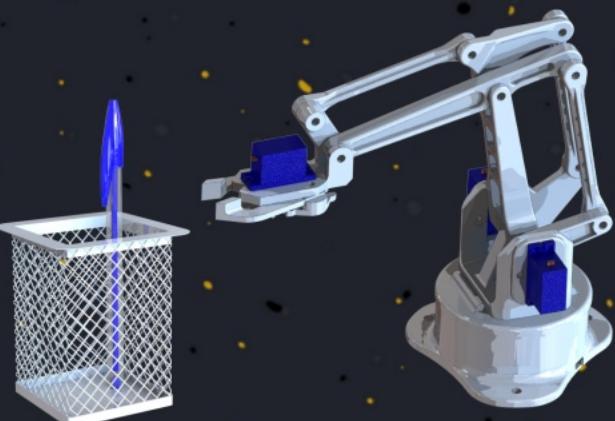
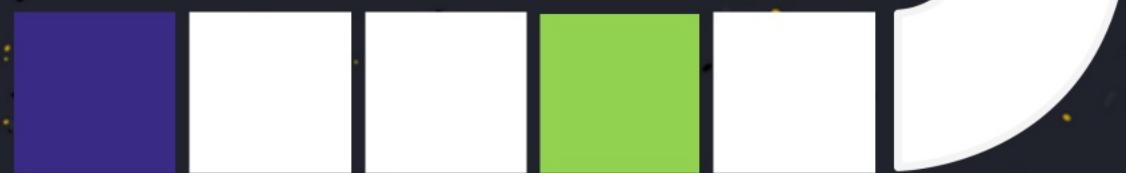
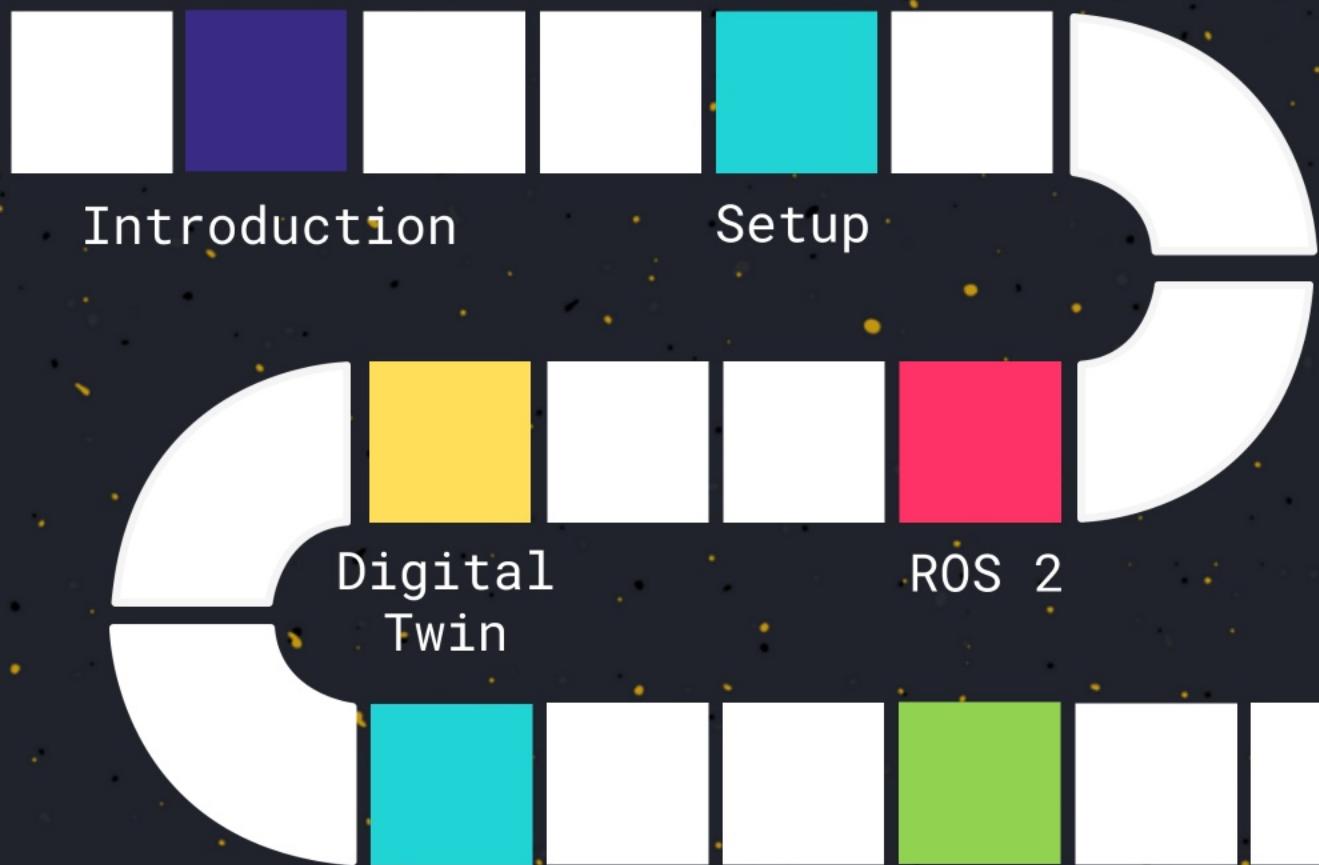


