

Applied Artificial Intelligence

Session 3: Programing And Development Tools
Or
How Easy It Is to Develop AI Solutions

Fall 2018

NC State University

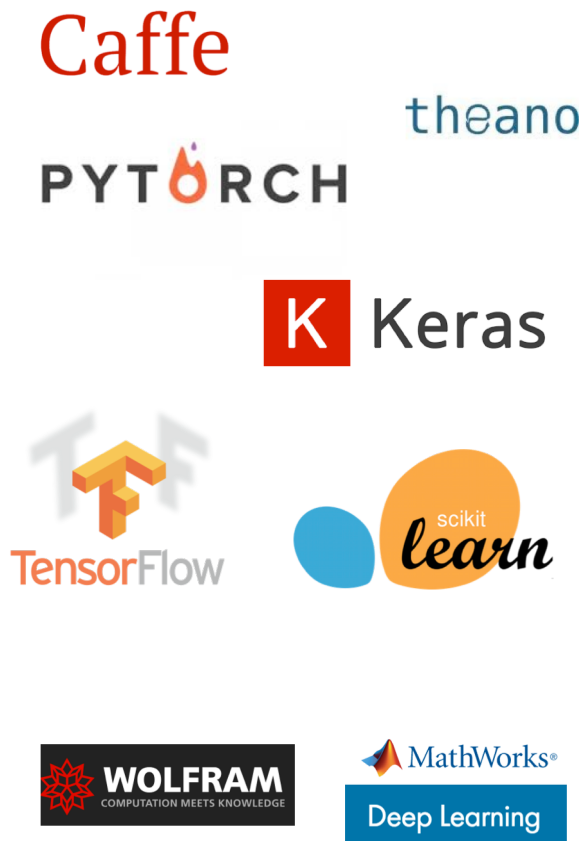
Instructor: Dr. Behnam Kia

Course Website: <https://appliedai.wordpress.ncsu.edu/>

Development Environment



Software



Models

- CNN
- Linear Regression
- SVM
- RNN
- Multilayer Perceptron
- GRU
- LSTM

Development Environment



Software



Models

CNN

Linear Regression

SVM

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Software



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CNN

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Our Solution Stack

Software

In computing, a solution stack or software stack is a set of software subsystems or components needed to create a complete platform such that no additional software is needed to support applications. Applications are said to "run on" or "run on top of" the resulting platform.

-Wikipedia



Why Python is so popular?!

Why Python is so popular?!

C++

Fast Execution

Python

Fast Production

Why Python is so popular?!

C++

Fast Execution

Python

Fast Production

In many applications and fields, we are indifferent to fractions of a second that a code might execute faster, but faster production means saving developer's time, \$, faster to market, etc.

Why Python code is fast to produce?

- Friendly & Easy to Learn
- Open-source
- Thousands of standard and third-party modules for Python, allowing for endless possibilities.

