

# Arduinobot

Introduction

Setup

Digital  
Twin

ROS 2

Control

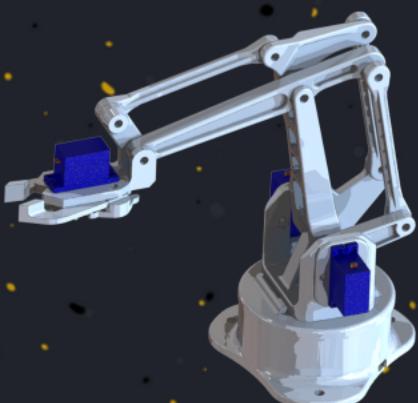
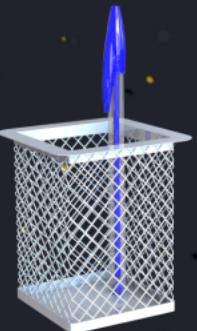
Kinematics

Application

Alexa

Conclusions

Build

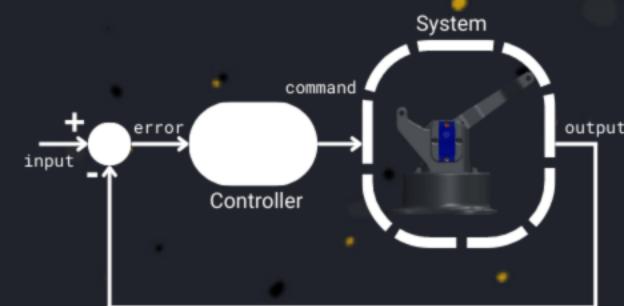


Digital Twin



Control

ros2\_control

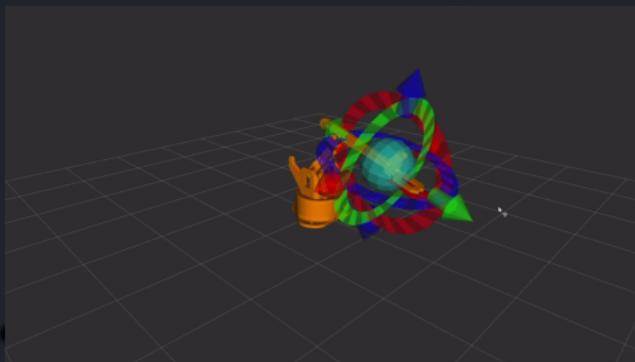


Digital Twin



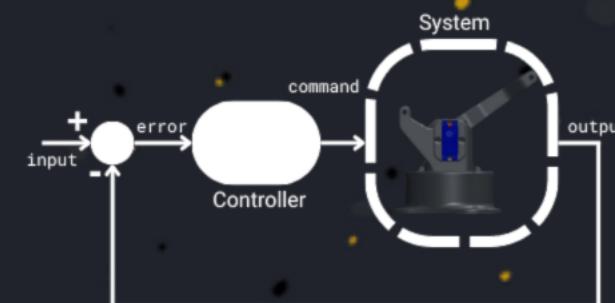
## Kinematics

 **MoveIt2**

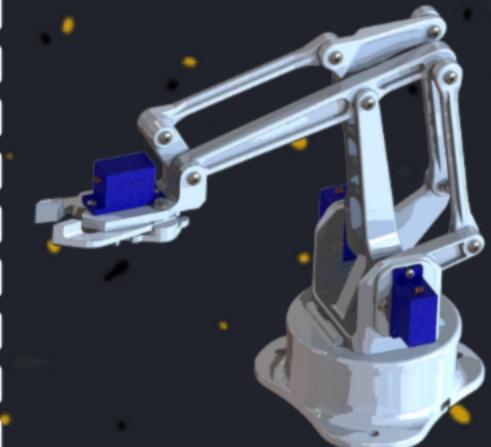


## Control

`ros2_control`



