

6주차(3/3)

다층 퍼셉트론

파이썬으로 배우는 기계학습

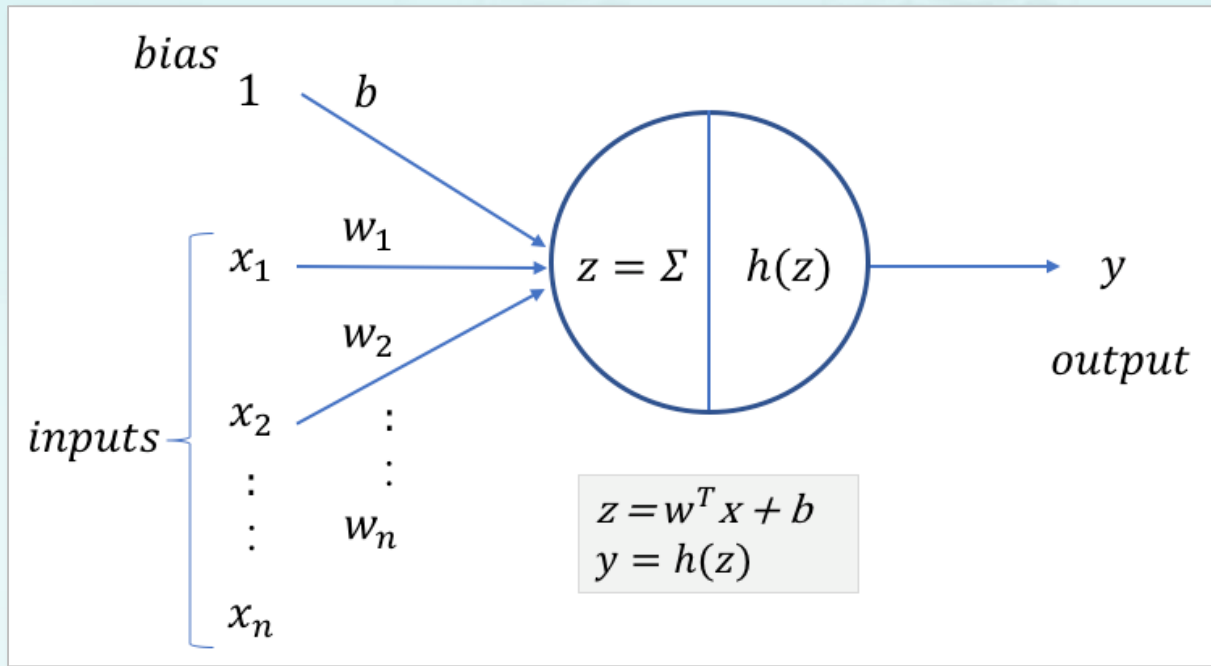
한동대학교
김영섭 교수

다층 퍼셉트론

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

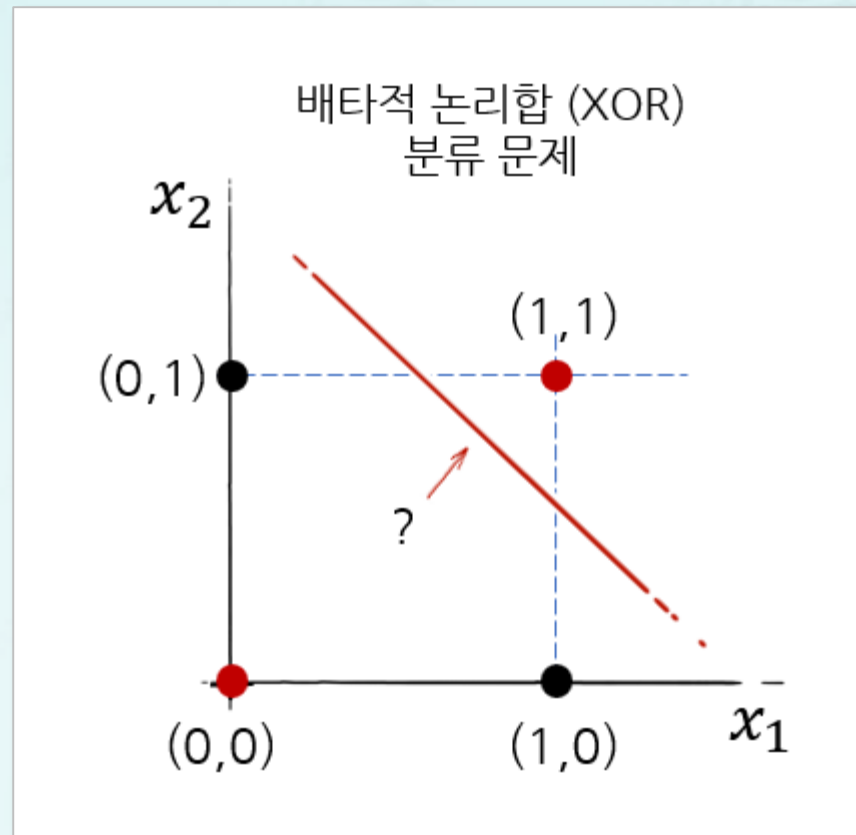
1.퍼셉트론 다시 보기

- 인공 뉴론
- 최초의 인공 신경망



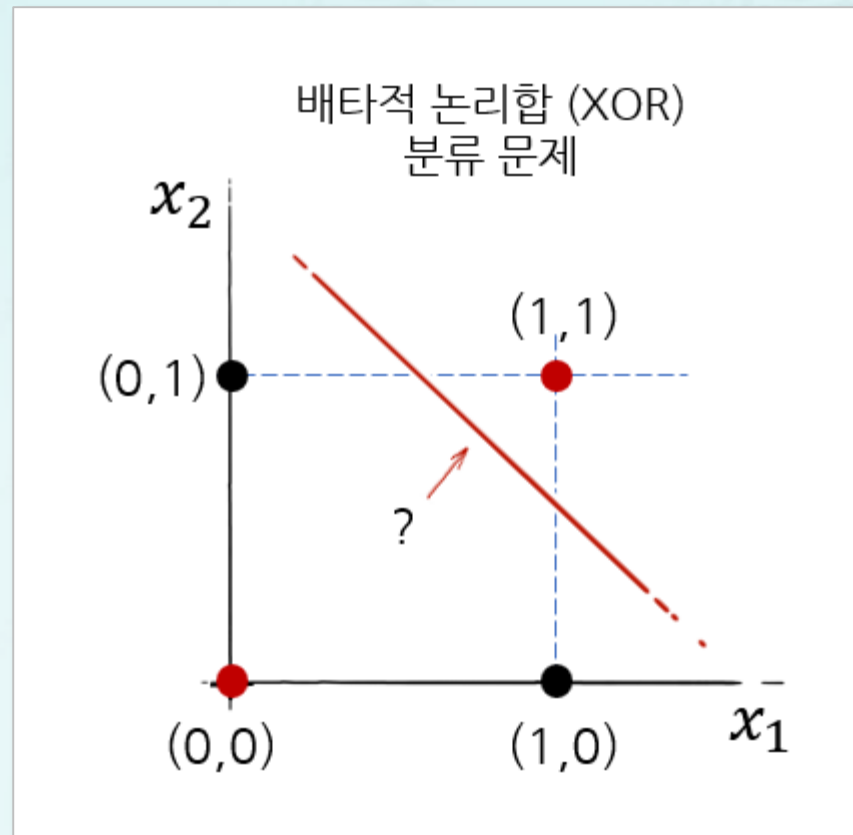
1. 퍼셉트론 다시 보기

- 배타적 논리합(XOR) 문제
 - Perceptron

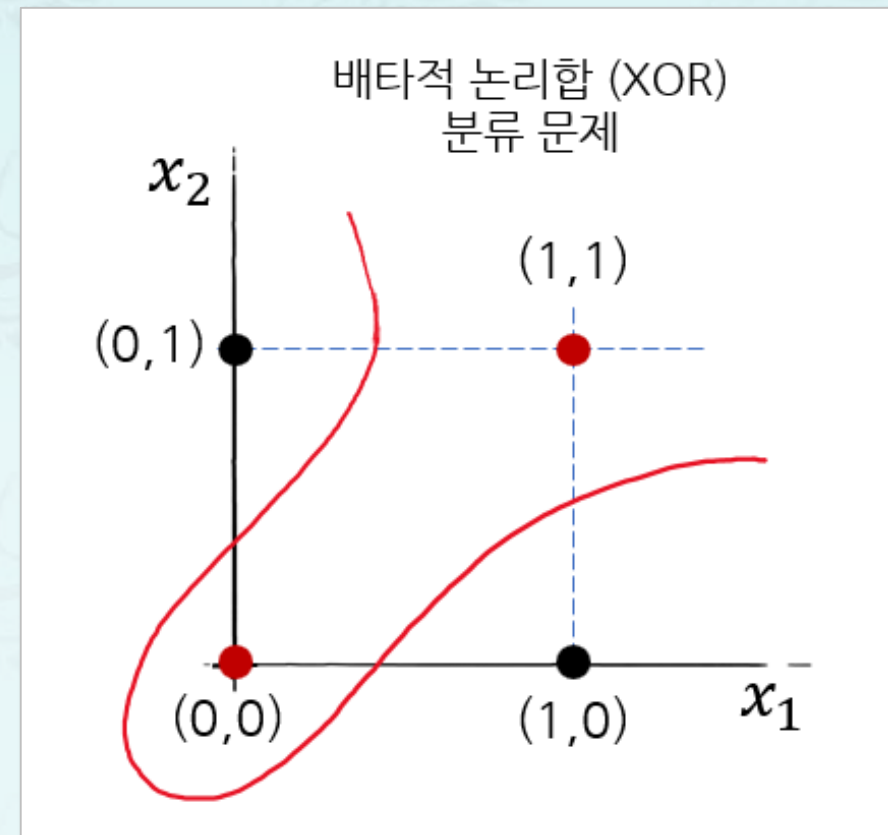


1. 퍼셉트론 다시 보기

- 배타적 논리합(XOR) 문제
 - Perceptron

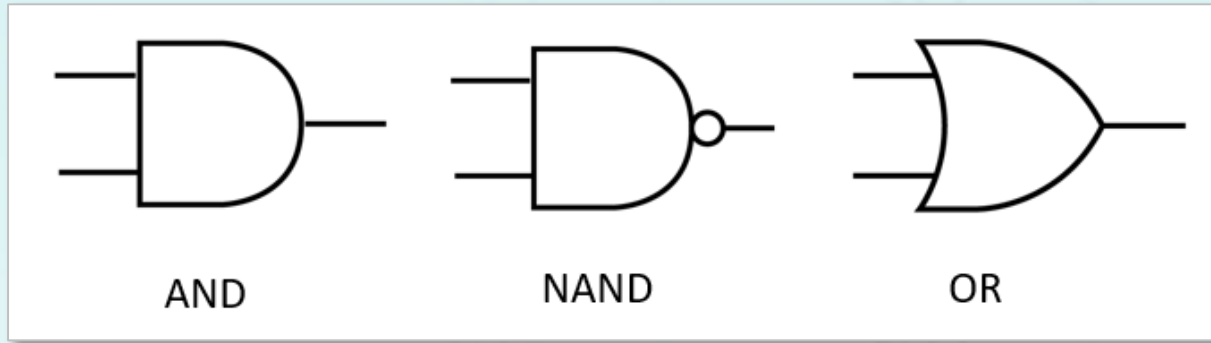


- 다층 퍼셉트론(MLP)
 - Multi-layer Perceptron



2.다층 퍼셉트론

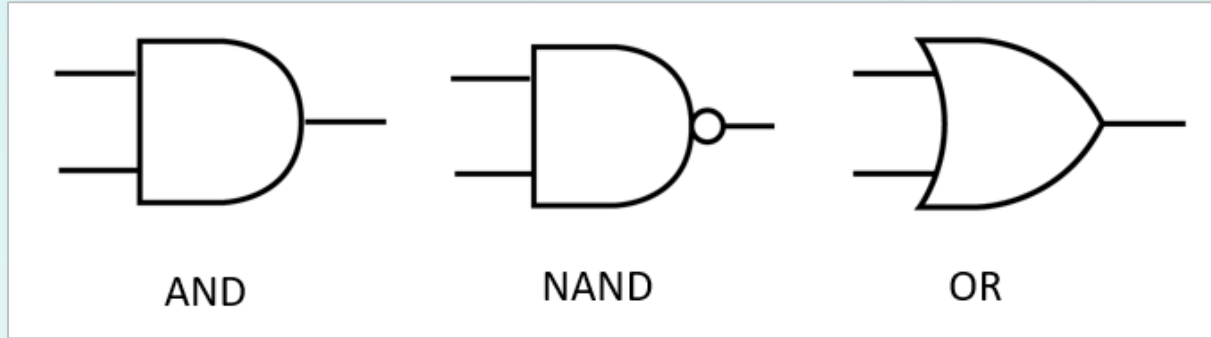
- 퍼셉트론 + 퍼셉트론 + ...