Python

Fast Production

Wh

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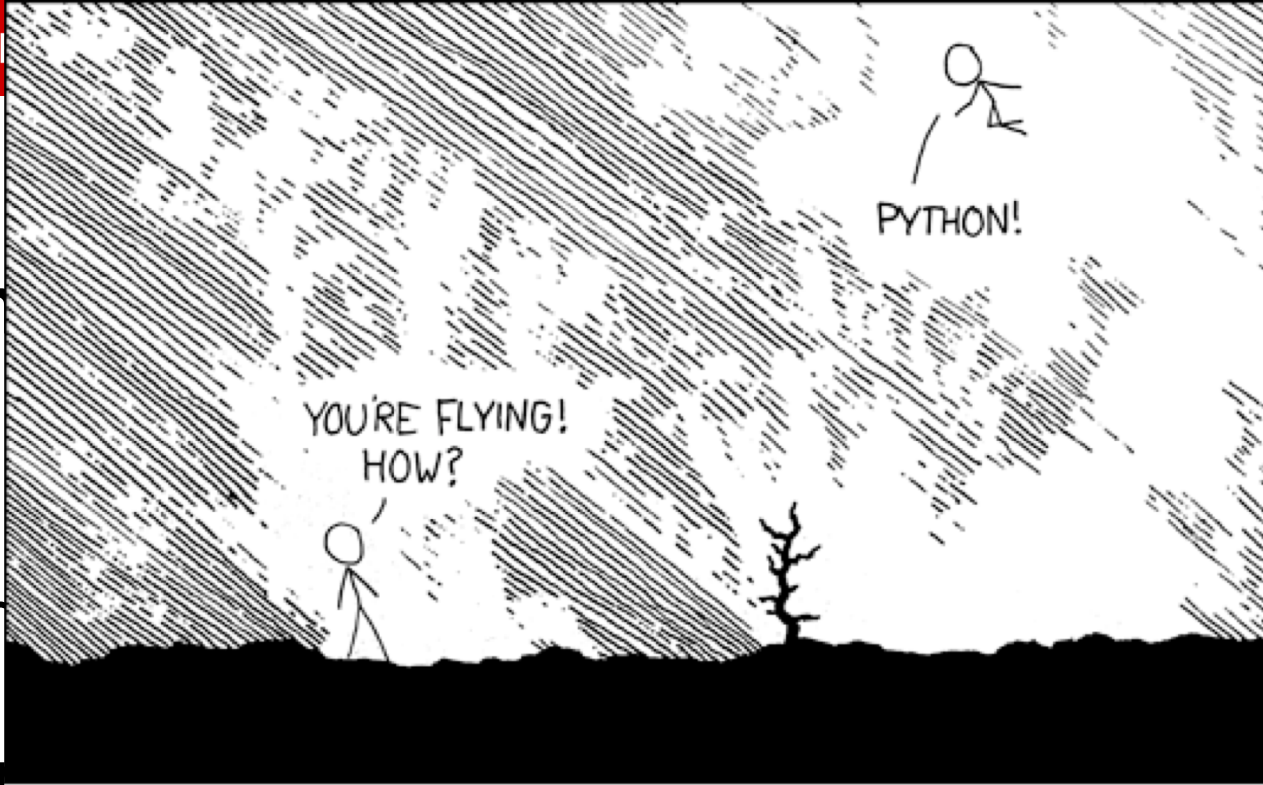
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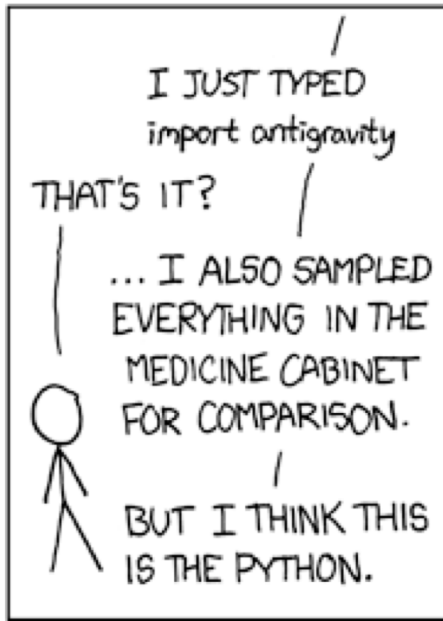
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Python

Named after this?



Python



Guido van Rossum



Python



Python



Making references to Monty Python skits in documentation is not only allowed, it is encouraged!

-<https://docs.python.org>

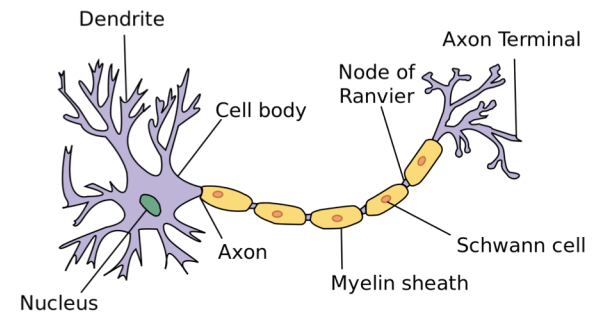
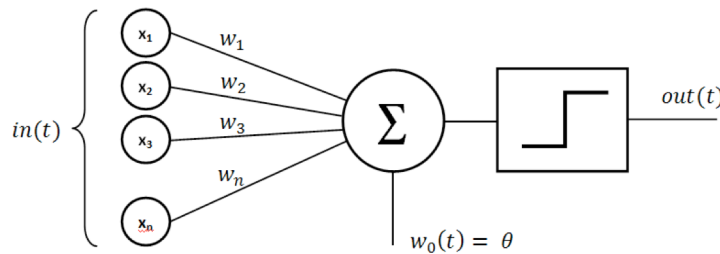