Arduinobot

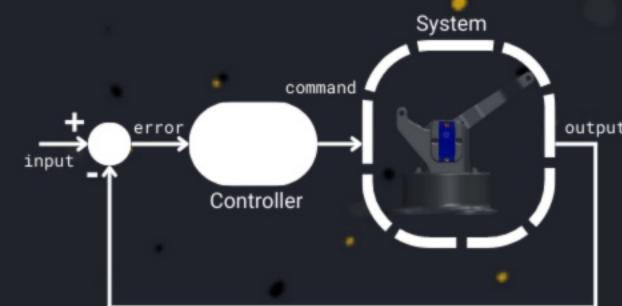


Digital Twin



Control

ros2_control

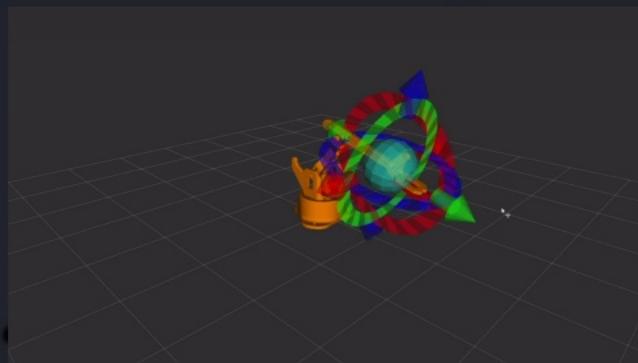


Digital Twin



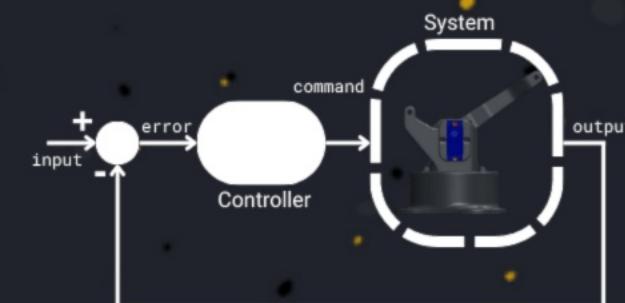
