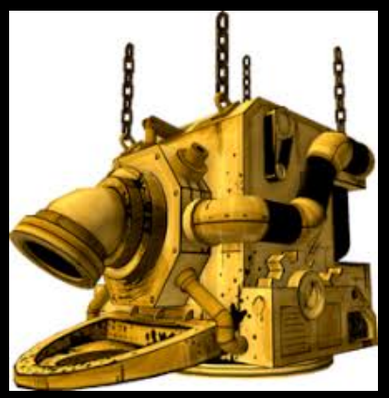
GDG for ML Newcastle

25th Oct. OPEN LAB

What is expected?

- Basic theory of machine learning
- Simple code implementation
- Small tricks in training a model



Machine learning is easy and funny.

Machine learning is the science of getting computers to act without being explicitly programmed.

— Stanford

Machine learning is the science of getting computers to act without being explicitly programmed. But instead letting them learn a few tricks on their own.

— Stanford, Max-Planck Institute.

Machine learning is the science of getting computers to act without being explicitly programmed. But instead letting them learn a few tricks on their own.

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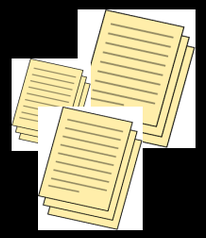
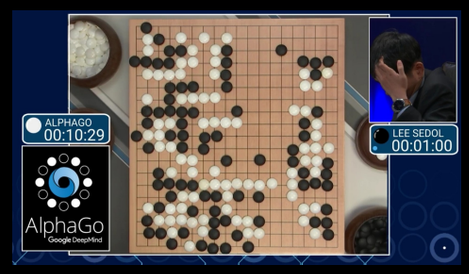
Observations



Model

Outcomes

Dog/Cat



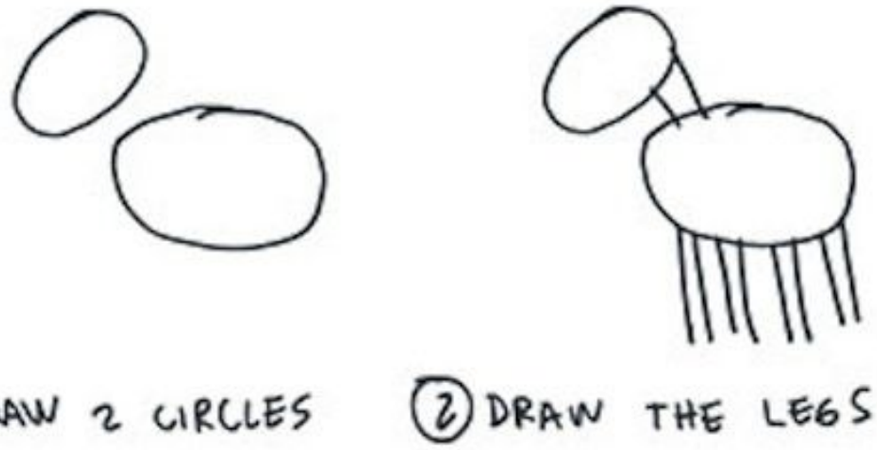
https://developers.google.com/machine-learning/crash-course/

Build a Model

- Representation
  - LBP, SIFT.
- Modelling
  - Classification: Cross entropy
- Optimisation
  - Gradient Decent, Expectation Maximisation

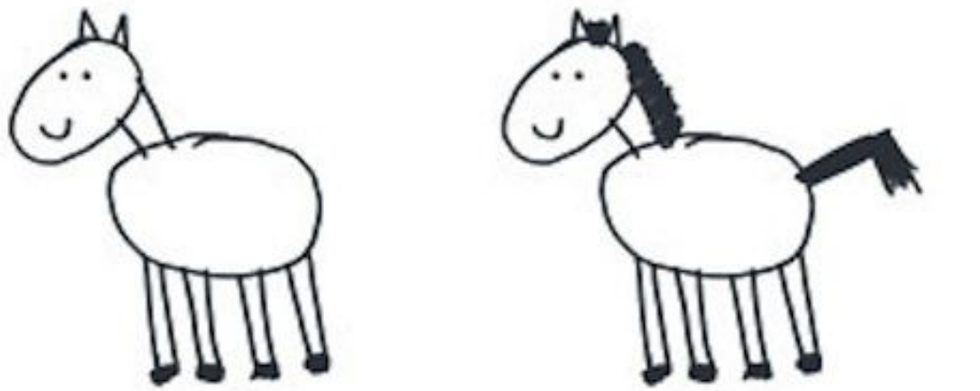
HOW TO:
DRAW A HORSE

BY VAN OKTOP



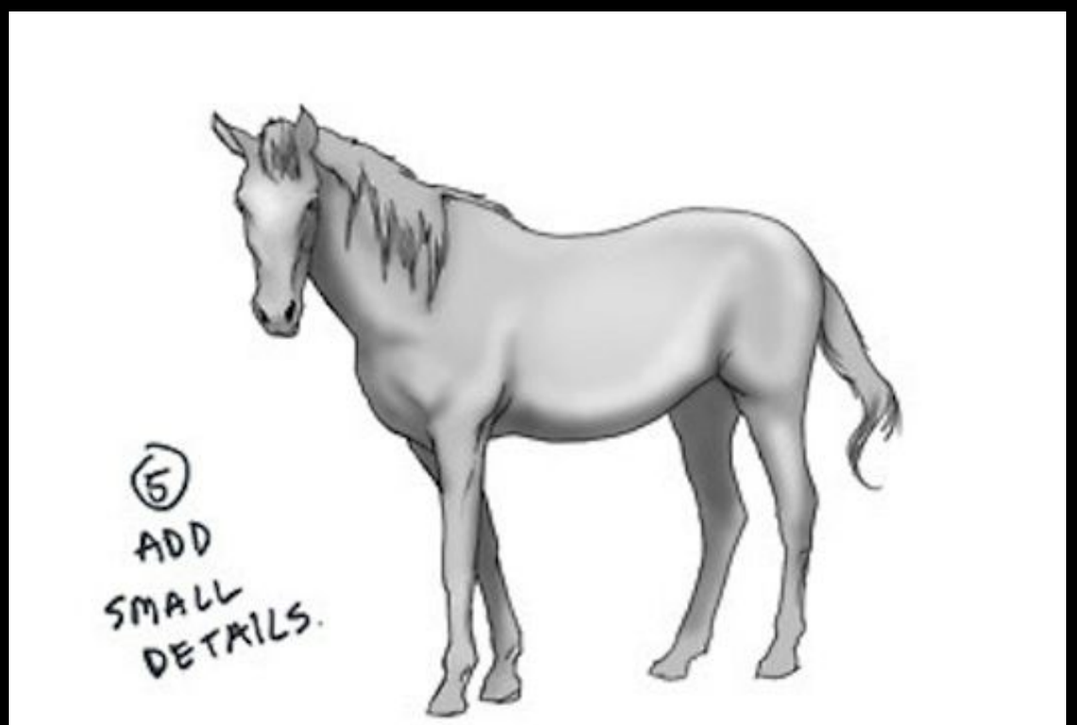
① DRAW 2 CIRCLES

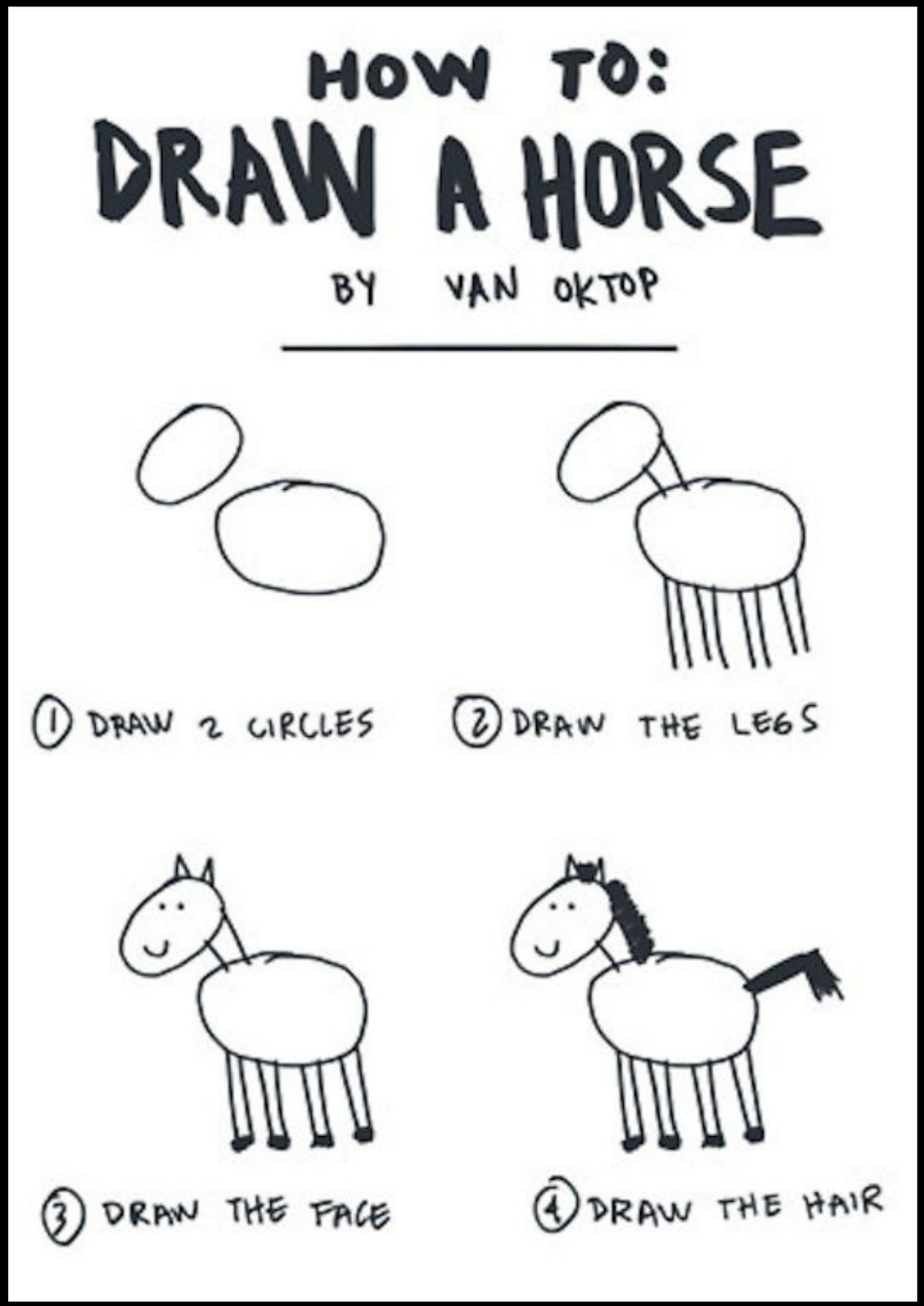
② DRAW THE LEGS

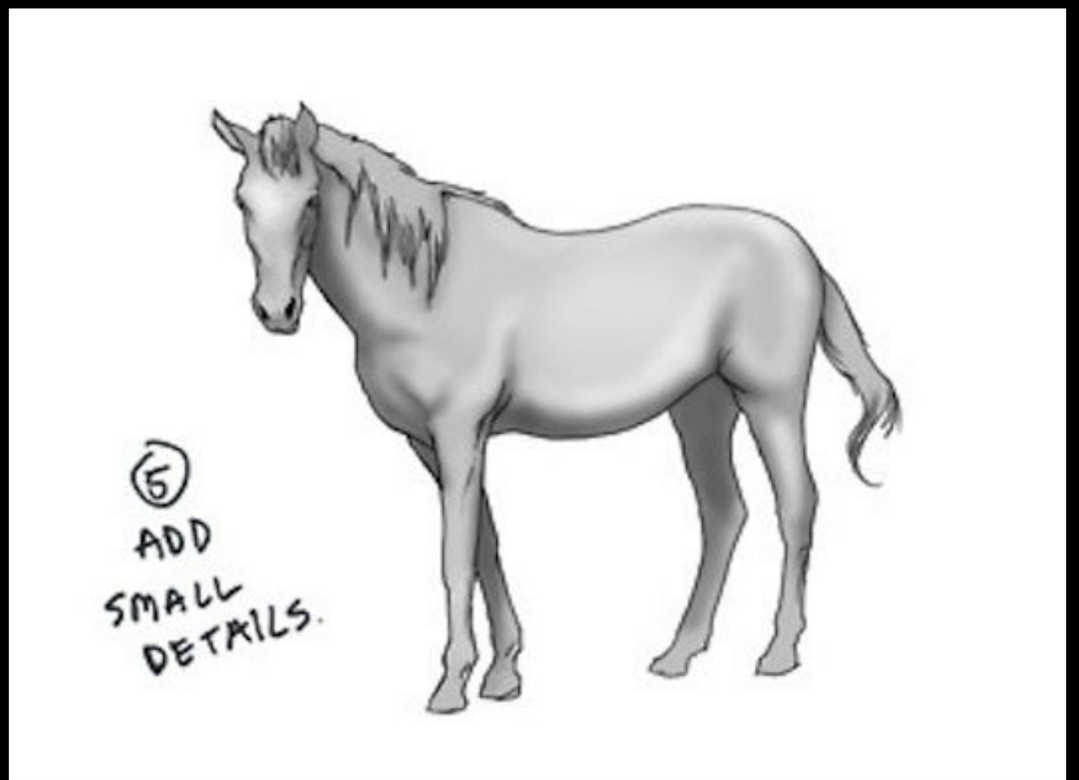


③ DRAW THE FACE

④ DRAW THE HAIR




HOW TO:
DRAW A HORSE
BY VAN OKTOP
① DRAW 2 CIRCLES
② DRAW THE LEGS
③ DRAW THE FACE
④ DRAW THE HAIR


⑤
ADD
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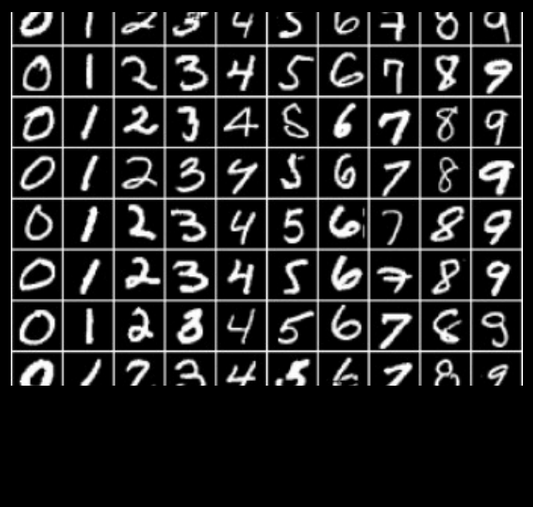

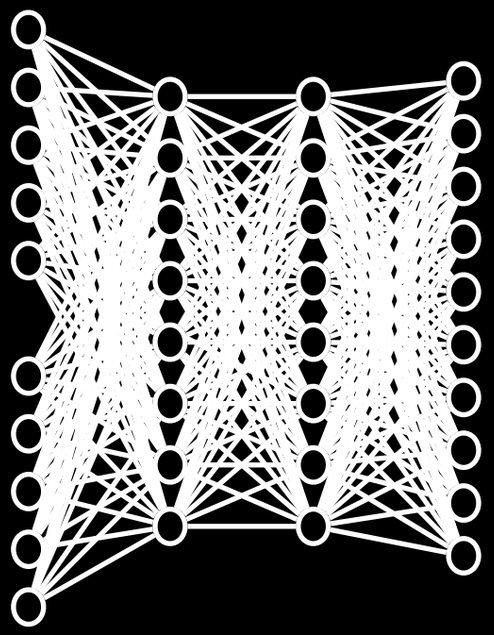

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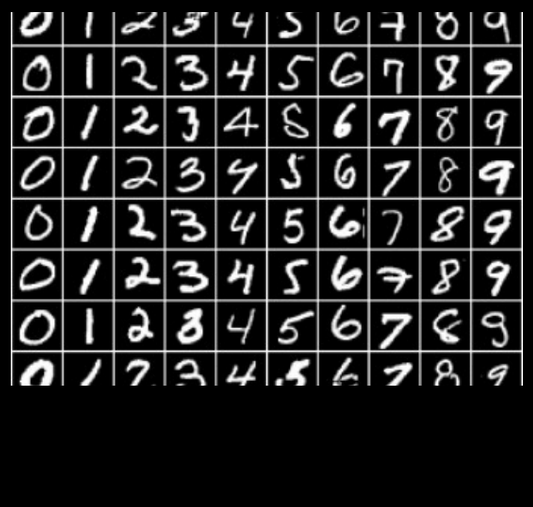