First Exercise: Looping vs. Vectorization

Perceptron: A Computational Neuron Model

$$y = f(WX^T) = f\left(\sum w_i x_i\right)$$



First introduced as a computational model for a nerve cell. And ever since it has carried the name of artificial neuron.

Machine Learning: Tensors, Tensors, Tensors, Tensors,...

- Machine learning software is basically a linear algebra package to work with Tensors!
 - TensorFlow
 - Theano
 - ...
- And machine learning hardware is (going to be) a dense system of Tensor- Tensor multipliers with fast routing for data.
 - TPU
 - Intel's Nervana Neural Network Processor
 - ...

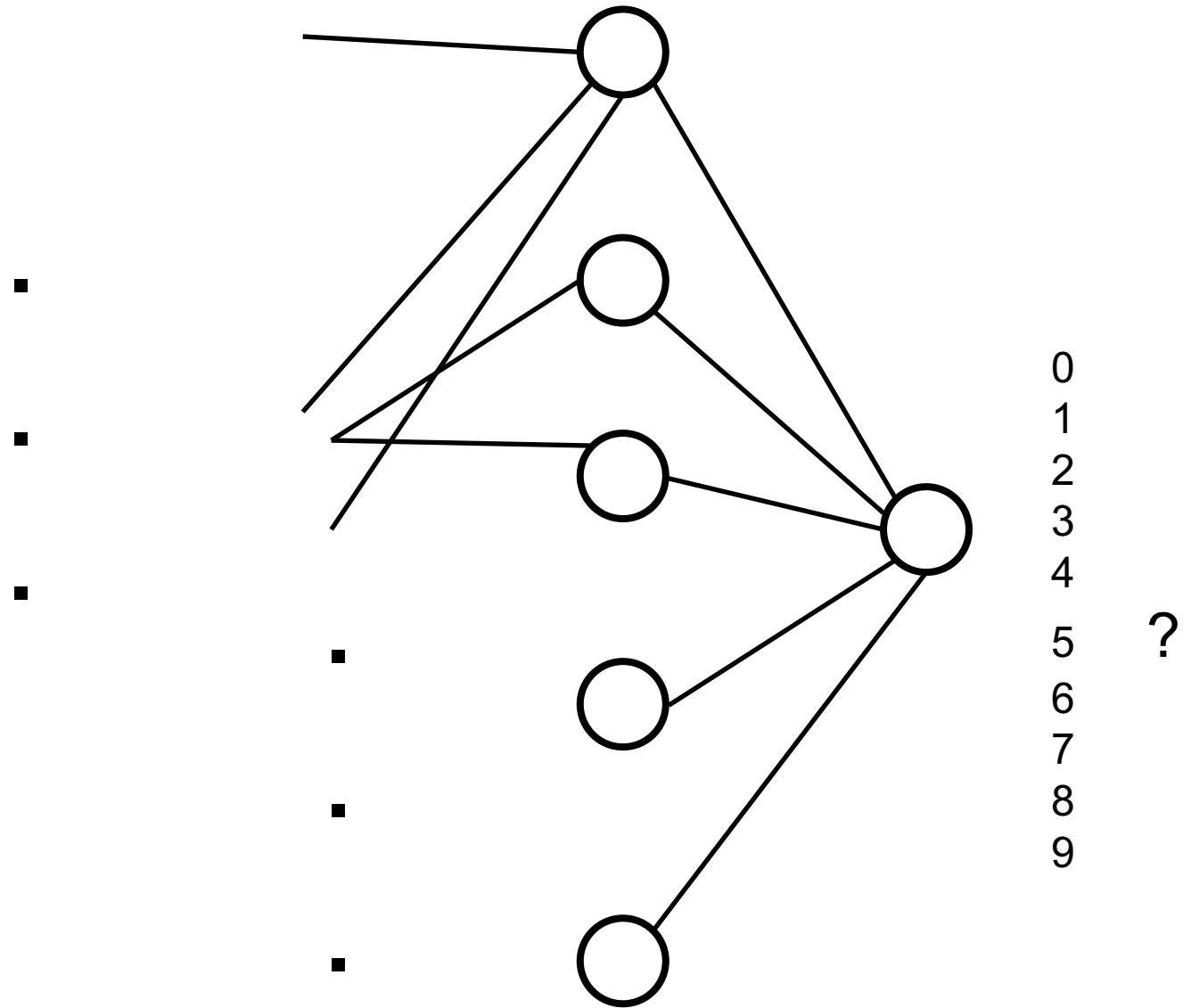
First Exercise: Looping vs. Vectorization