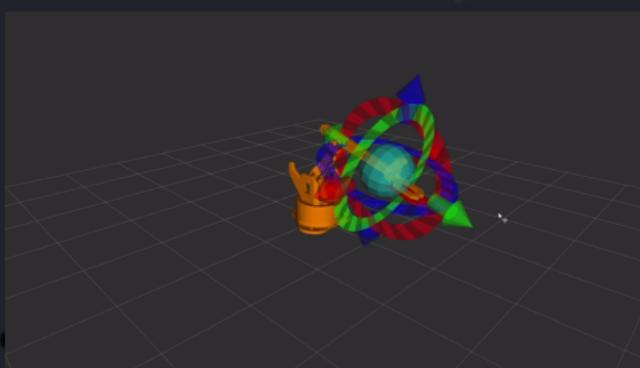
## Digital Twin



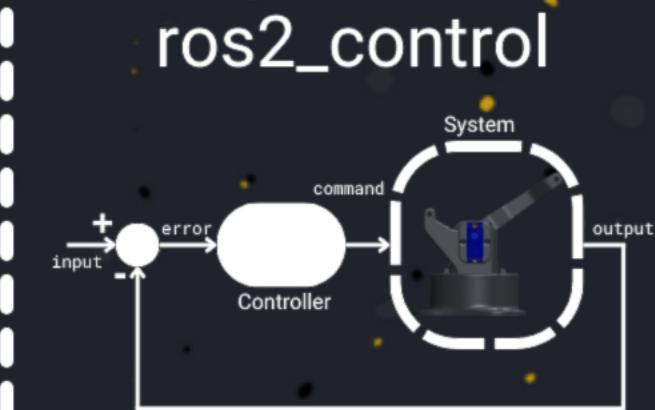
## Application



## Kinematics

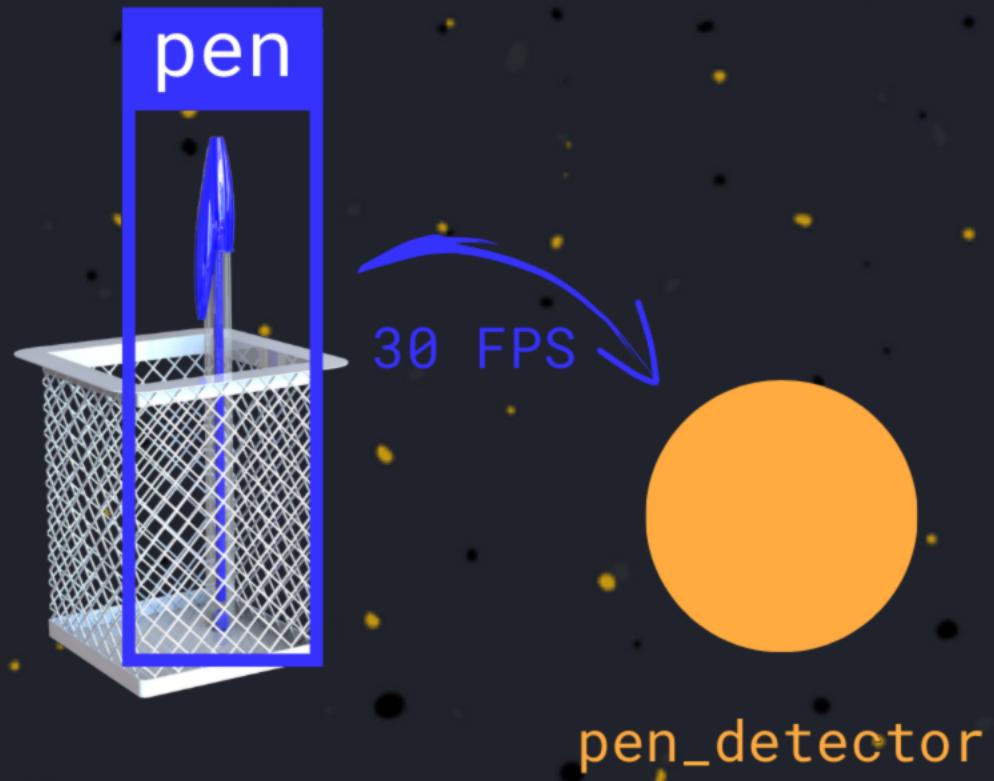


## Control



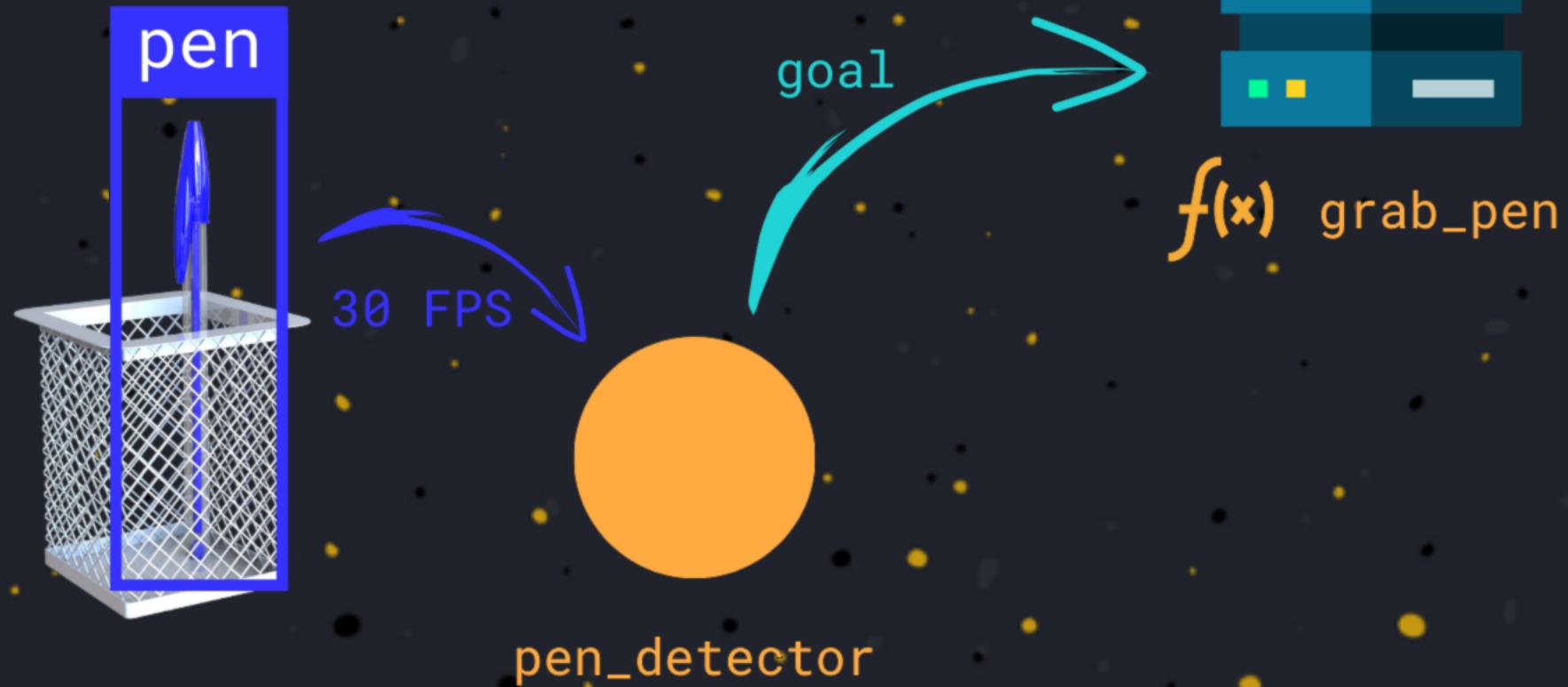
## Digital Twin

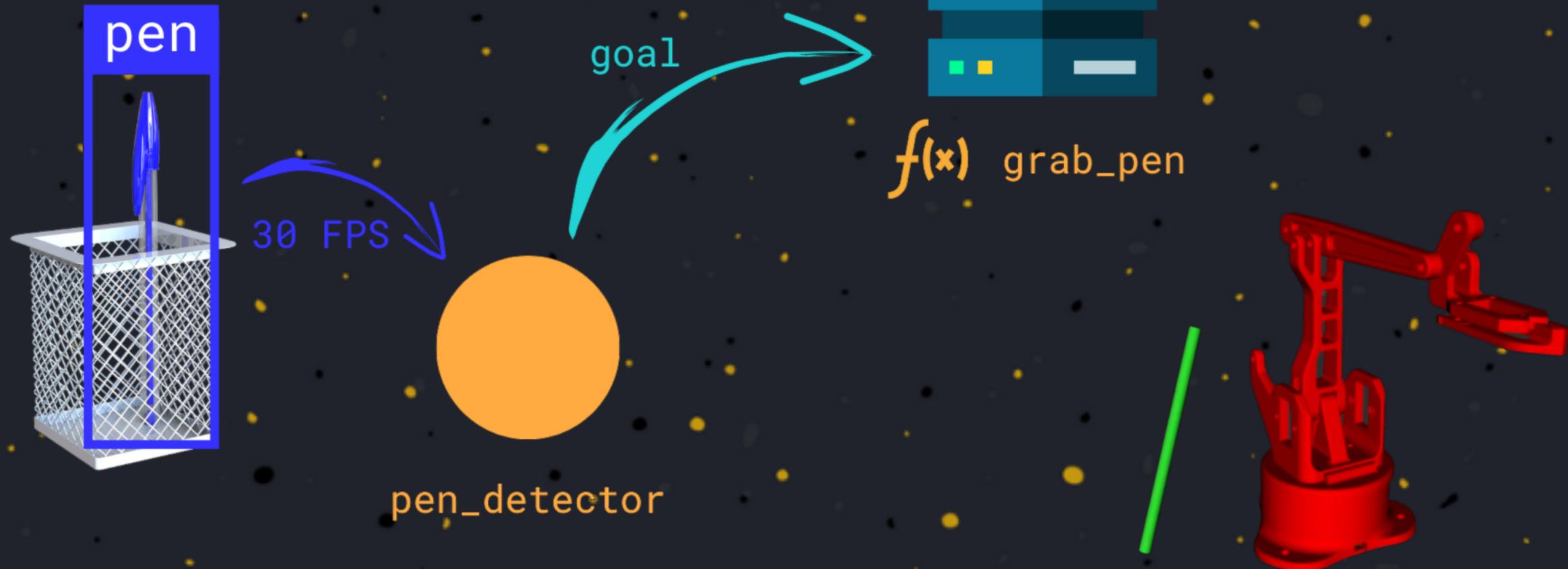


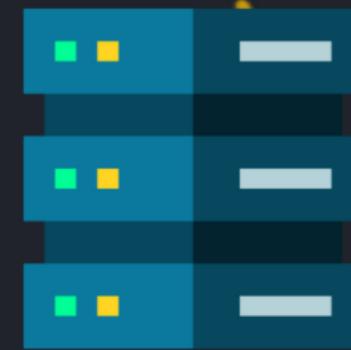




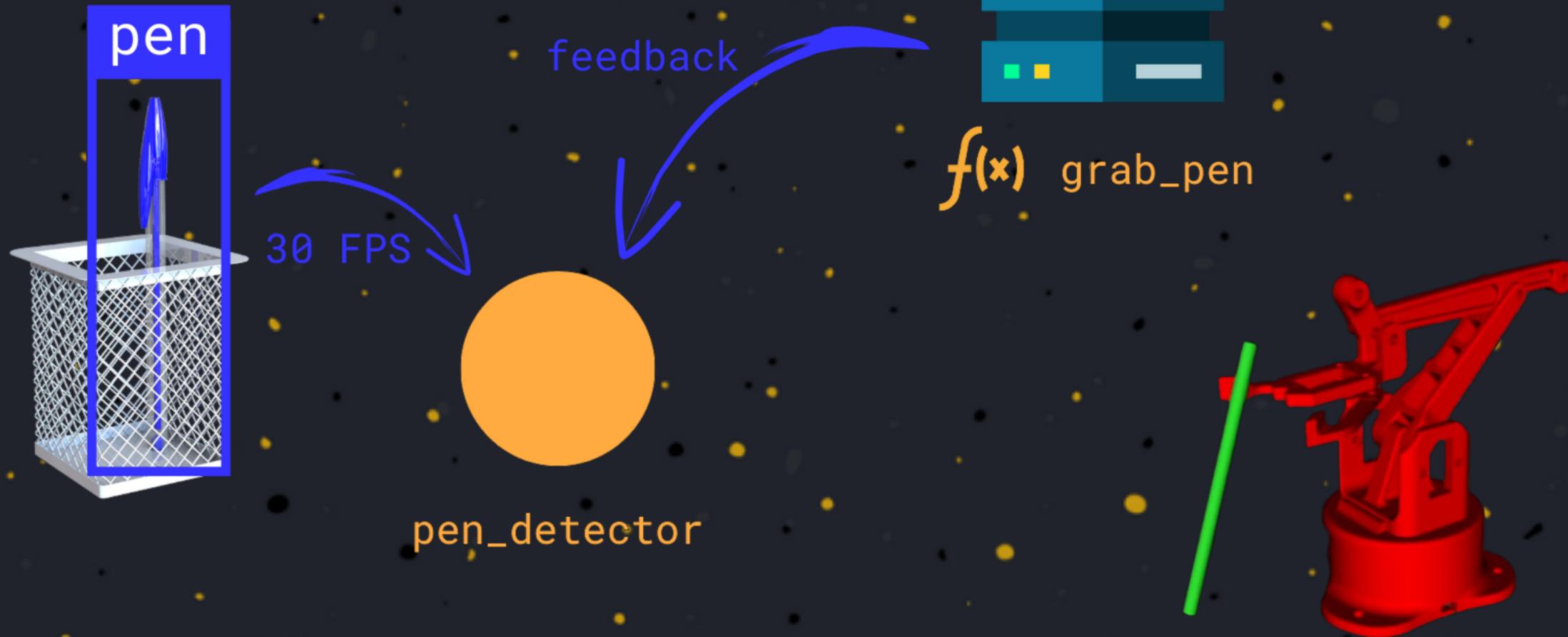
$f(\mathbf{x})$  grab\_pen

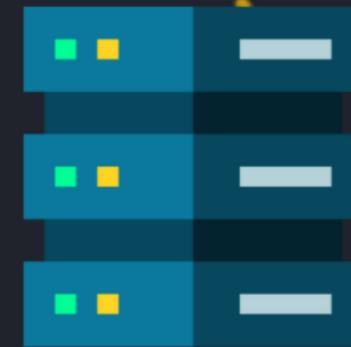




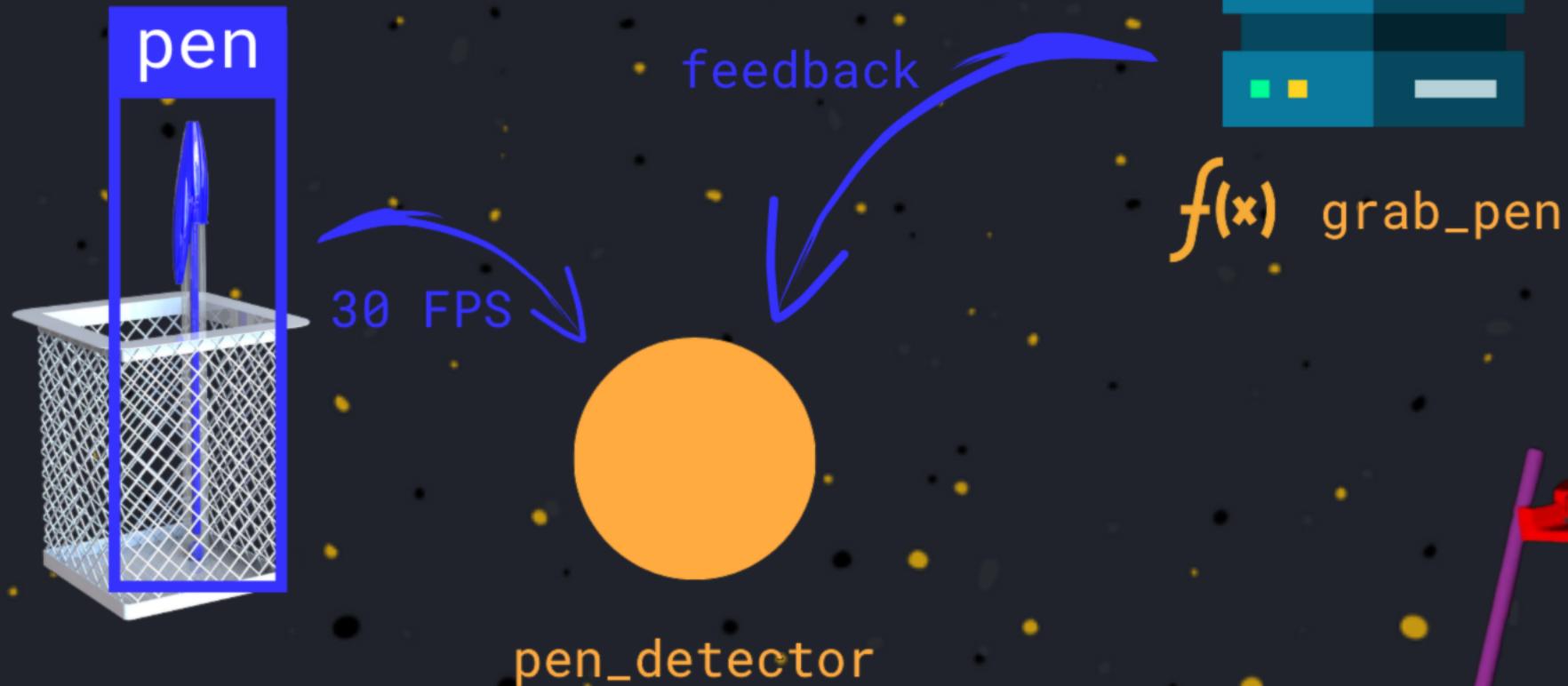