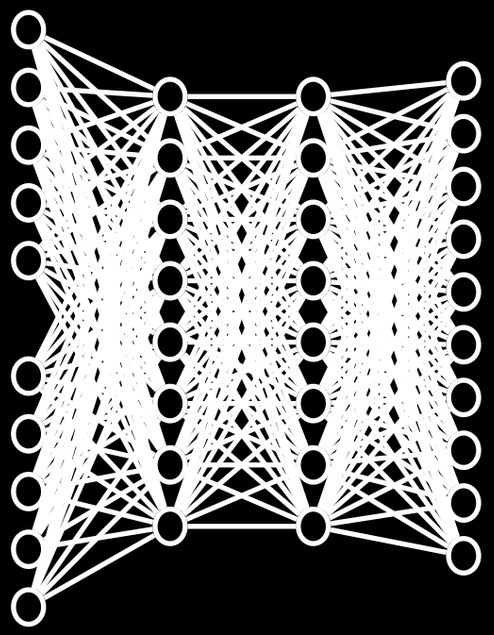

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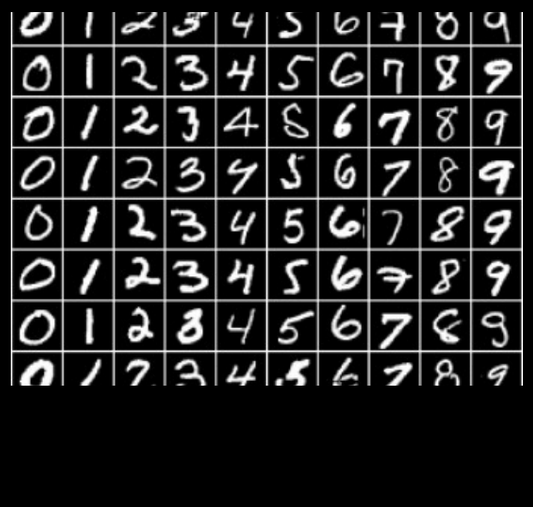

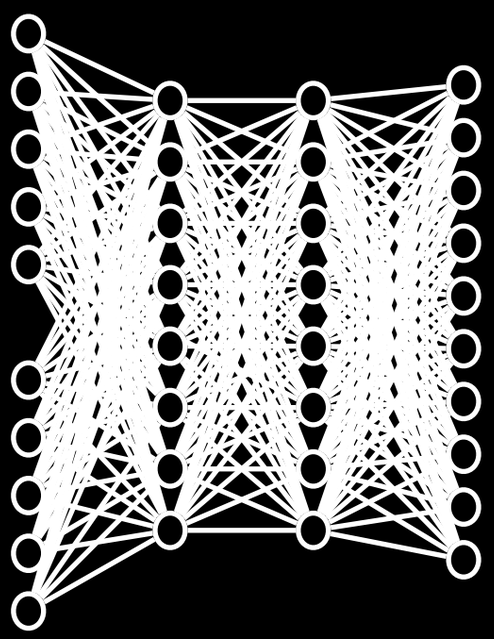

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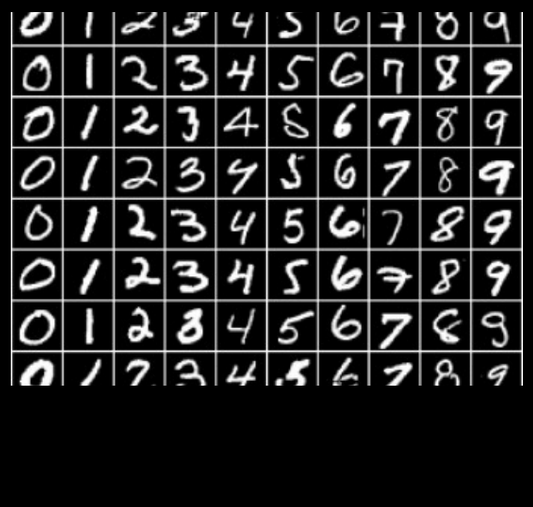

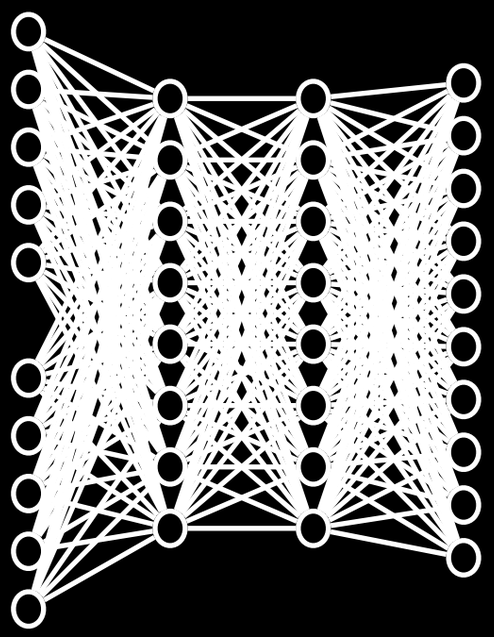

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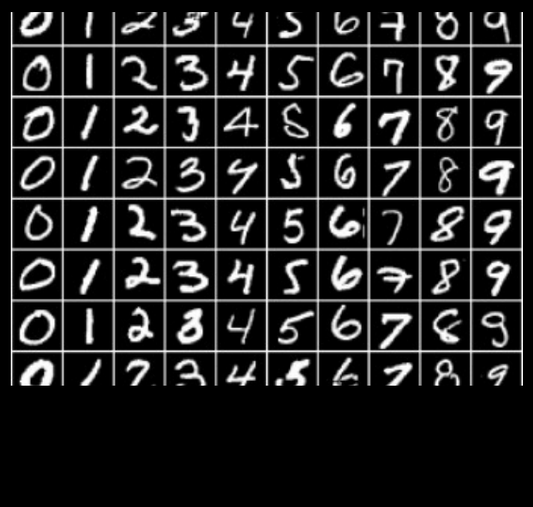

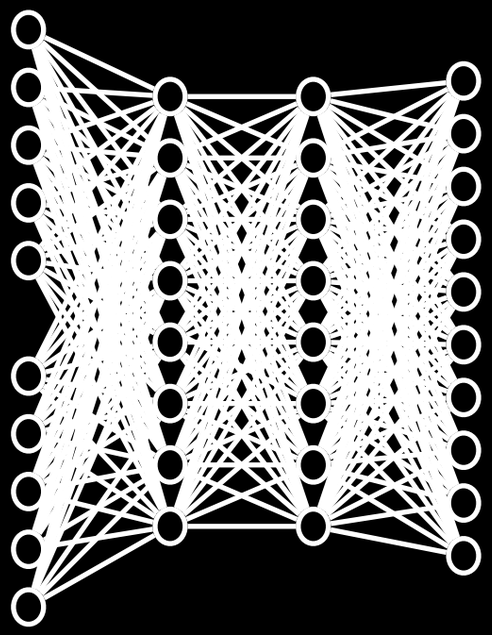

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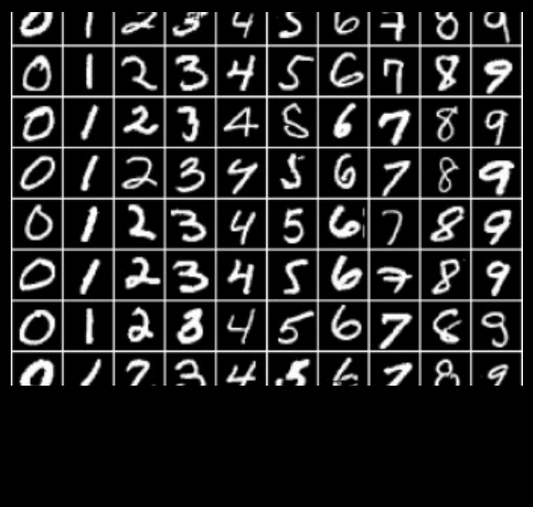

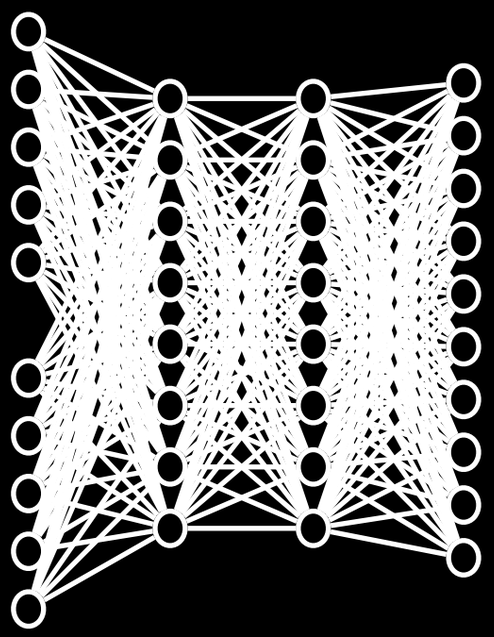

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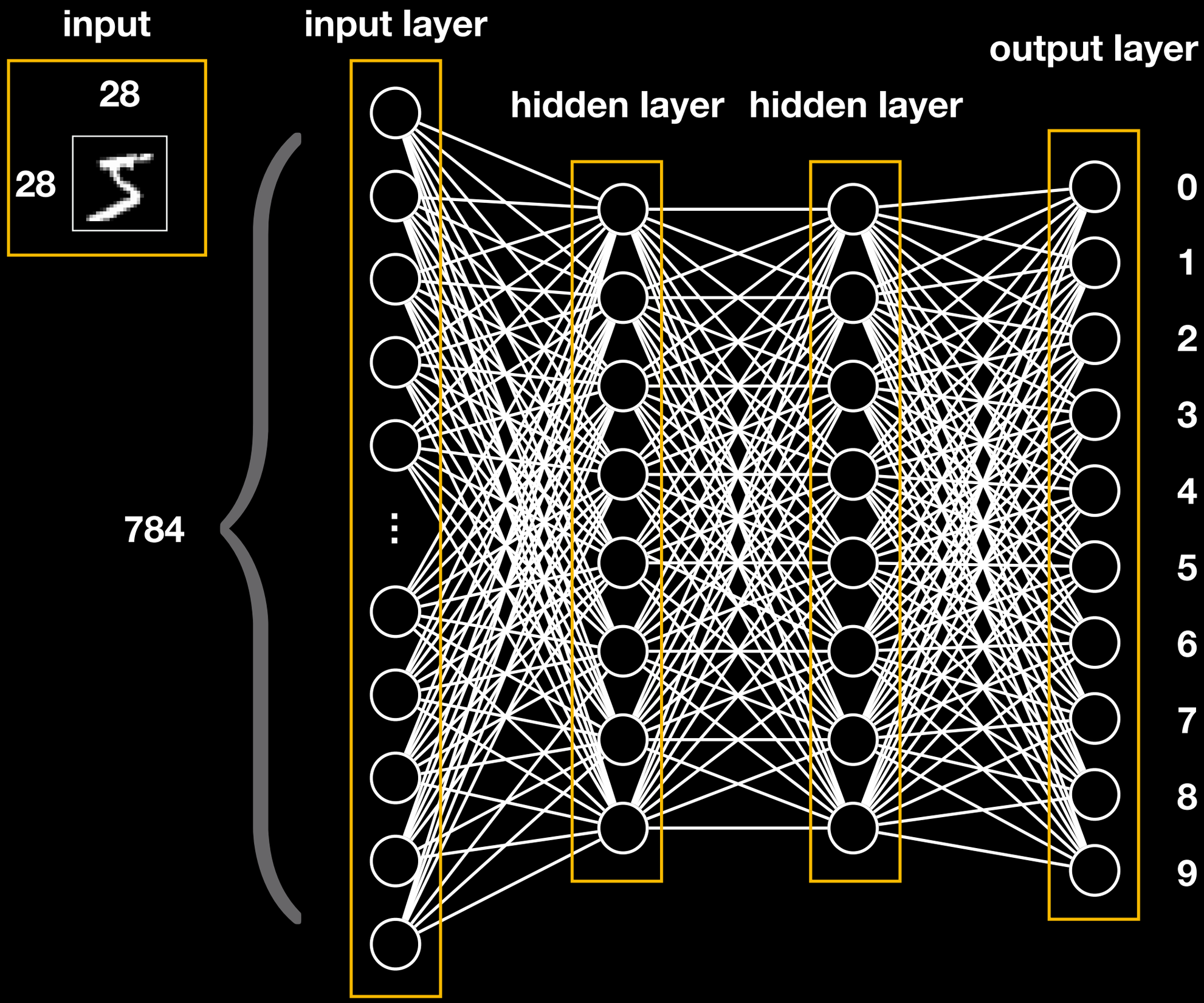
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Neurons: Placeholders that take the input.
Connections: Parameters/Weights of the network.

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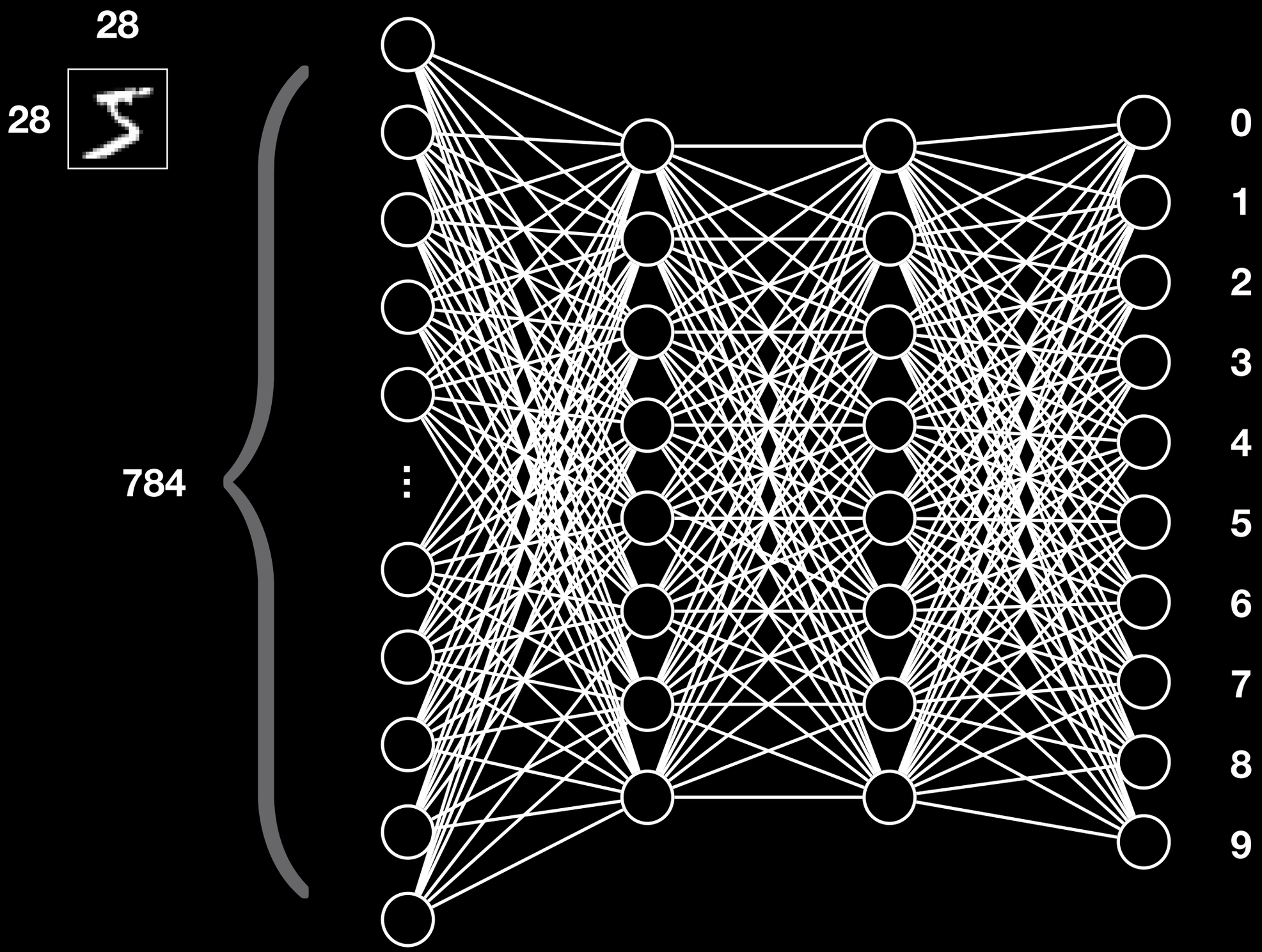
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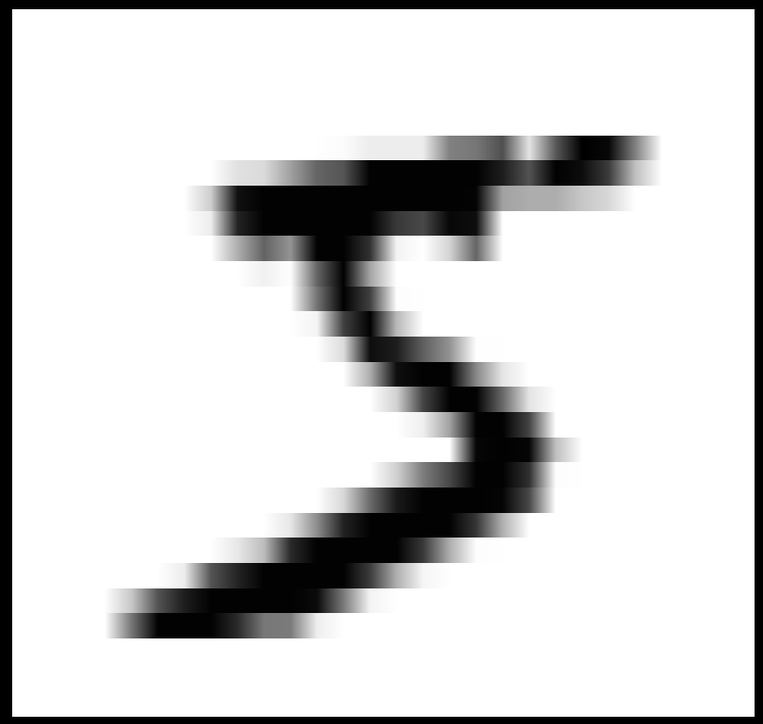

