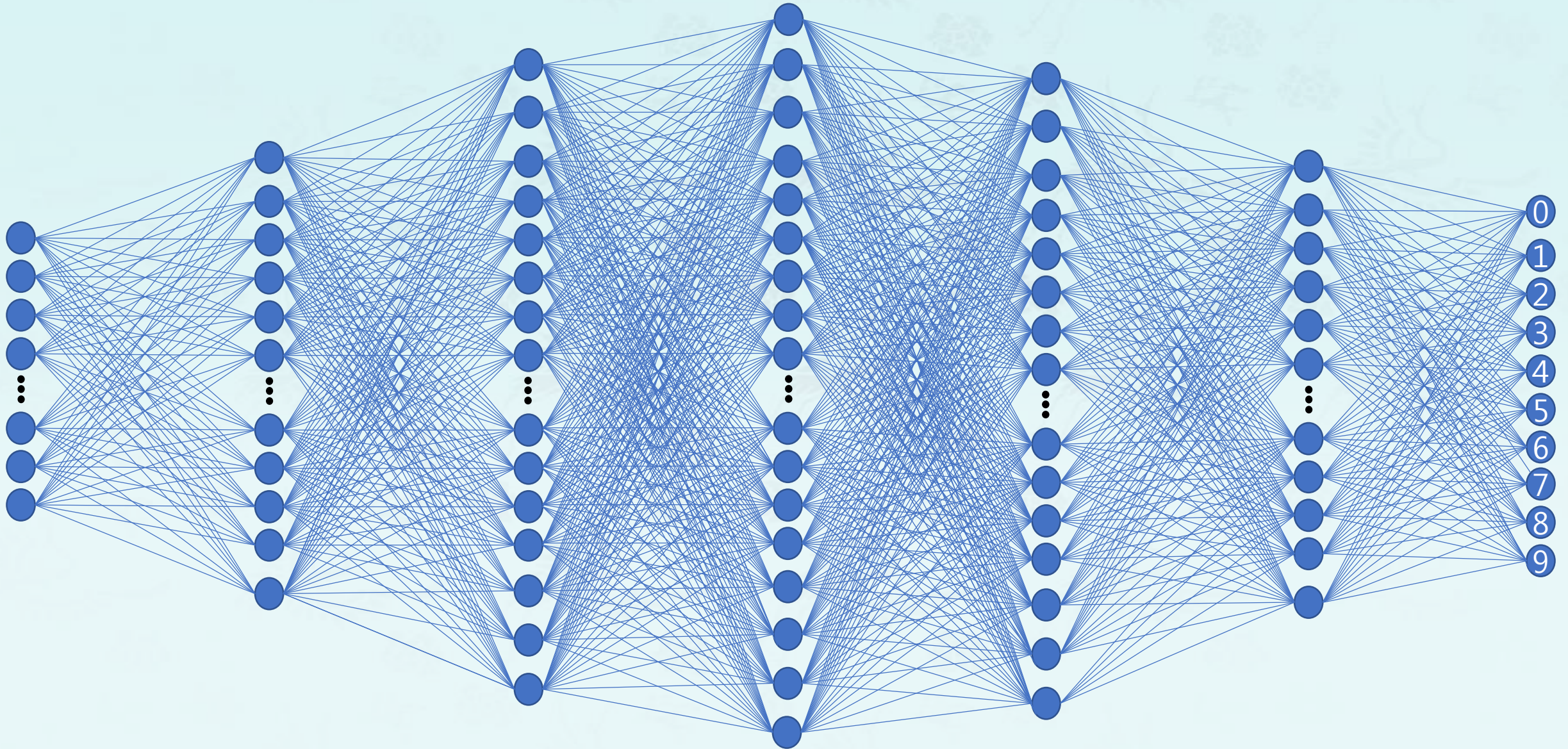
- 퍼셉트론 + 퍼셉트론 + ...