$f(\mathbf{x})$  grab\_pen



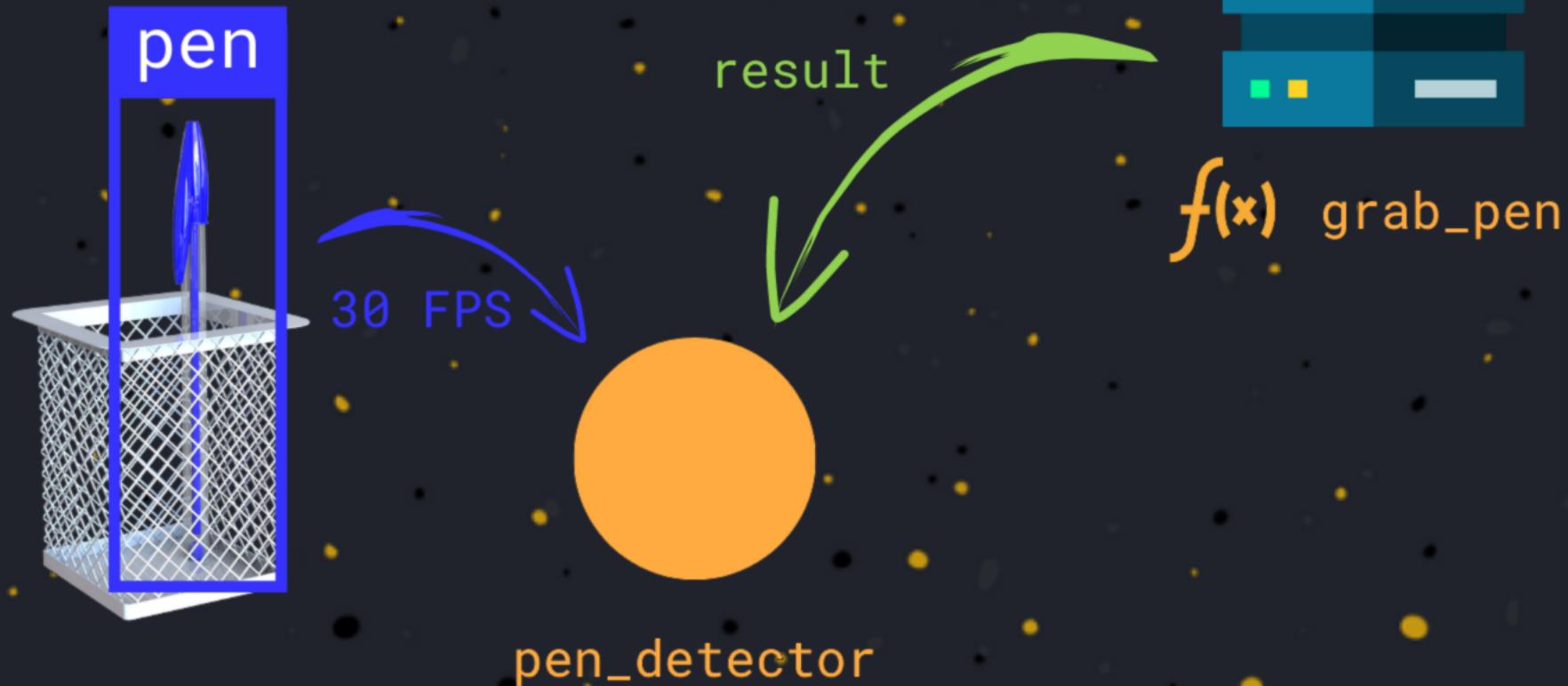


$f(\mathbf{x})$  grab\_pen



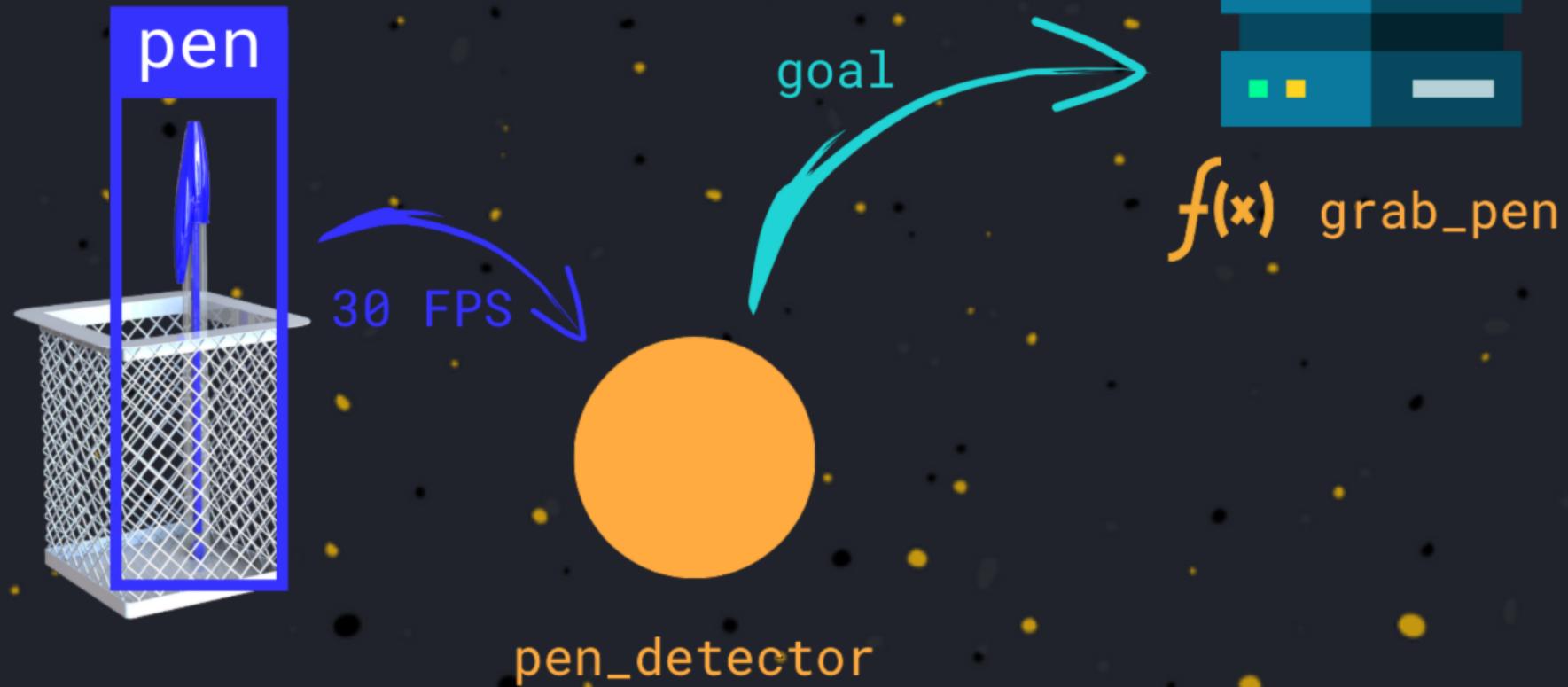


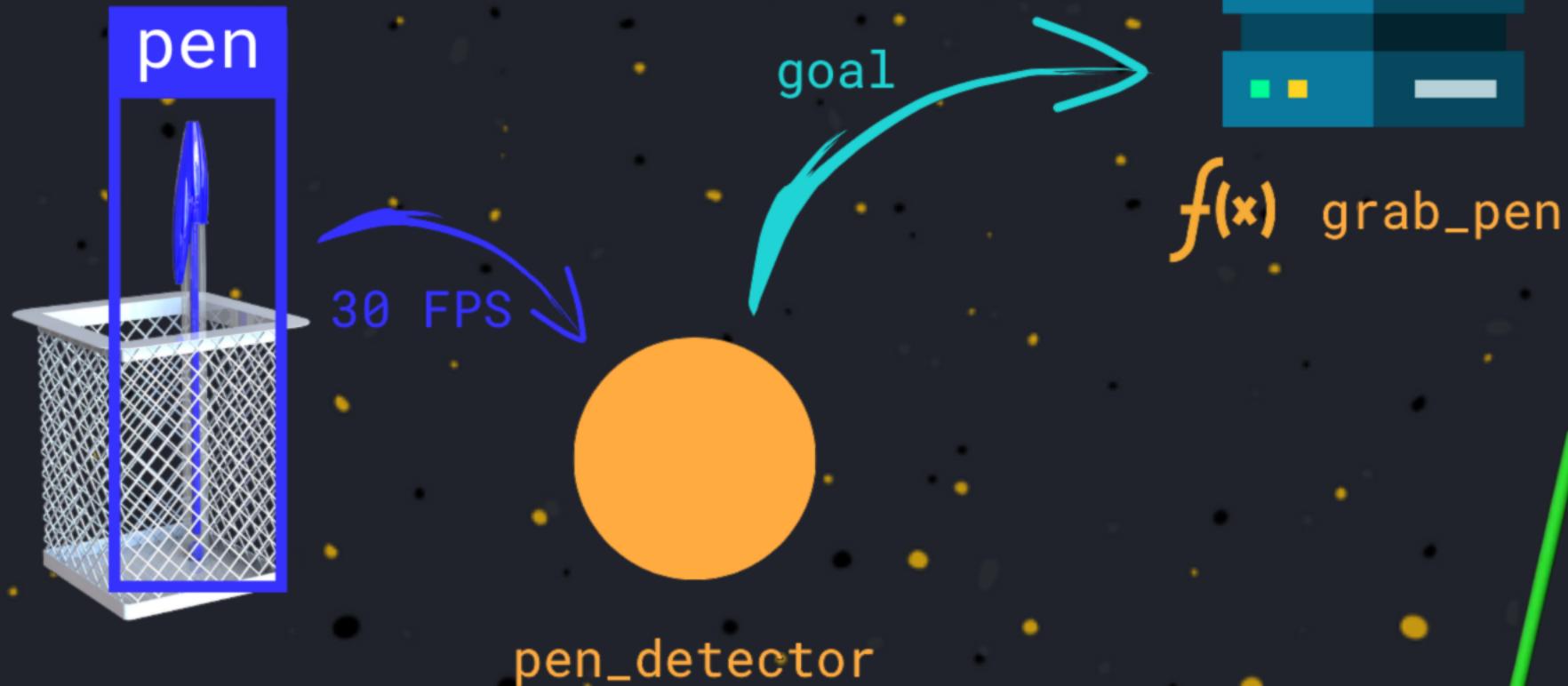
$f(\mathbf{x})$  grab\_pen





$f(\mathbf{x})$  grab\_pen









30 FPS

pen\_detector

cancel



$f(\mathbf{x})$  grab\_pen





30 FPS

pen\_detector

cancel



$f(\mathbf{x})$  grab\_pen





30 FPS

pen\_detector



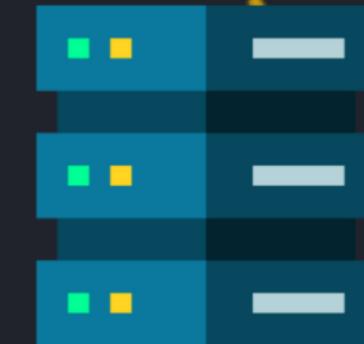
$f(\mathbf{x})$  grab\_pen



30 FPS

pen\_detector

result