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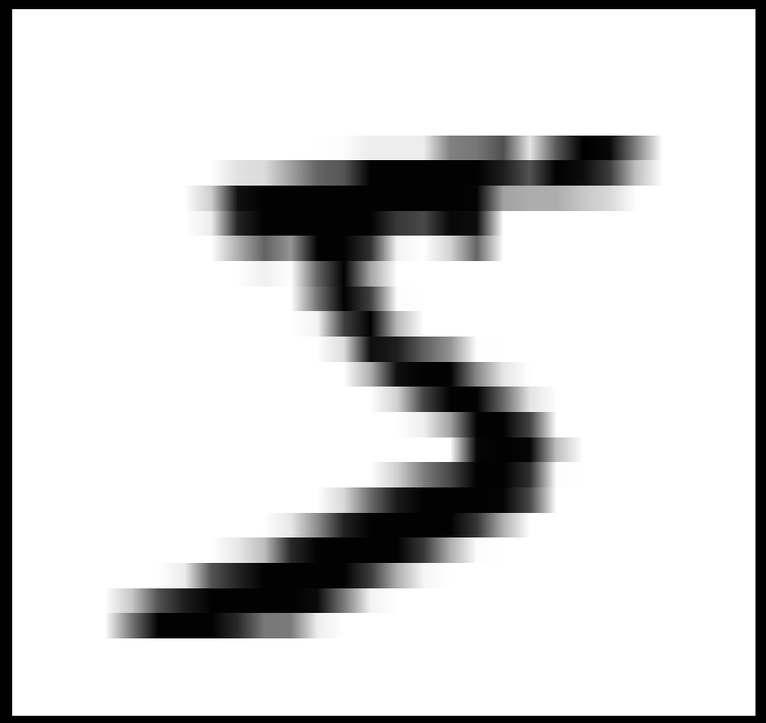

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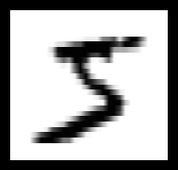

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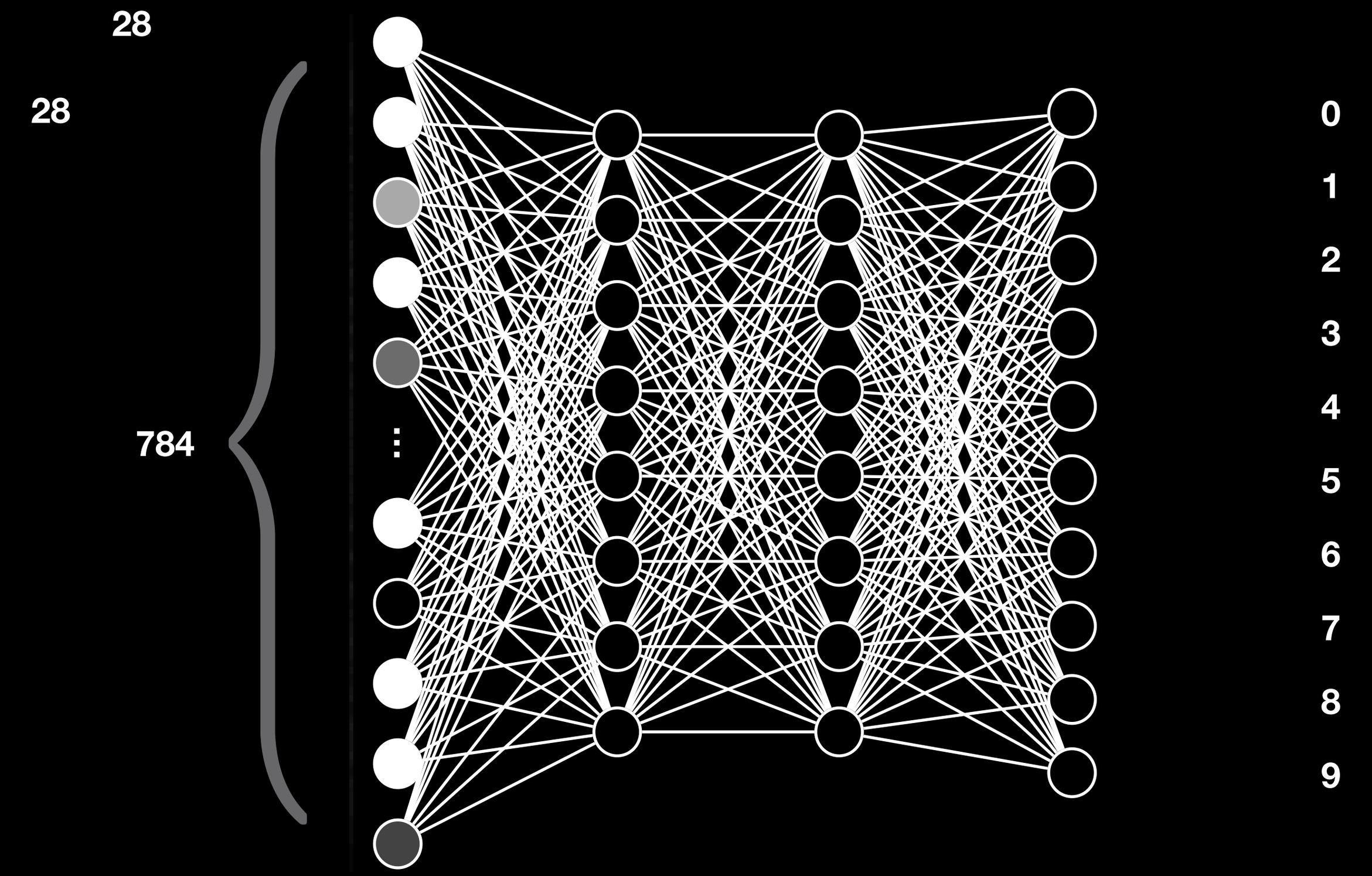
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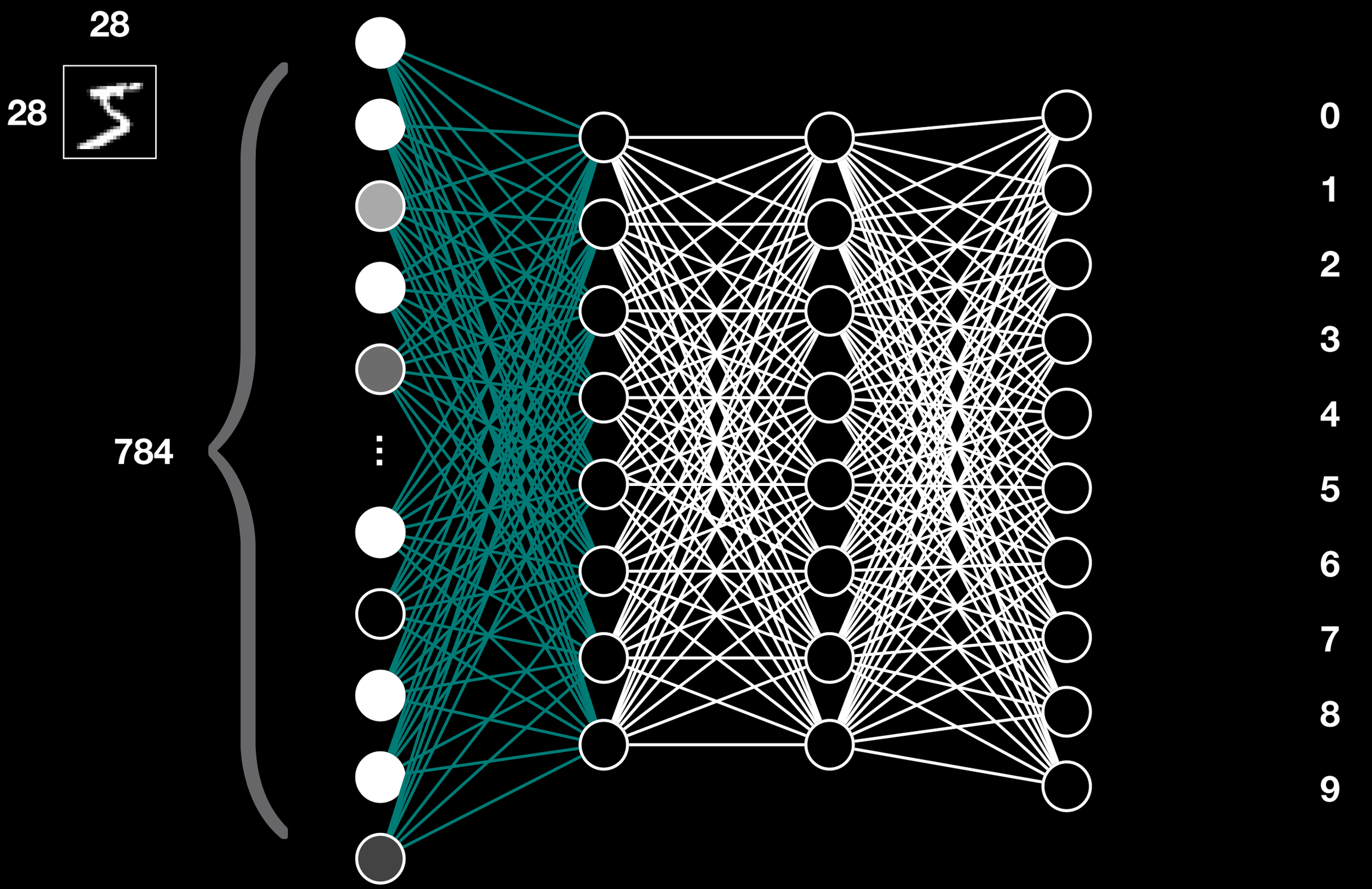
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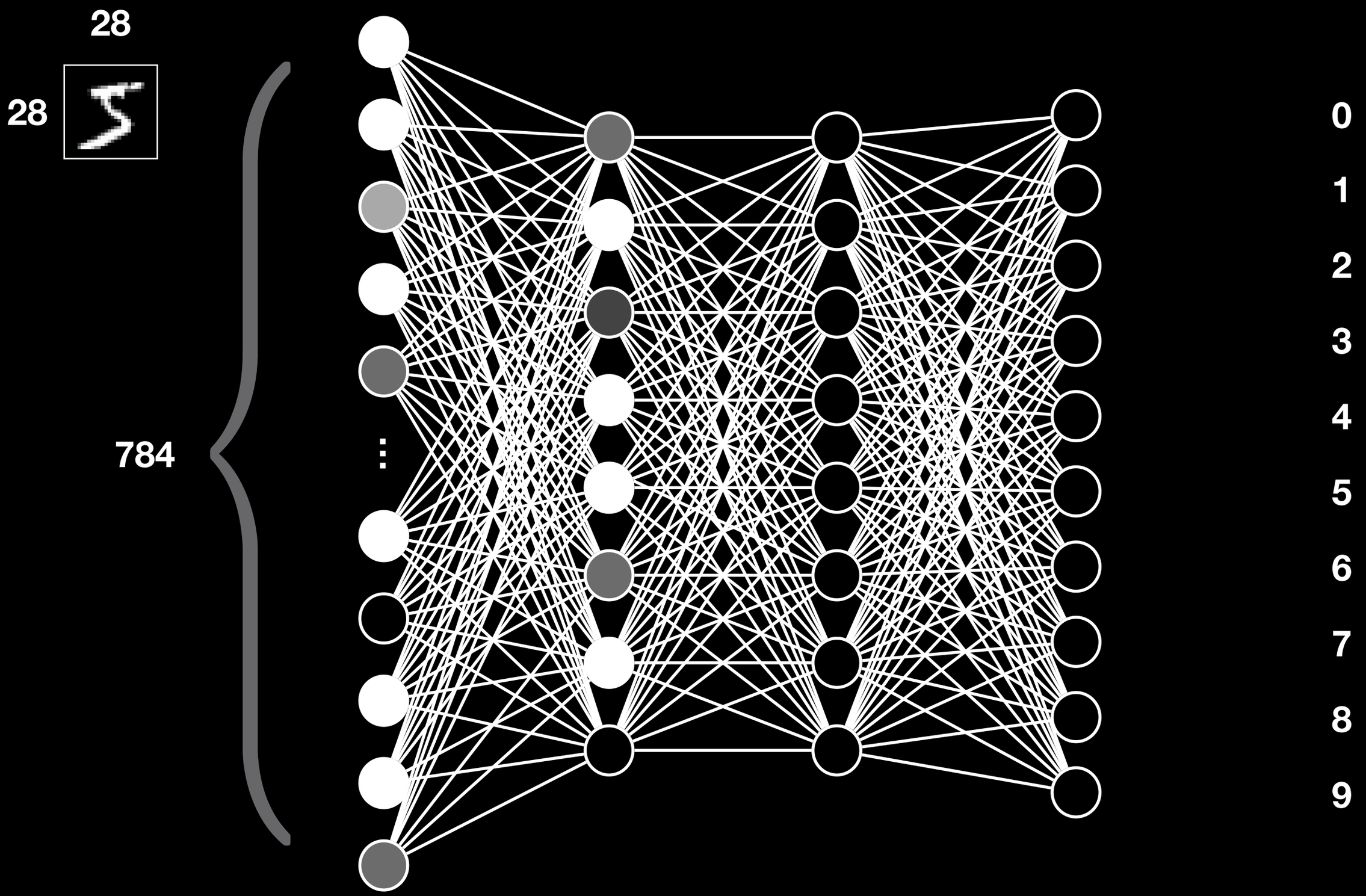
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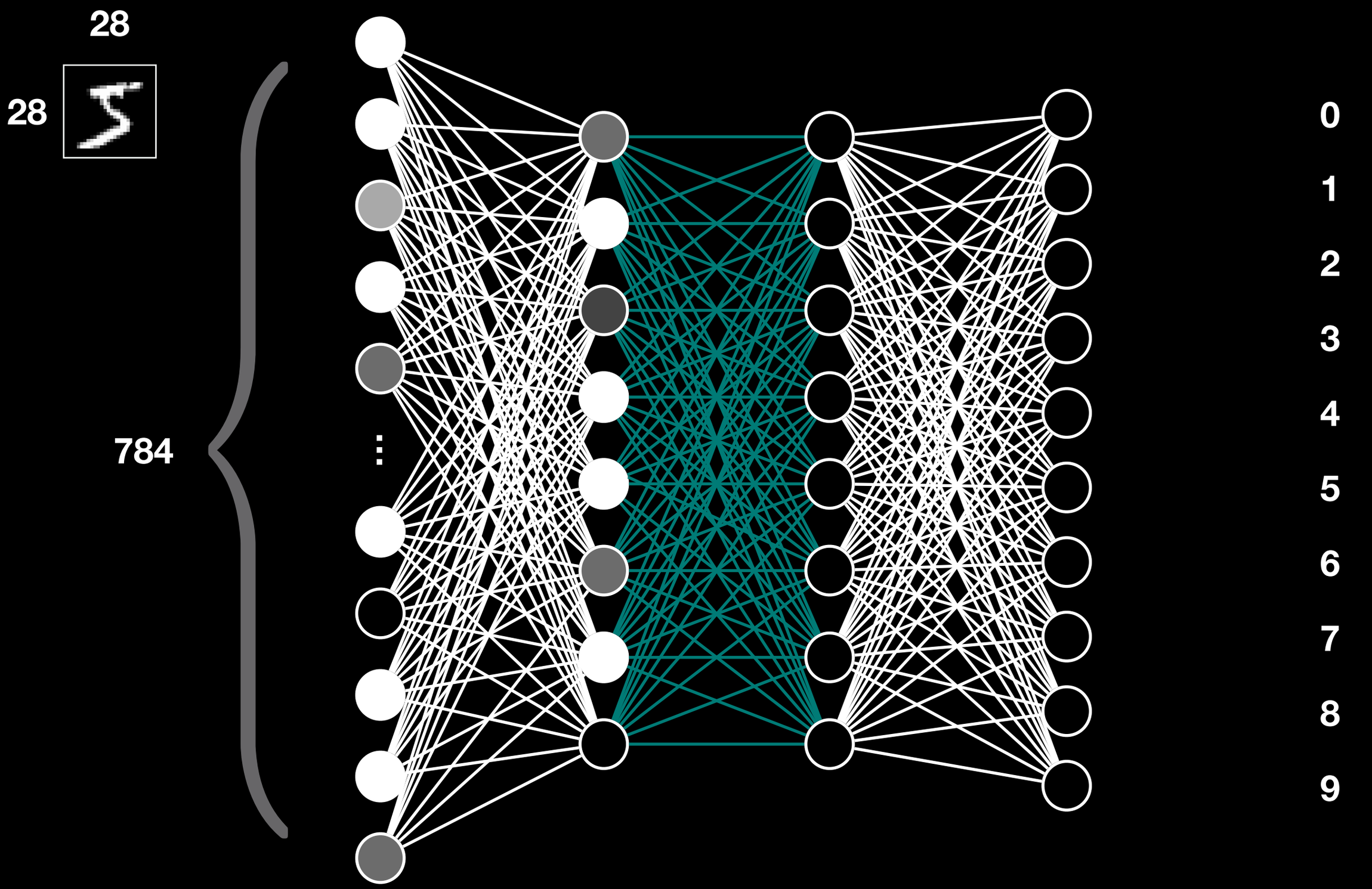
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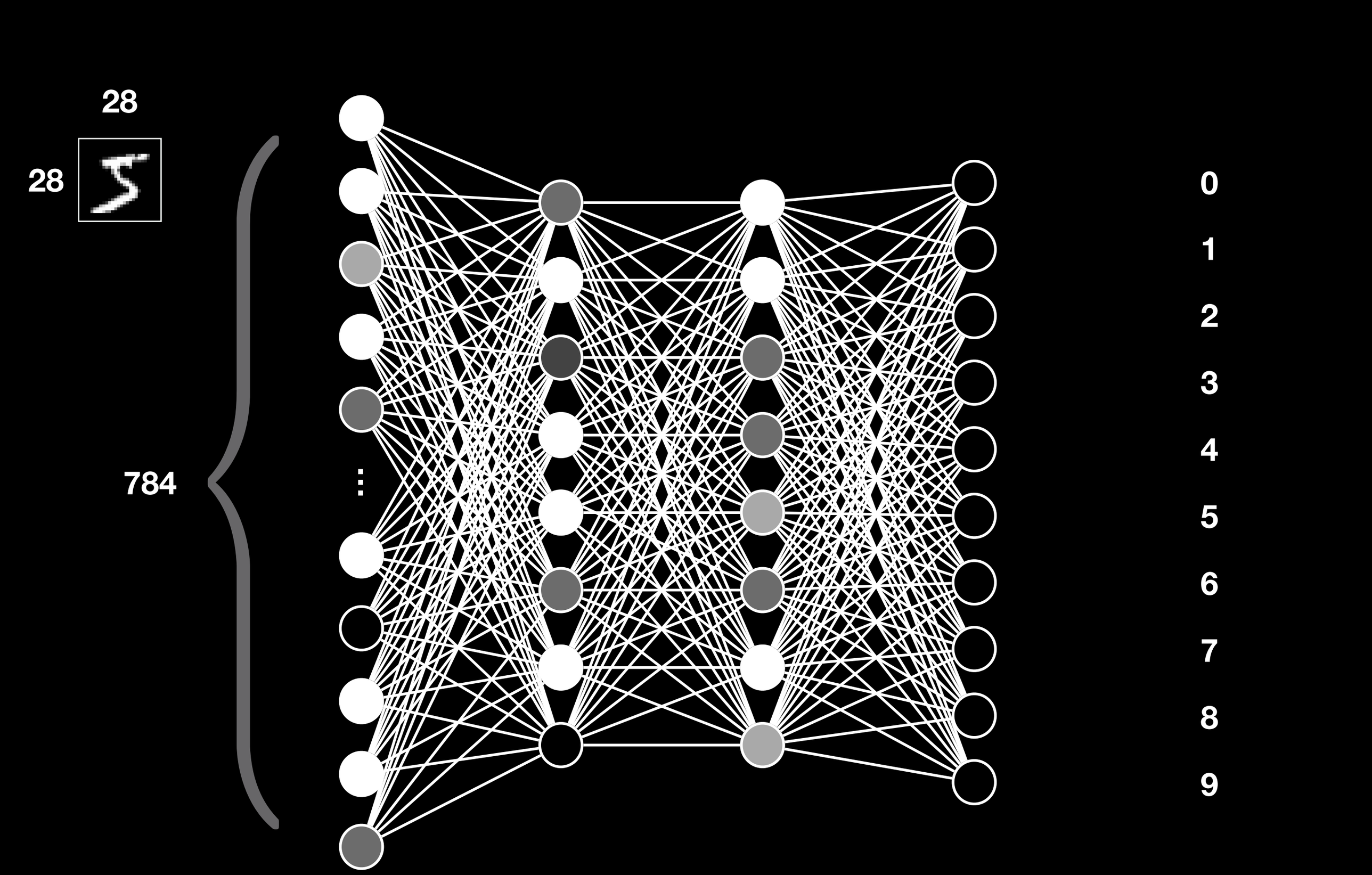
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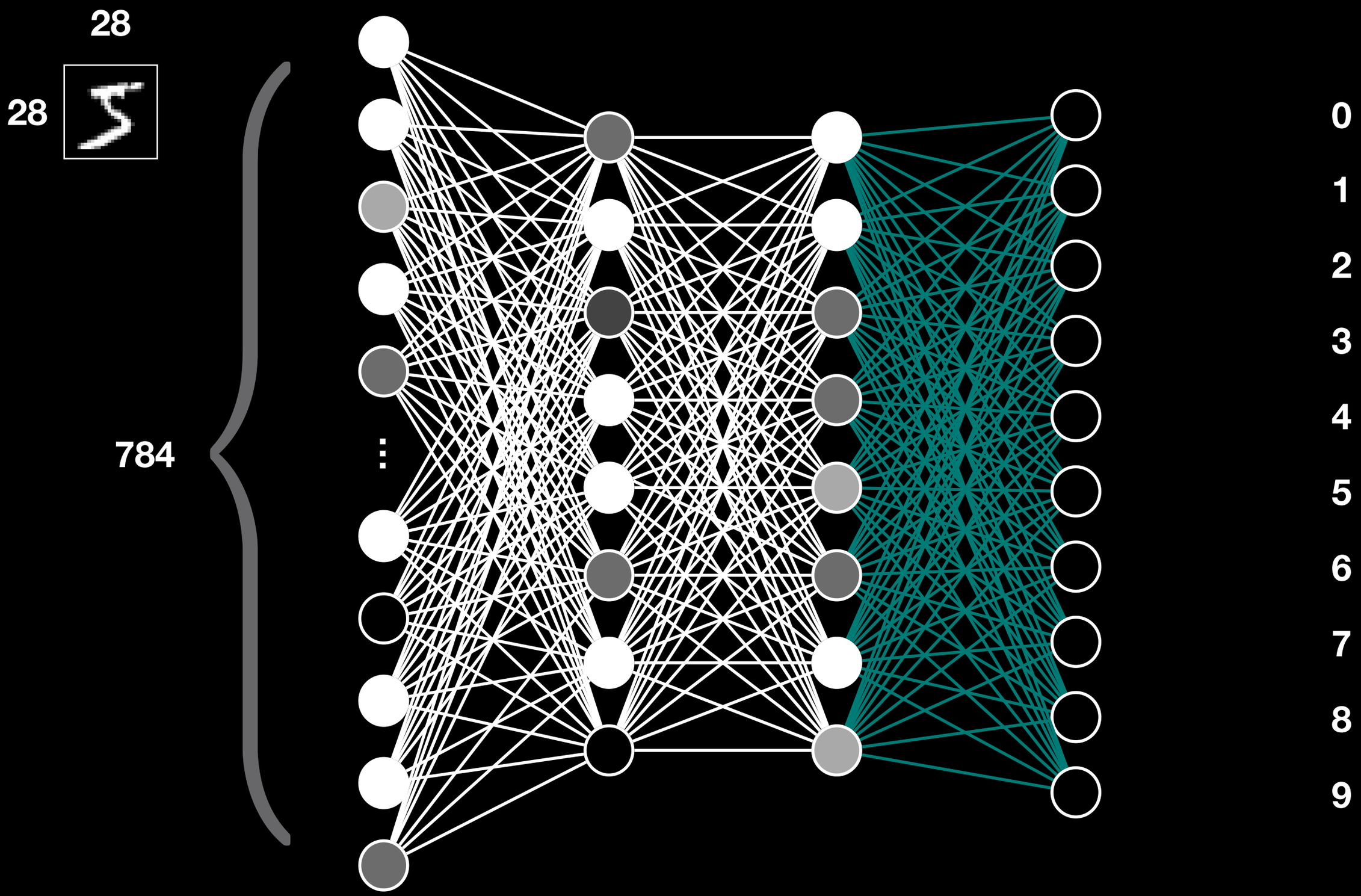
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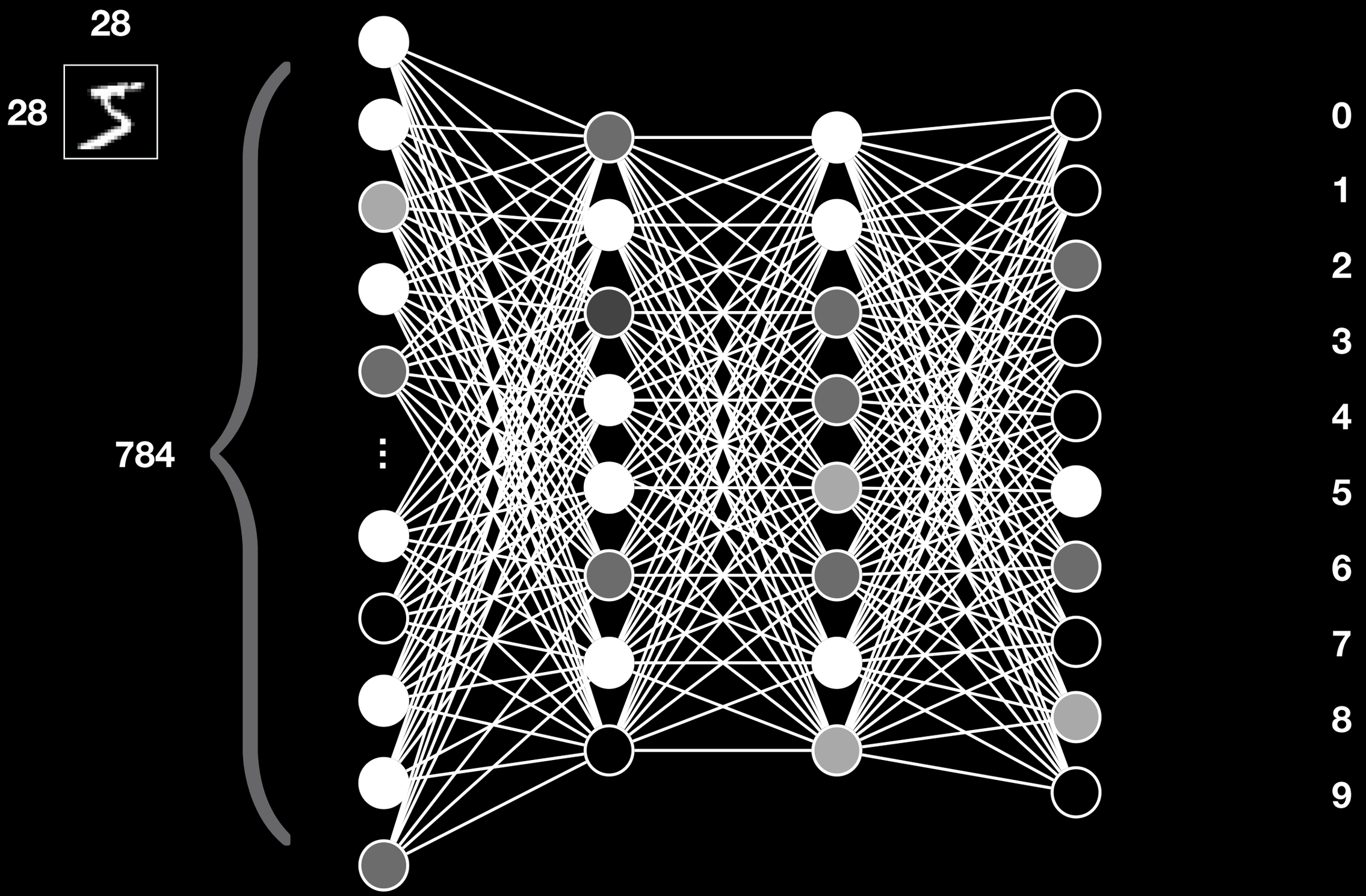
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Probability