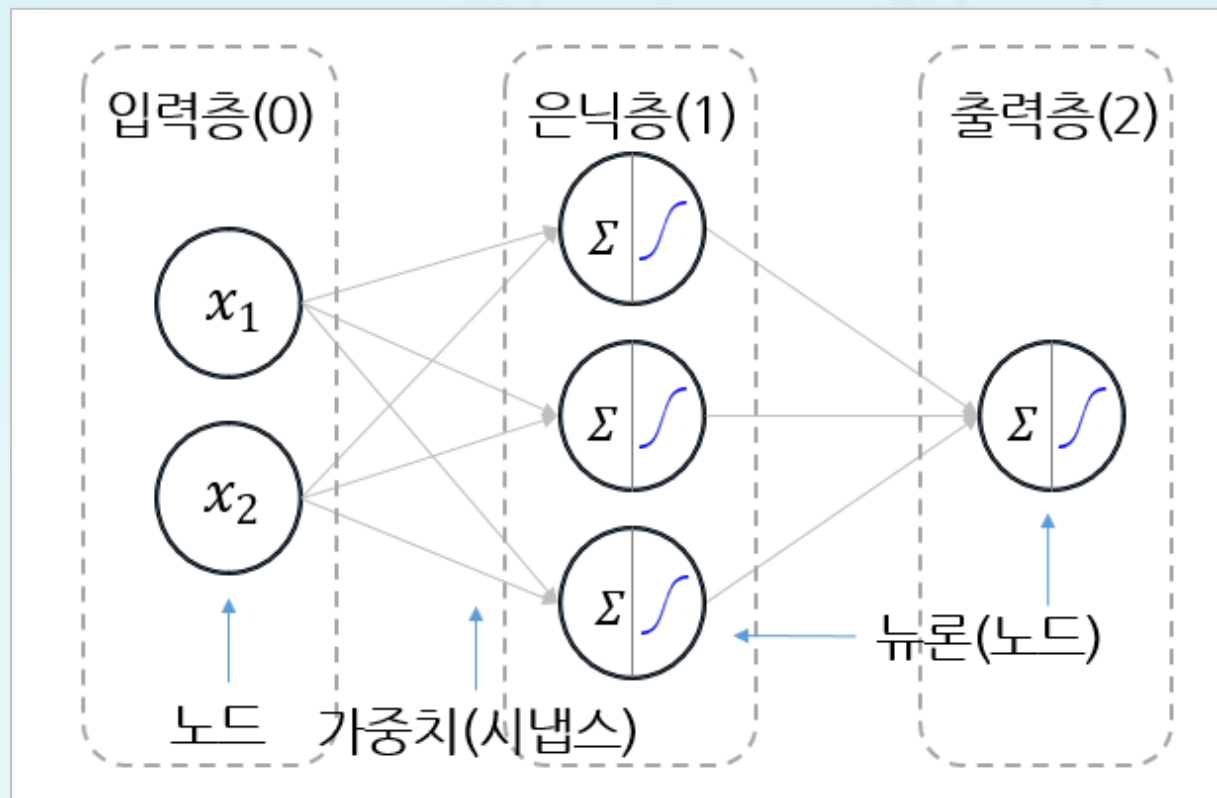
NAND NAND NAND XOR

x_1	x_2	h_1	h_2	h_3	y
0	0	1	1	1	0
0	1	1	1	0	1
1	0	1	0	1	1