$f(\mathbf{x})$  grab\_pen

Action



Client



Server

Action



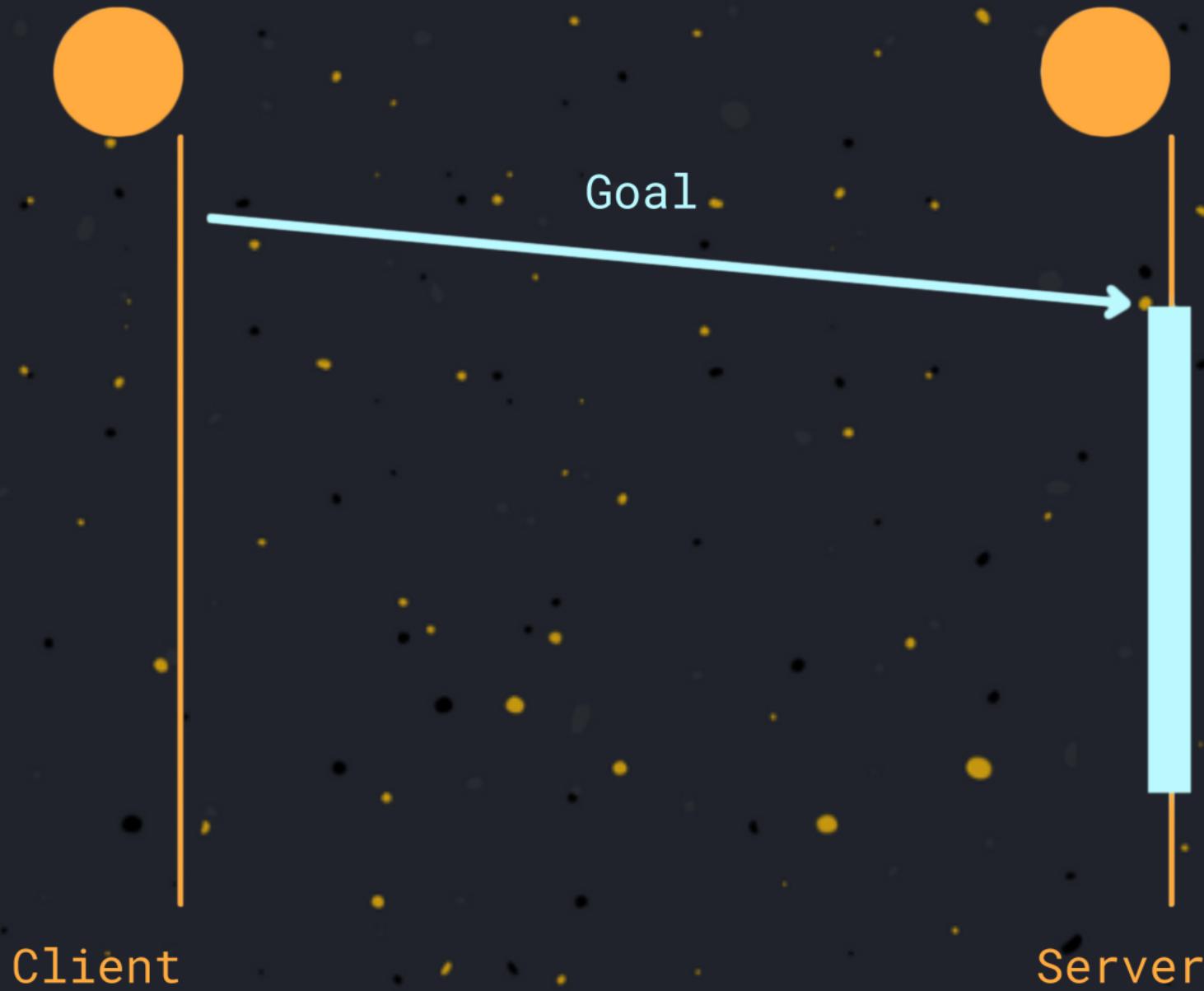
Goal



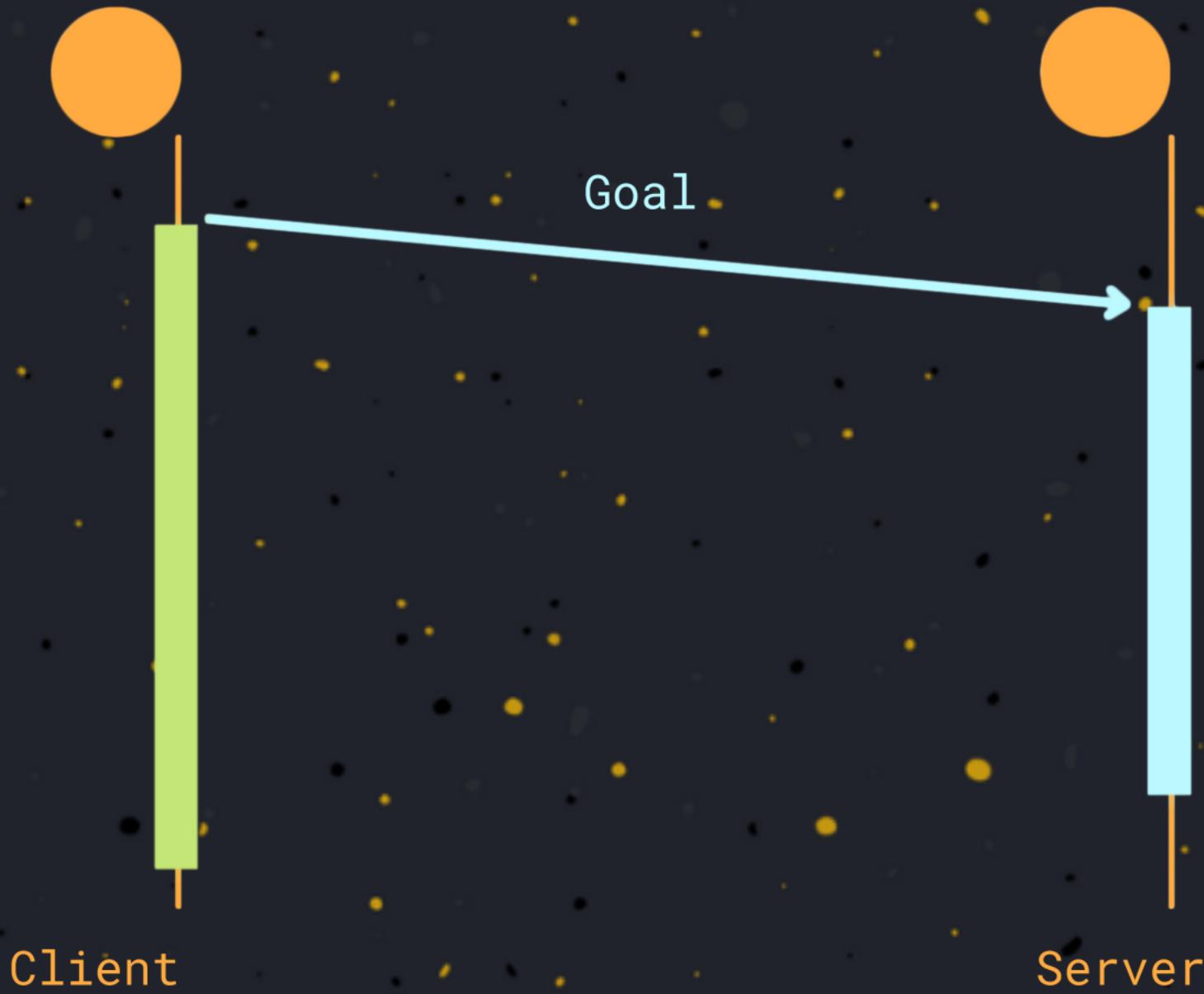
Client

Server

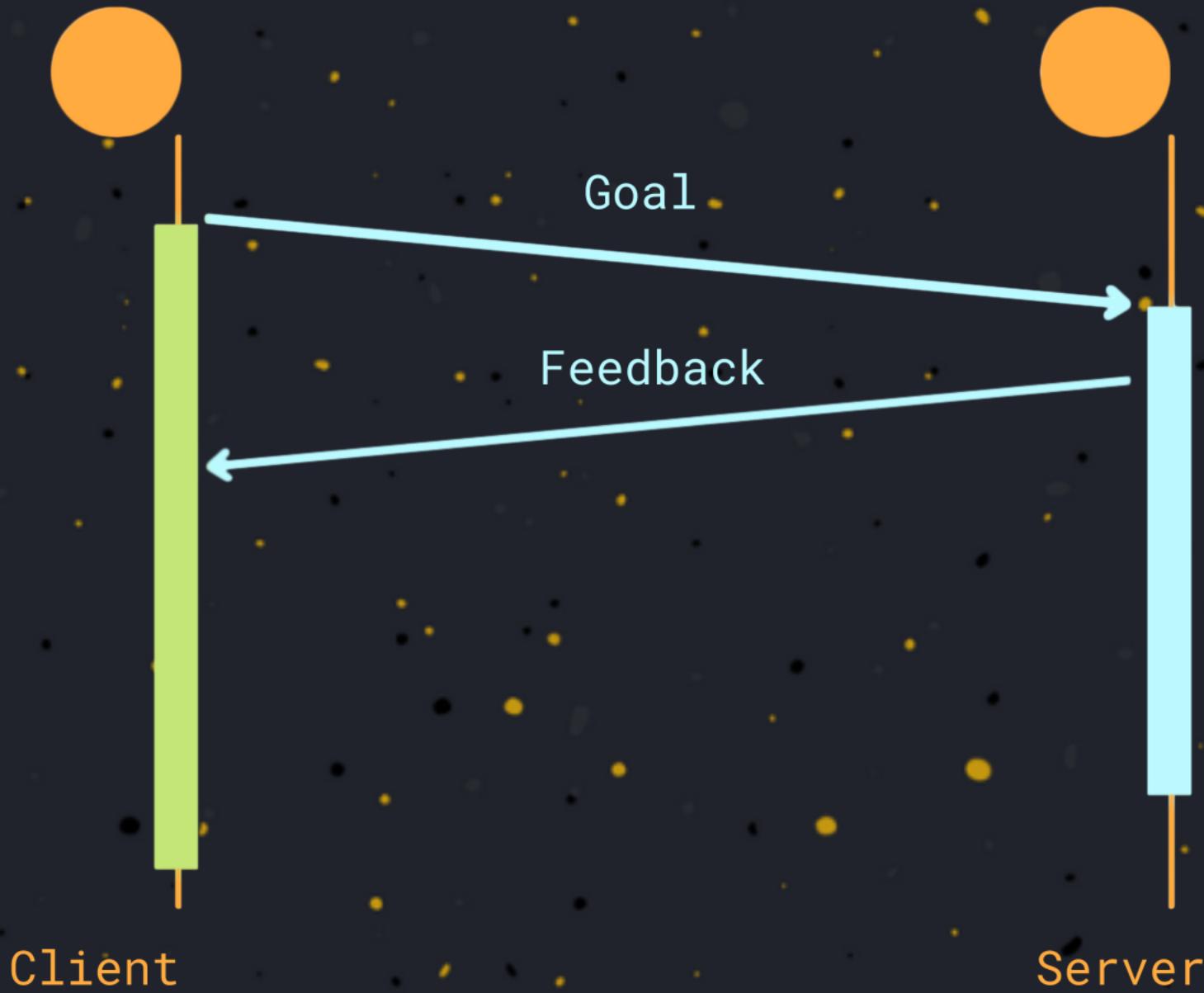
Action



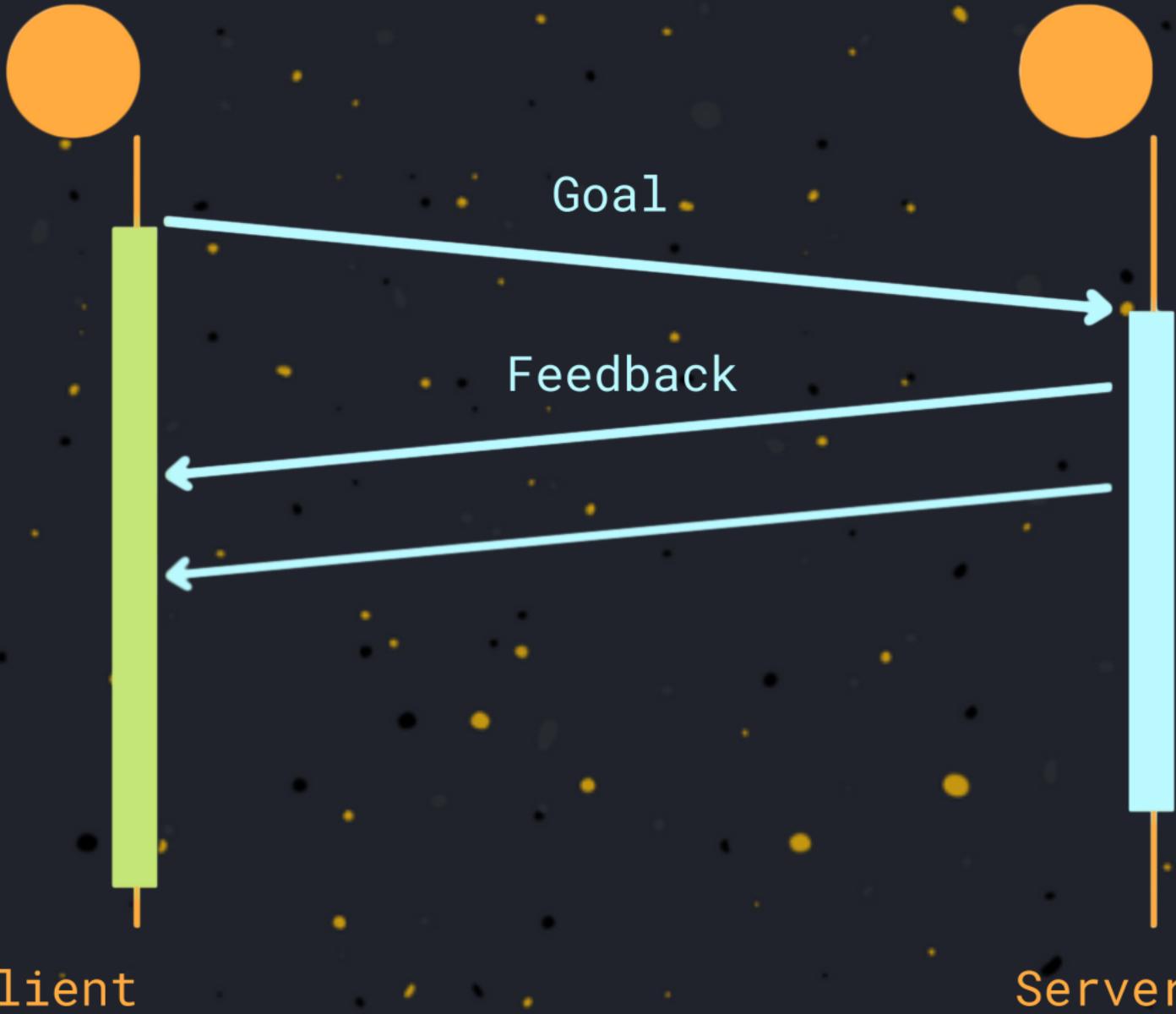
Action



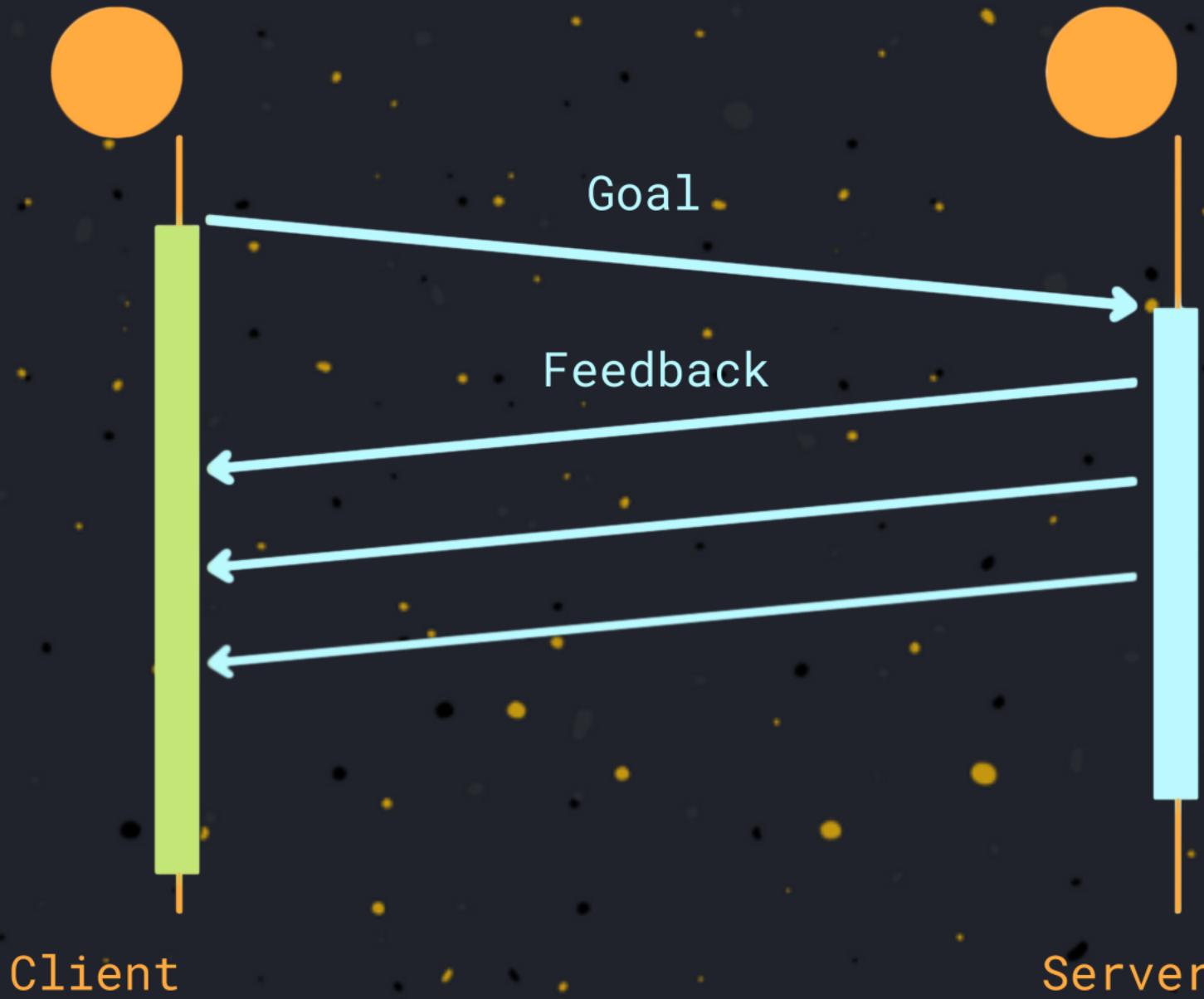
Action



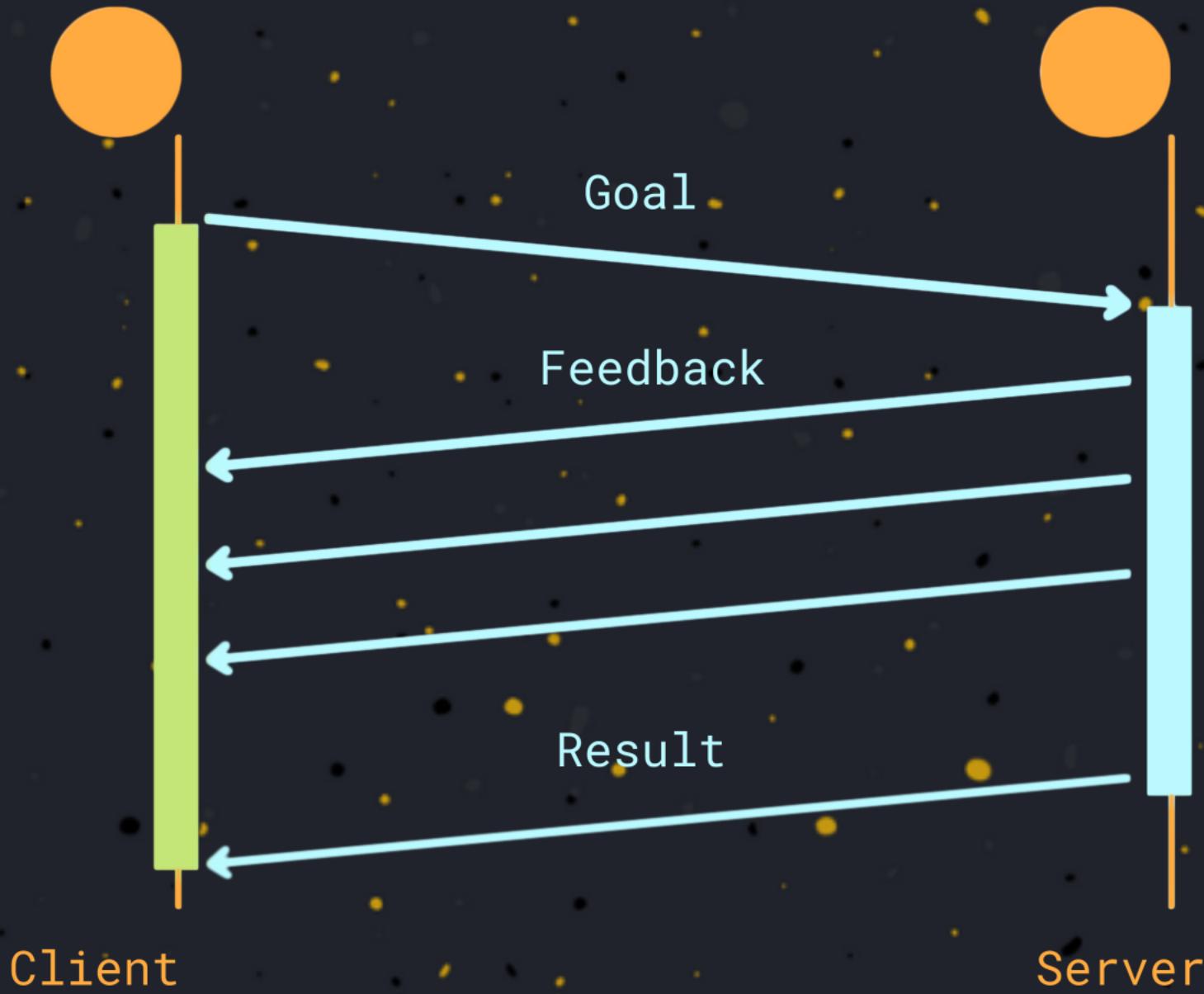
Action



Action



Action



Action

Client

Server

Action



Client



Server

Action



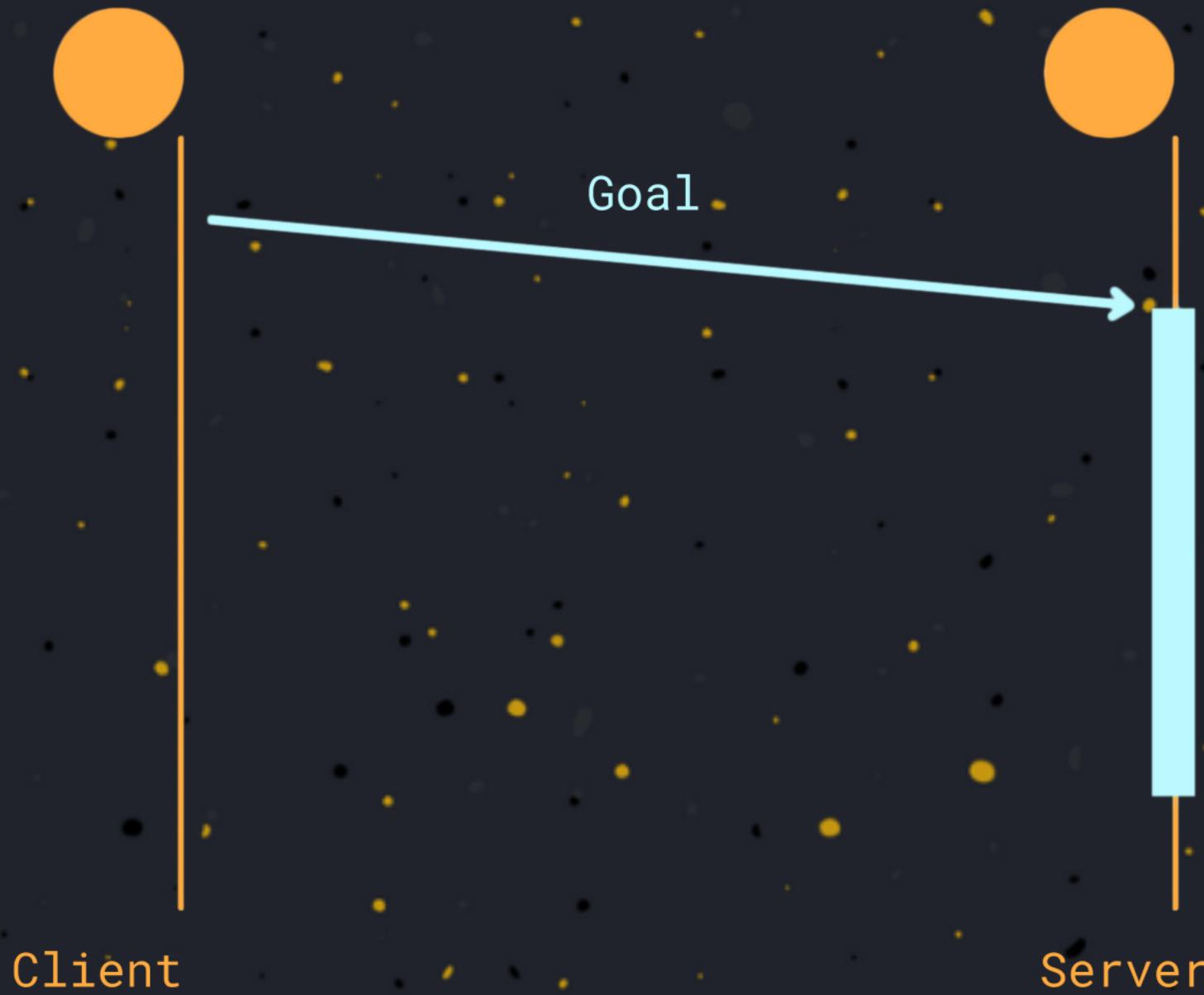