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10%	2
0	3
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60%	5
20%	6
0	7
10%	8
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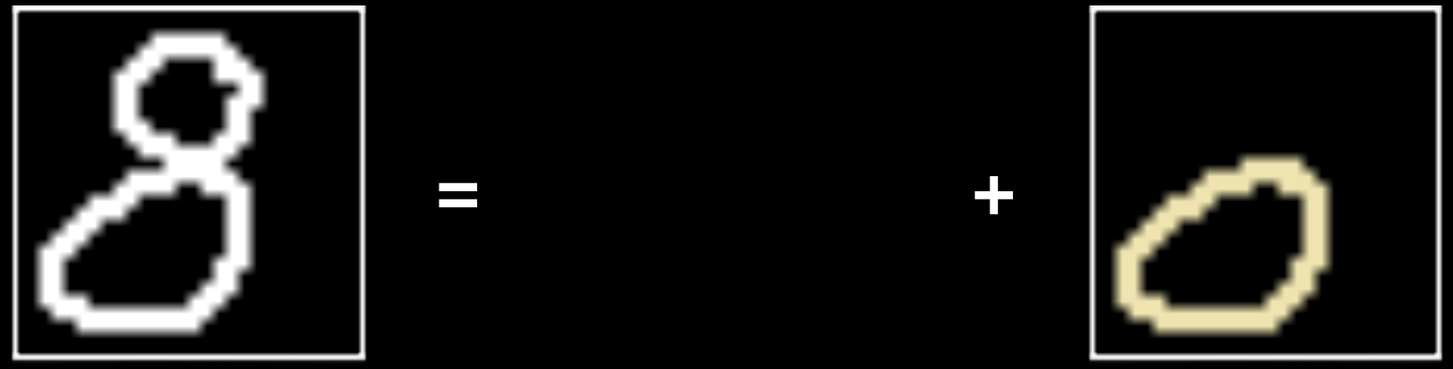
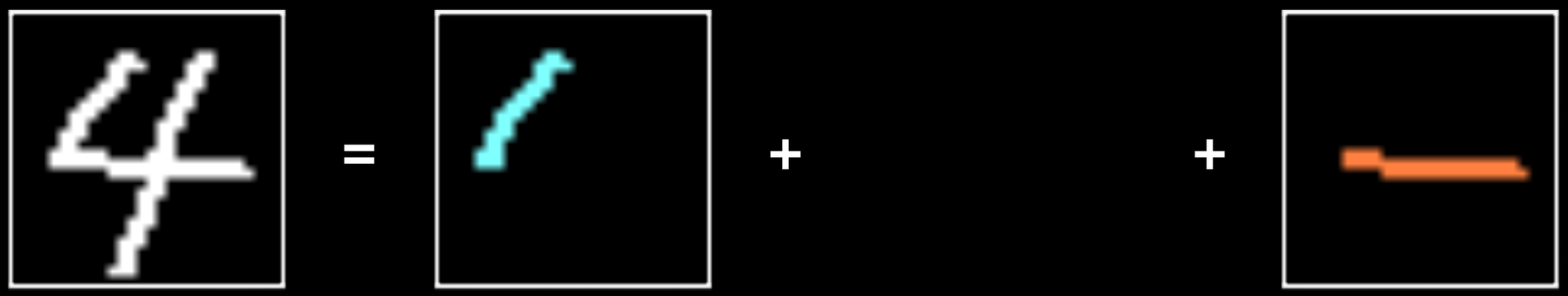
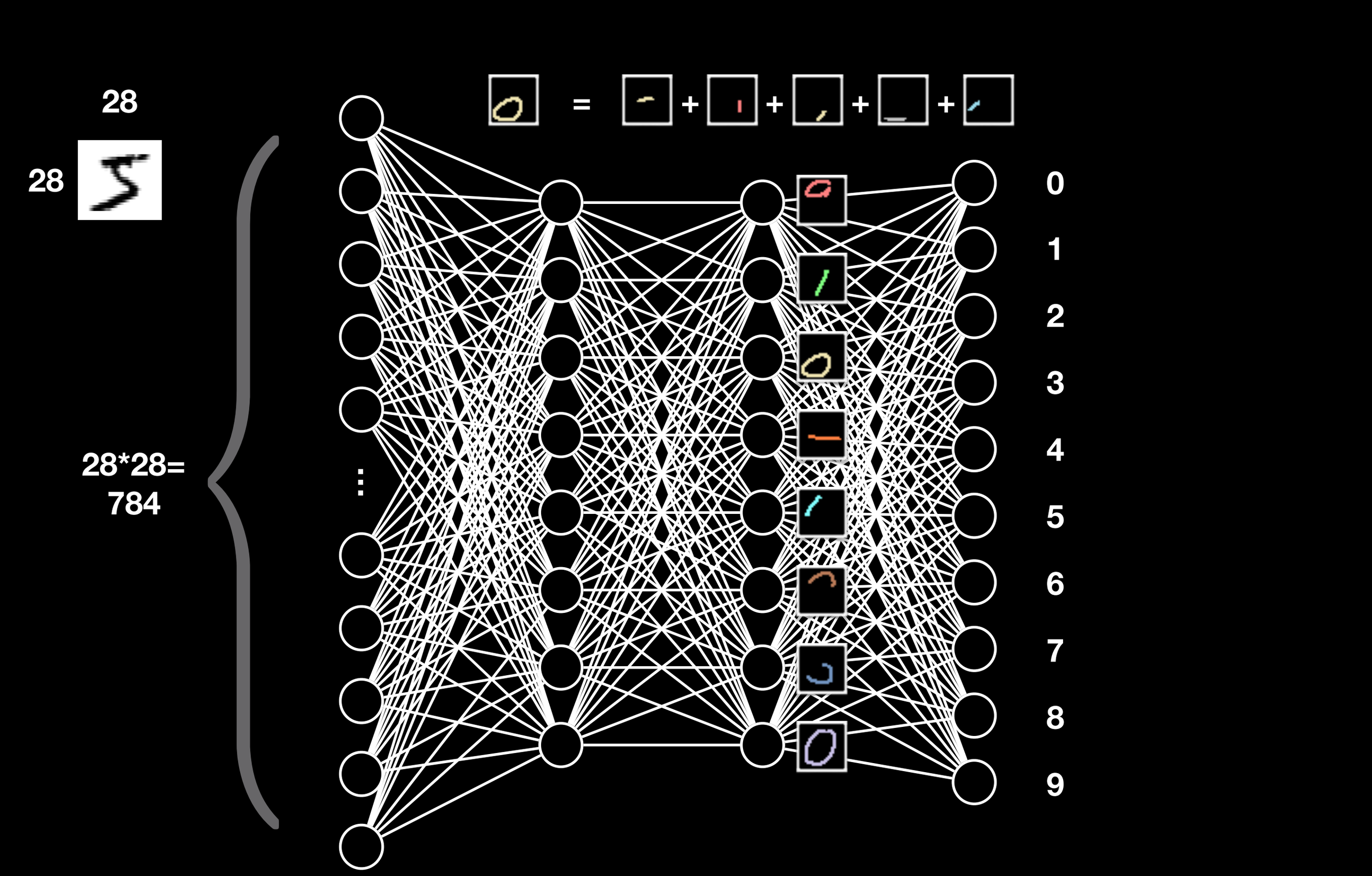
How does it work?