2.다층 퍼셉트론

■ 퍼셉트론 + 퍼셉트론 + ...

■ XOR



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

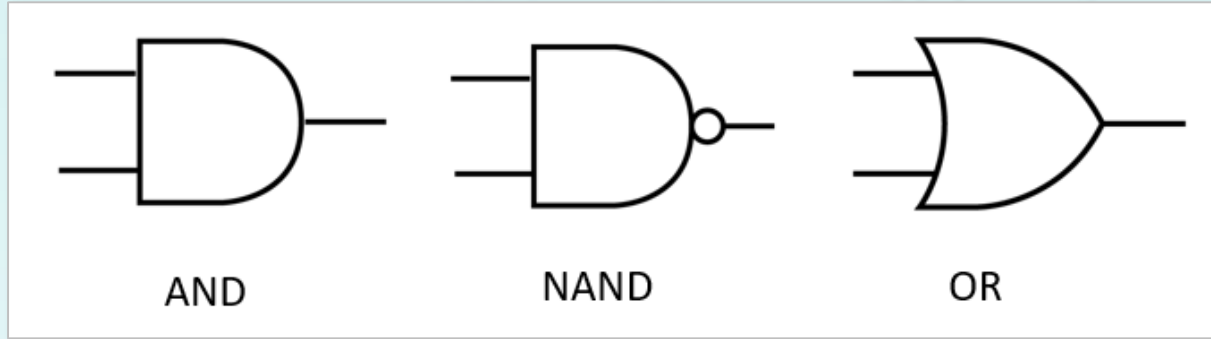
x_1	x_2	y
0	0	1
0	1	1
1	0	1
1	1	0

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

2.다층 퍼셉트론

■ 퍼셉트론 + 퍼셉트론 + ...

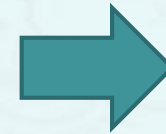
■ XOR



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

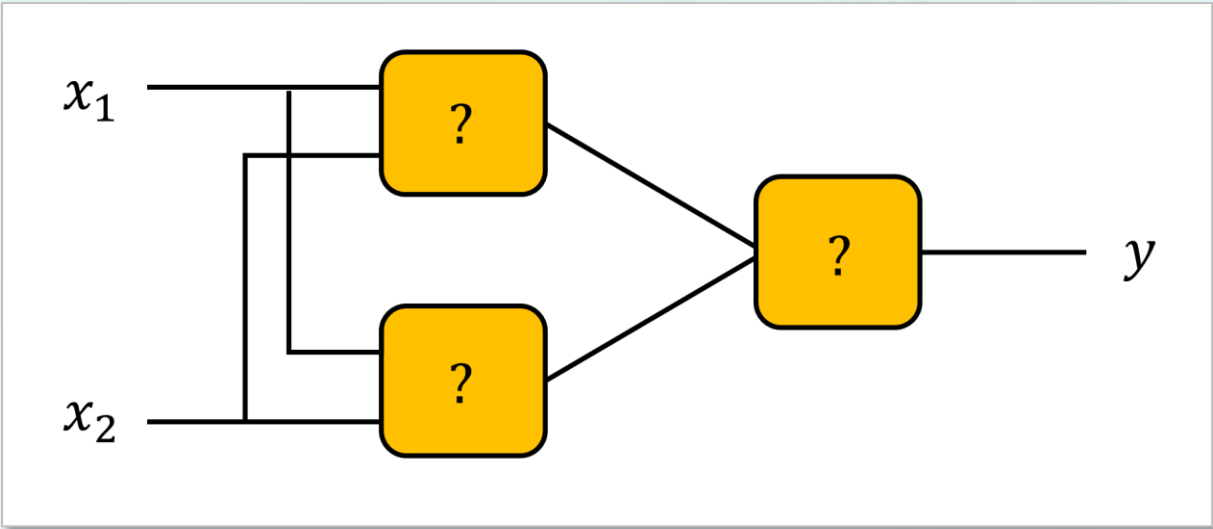
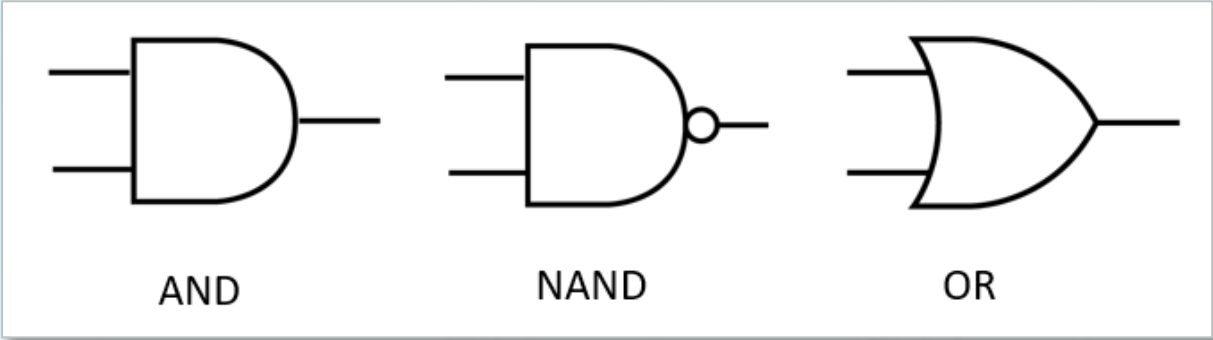


x_1	x_2	y
0	0	0
0	1	1
1	0	1
1	1	0

2.다층 퍼셉트론

■ 퍼셉트론 + 퍼셉트론 + ...

■ XOR

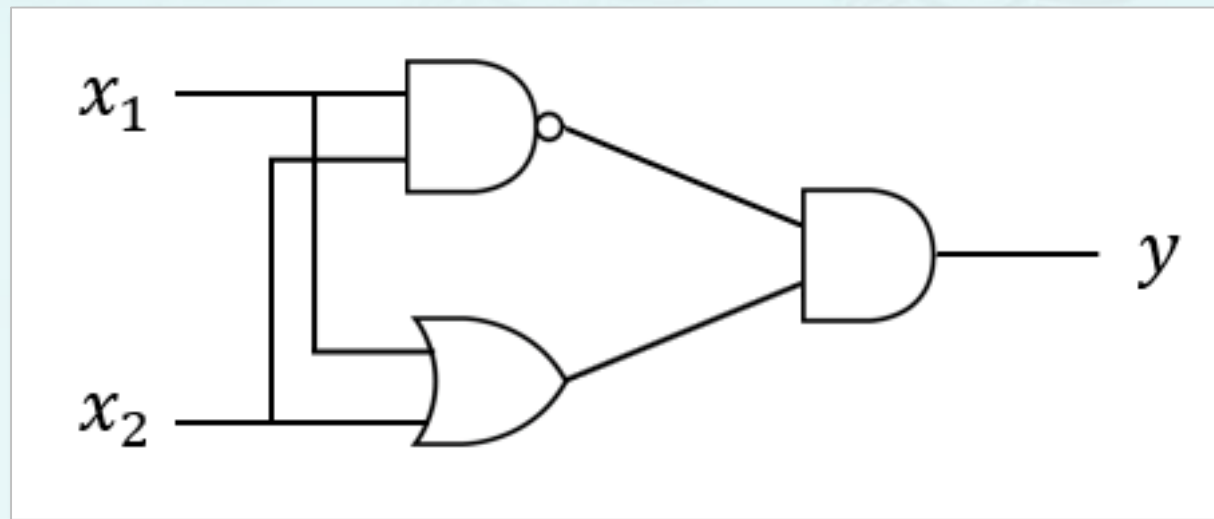
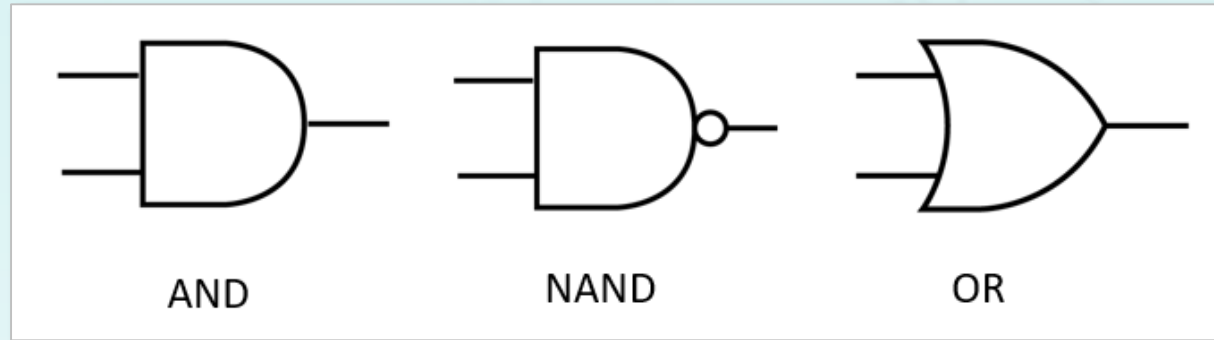


x_1	x_2	y
0	0	0
0	1	1
1	0	1
1	1	0

2.다층 퍼셉트론

■ 퍼셉트론 + 퍼셉트론 + ...

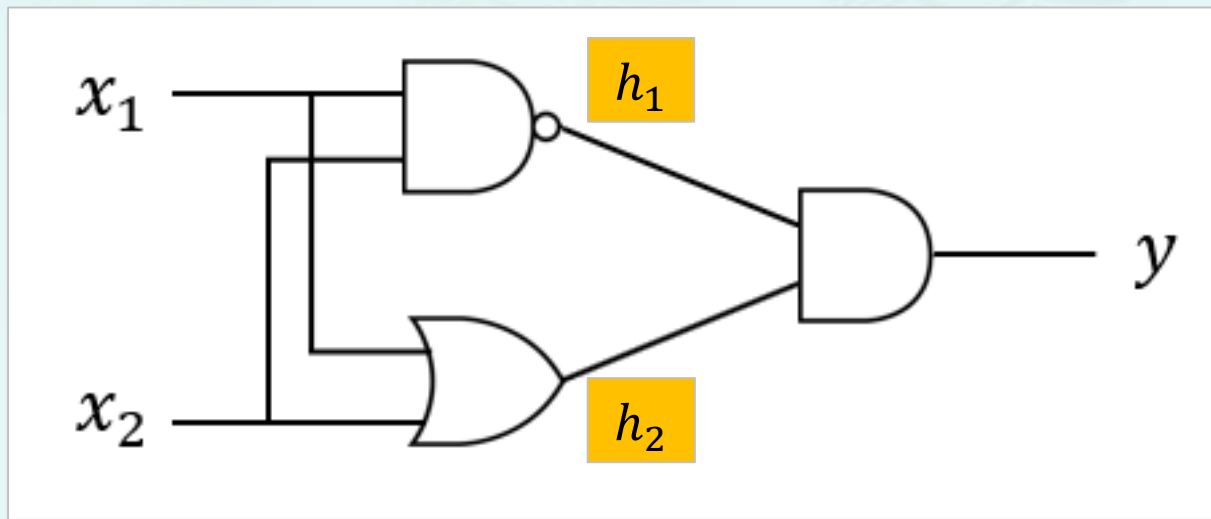
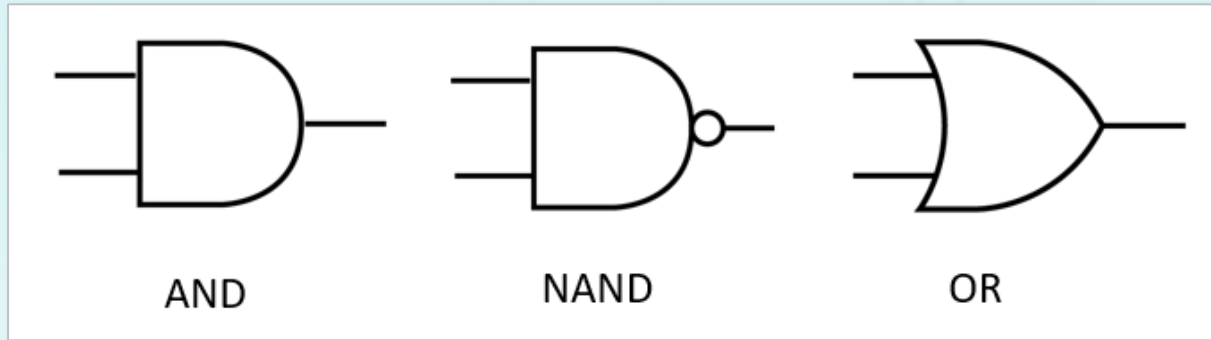
■ XOR



2.다층 퍼셉트론

■ 퍼셉트론 + 퍼셉트론 + ...