Goal



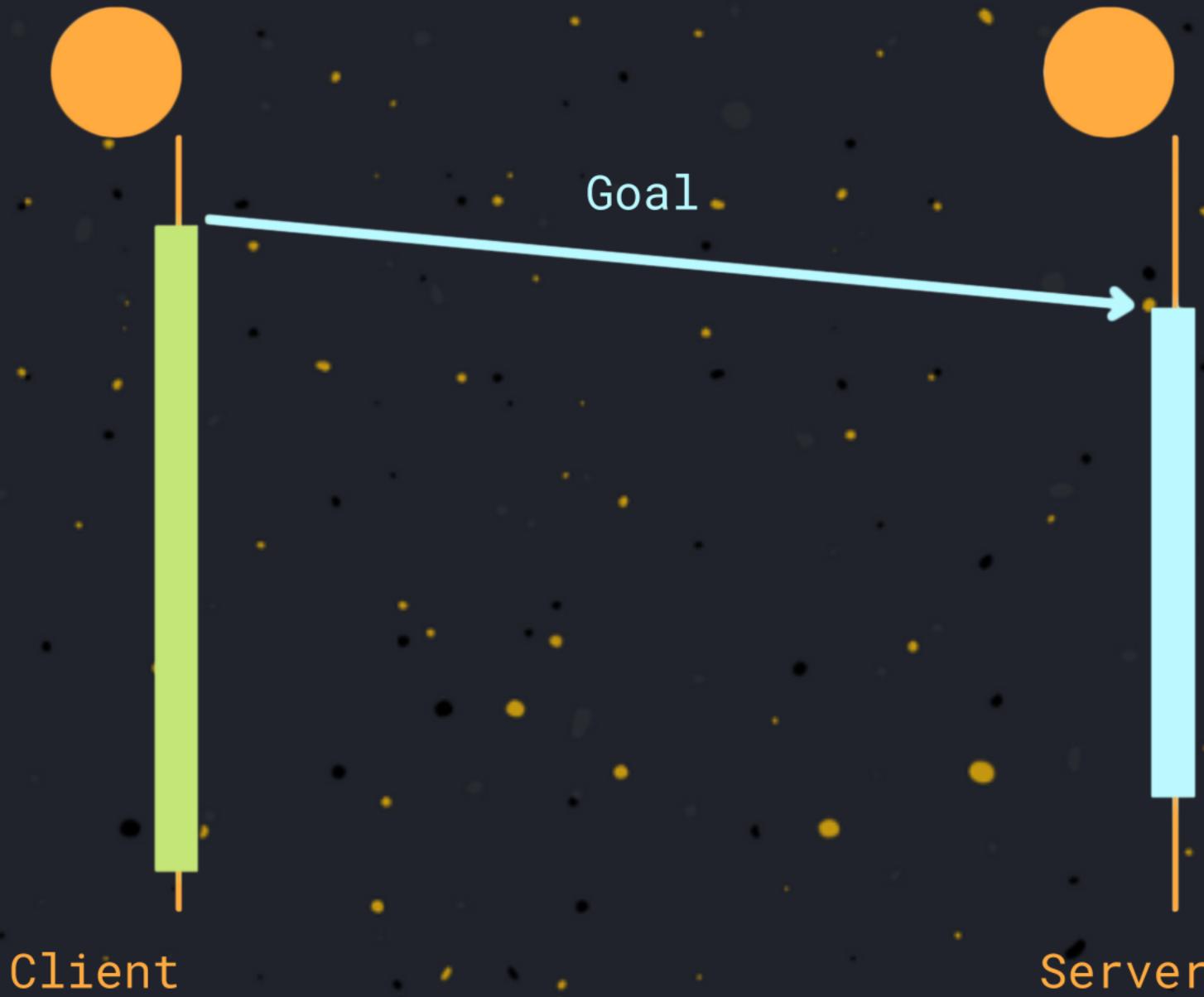
Client

Server

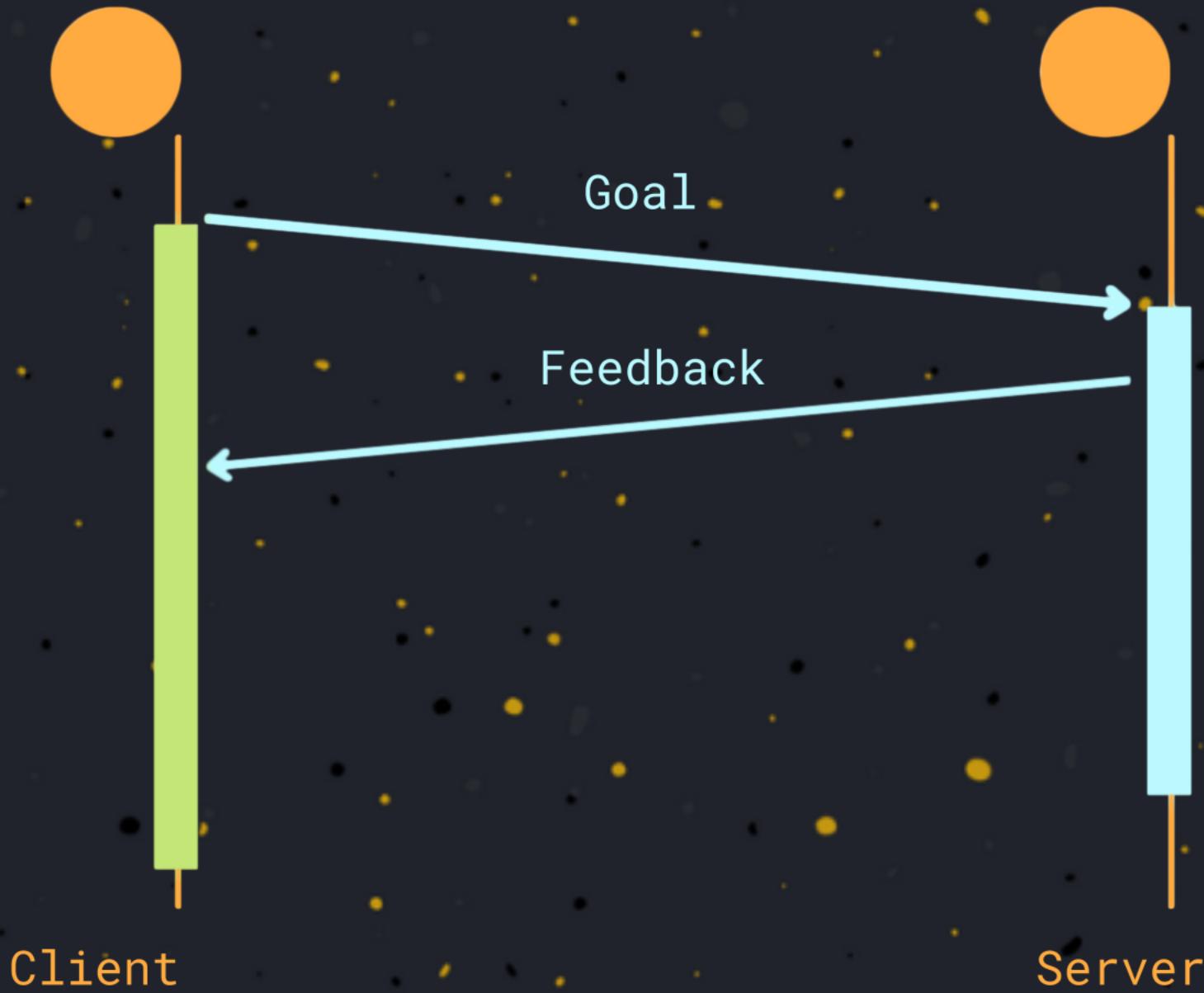
Action



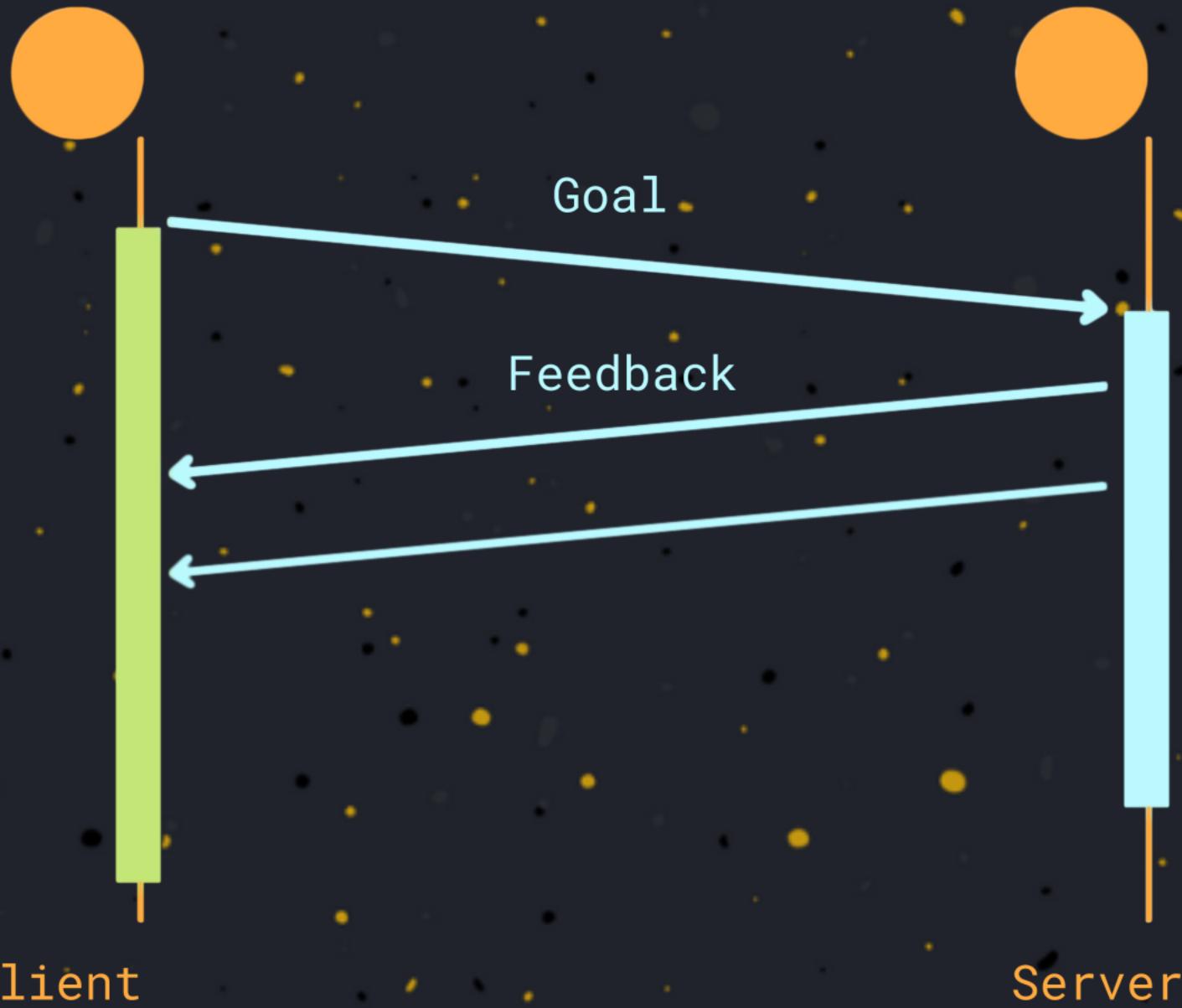
Action



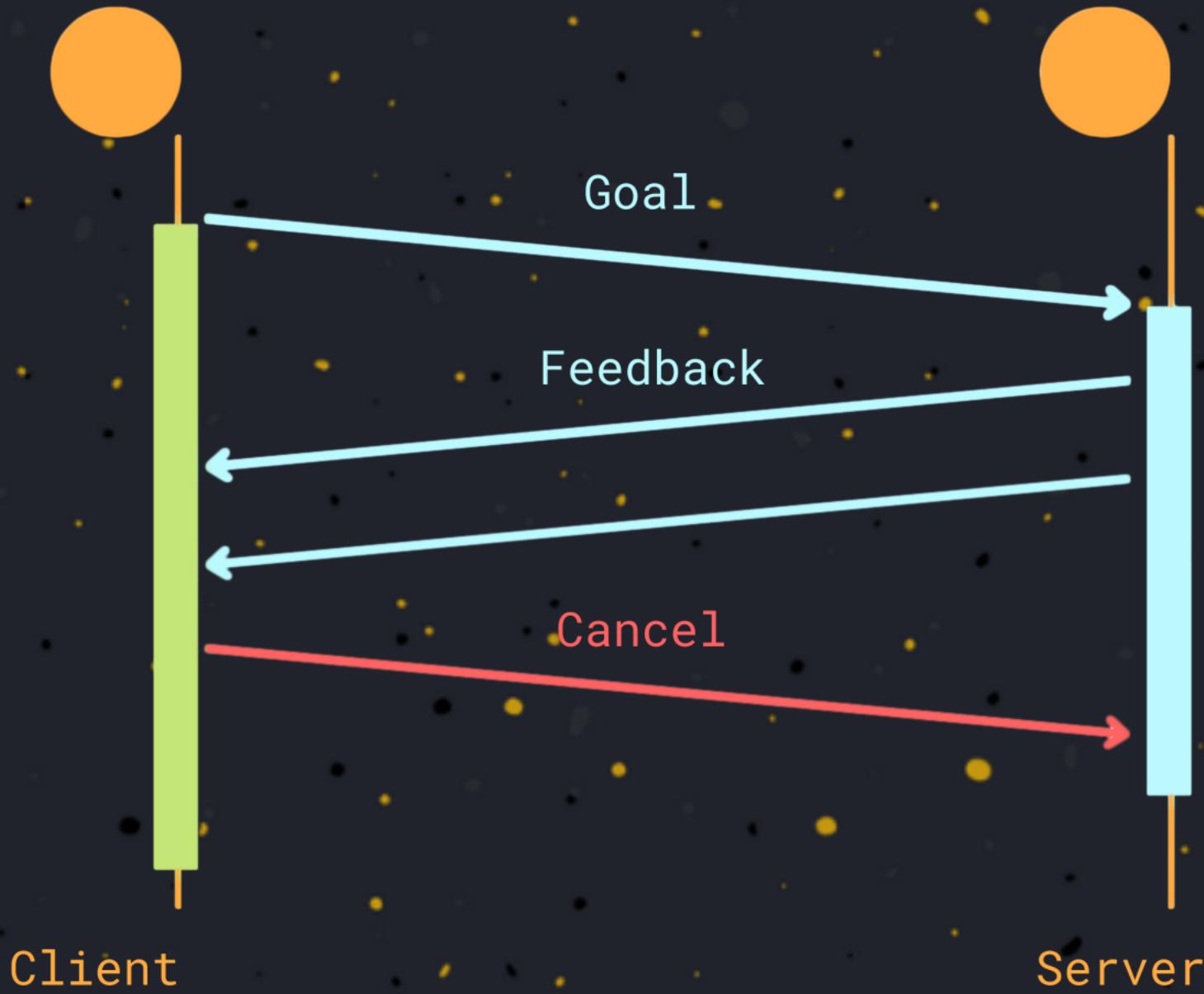
Action



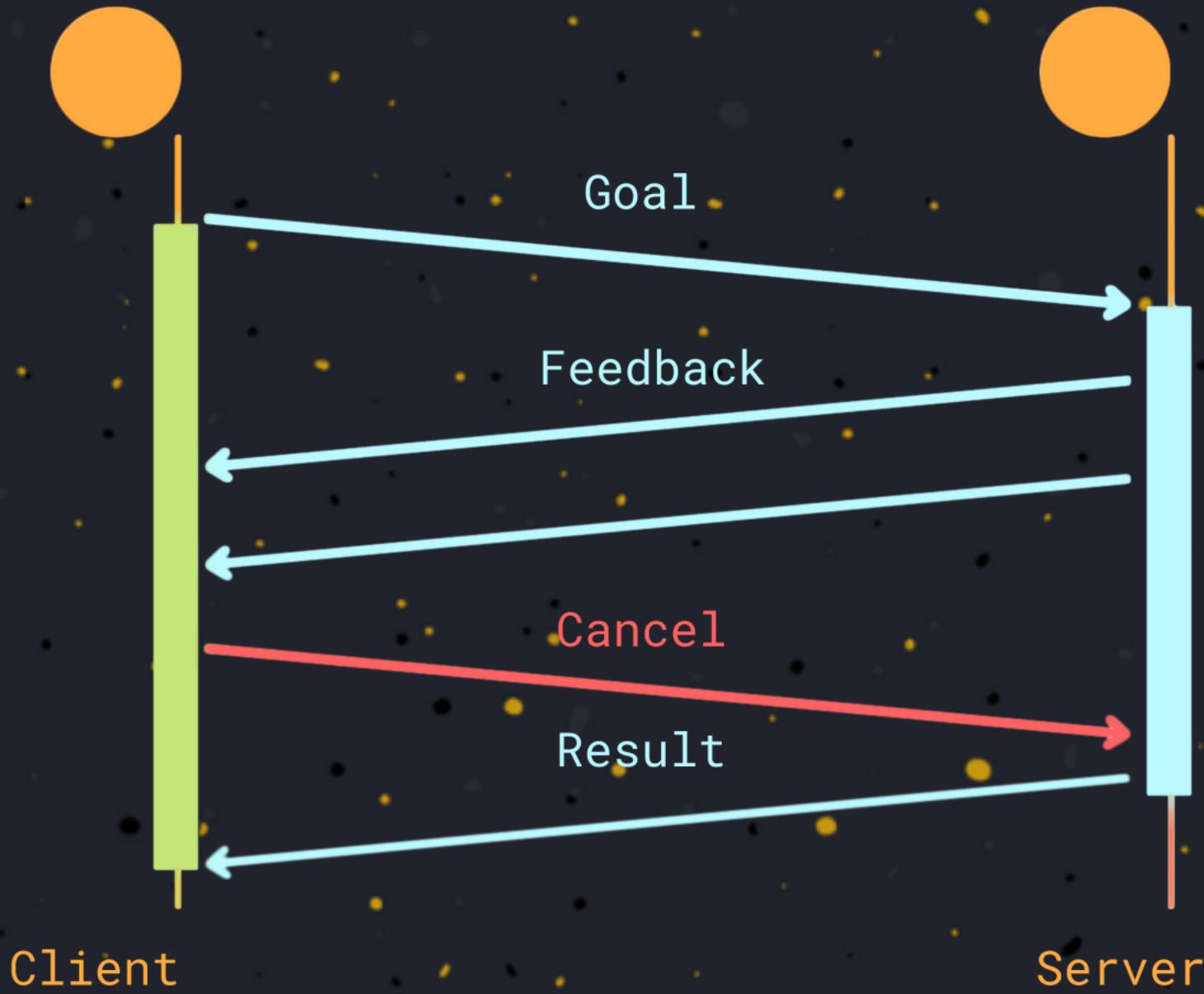
Action



Action



Action

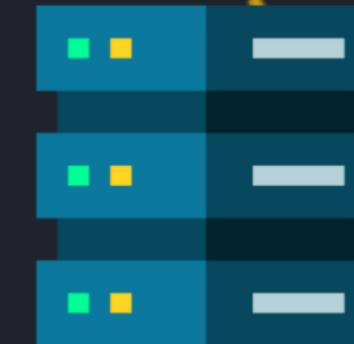




30 FPS

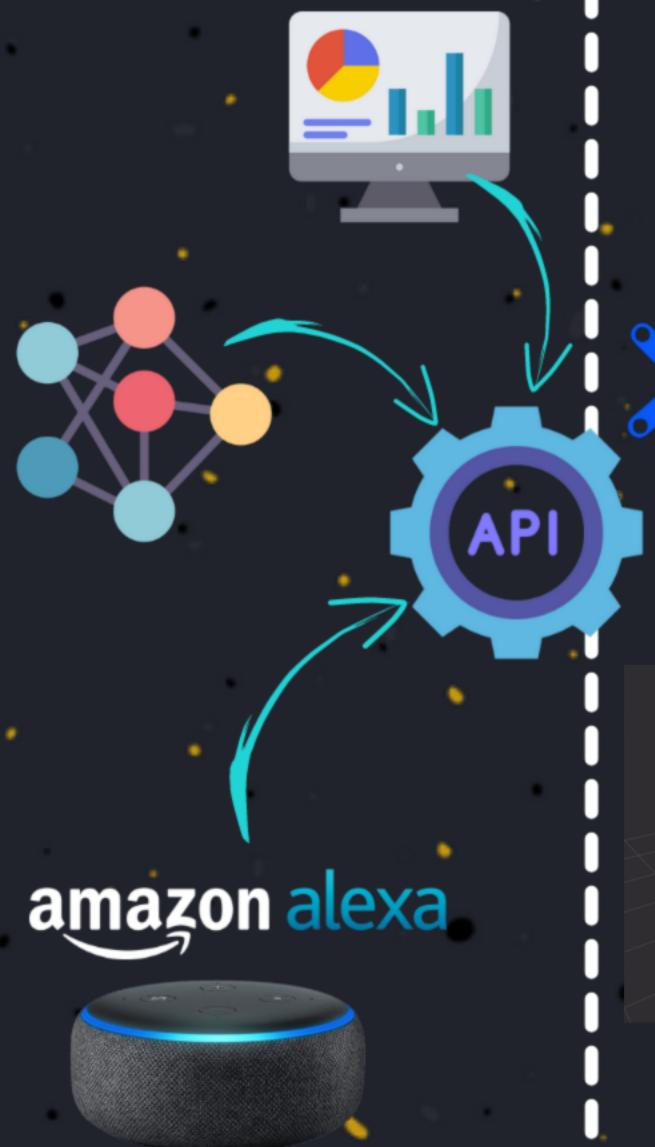
pen\_detector

result

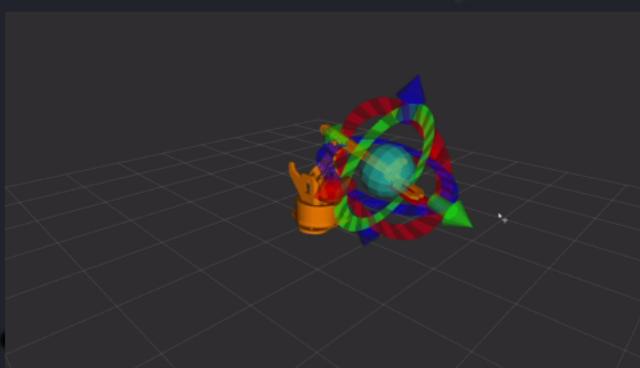


$f(\mathbf{x})$  grab\_pen