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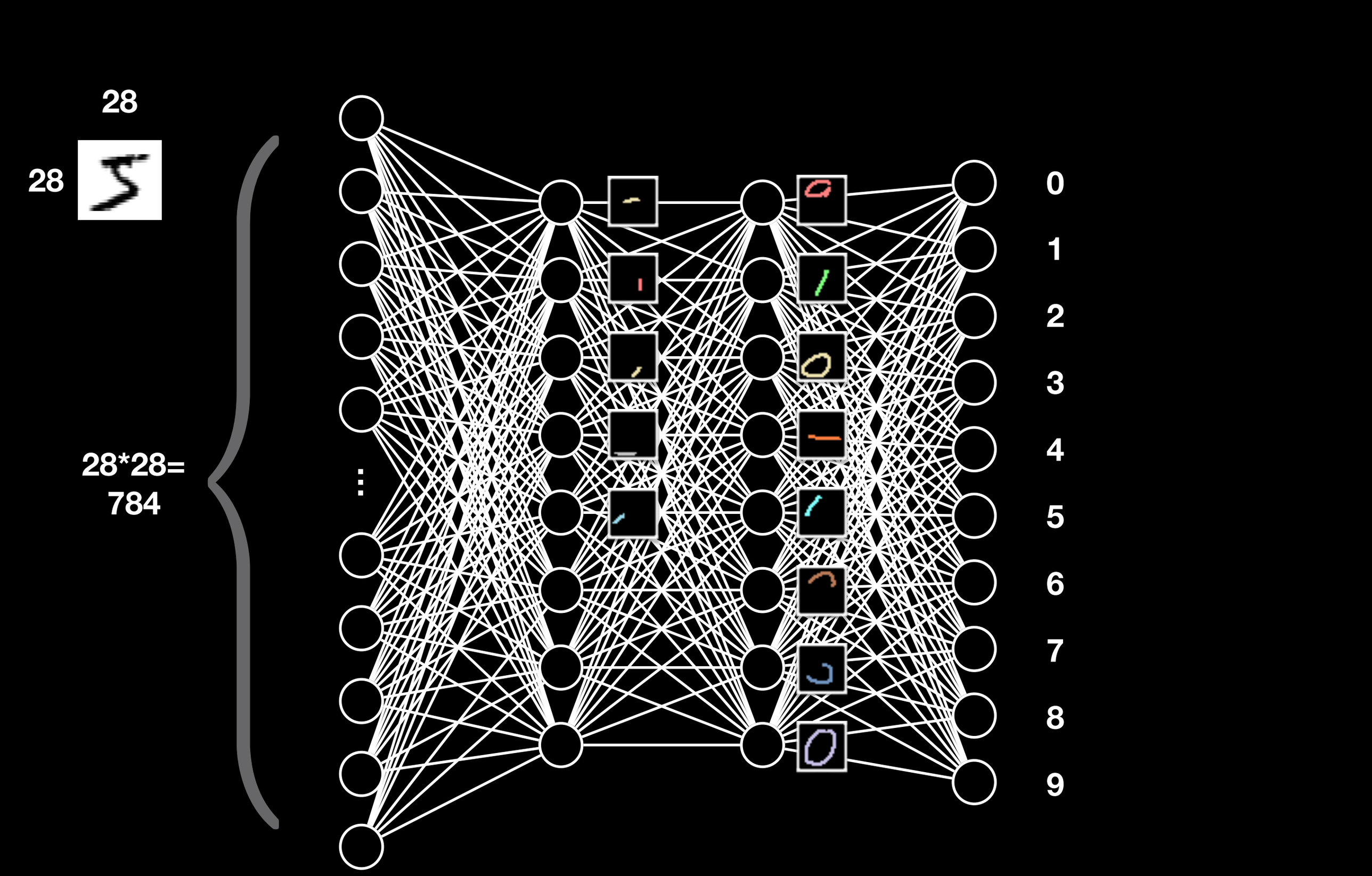
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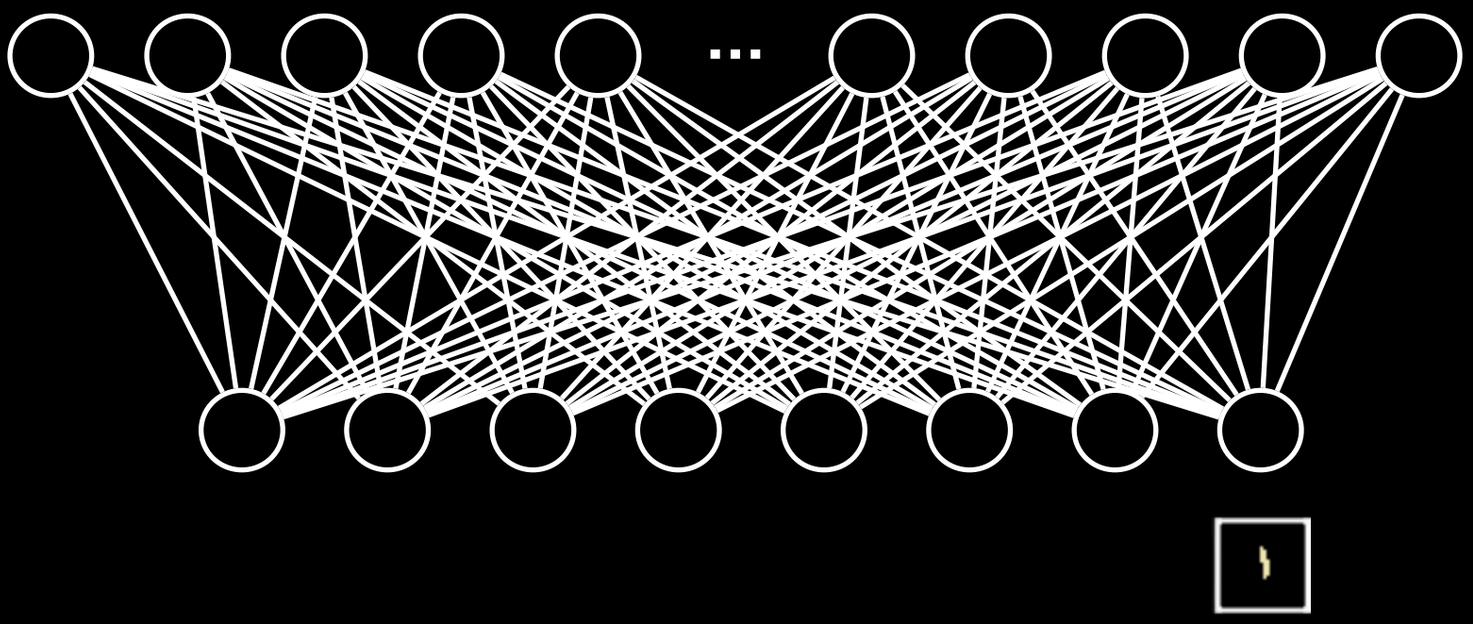
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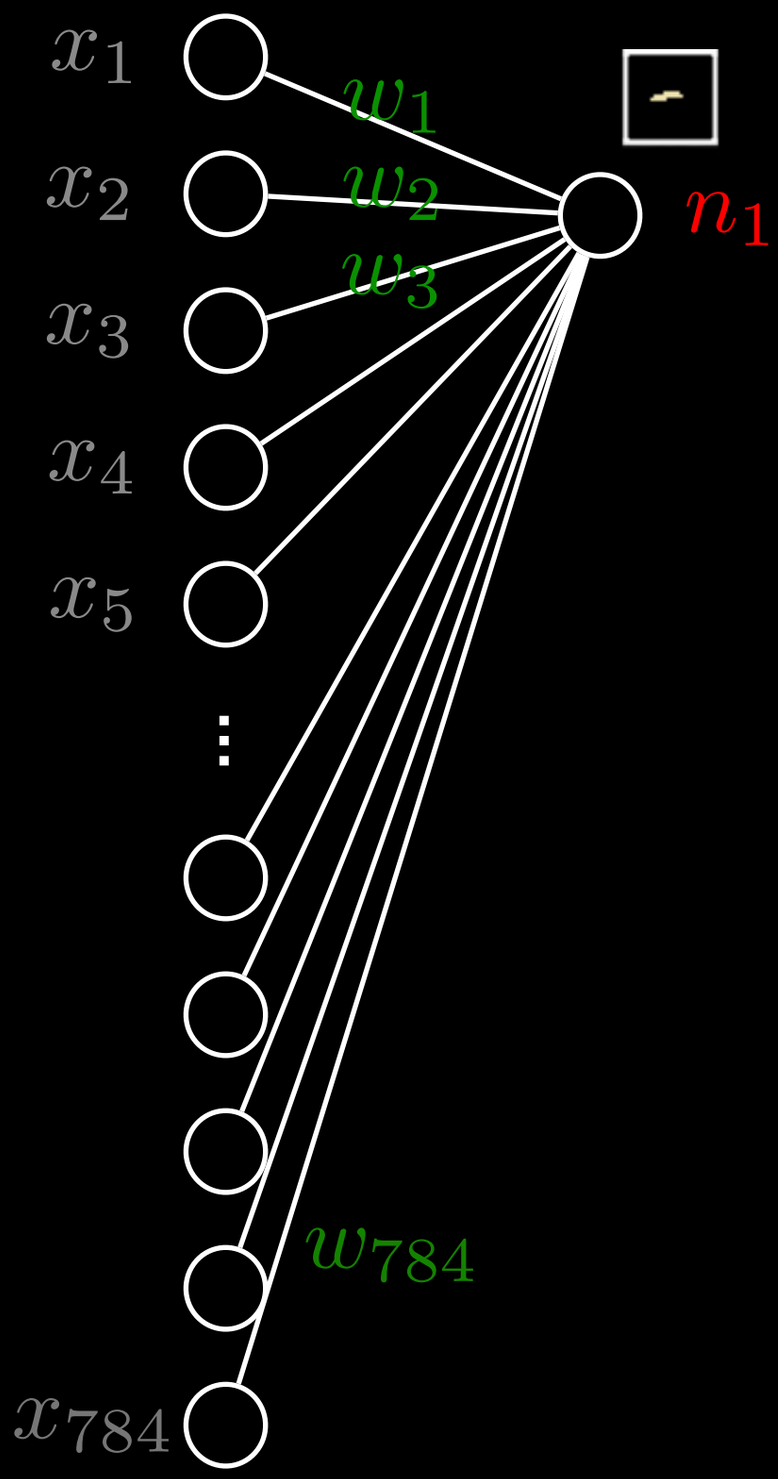
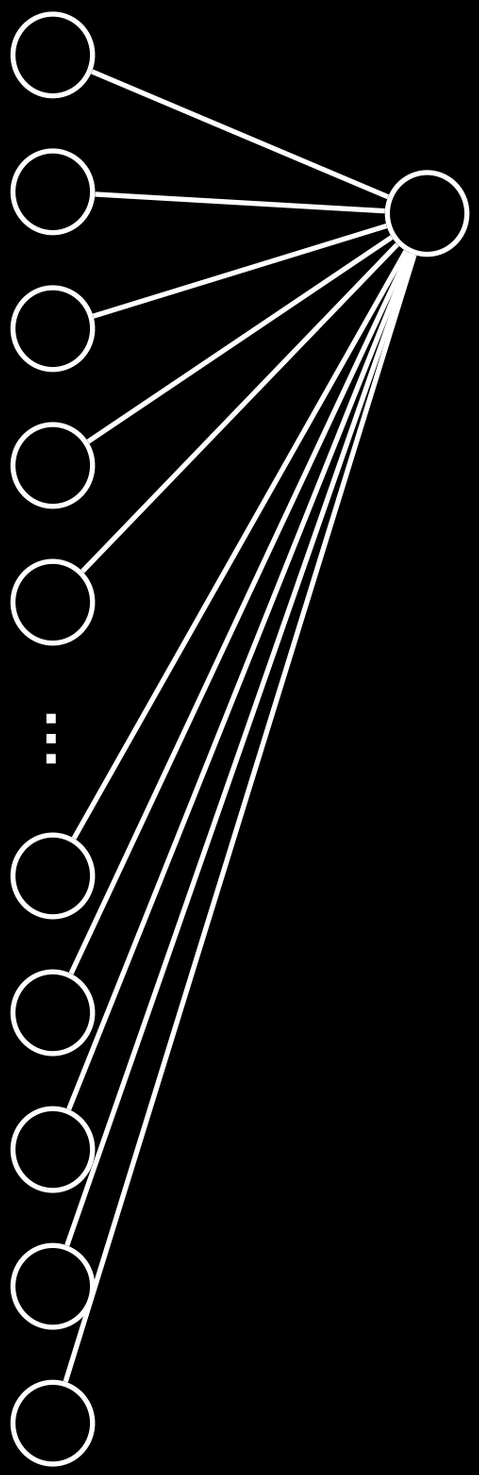
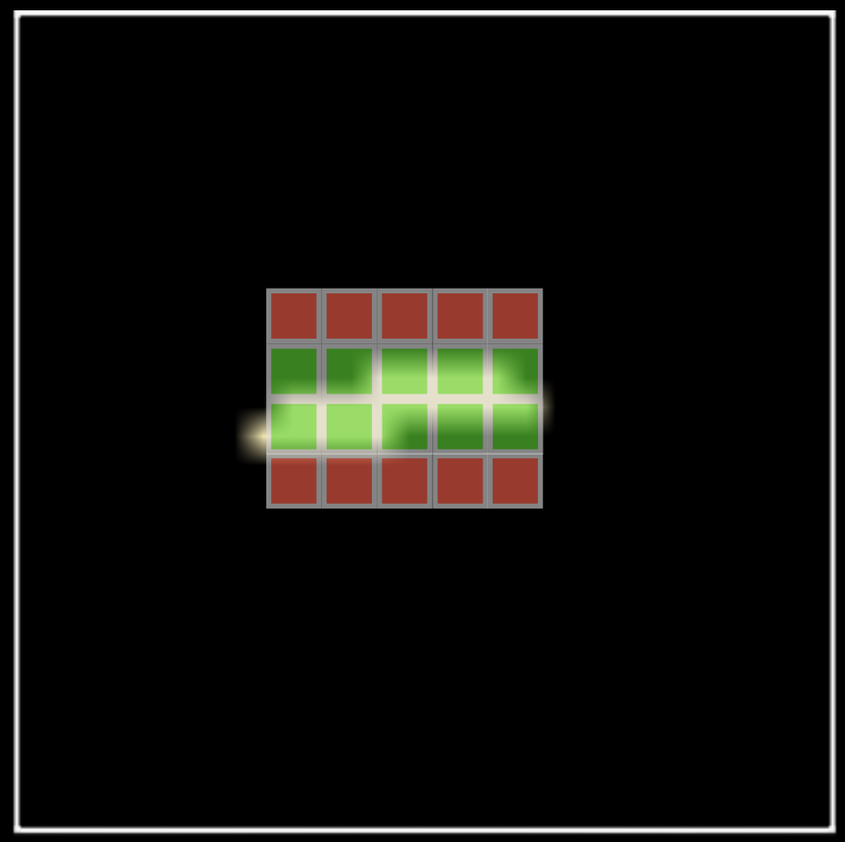


Neurons: Placeholders that take the input.

Connections: Parameters/Weights of the network.