■ XOR

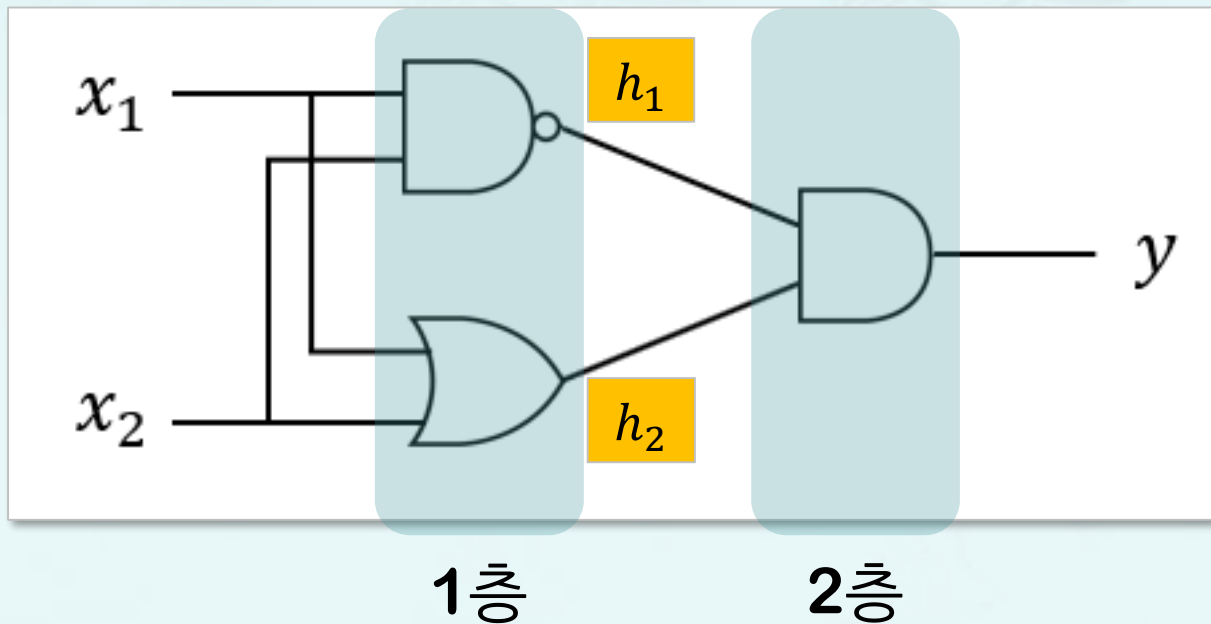
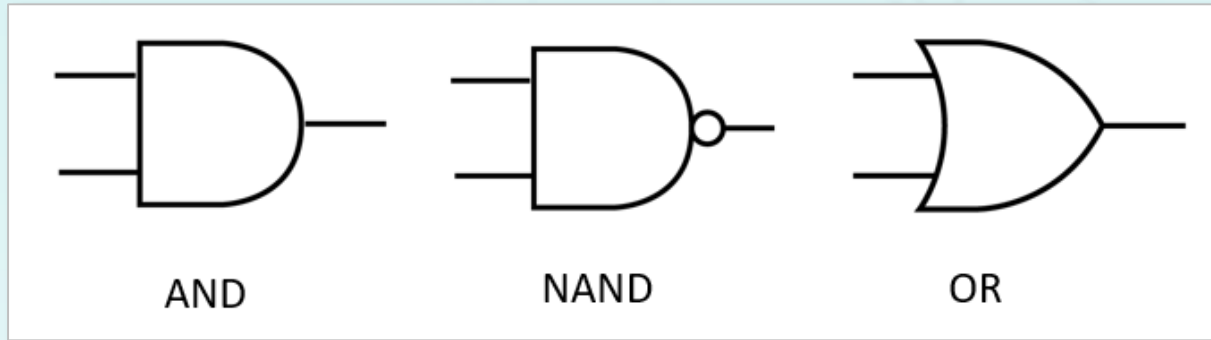


		NAND	OR	XOR
x_1	x_2	h_1	h_2	y
0	0	1	0	0
0	1	1	1	1
1	0	1	1	1
1	1	0	1	0

2.다층 퍼셉트론

■ 퍼셉트론 + 퍼셉트론 + ...

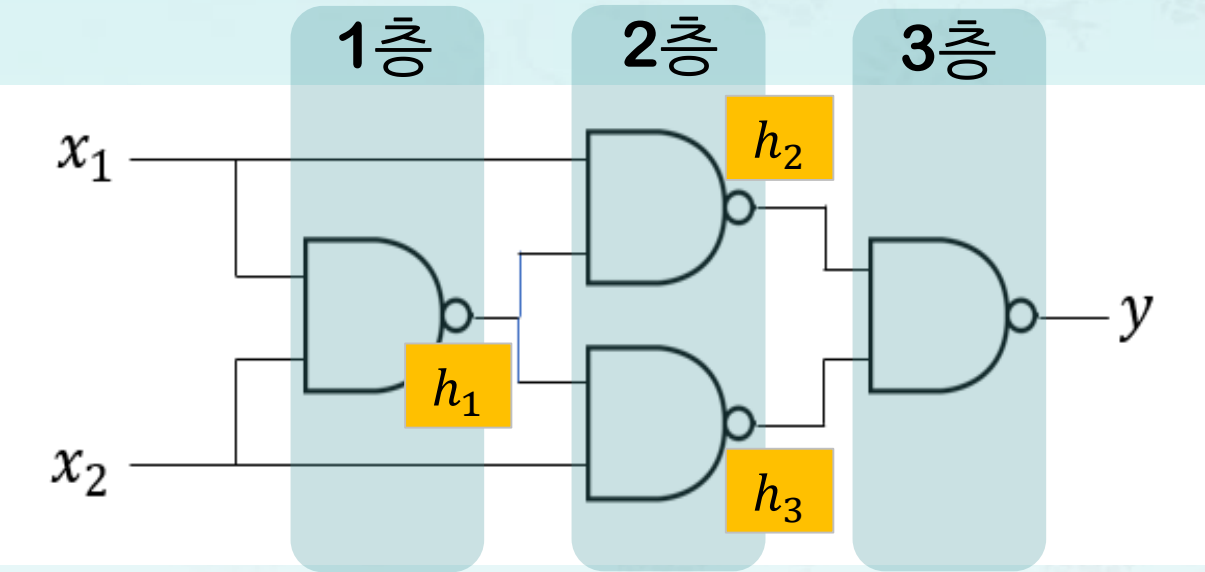
■ XOR



		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

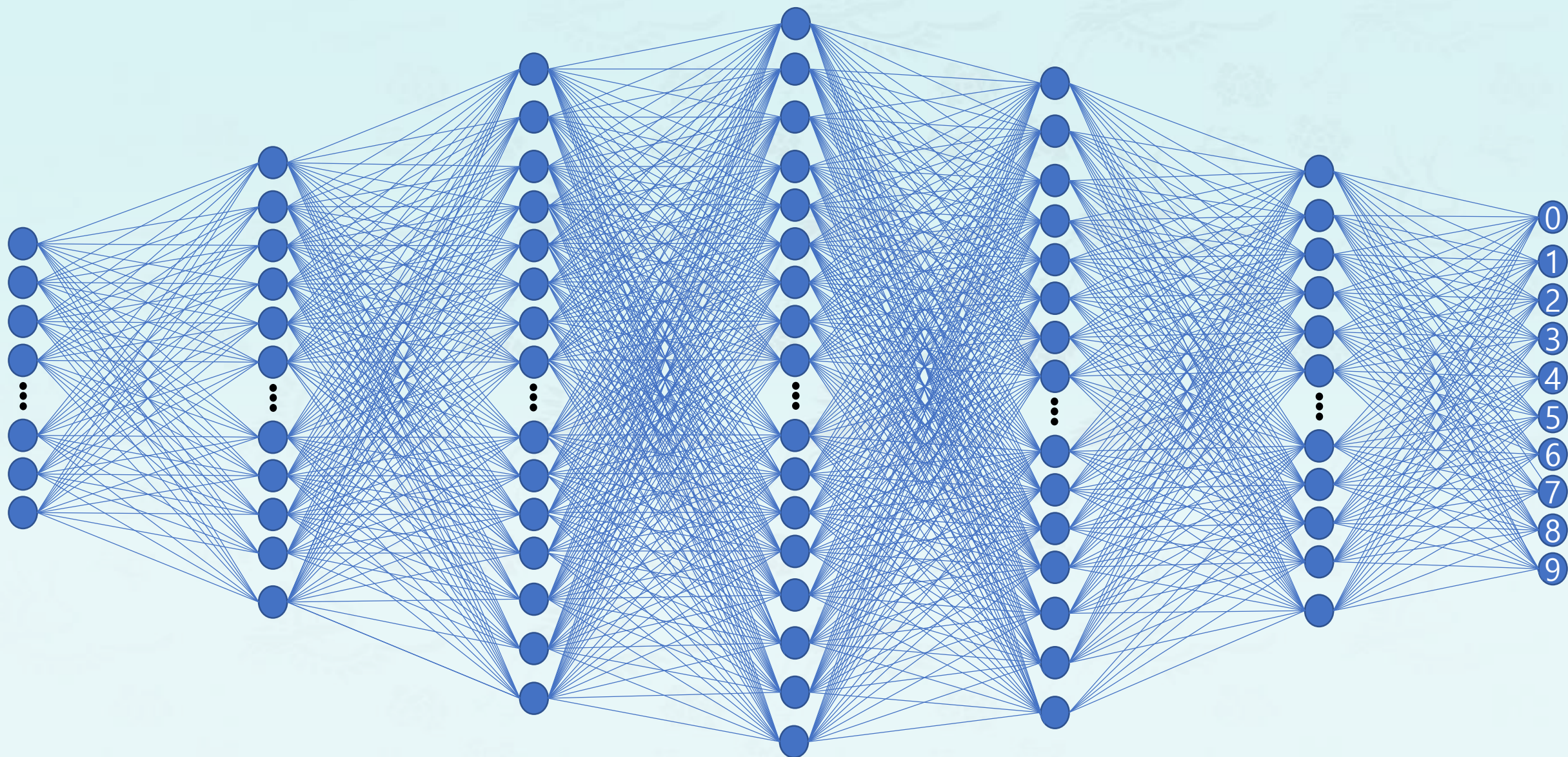
- 퍼셉트론 + 퍼셉트론 + ...