Kinematics

 **MoveIt2**



Control

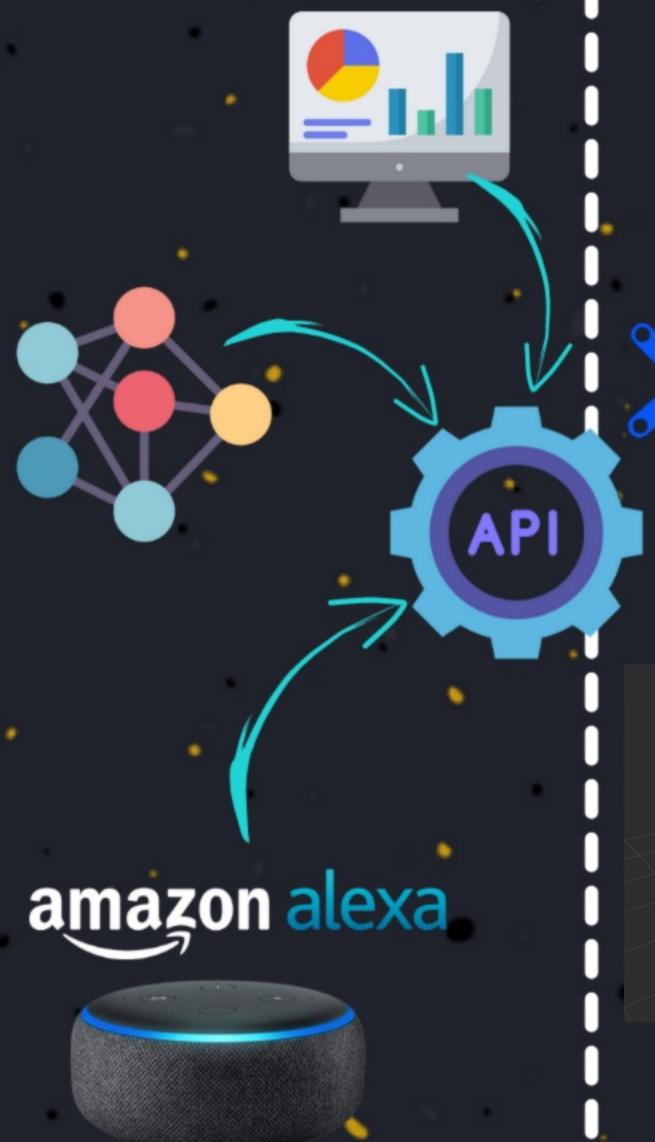
`ros2_control`



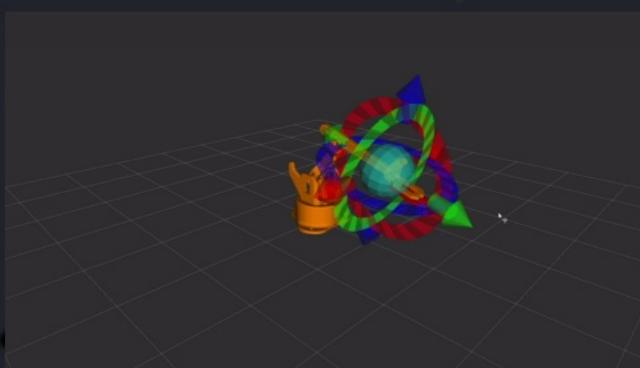
Digital Twin



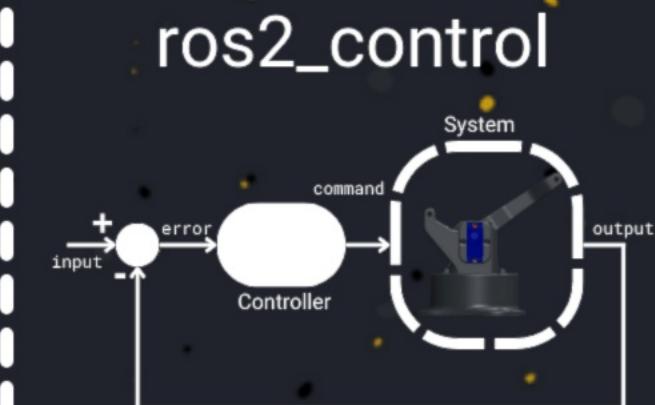