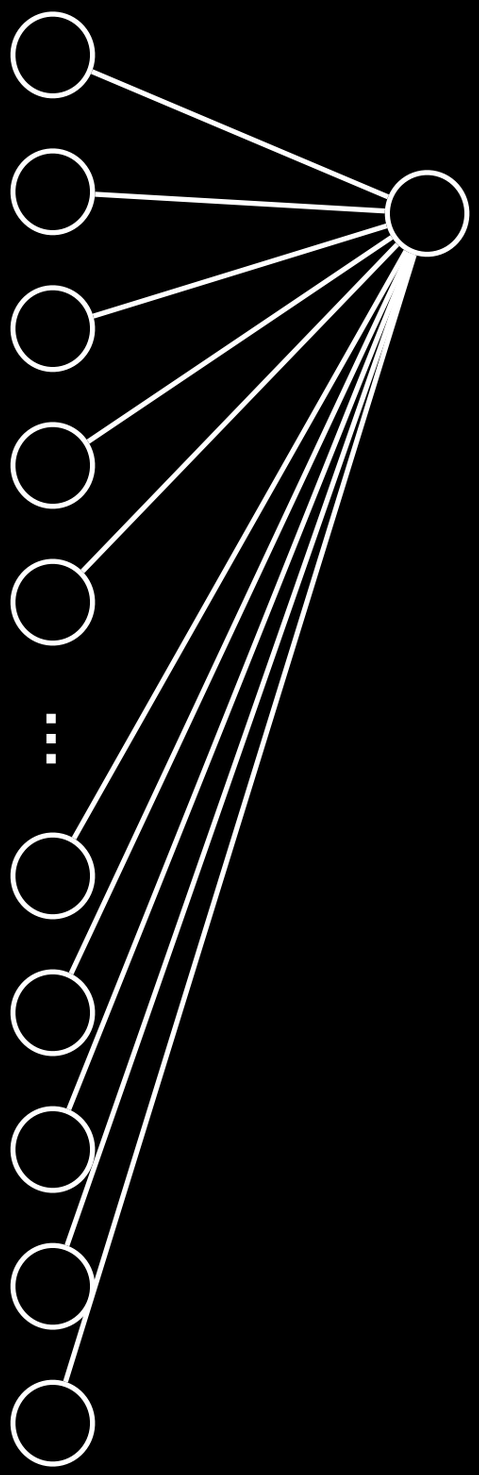
$$n_1 = (w_1x_1 + w_2x_2 + w_3x_3 + \ldots + w_{784}x_{784})$$



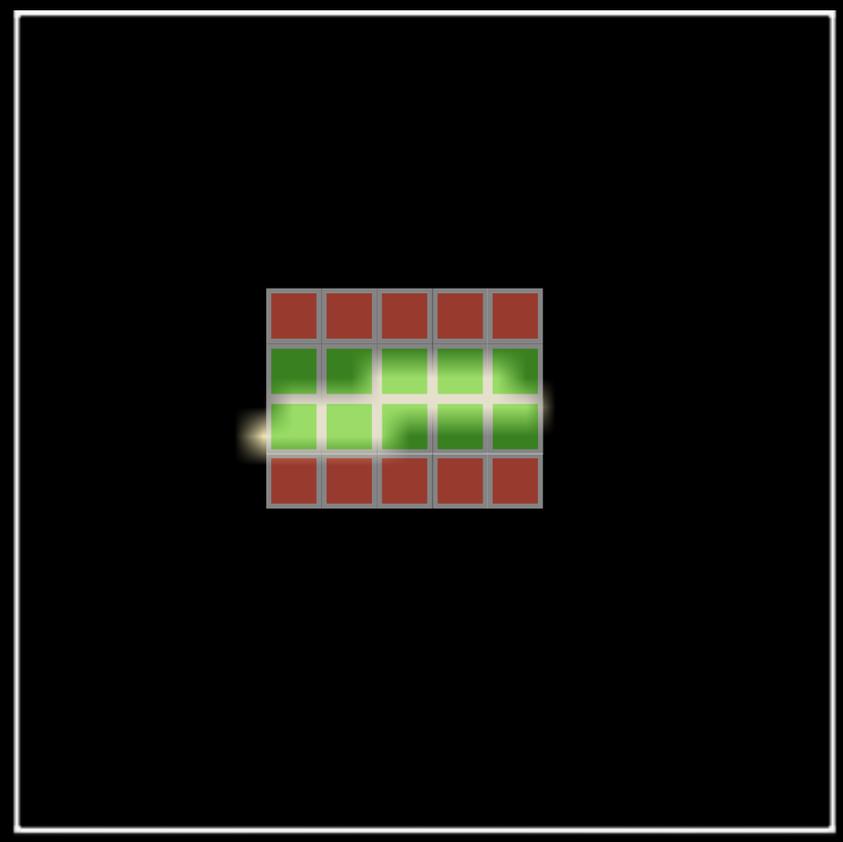
Red indicates the weights are negative
Green indicates the weights are positive

Neurons: Placeholders that take the input.

Connections: Parameters/Weights of the network.



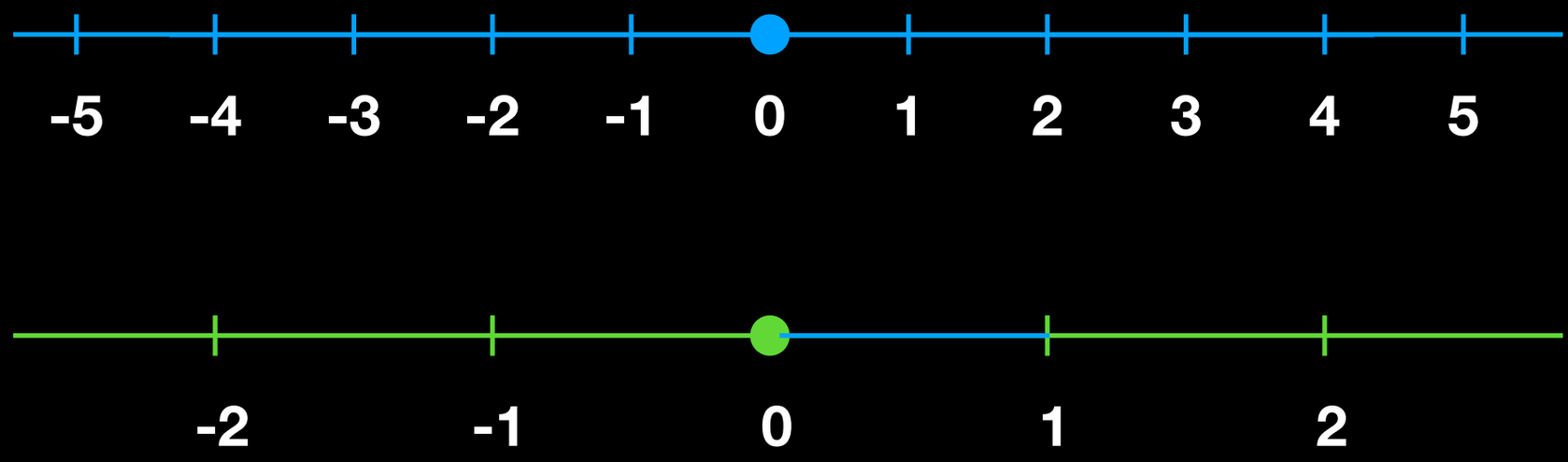
$$n_1 = (w_1x_1 + w_2x_2 + w_3x_3 + \ldots + w_{784}x_{784} + bias)$$



Red indicates the weights are negative
Green indicates the weights are positive

Neurone: Placeholder that takes the numbers.

Connections: Parameters/Weights of the network.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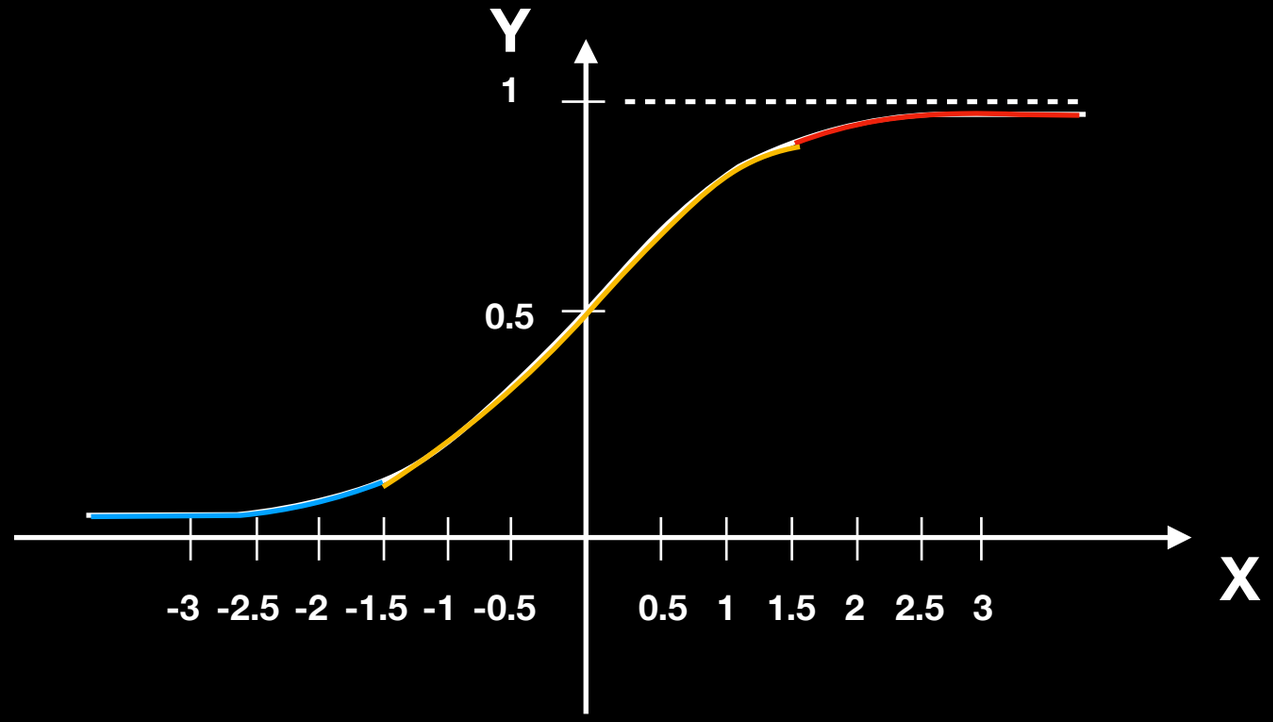
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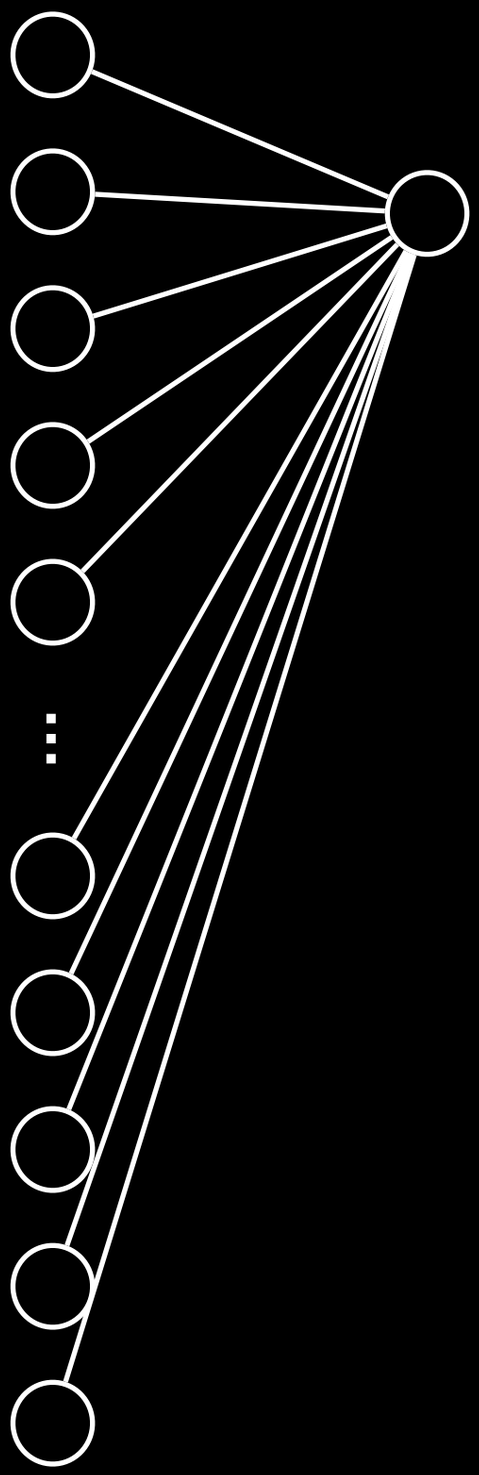
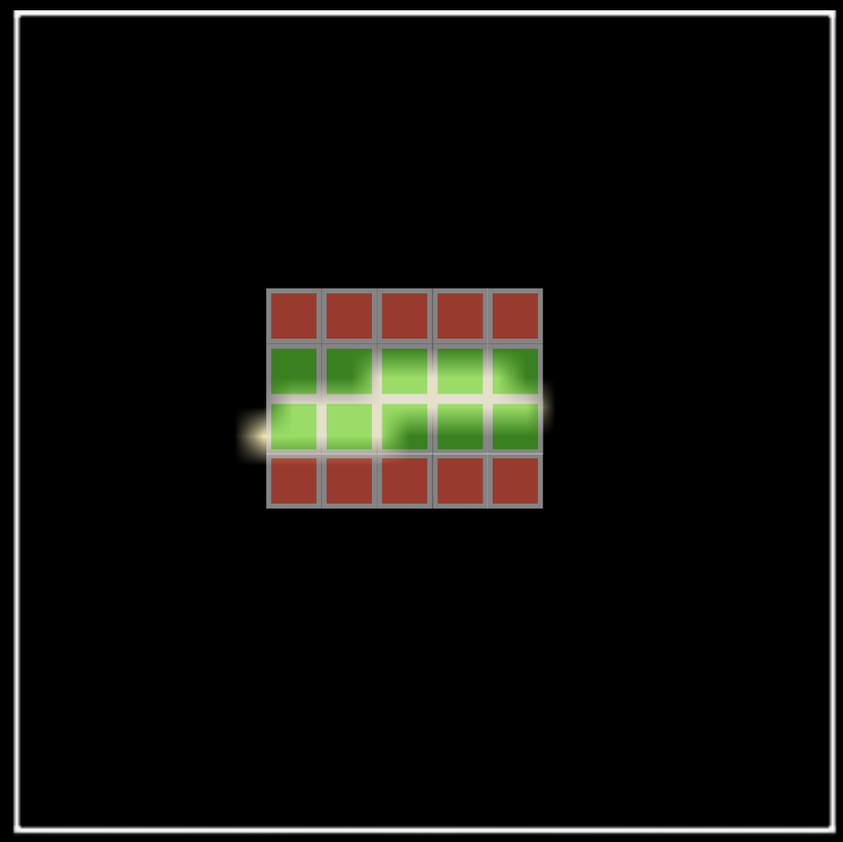


$$n_1 = \sigma\,(w_1x_1 + w_2x_2 + w_3x_3 + \ldots + w_{784}x_{784} + bias)$$



Red indicates the weights are negative
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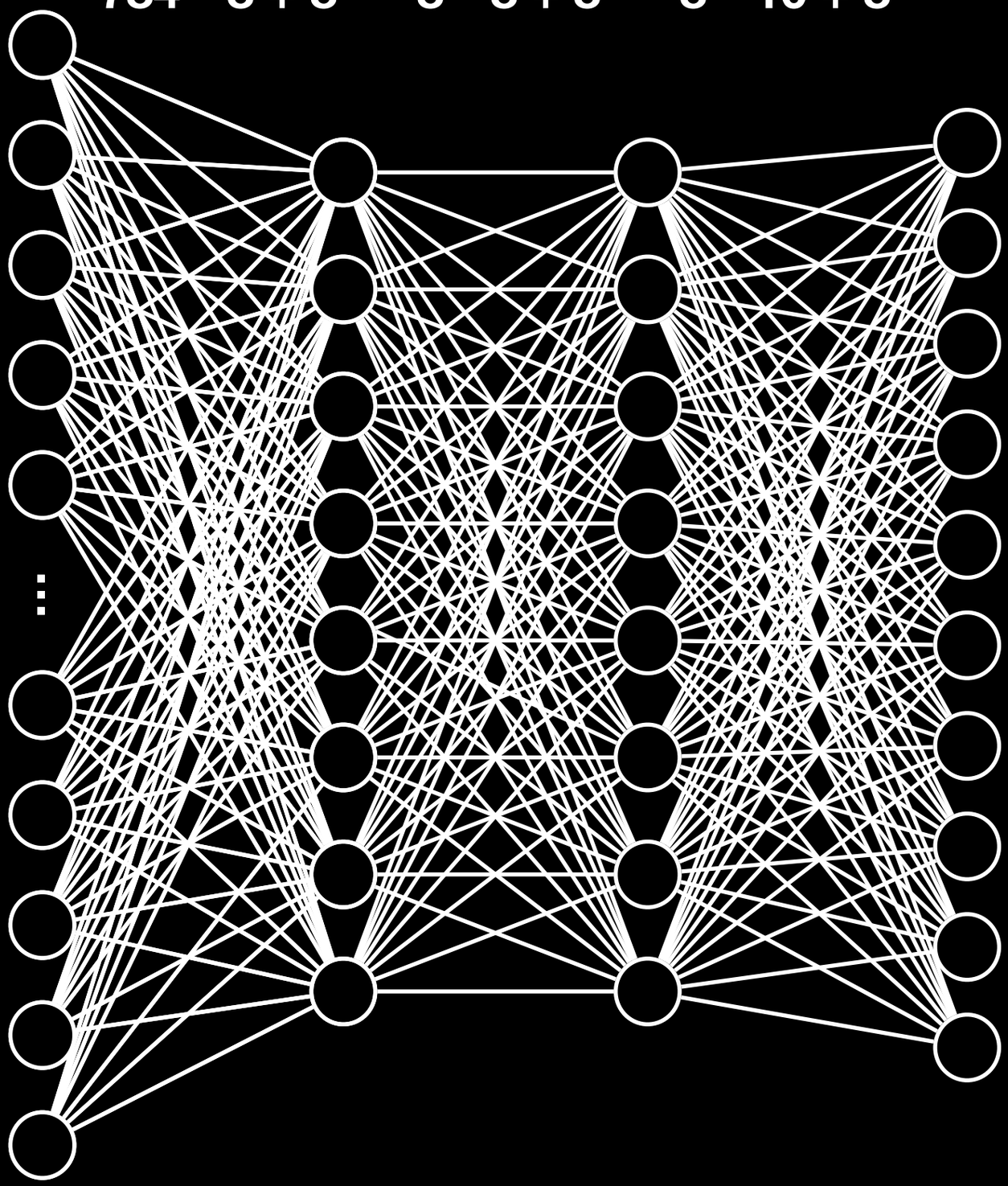
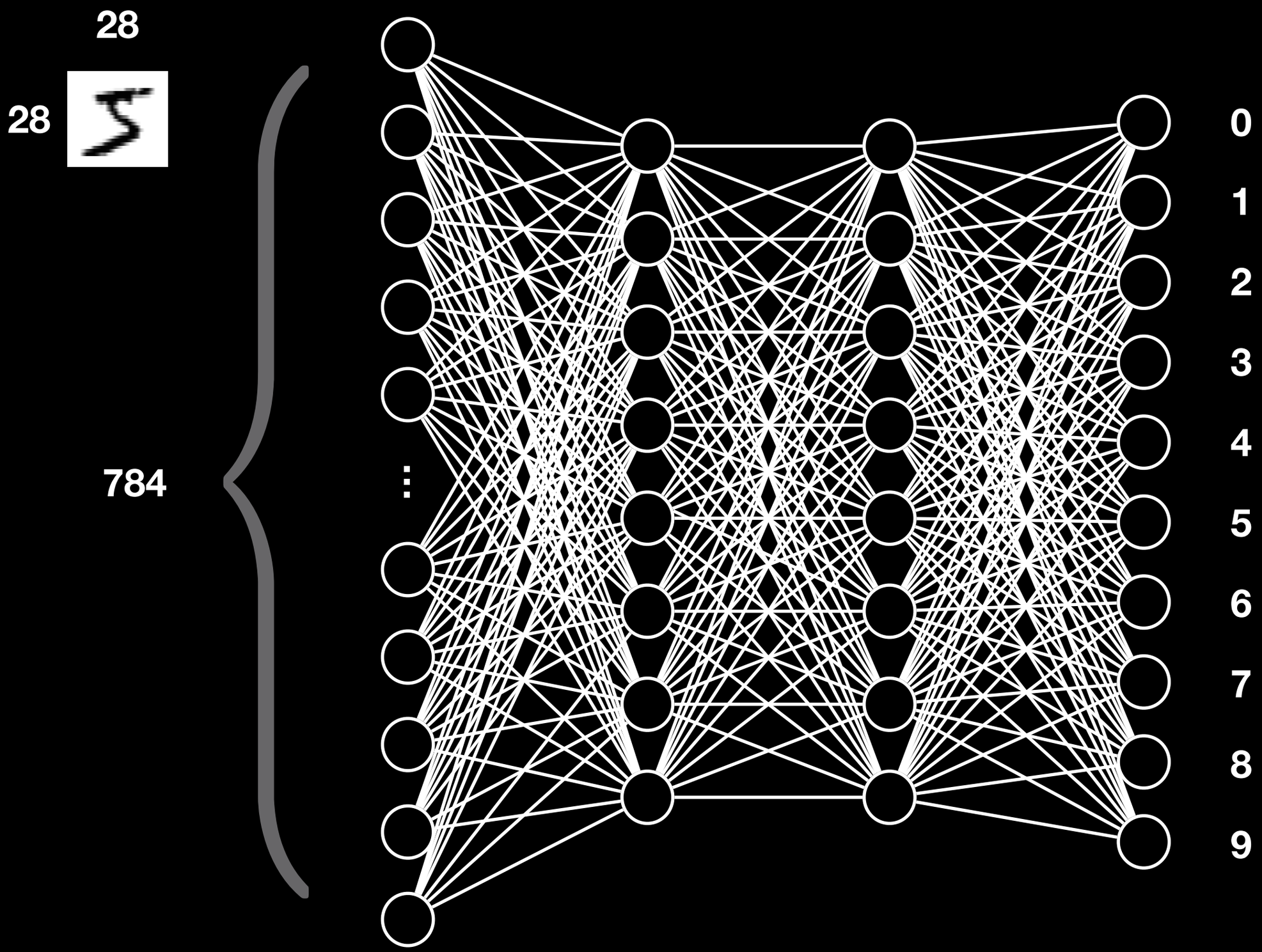
Neurons: Placeholders that take the input.