- XOR

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

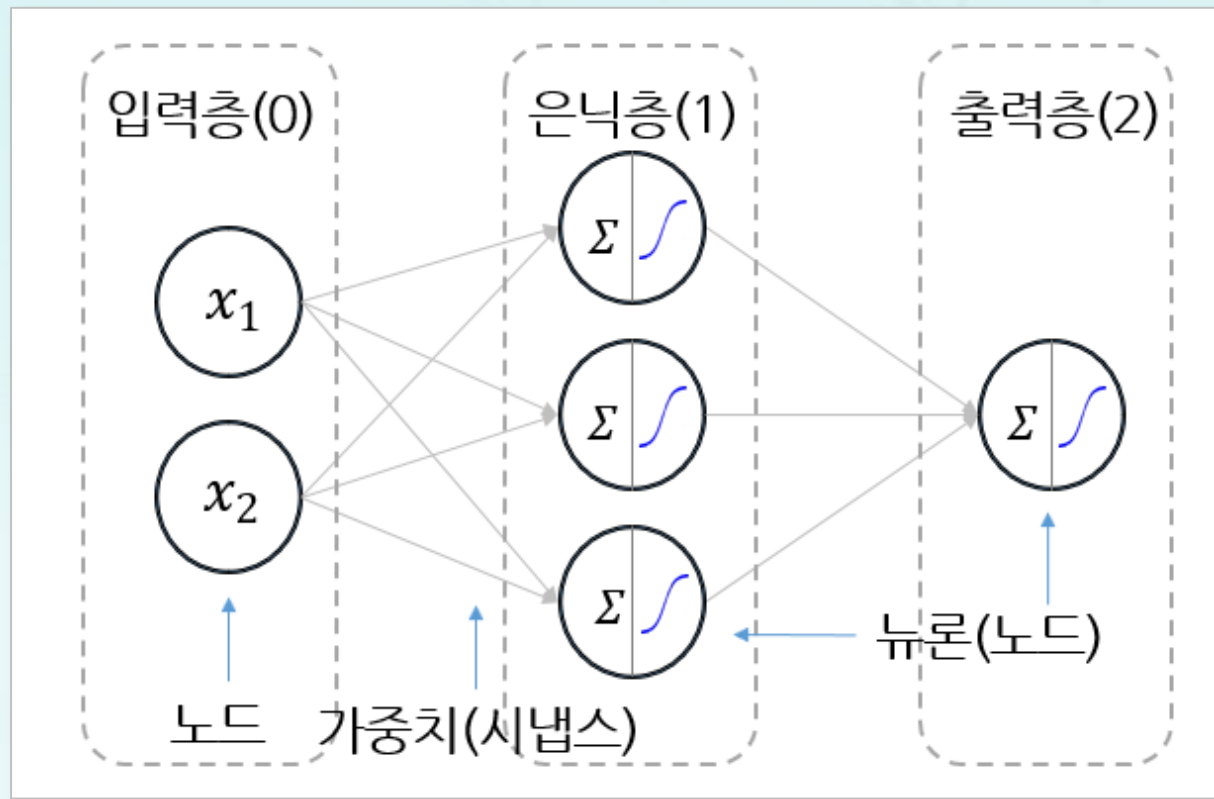


3. 다층 구조 네트워크

- 다층 구조 인공신경망

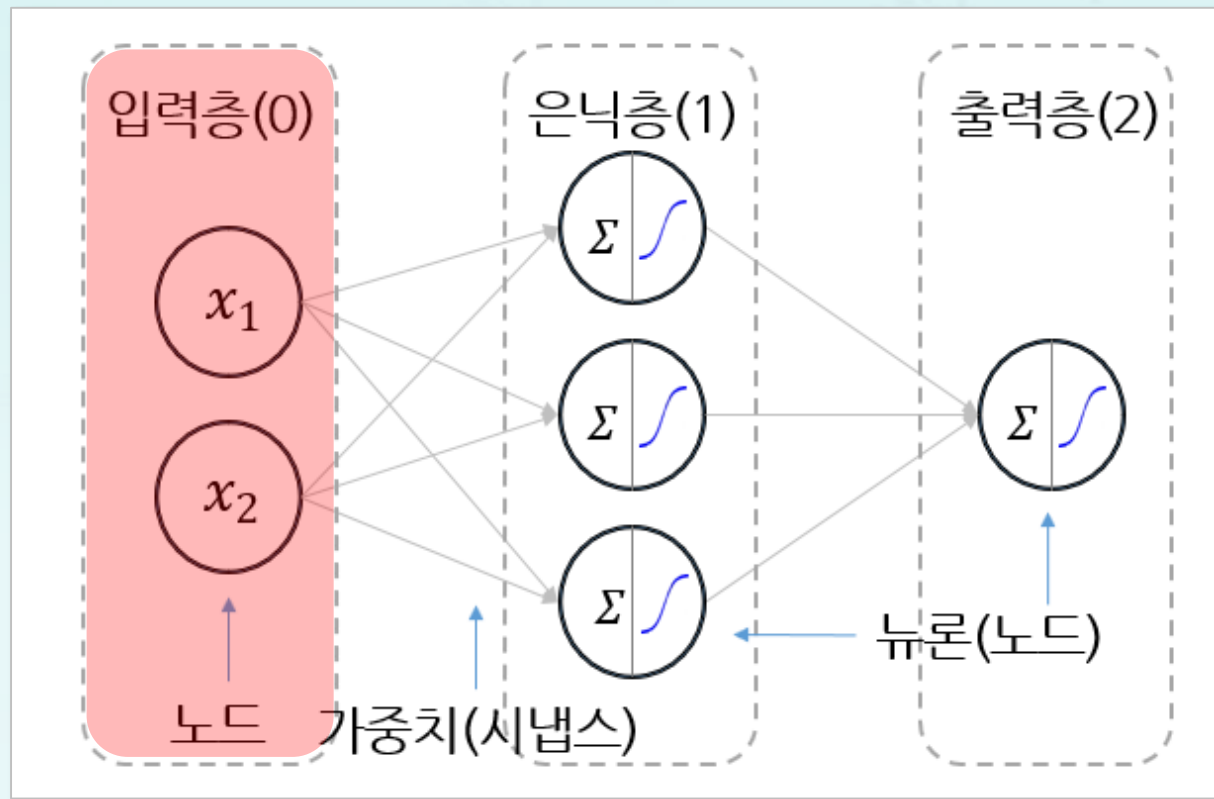
3. 다층 구조 네트워크

- 다층 구조 인공신경망



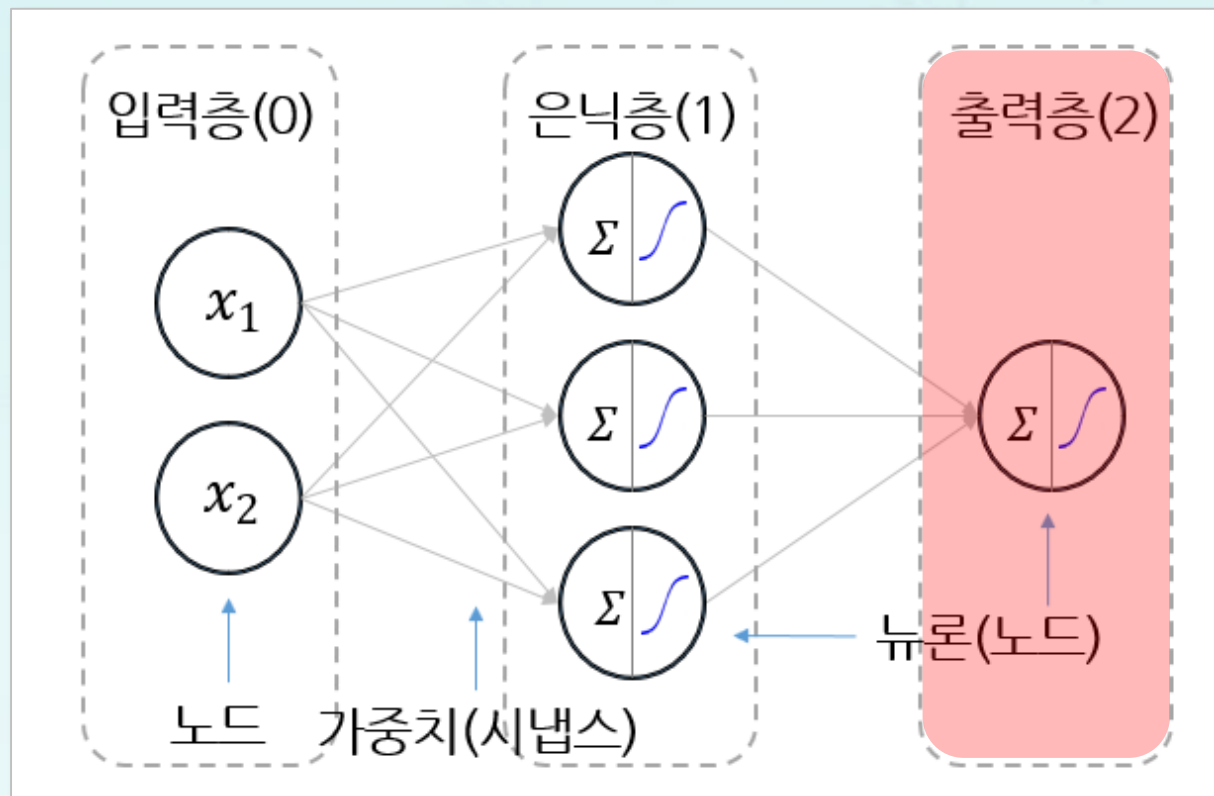
3. 다층 구조 네트워크: 입력층

- 다층 구조 인공신경망



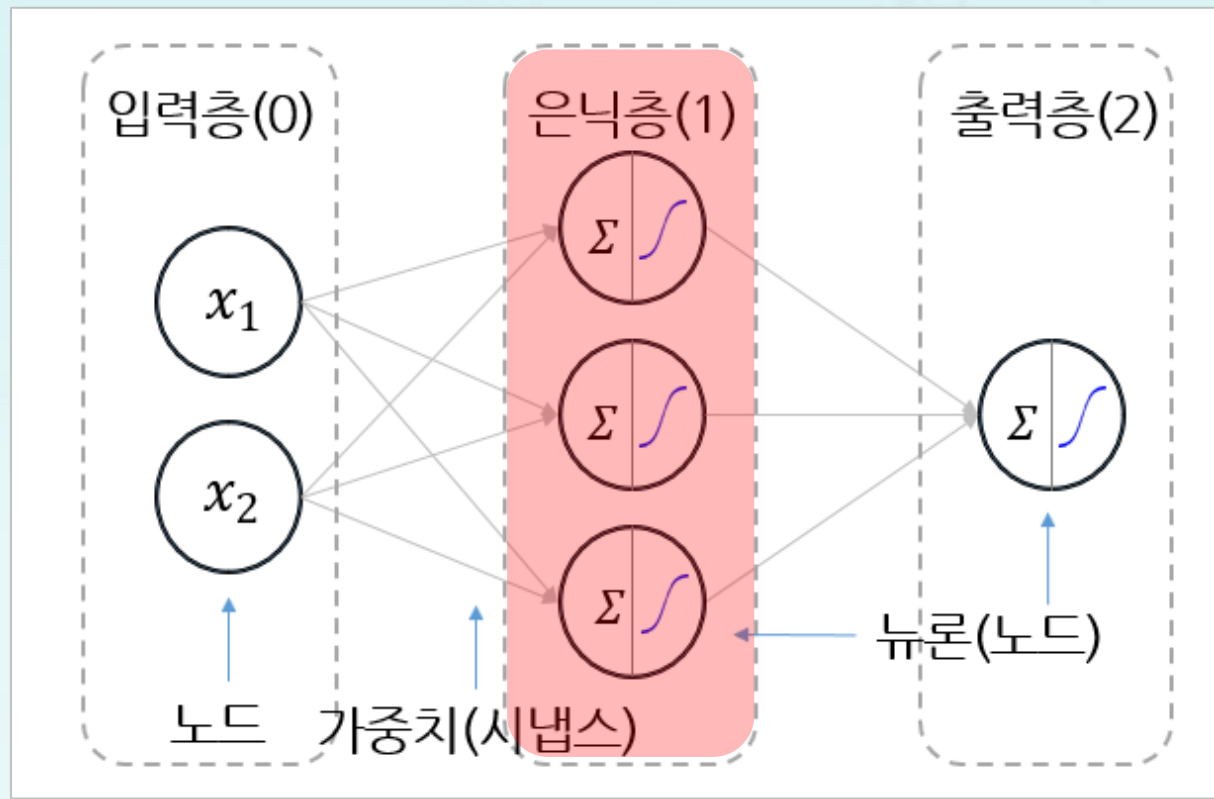