Application



Kinematics

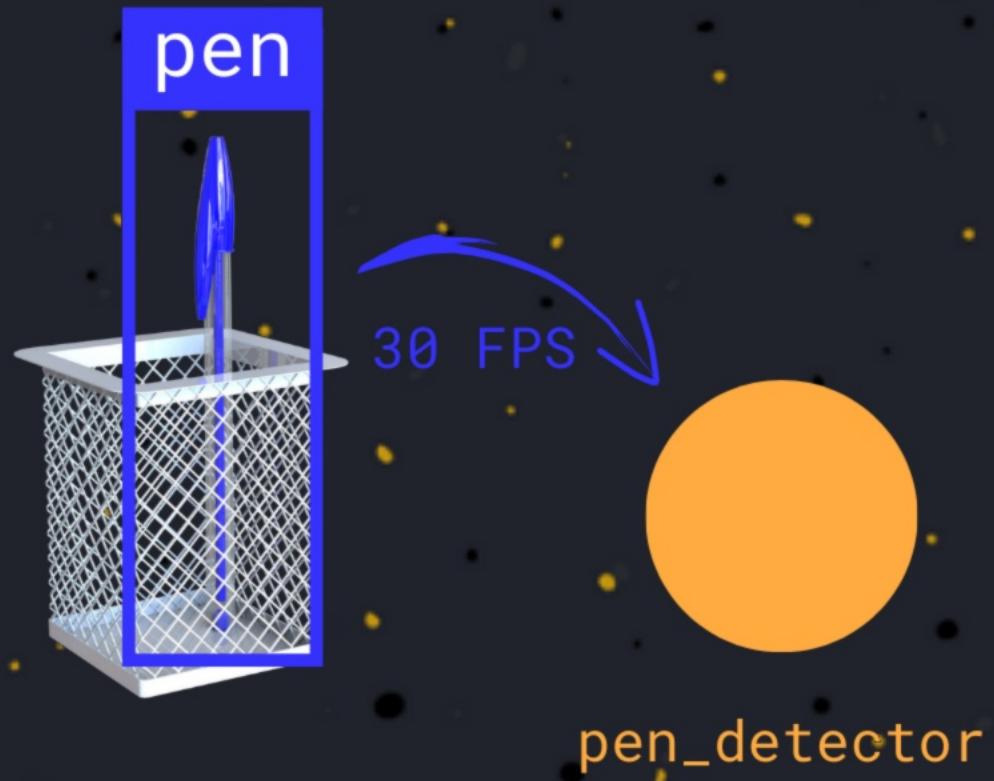


Control



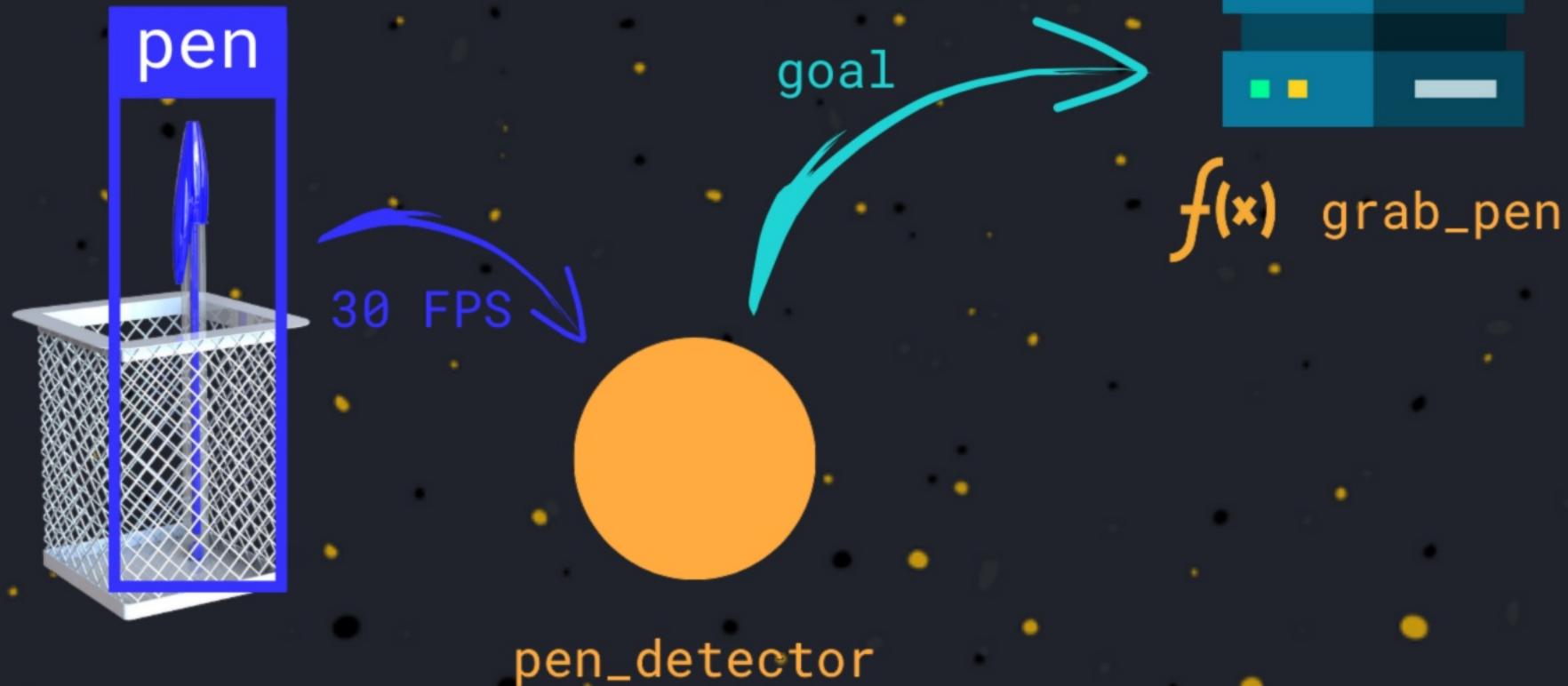
Digital Twin

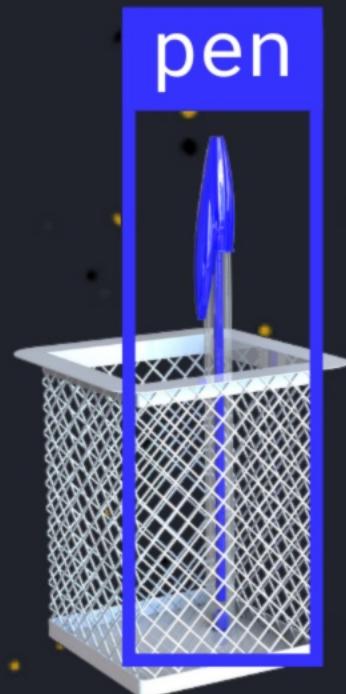






$f(\mathbf{x})$ grab_pen