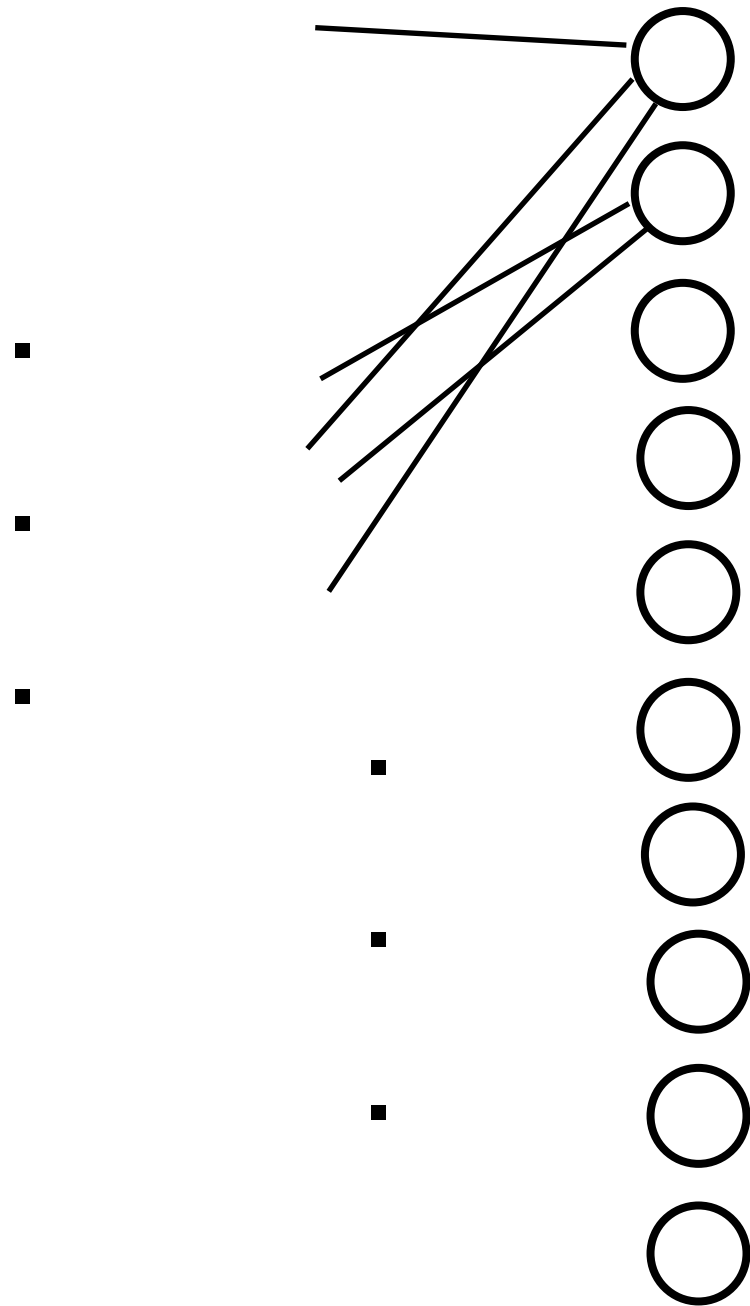
- Reading Assignment for next session:
"The NumPy array: a structure for efficient numerical computation." Computing in Science & Engineering 13.2 (2011): 22-30.