3. 다층 구조 네트워크: 출력층

- 다층 구조 인공신경망



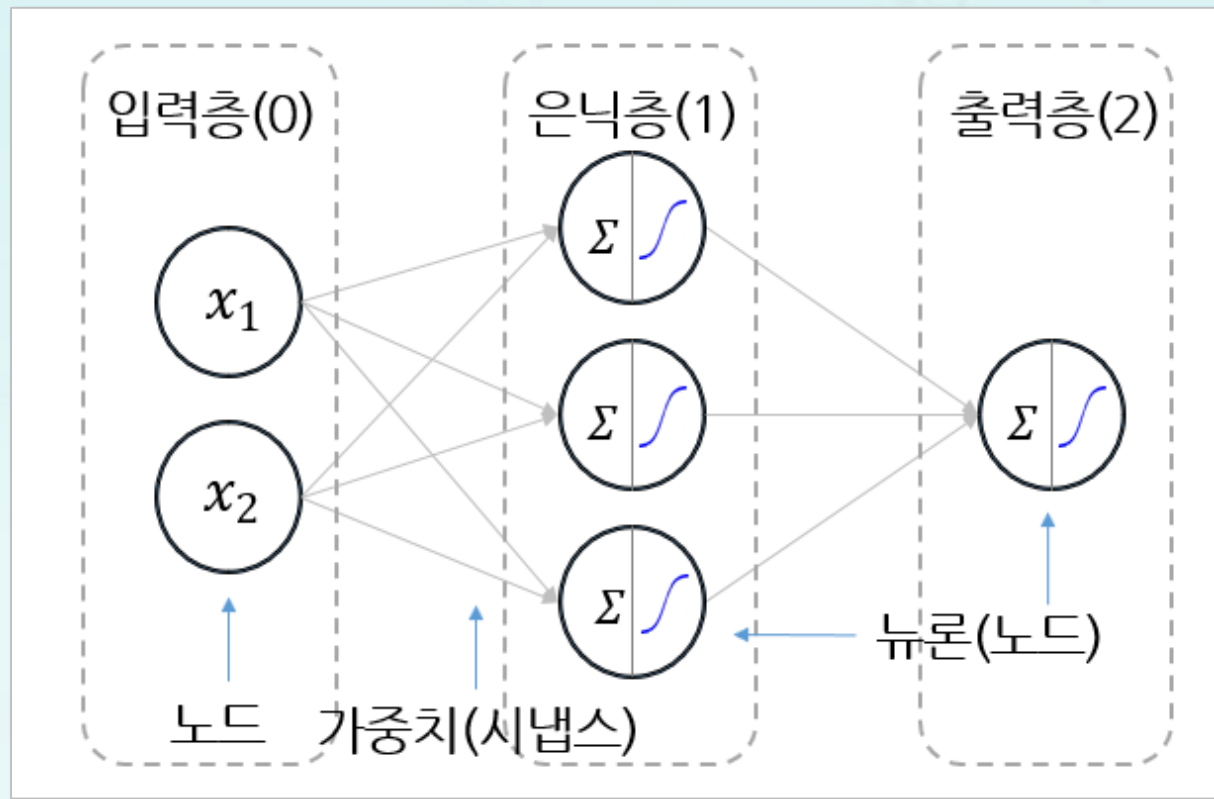
3. 다층 구조 네트워크: 은닉층

- 다층 구조 인공신경망



3. 다층 구조 네트워크: 층수

- 다층 구조 인공신경망

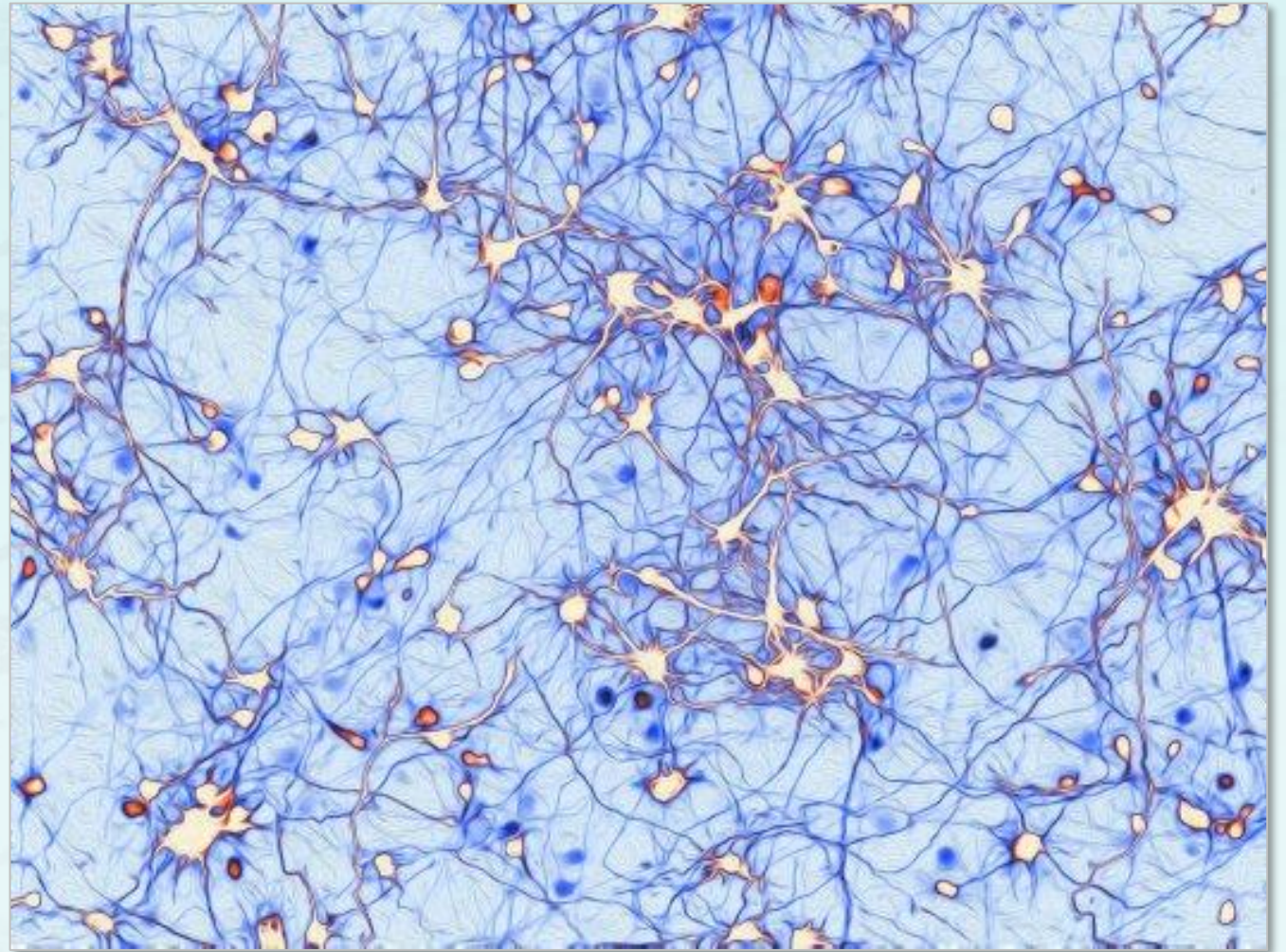


4. 생물학적 뉴론: 복습

- 뉴론

4. 생물학적 뉴론: 복습

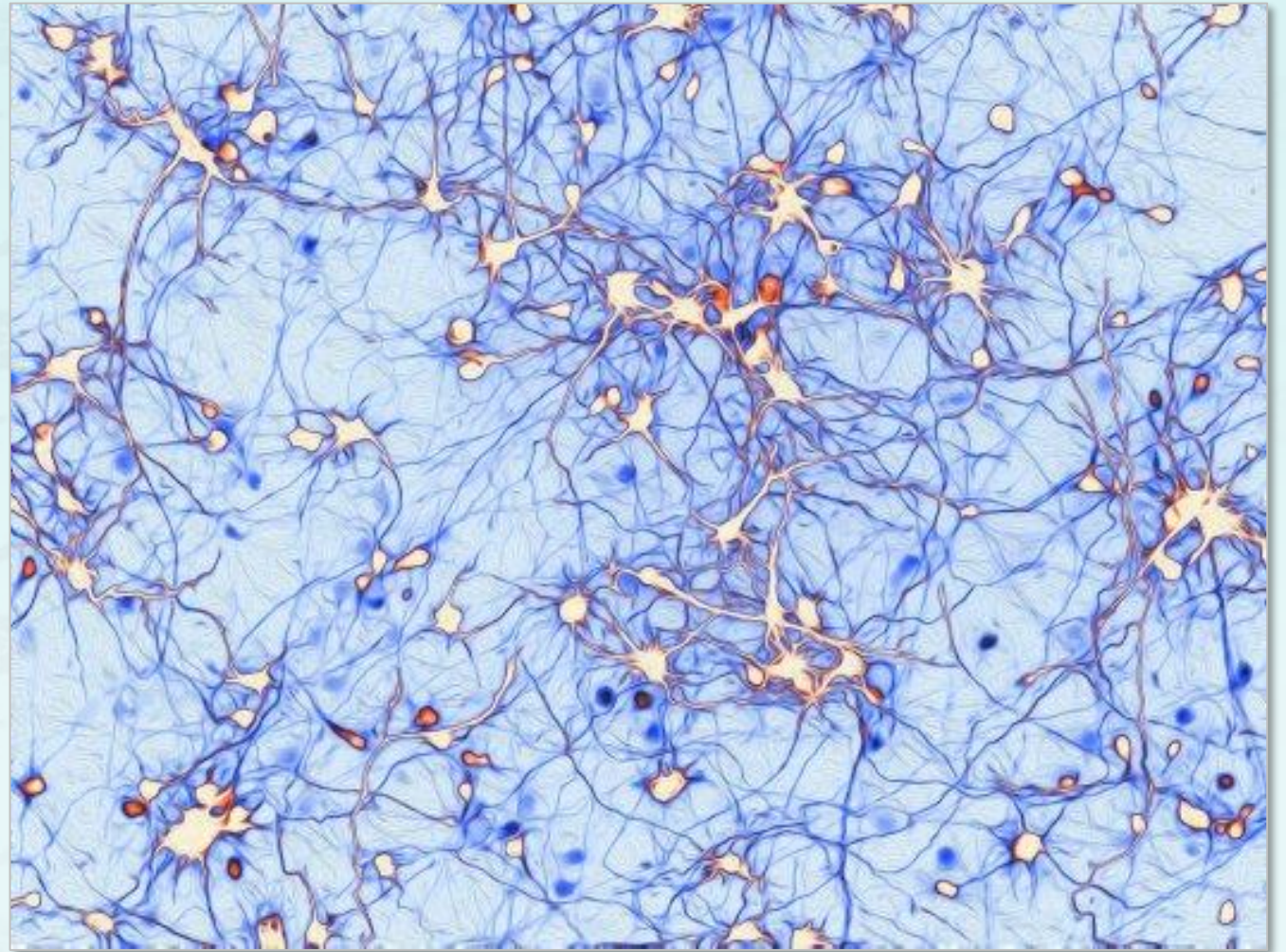
- 뉴론
 - 시냅스(> 임계값)