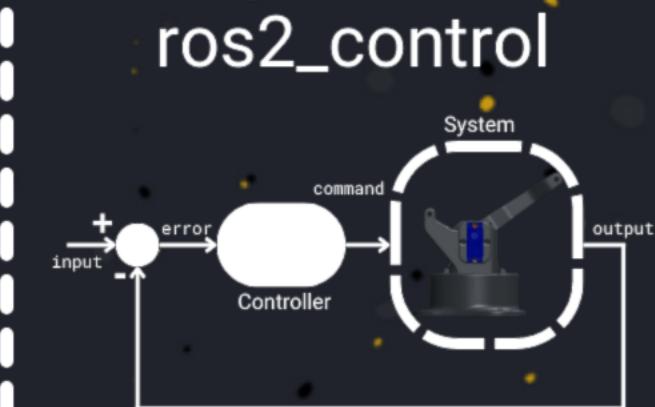
## Application



## Kinematics



## Control



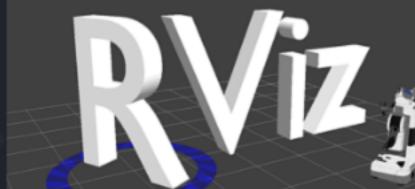
## Digital Twin



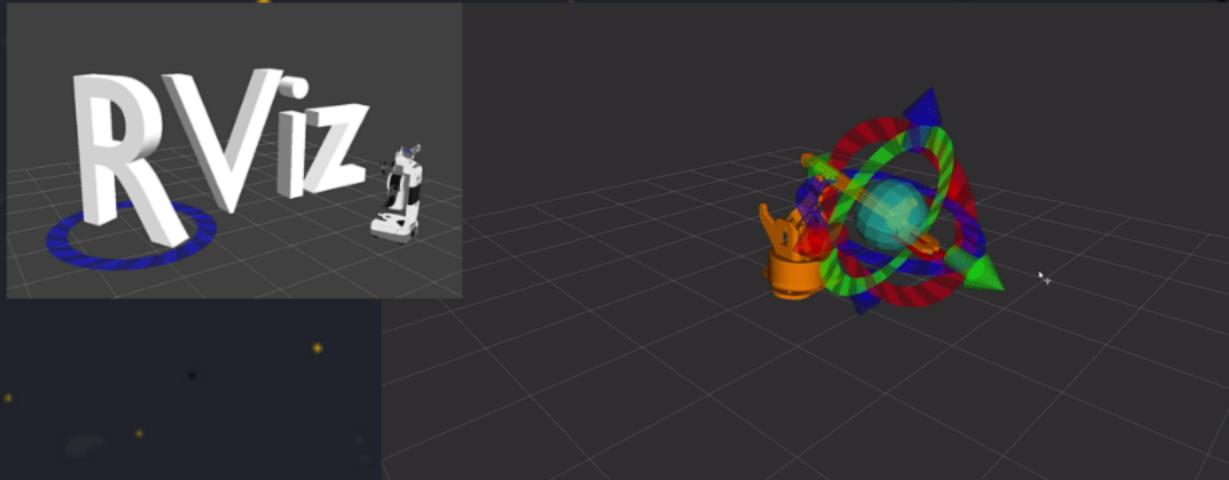
 MoveIt<sup>2</sup>

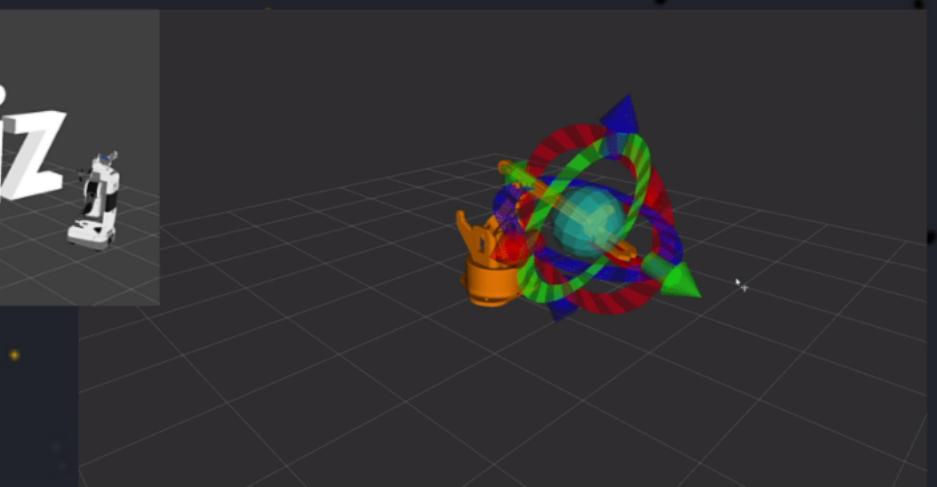


# MoveIt<sup>2</sup>



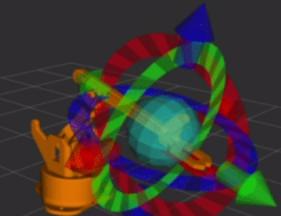
## RViz







The text 'MoveIt2' in a large, white, sans-serif font. A blue wrench icon is positioned above the letter 'M'. A dashed white line encloses the text and the wrench icon.