30 FPS

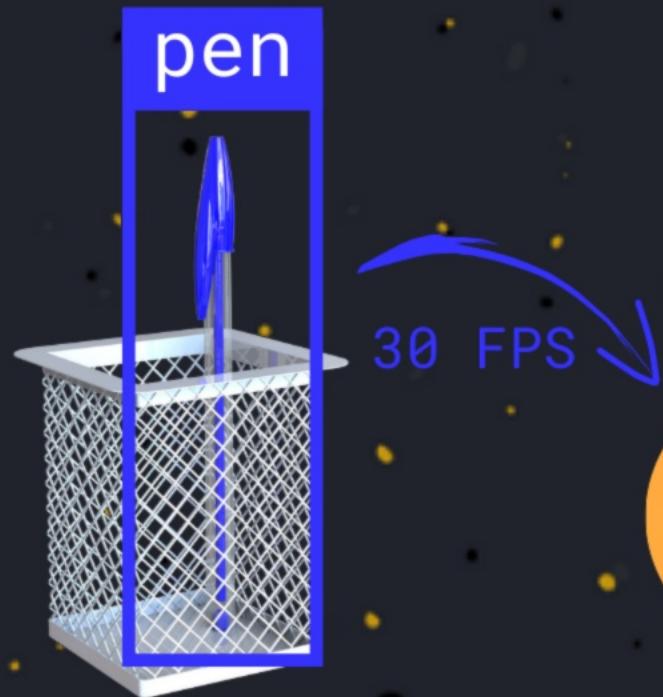
pen_detector

goal

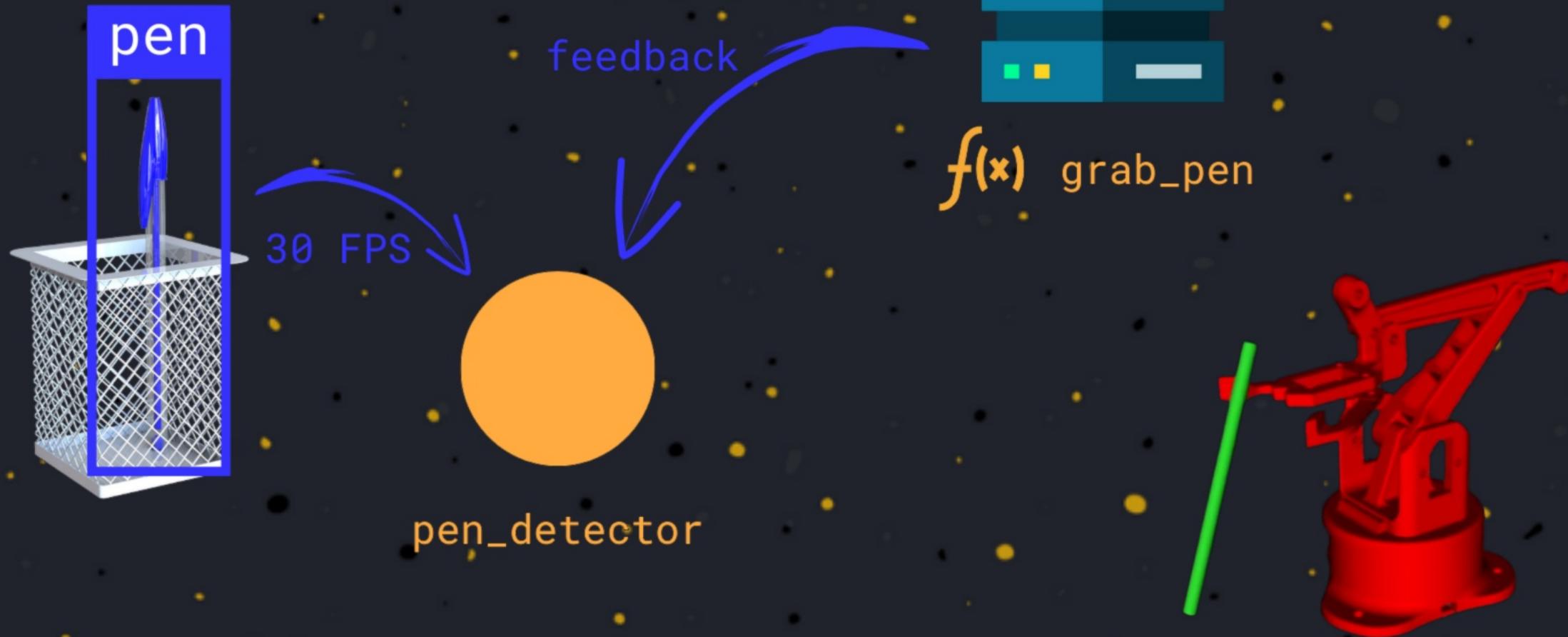


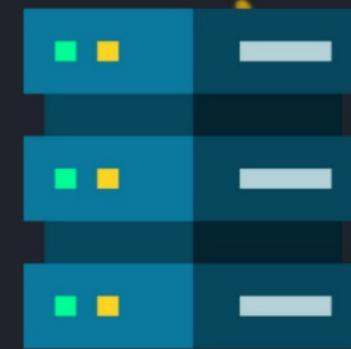
$f(\mathbf{x})$ grab_pen