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4. 생물학적 뉴론: 복습

- 뉴론
 - 시냅스(> 임계값)
 - 출력 = \sum 입력



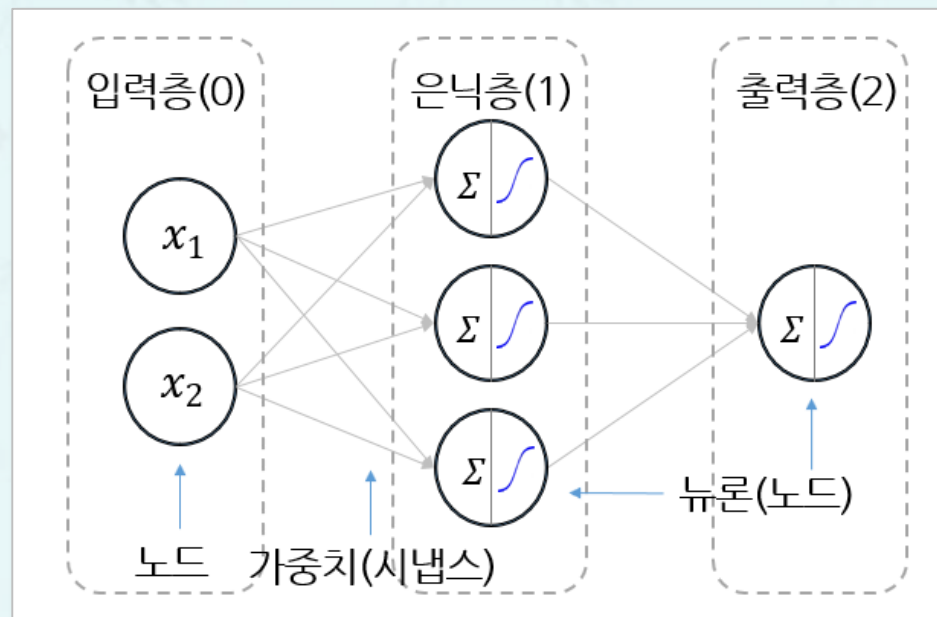
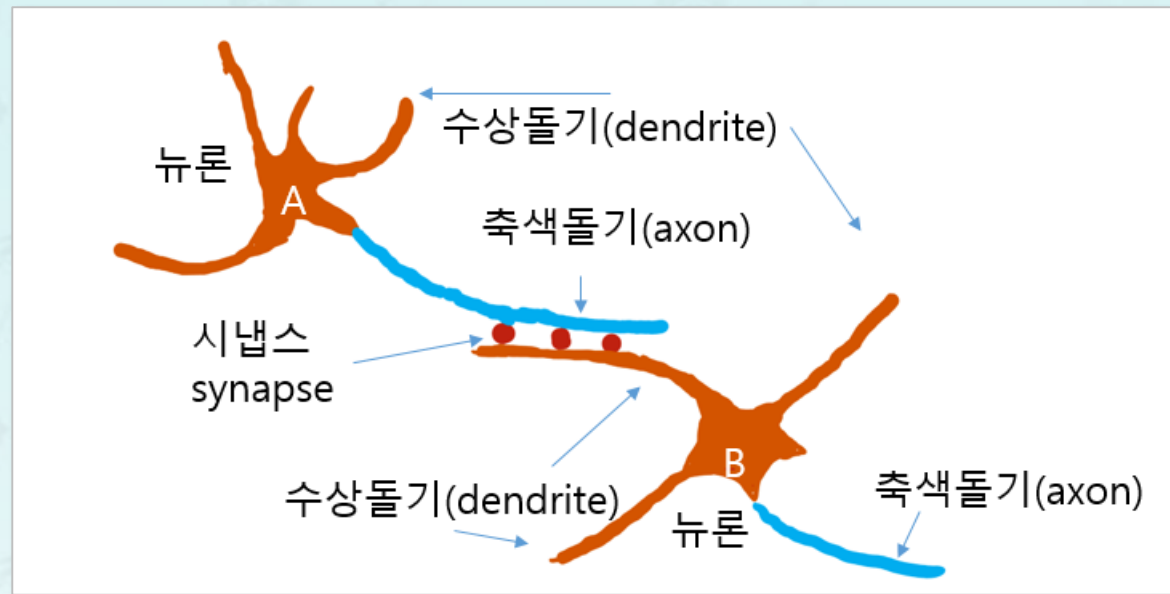
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4. 생물학적 뉴론: 인공신경망과의 비교

■ 뉴론 vs. 퍼셉트론

생물학적 신경망

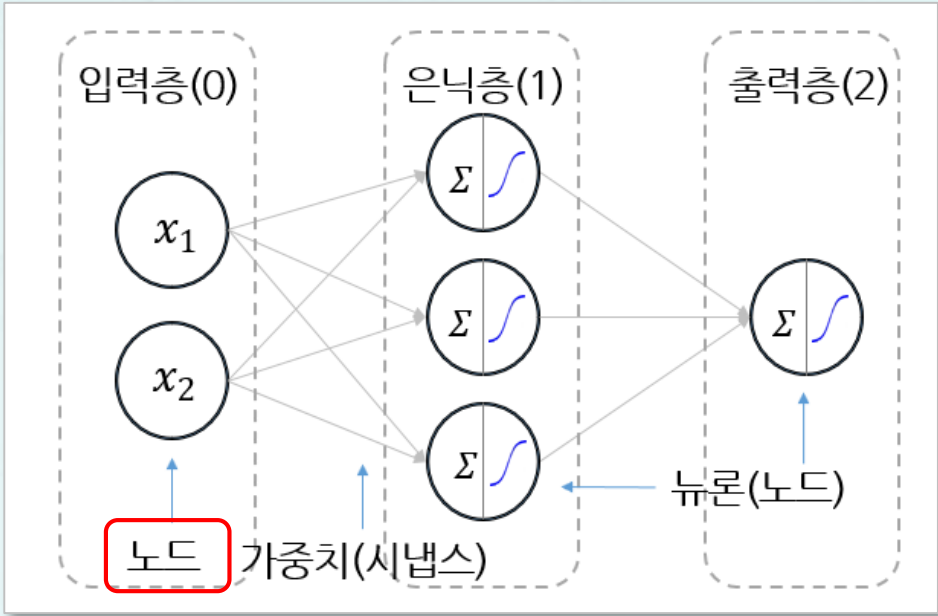
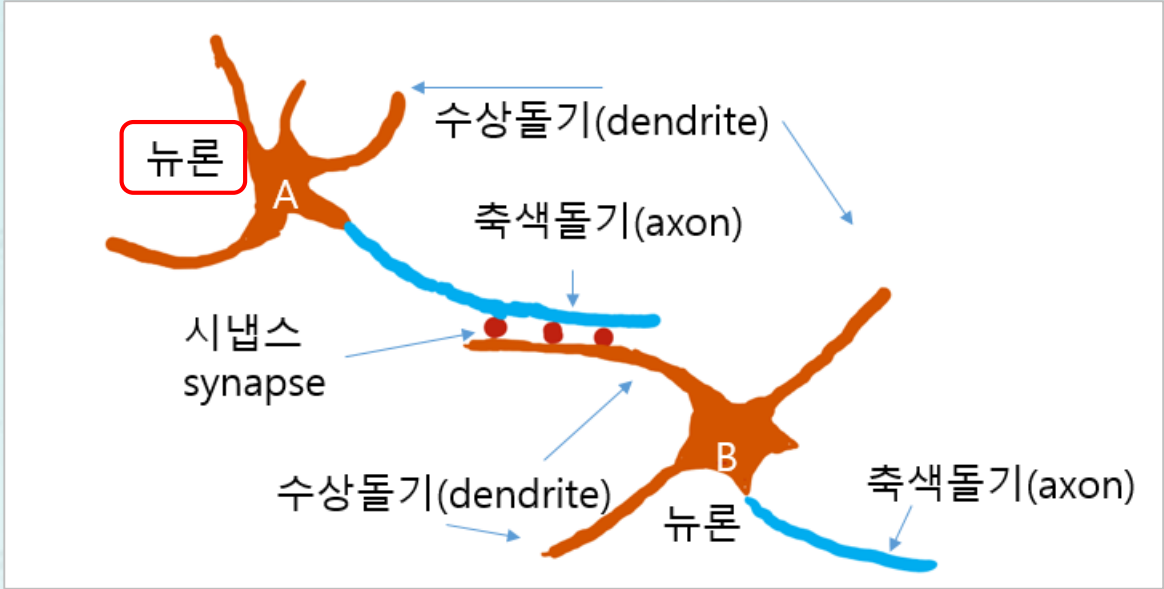
인공 신경망



4. 생물학적 뉴론: 인공신경망과의 비교

■ 뉴론 vs. 퍼셉트론

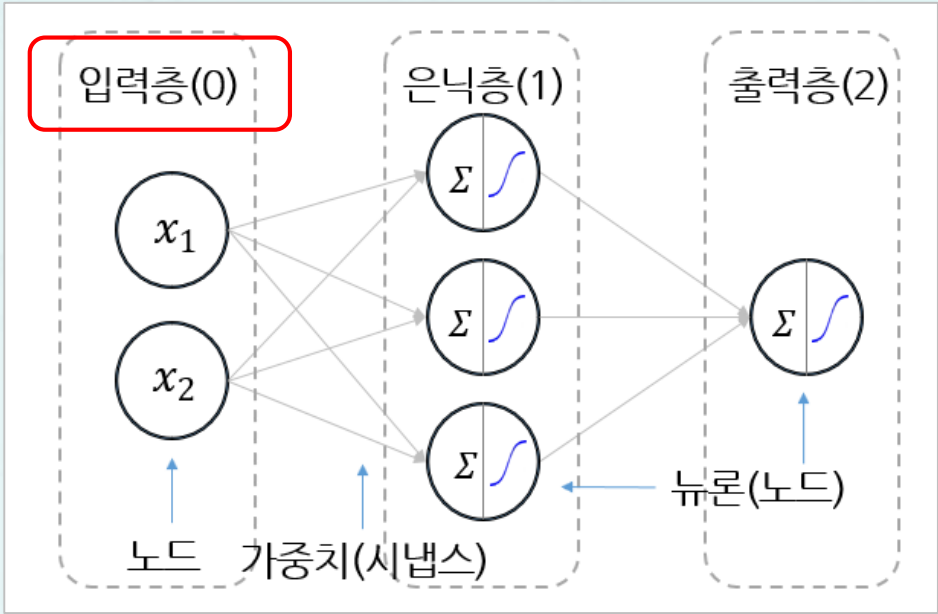
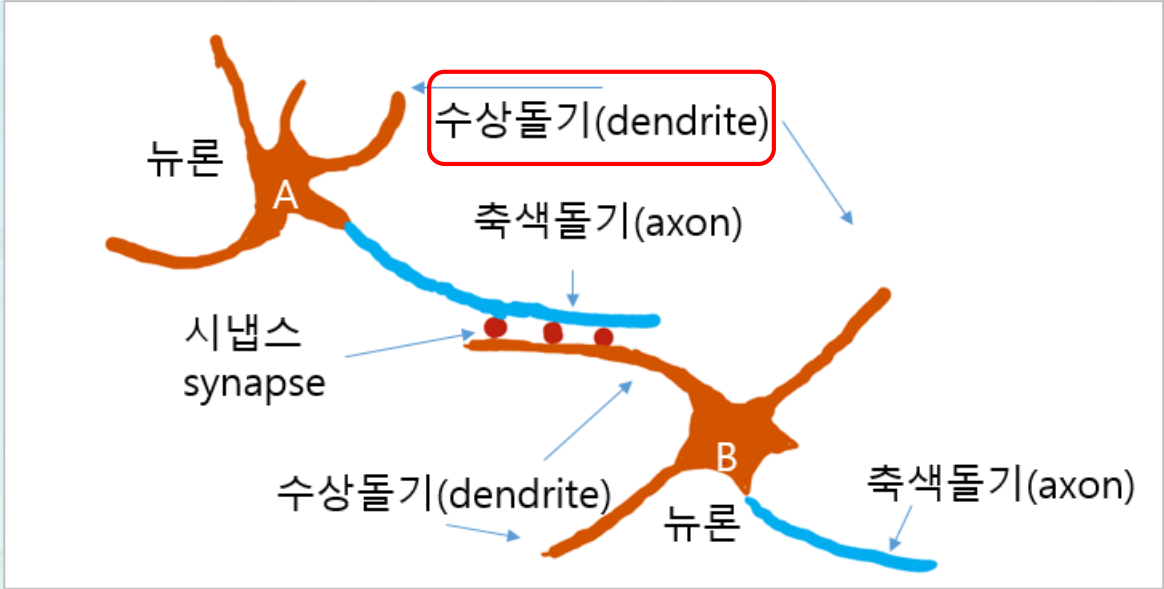
생물학적 신경망	인공 신경망
뉴론(Neuron)	노드(Node)