$f(\mathbf{x})$  task\_server



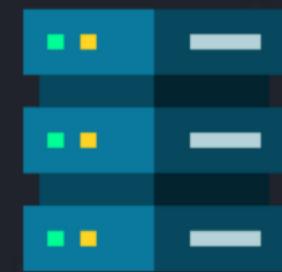
$f(\star)$  task\_server





$f(x)$  task\_server

 MoveIt2

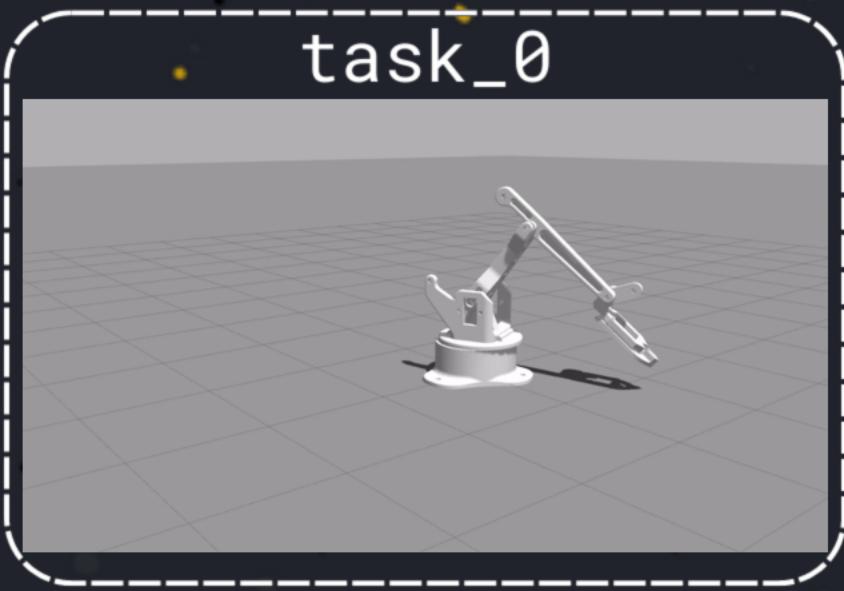


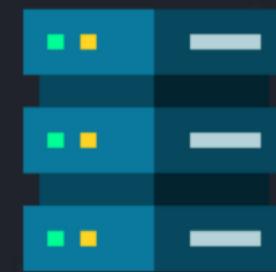
$f(x)$  task\_server

MoveIt<sup>2</sup>

The MoveIt2 logo, featuring the word "MoveIt" in white and "2" in blue, with a wrench icon integrated into the letter "i".

task\_0

A dashed rectangular box containing the text "task\_0" and a 3D rendering of a robotic arm on a grid base.