<https://arxiv.org/pdf/1102.1523.pdf>

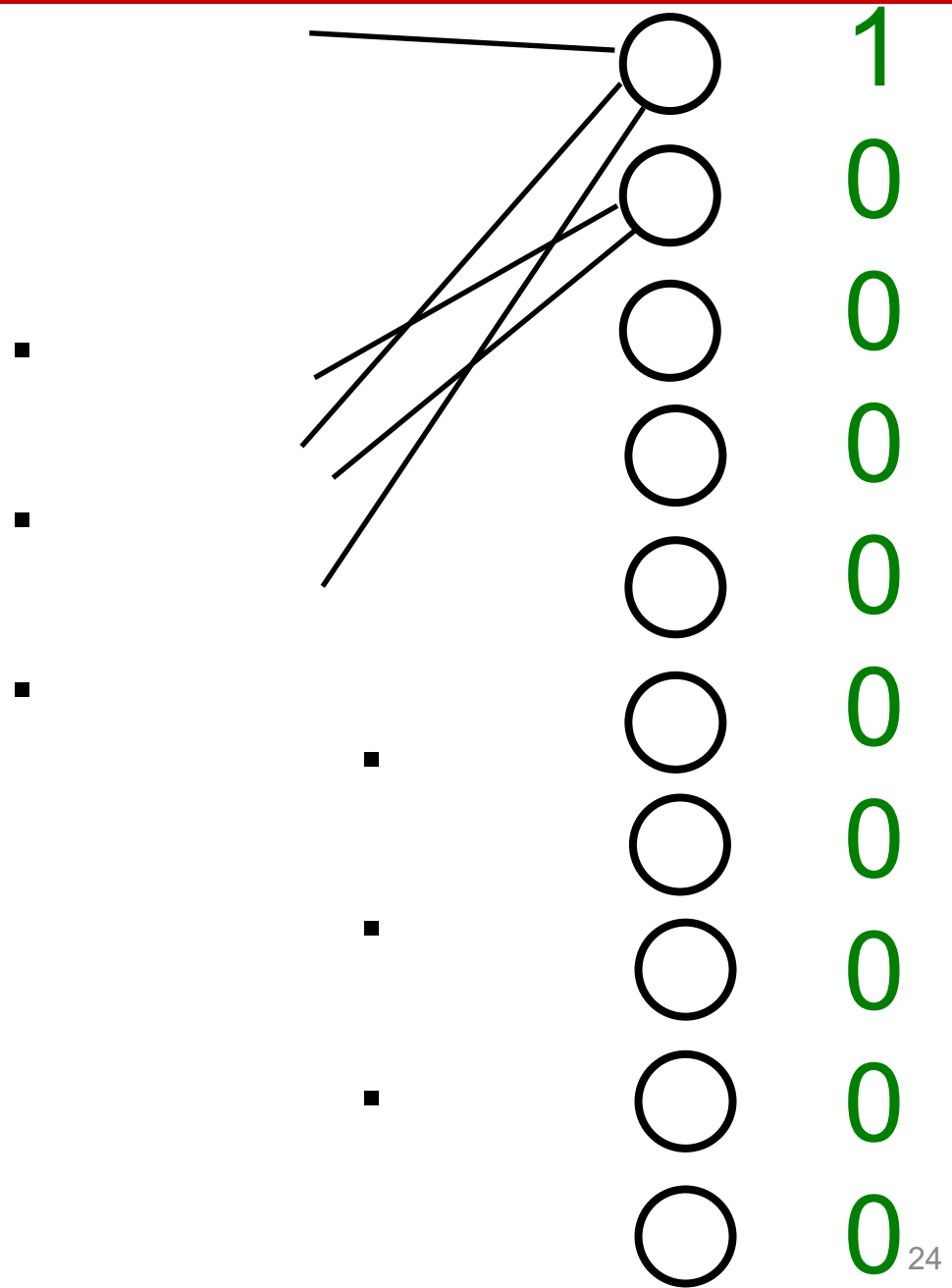
Second Exercise: Multilayer Perceptron (deep network) for MNIST Classification