4. 생물학적 뉴론: 인공신경망과의 비교

■ 뉴론 vs. 퍼셉트론

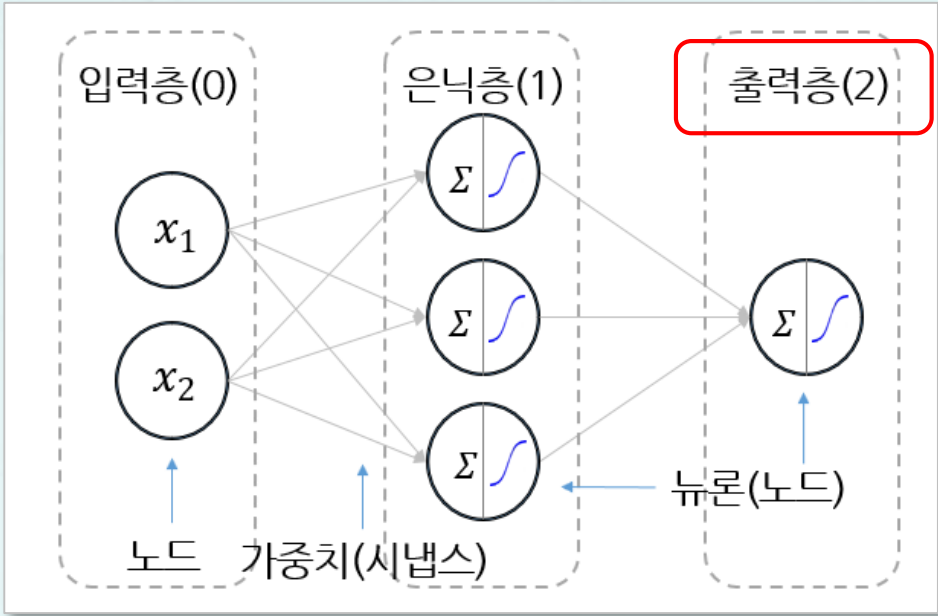
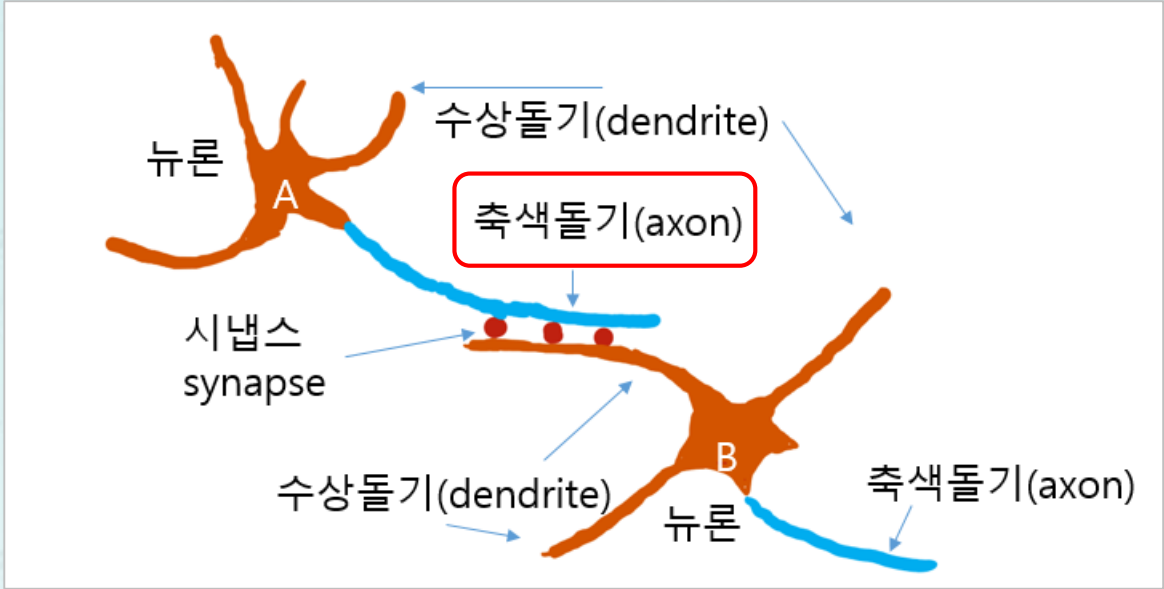
생물학적 신경망	인공 신경망
뉴론(Neuron)	노드(Node)
수상돌기(Dendrite)	입력(Input)



4. 생물학적 뉴론: 인공신경망과의 비교

■ 뉴론 vs. 퍼셉트론

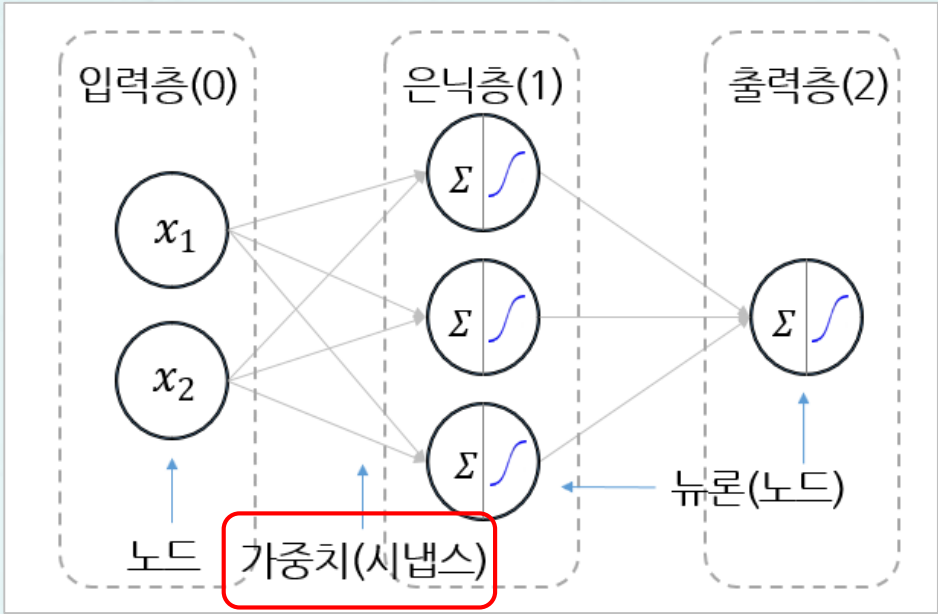
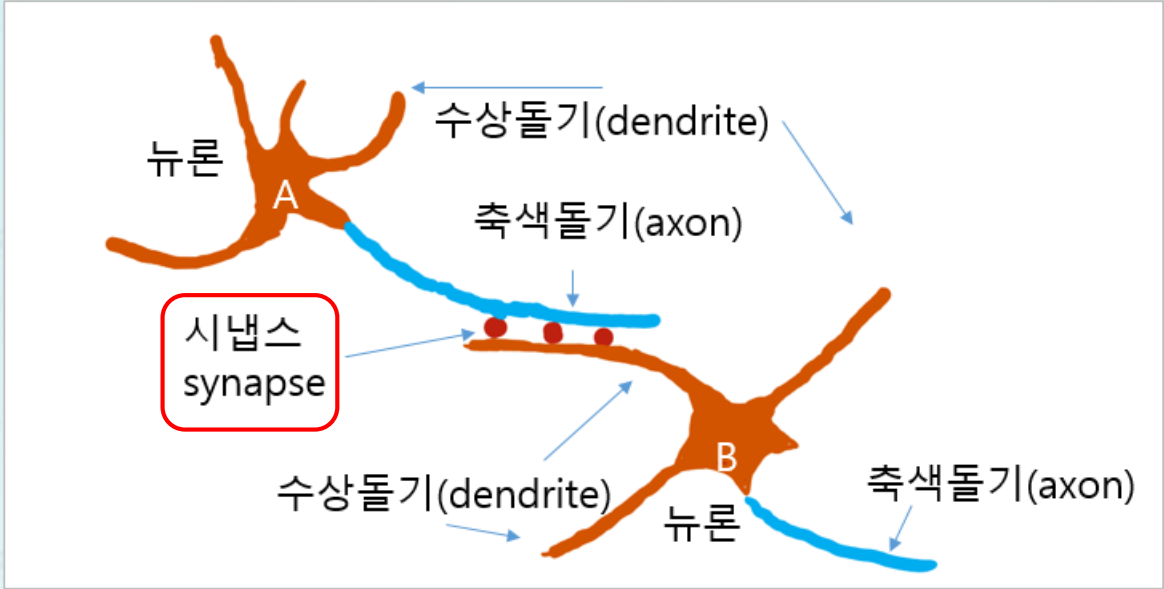
생물학적 신경망	인공 신경망
뉴론(Neuron)	노드(Node)
수상돌기(Dendrite)	입력(Input)
축색돌기(Axon)	출력(Output)