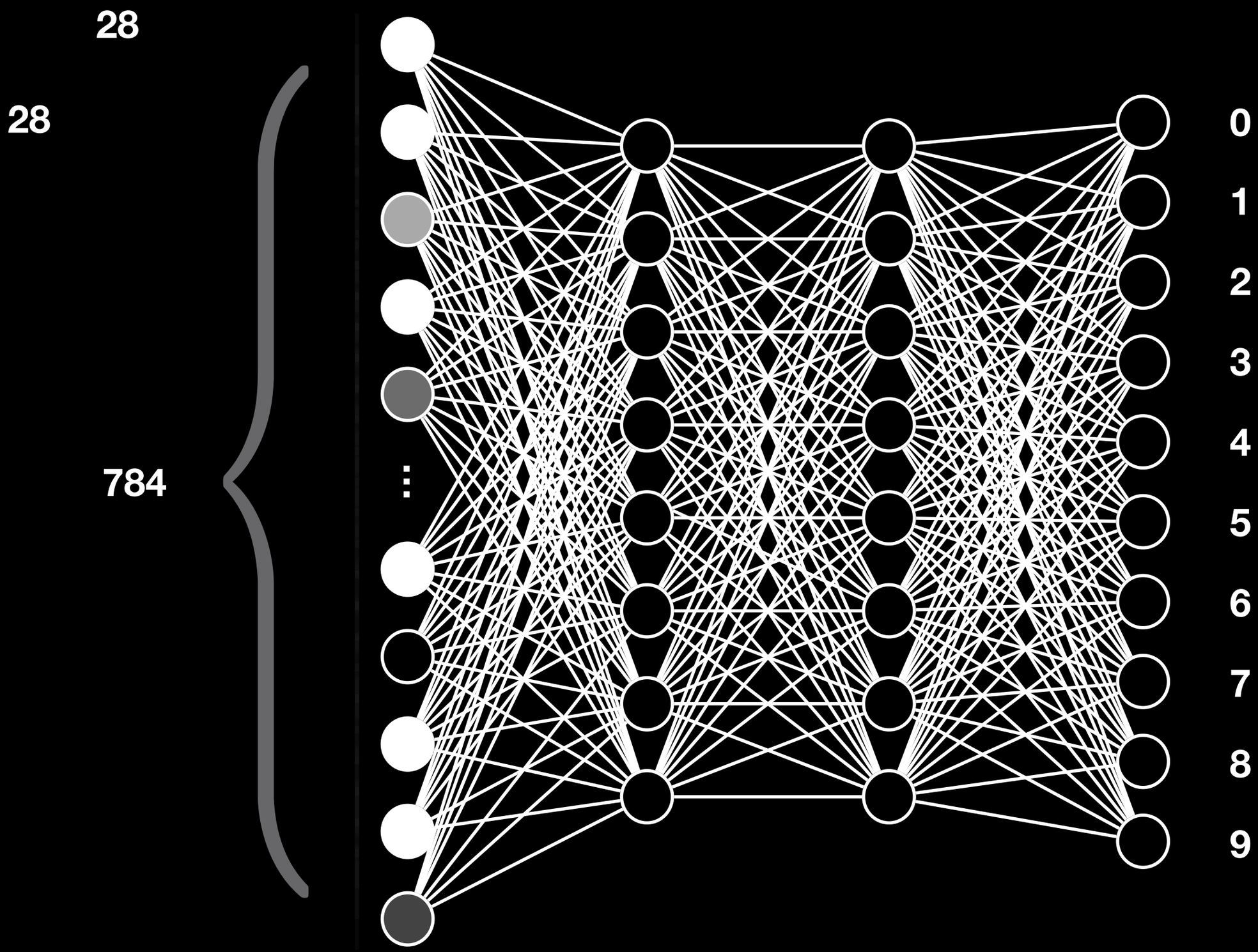
Connections: Parameters/Weights of the network.

784 * 8 + 8 8 * 8 + 8 8 * 10 + 8

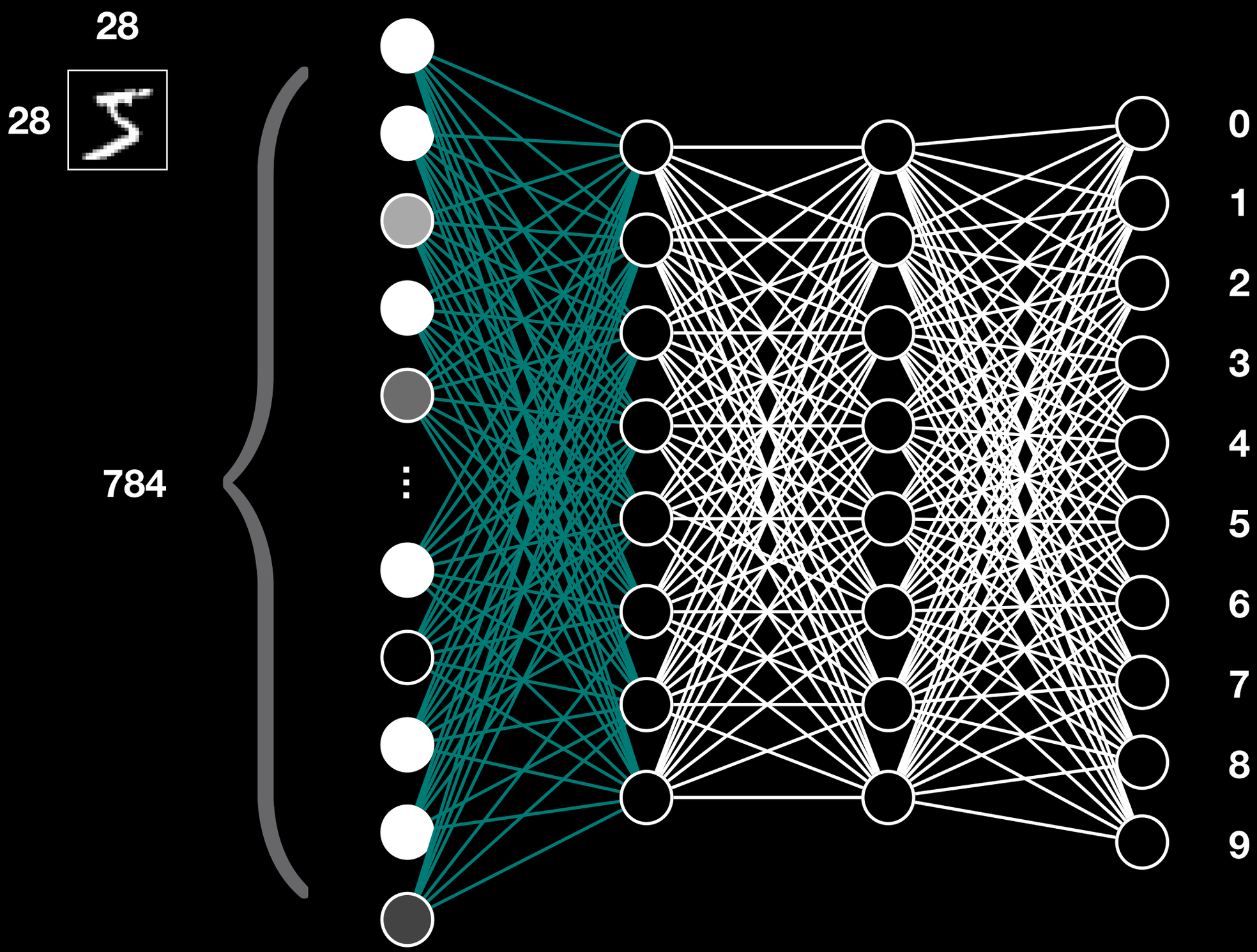


$$(c_0, c_1, ..., c_9) = f(x_1, x_2, ...x_{784})$$

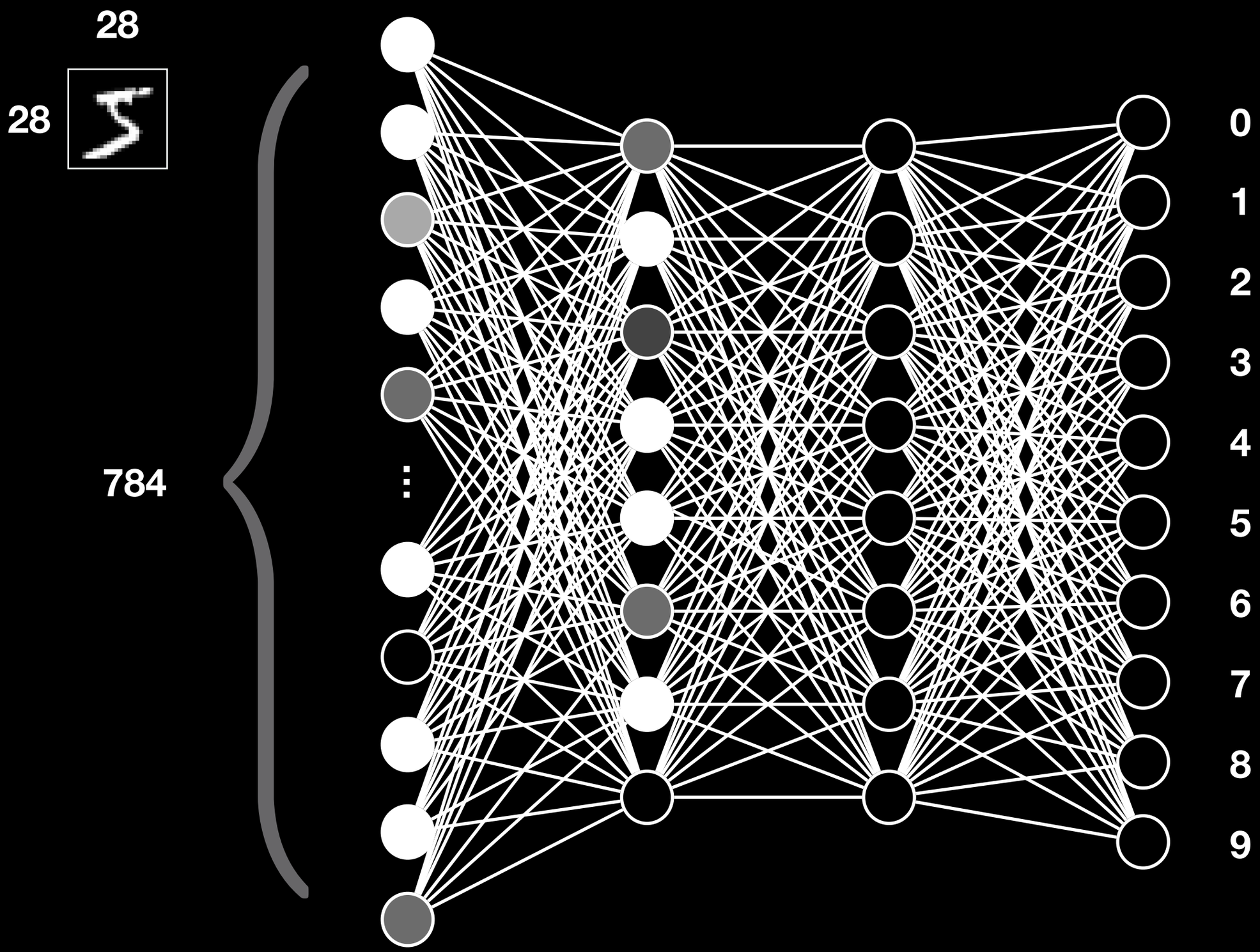

28
28
784
0
1
2
3
4
5
6
7
8
9



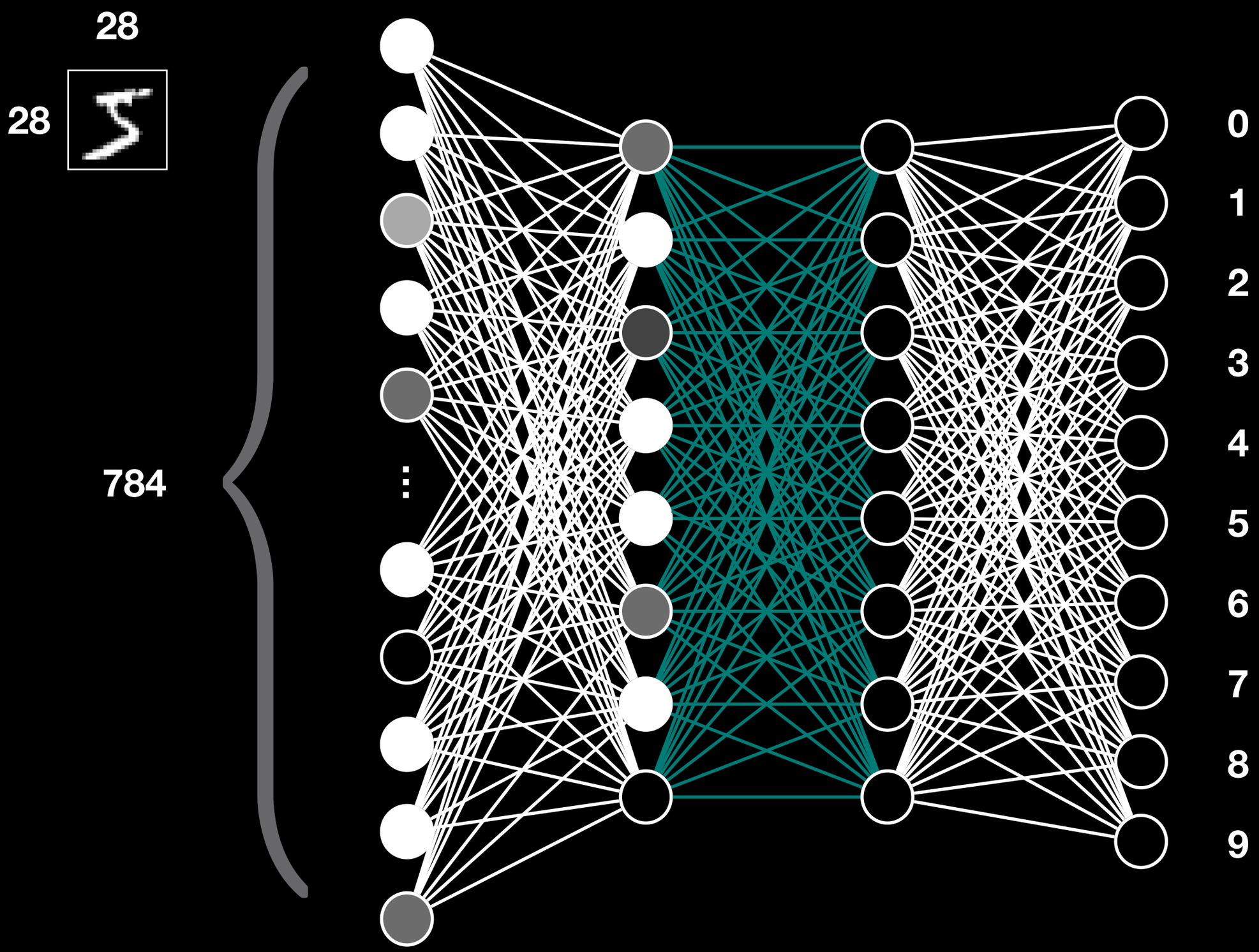
$$(c_0, c_1, ..., c_9) = f(x_1, x_2, ...x_{784})$$