- <https://keras.io/>

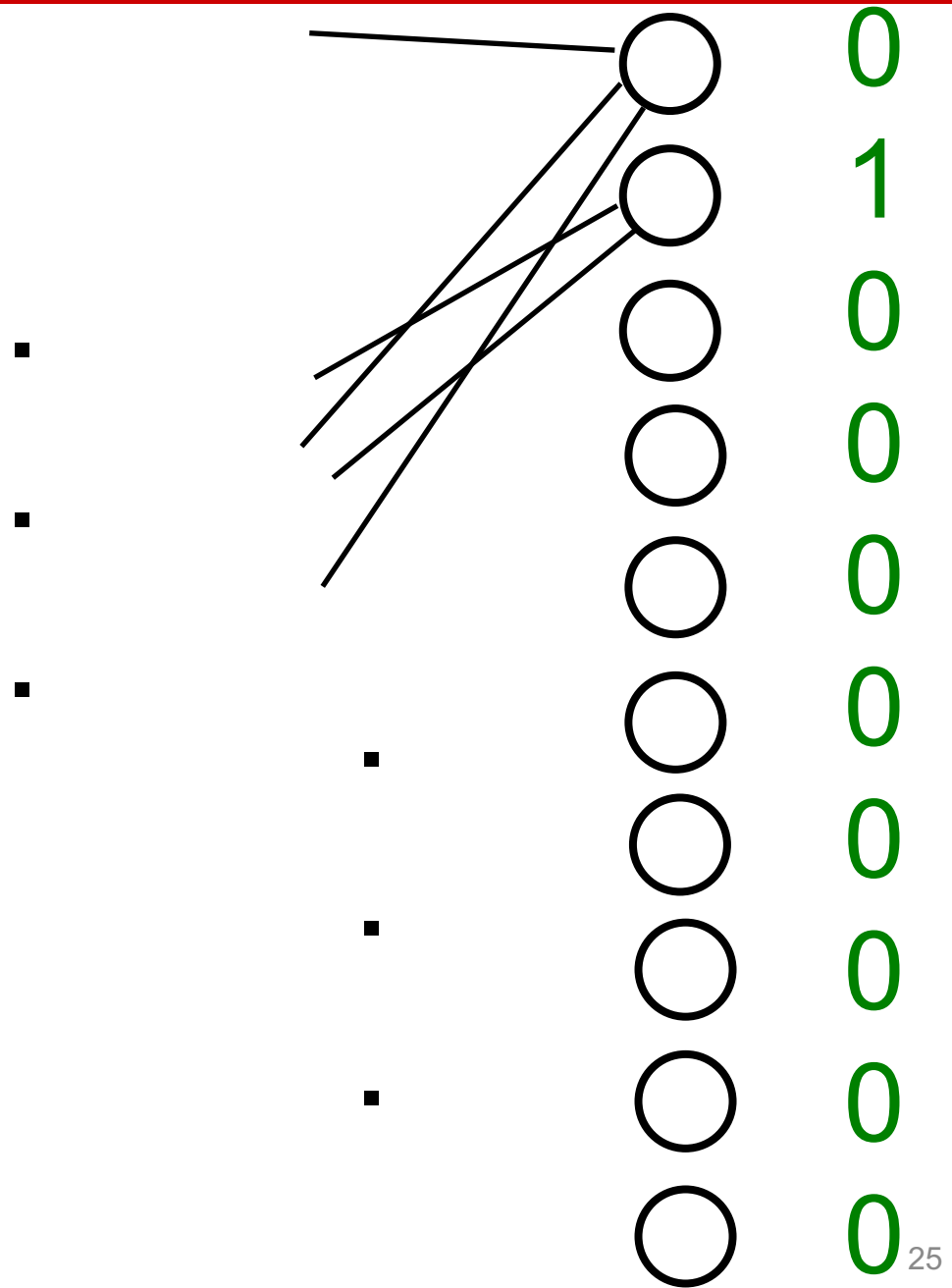




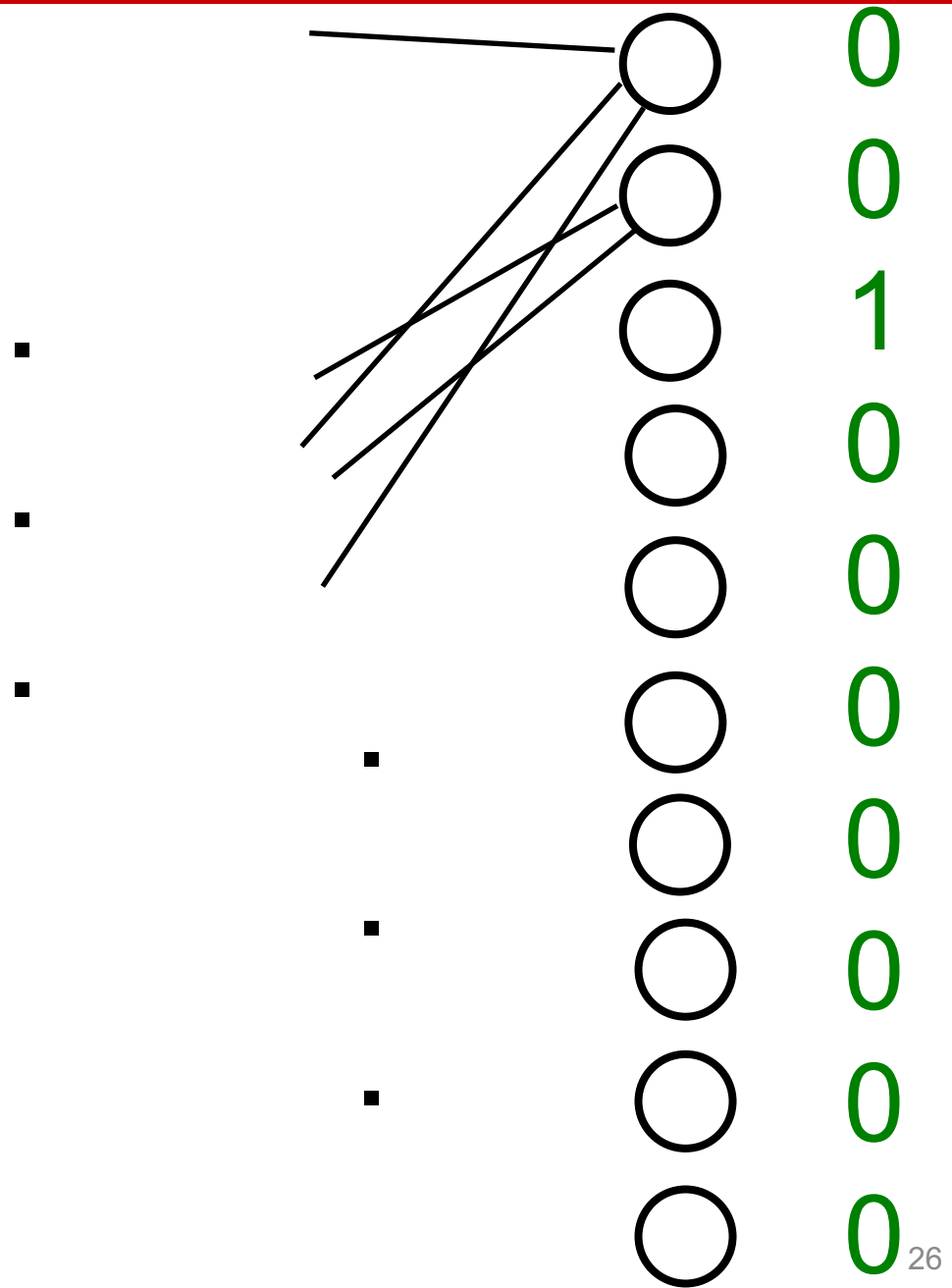