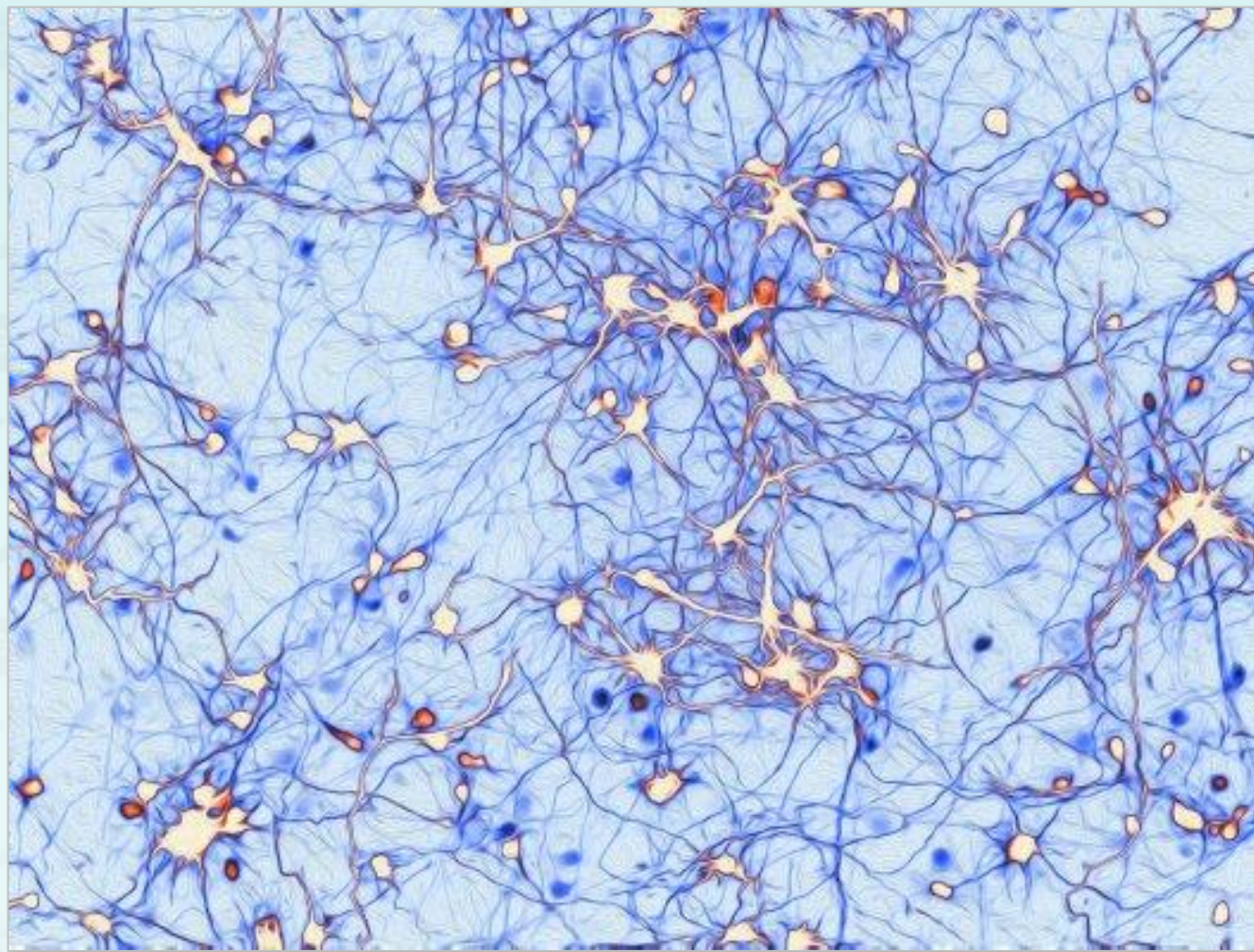
4. 생물학적 뉴론: 인공신경망과의 비교

■ 뉴론 vs. 퍼셉트론

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



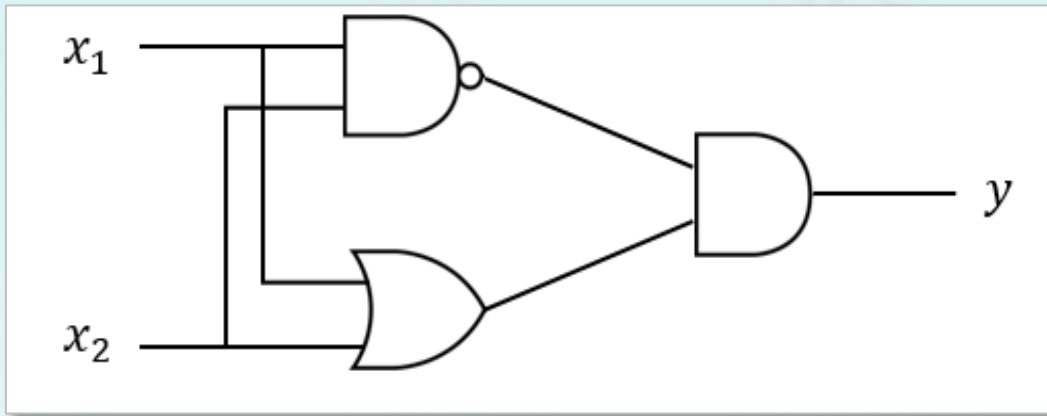
4. 생물학적 뉴론: 인공신경망과의 비교



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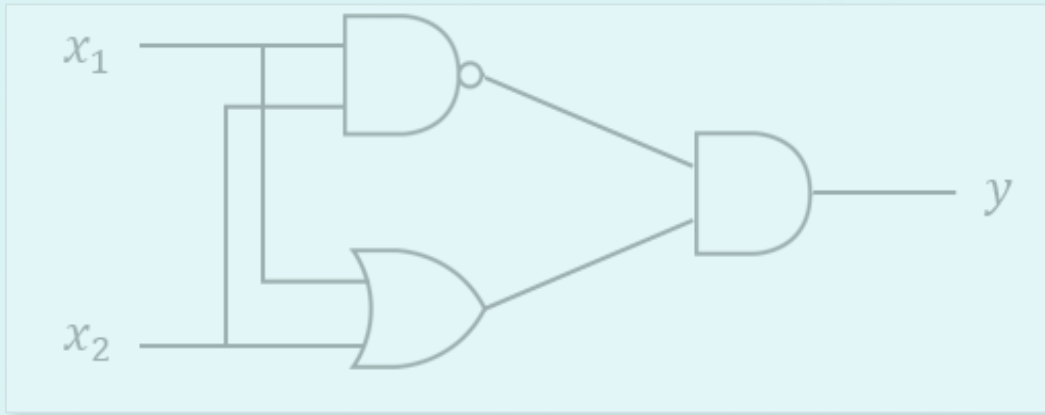
5. 다층 퍼셉트론 활용

- AND + NAND + OR

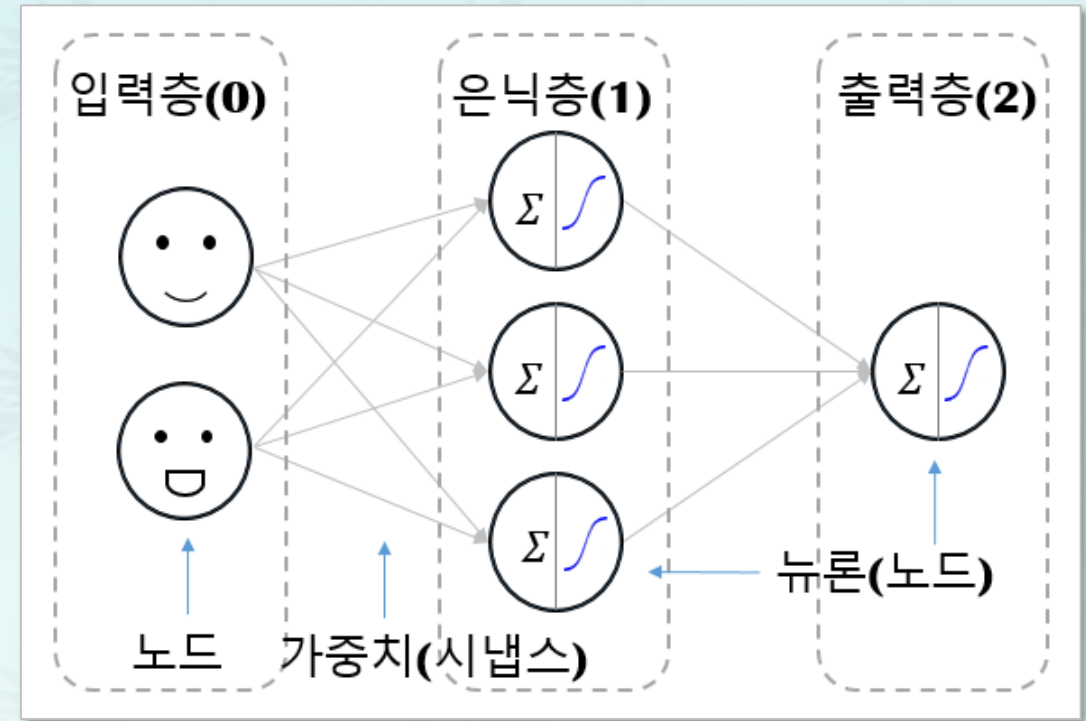


5. 다층 퍼셉트론 활용

- AND + NAND + OR



- 신경망 학습



5. 다층 퍼셉트론 활용

Chinese man caught by facial recognition at pop concert

13 April 2018

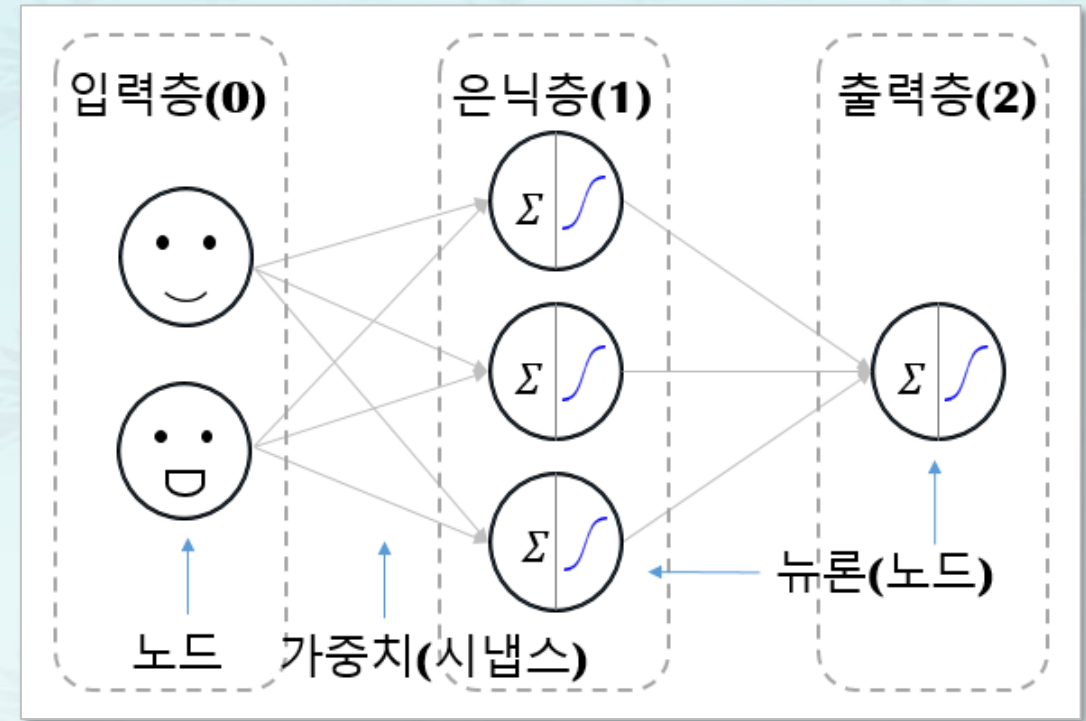
f     Share



GETTY IMAGES

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

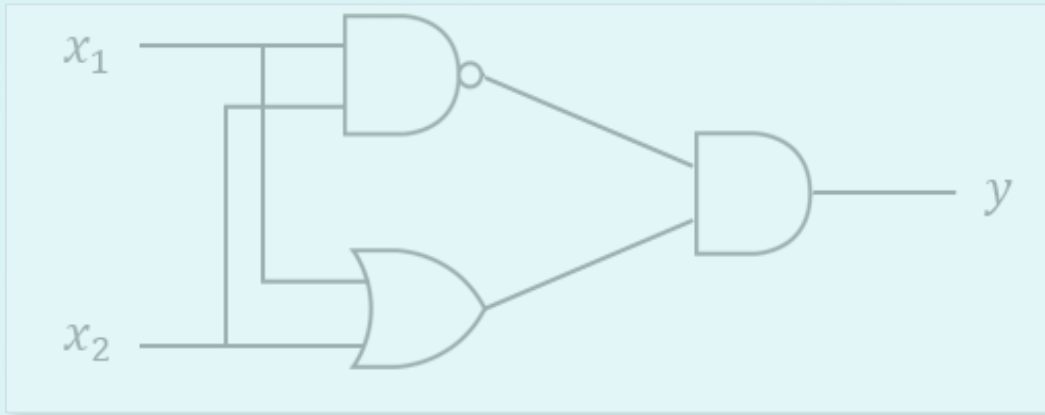
■ 신경망 학습



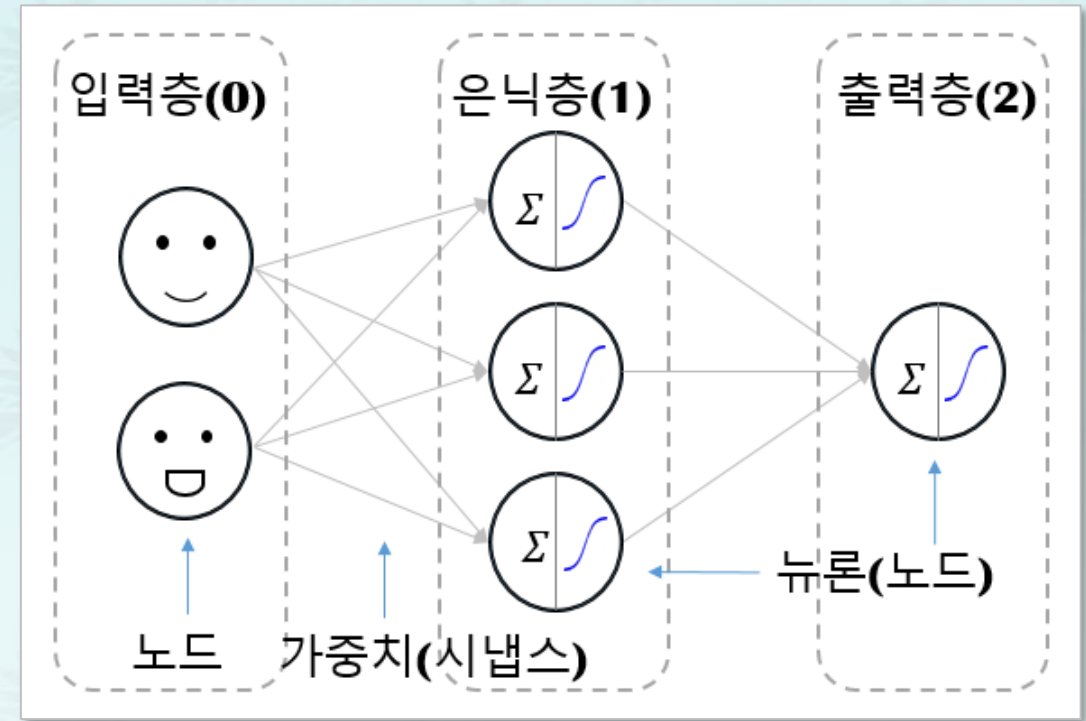
출처: BBC 뉴스, www.bbc.com, 2018.4

5. 다층 퍼셉트론 활용

- AND + NAND + OR



- 신경망 학습



다층 퍼셉트론

- 학습 정리
 - 단순 퍼셉트론의 한계를 파악하고,
 - 다층 퍼셉트론의 구조와 학습방법을 이해하기
 - 생물학적 뉴런의 구조와 인공신경망을 비교하기
- 차시 예고
 - **7-1** 순방향 신경망

6주차(3/3)

다층 퍼셉트론

파이썬으로 배우는 기계학습

한동대학교
김영섭 교수

여러분 곁에 항상 열려 있는 K-MOOC 강의실에서 만나 뵙기를 바랍니다.