1	1	0	1	1	0

2.다층 퍼셉트론 : 꿈의 함수 구현

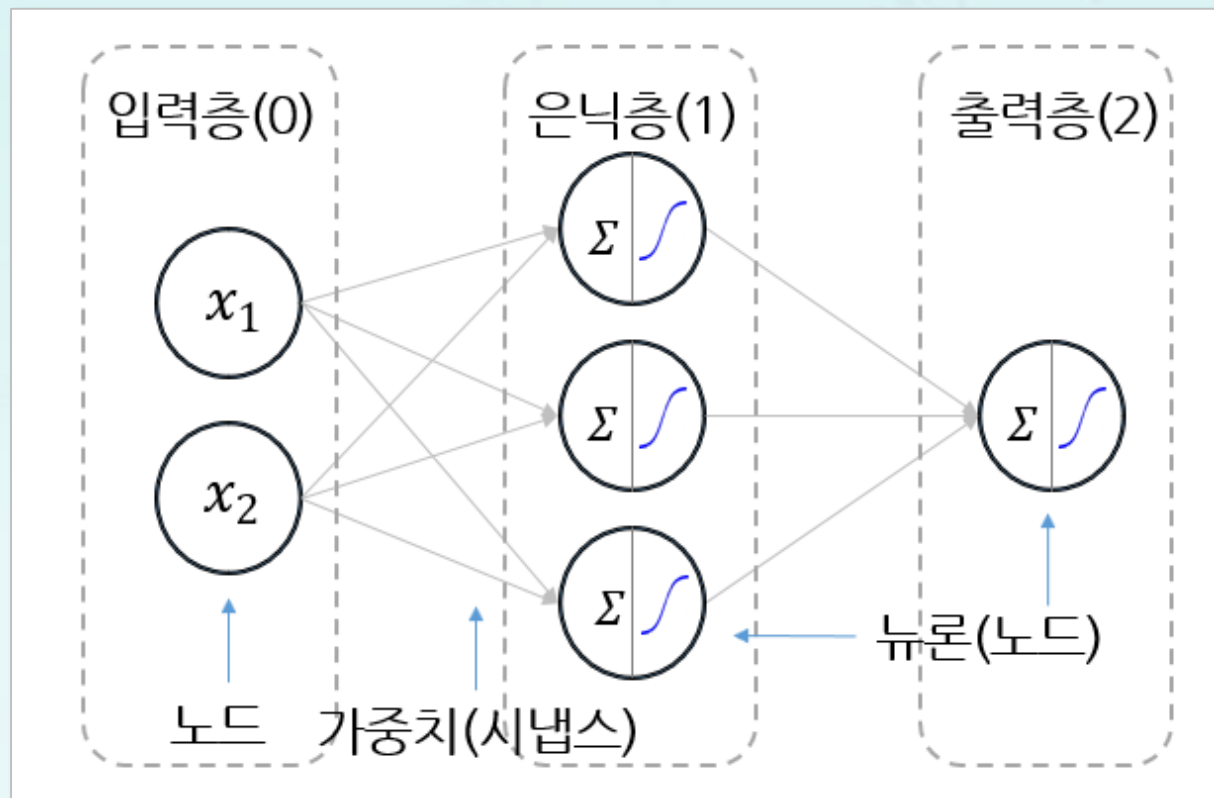


3. 다층 구조 네트워크: 다층 구조 인공신경망