This means the network says 0



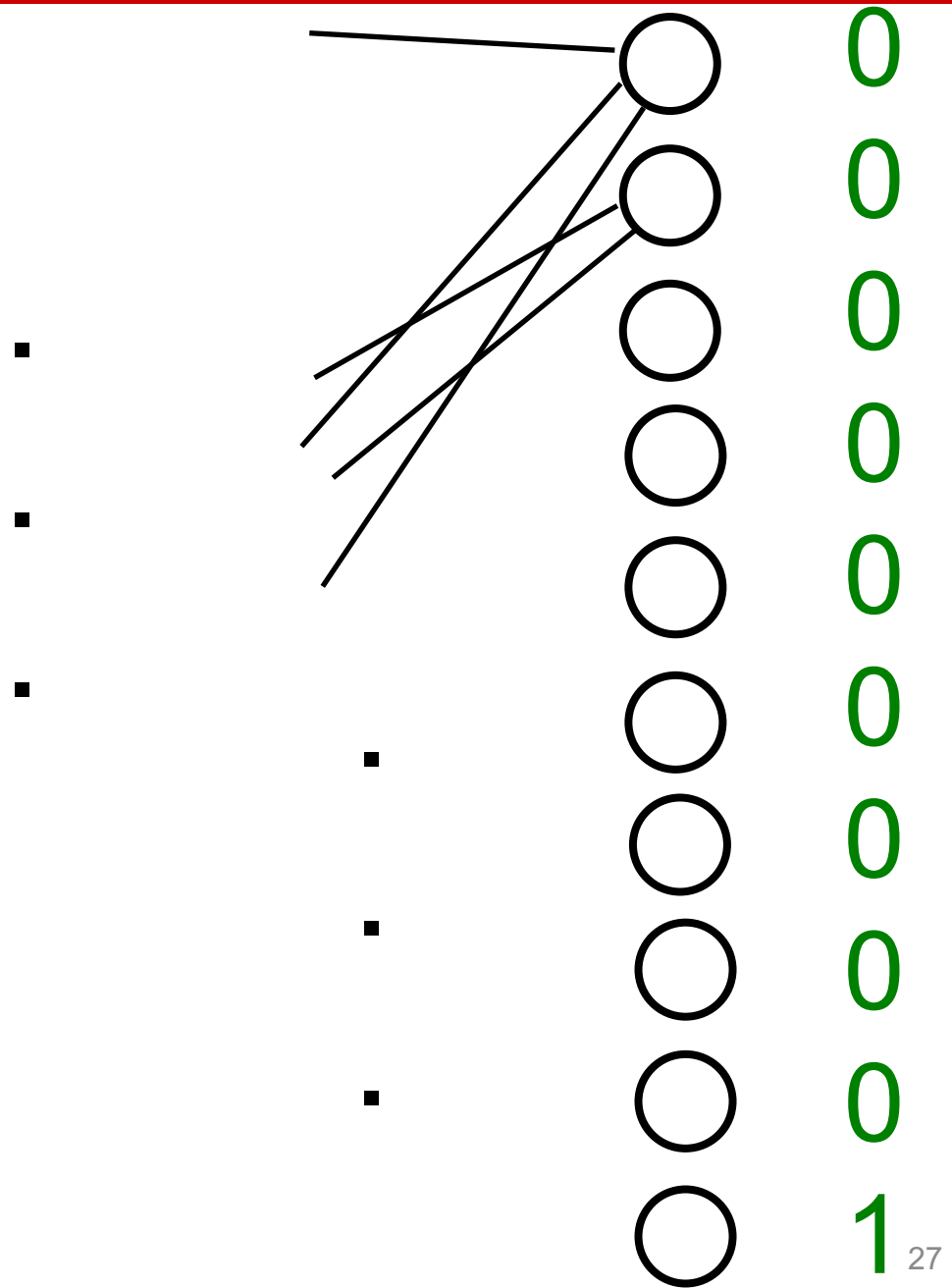
This means the network says 1



This means the network says 2



This means the network says 9



See you next week!

- Next session:
Searching as an AI method