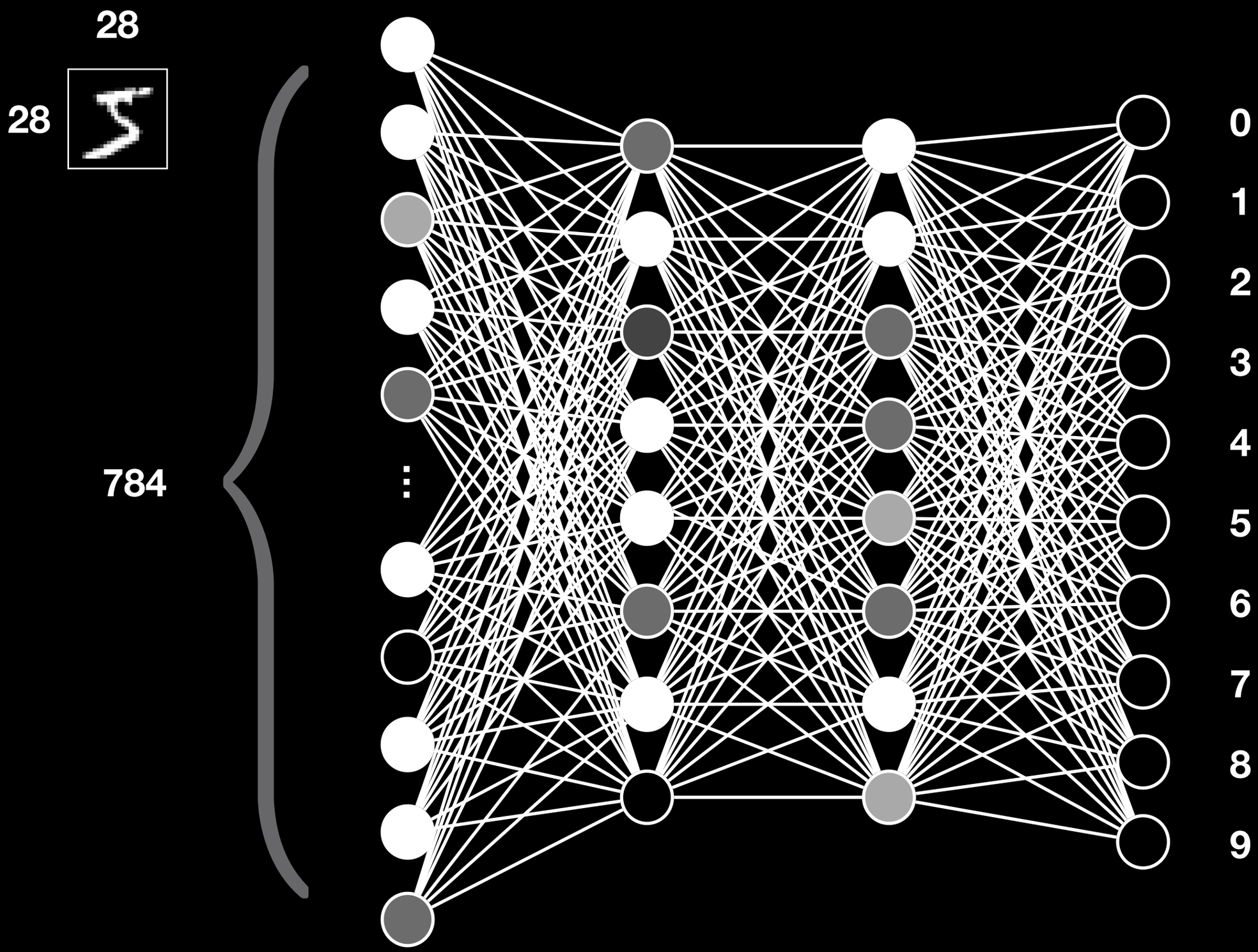
$$(c_0, c_1, ..., c_9) = f(x_1, x_2, ...x_{784})$$



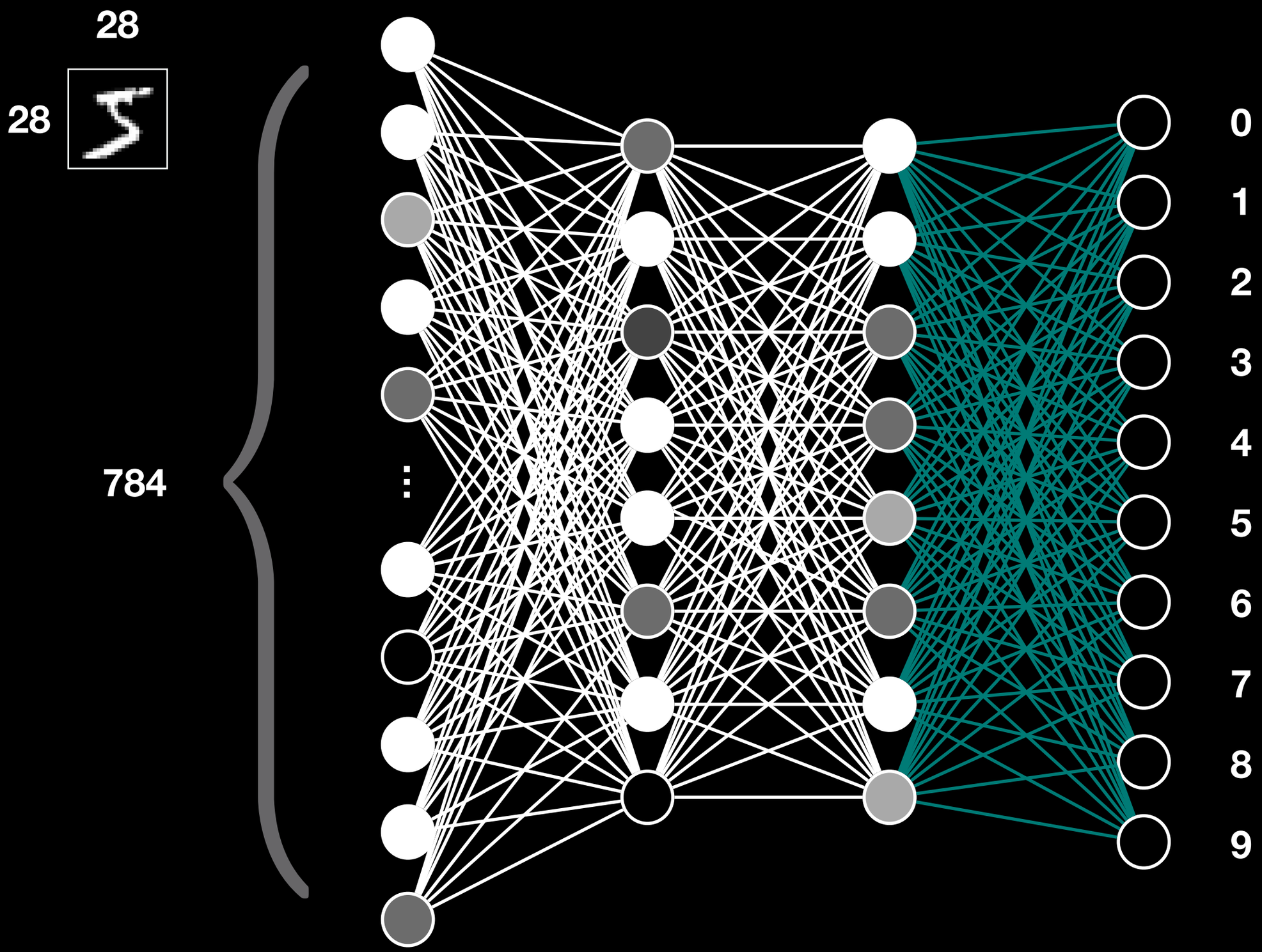
$$(c_0, c_1, ..., c_9) = f(x_1, x_2, ...x_{784})$$



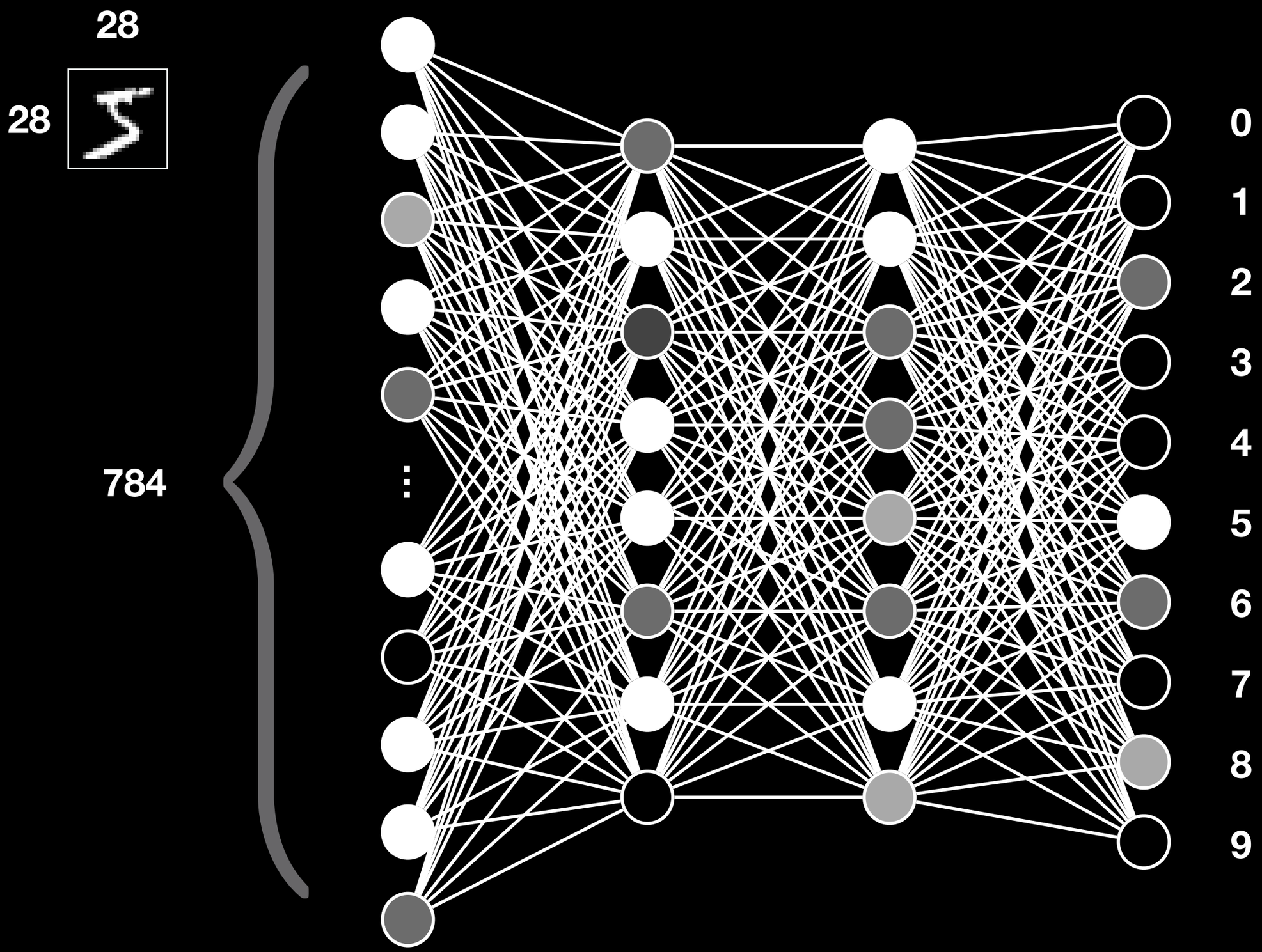
$$(c_0, c_1, ..., c_9) = f(x_1, x_2, ...x_{784})$$



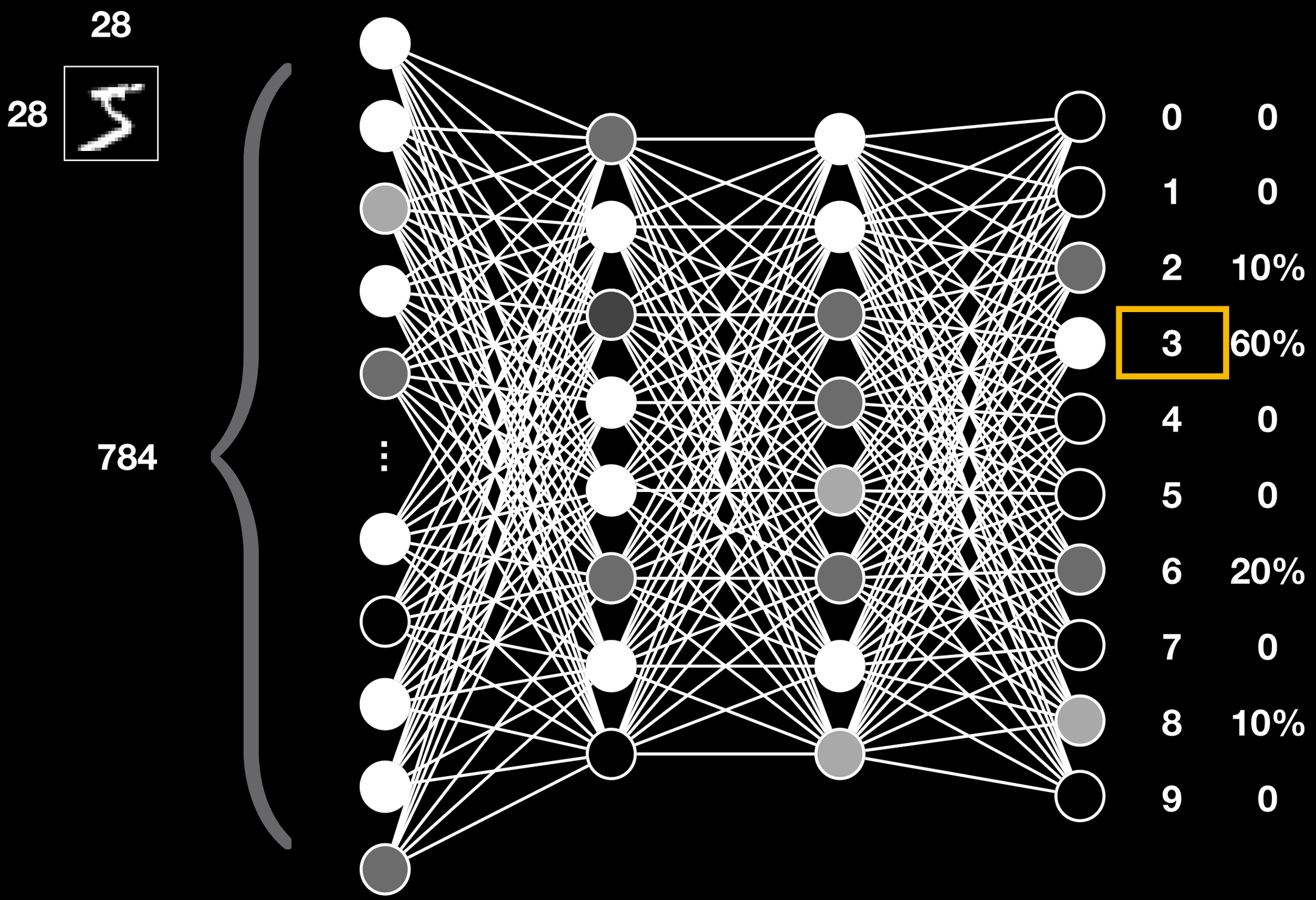
$$(c_0, c_1, ..., c_9) = f(x_1, x_2, ...x_{784})$$



$$(c_0, c_1, ..., c_9) = f(x_1, x_2, ...x_{784})$$



$$(c_0, c_1, ..., c_9) = f(x_1, x_2, ...x_{784})$$



$$(c_0, c_1, ..., c_9) = f(x_1, x_2, ...x_{784})$$

TensorFlow

Keras

theano

Install Python (Anaconda)

Install Keras (Tensorflow)

Download the dataset

Build the model and training

https://developers.google.com/machine-learning/crash-course/

bingzhang.hu@ncl.ac.uk

github.com/u112358

Caffe

PYTORCH

Caffe2