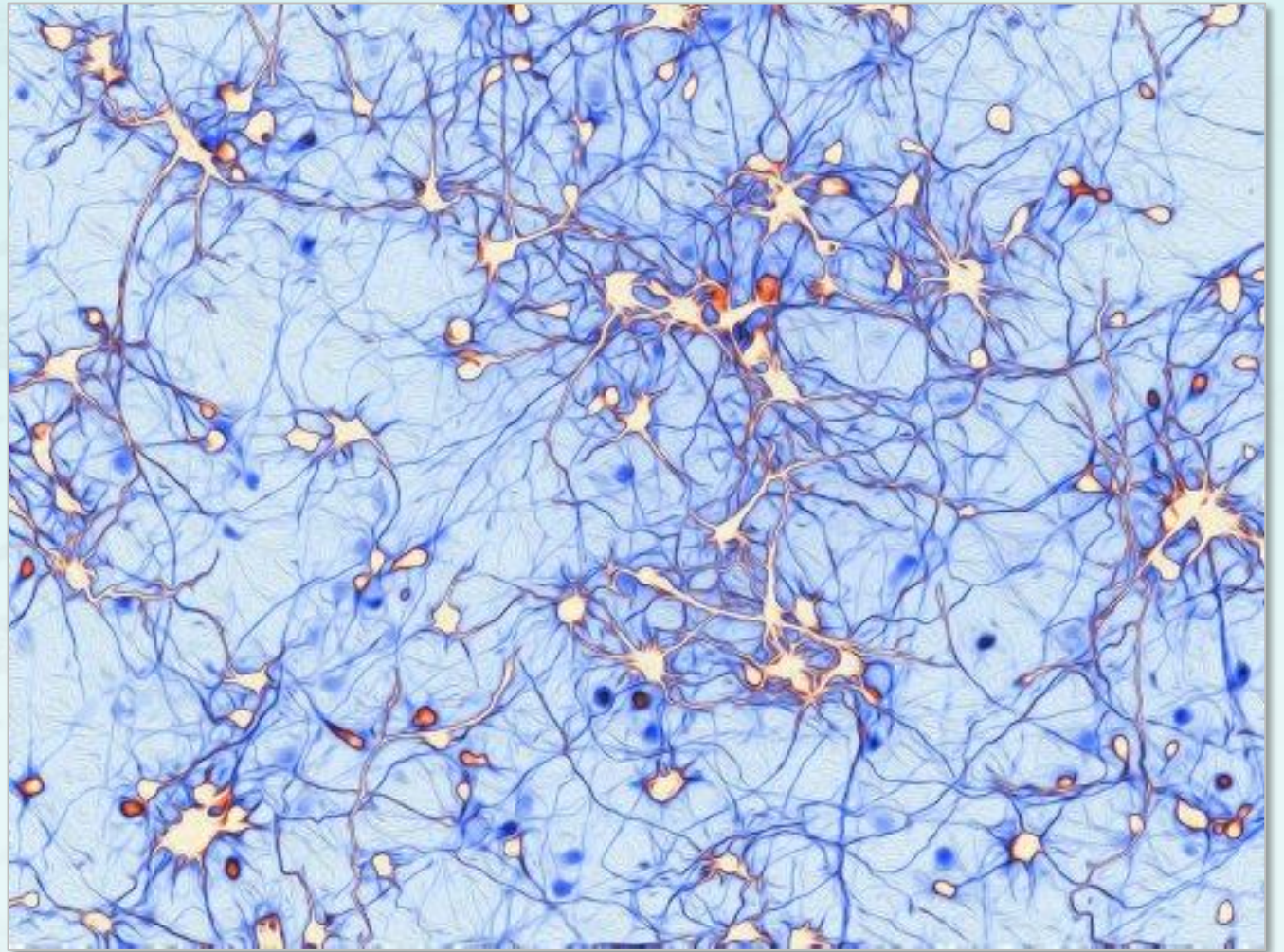
3. 다층 구조 네트워크: 다층 구조 인공신경망

- 2층 혹은 3층 인공신경망



4. 생물학적 뉴런: 복습

- 뉴런