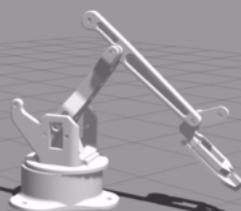


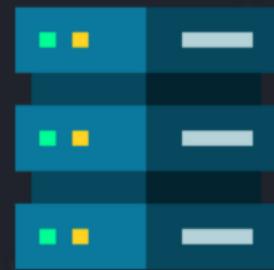
$f(\mathbf{x})$  task\_server



task\_0

task\_1

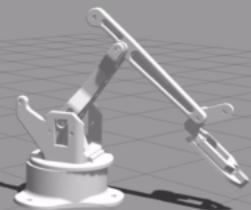




$f(x)$  task\_server



task\_0



task\_1

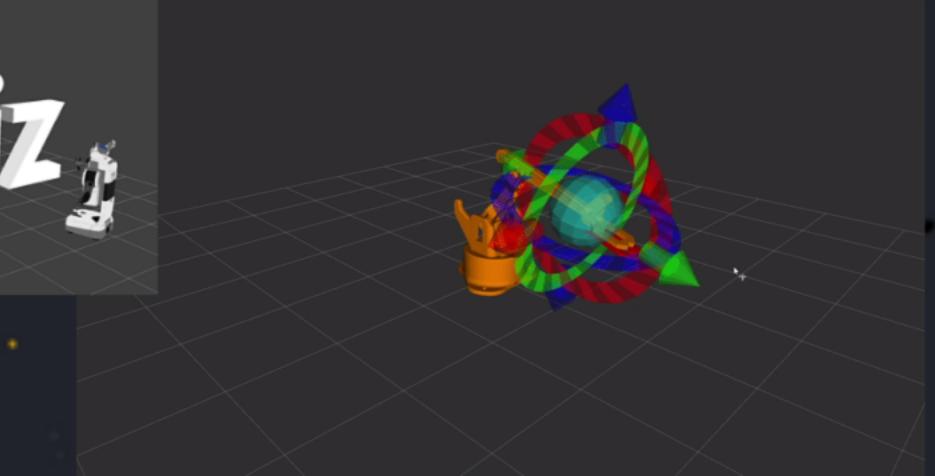


task\_2





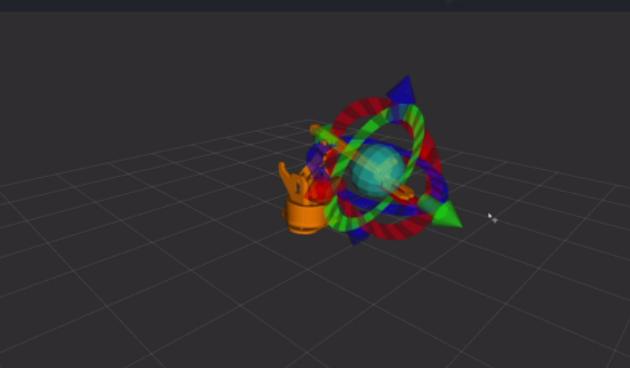
> **MoveIt2**



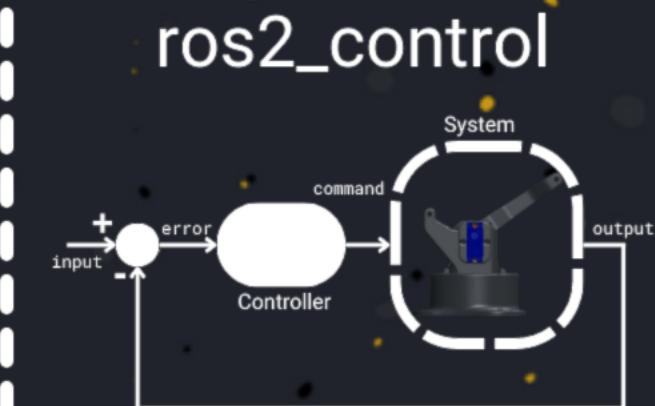
## Application



## Kinematics



## Control



## Digital Twin



# MoveIt2

# Fibonacci Sequence

0    1

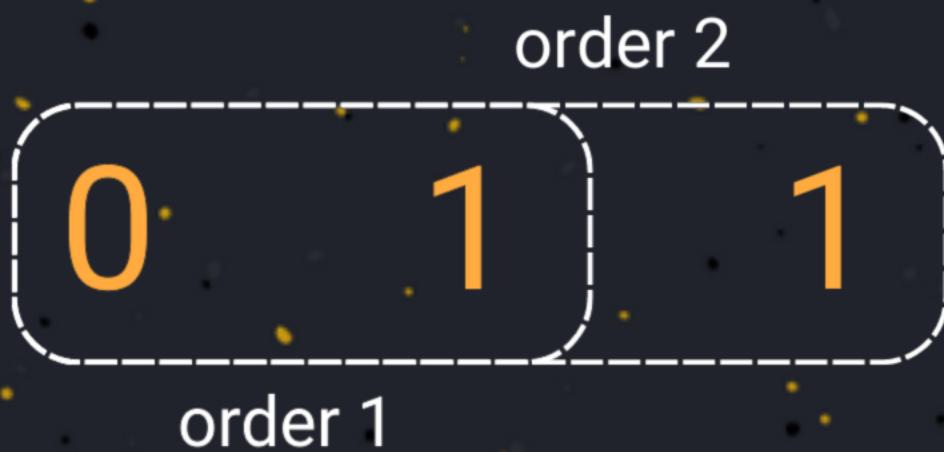
# Fibonacci Sequence



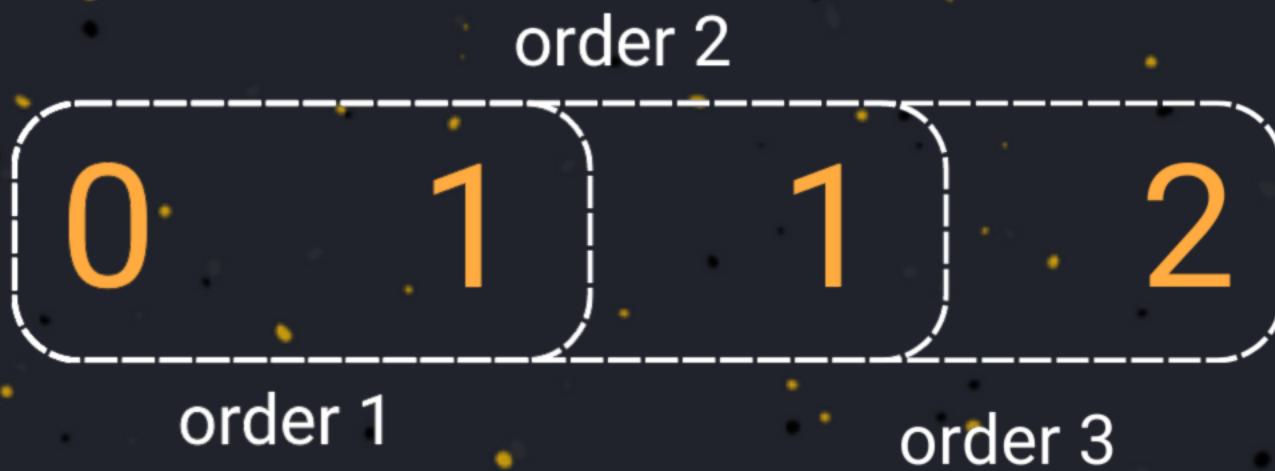
0 1

order 1

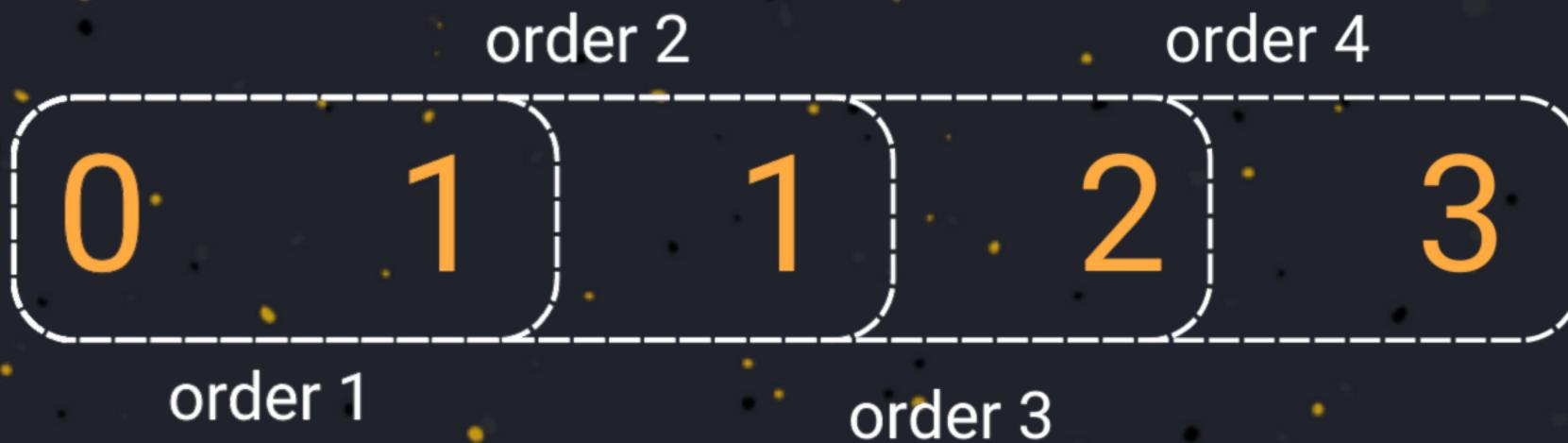
# Fibonacci Sequence



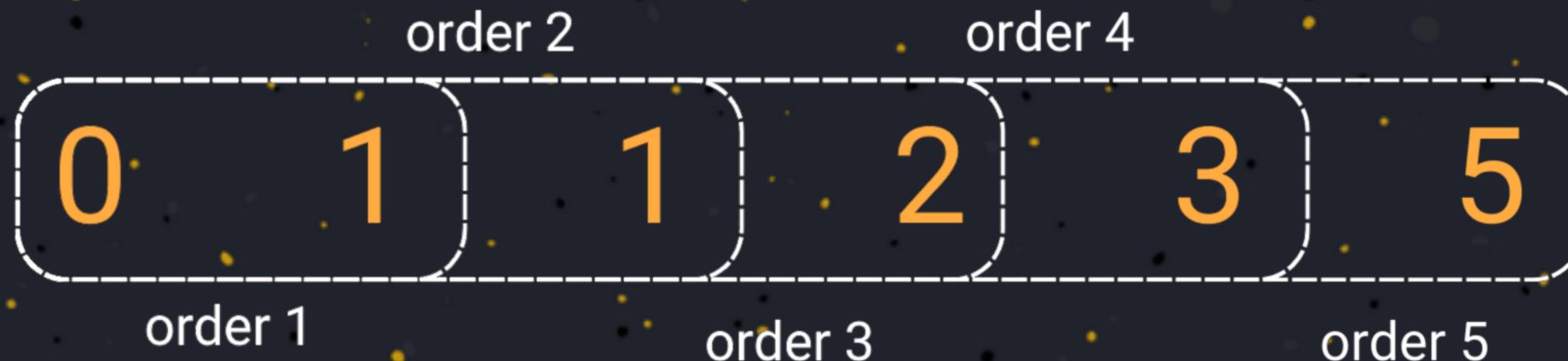
# Fibonacci Sequence



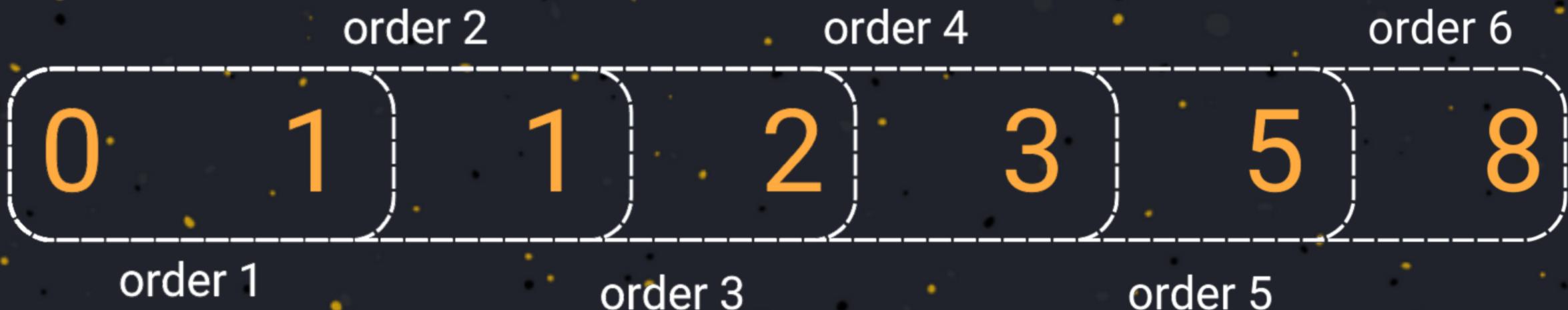
# Fibonacci Sequence



# Fibonacci Sequence



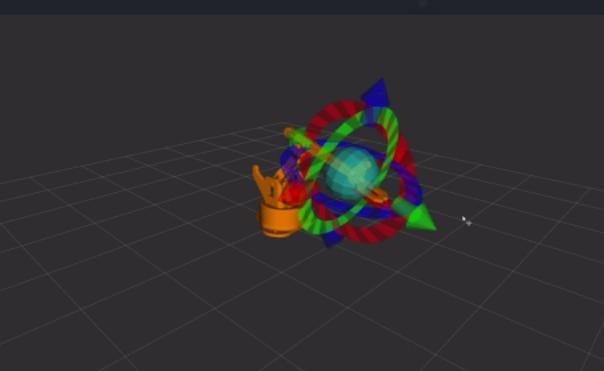
# Fibonacci Sequence



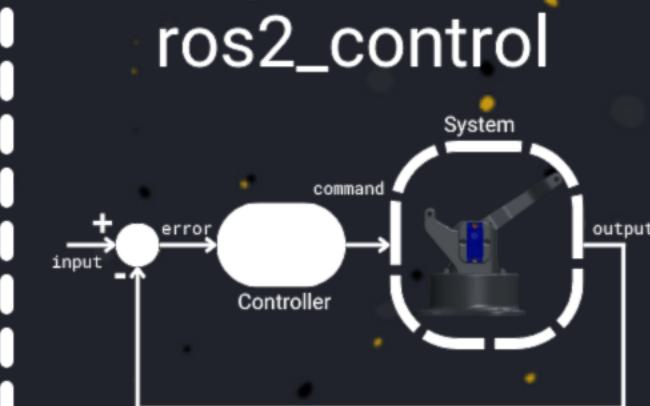
## Application



## Kinematics



## Control



## Digital Twin



# MoveIt2

# Arduinobot

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