 - 시냅스를 통해 신호 전달
 - 출력 = \sum 입력

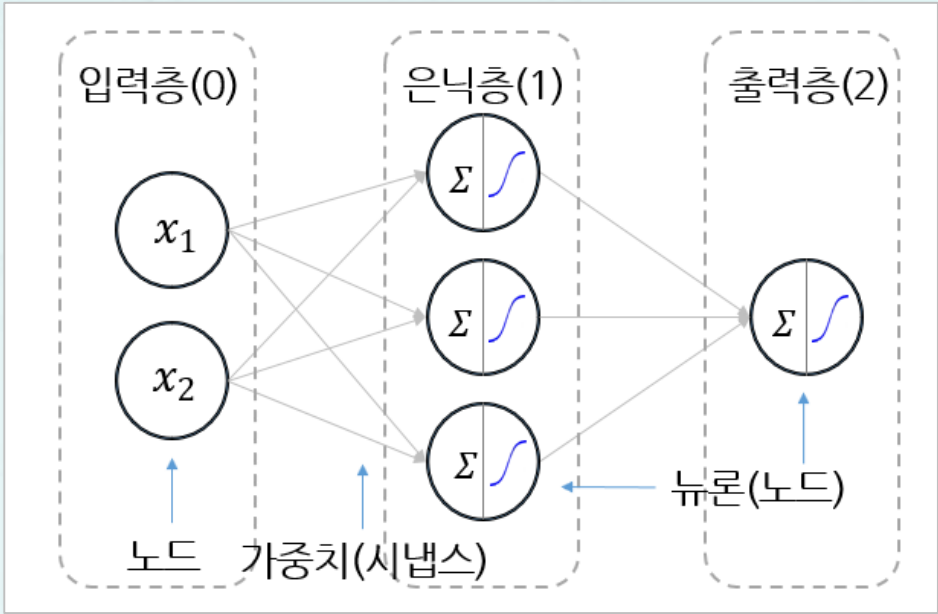
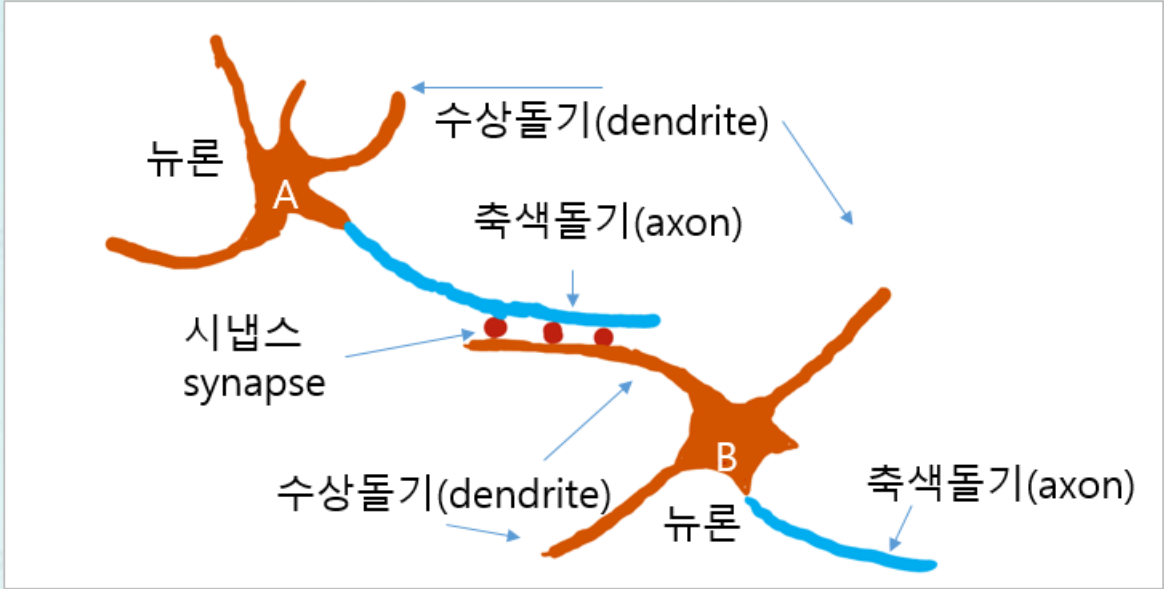


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4. 생물학적 뉴런: 인공신경망과의 비교

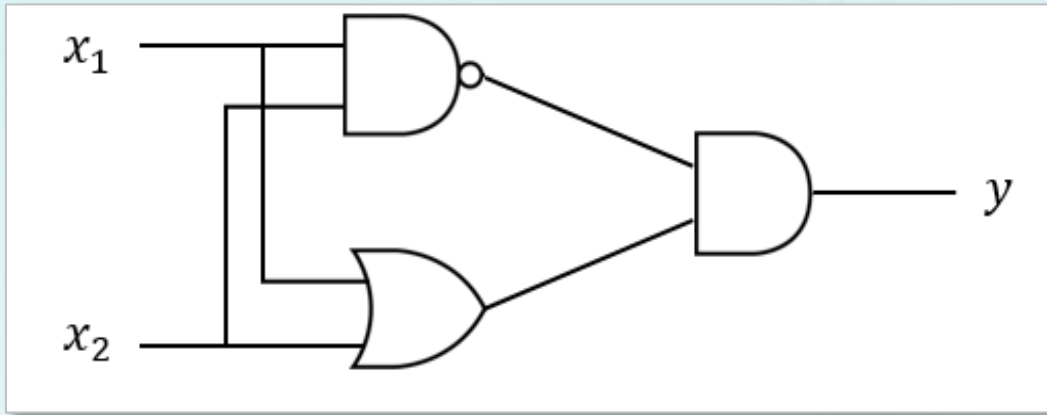
■ 뉴런 vs. 퍼셉트론

생물학적 신경망	인공 신경망
뉴런(Neuron)	노드(Node)
수상돌기(Dendrite)	입력(Input)
축색돌기(Axon)	출력(Output)
시냅스(Synapse)	가중치(Weight)



5. 다층 퍼셉트론 활용 : 단순 논리회로 구성

- AND + NAND + OR



5. 다층 퍼셉트론 활용 : 신경망 학습

Chinese man caught by facial recognition at pop concert

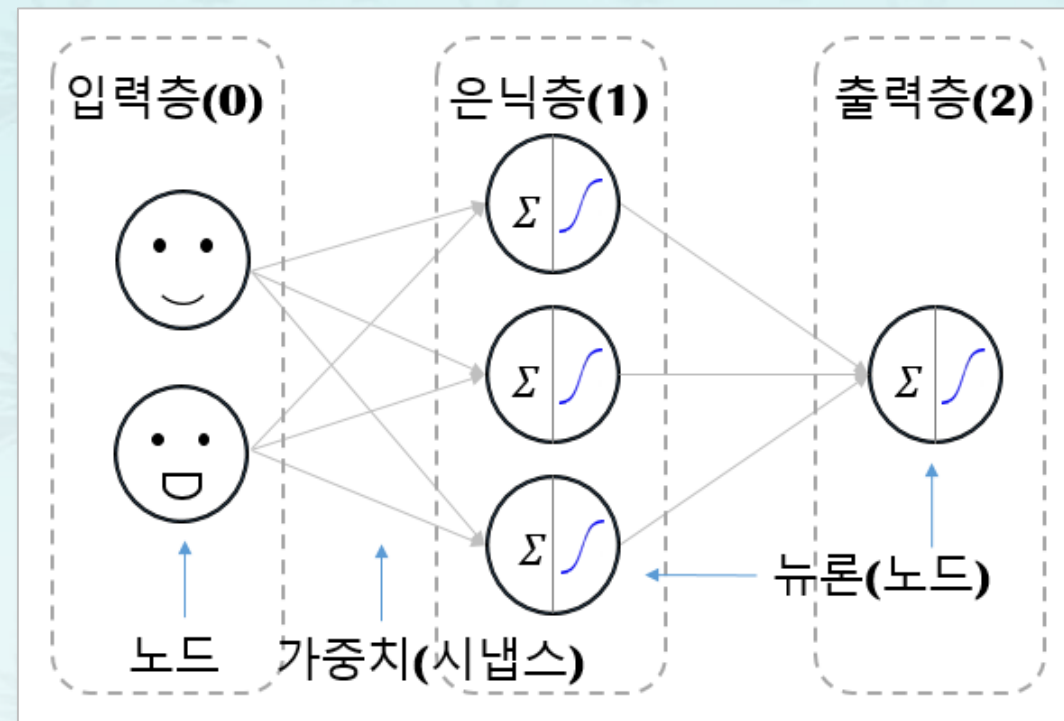
13 April 2018

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(File Photo) There are an estimated 170 million CCTV cameras already in place in China



다층 퍼셉트론

- 학습 정리
 - 단순 퍼셉트론의 한계
 - 다층 퍼셉트론의 구조와 학습방법
 - 생물학적 뉴런의 구조와 인공신경망 비교