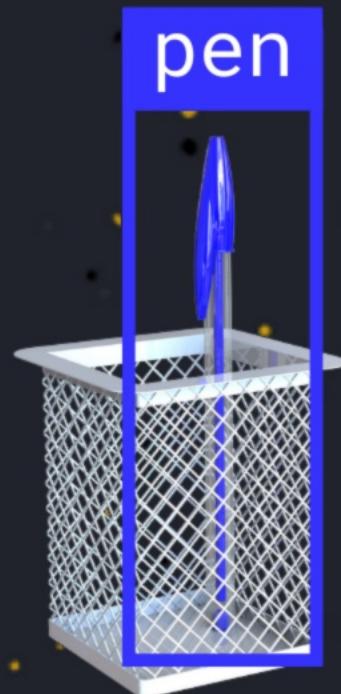


$f(\mathbf{x})$ grab_pen





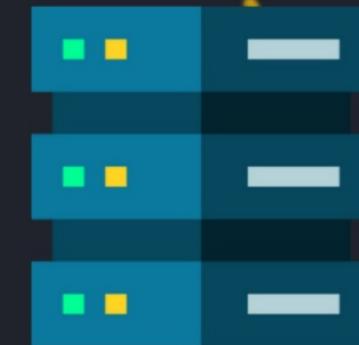
$f(\mathbf{x})$ grab_pen



30 FPS

pen_detector

feedback



$f(\mathbf{x})$ grab_pen

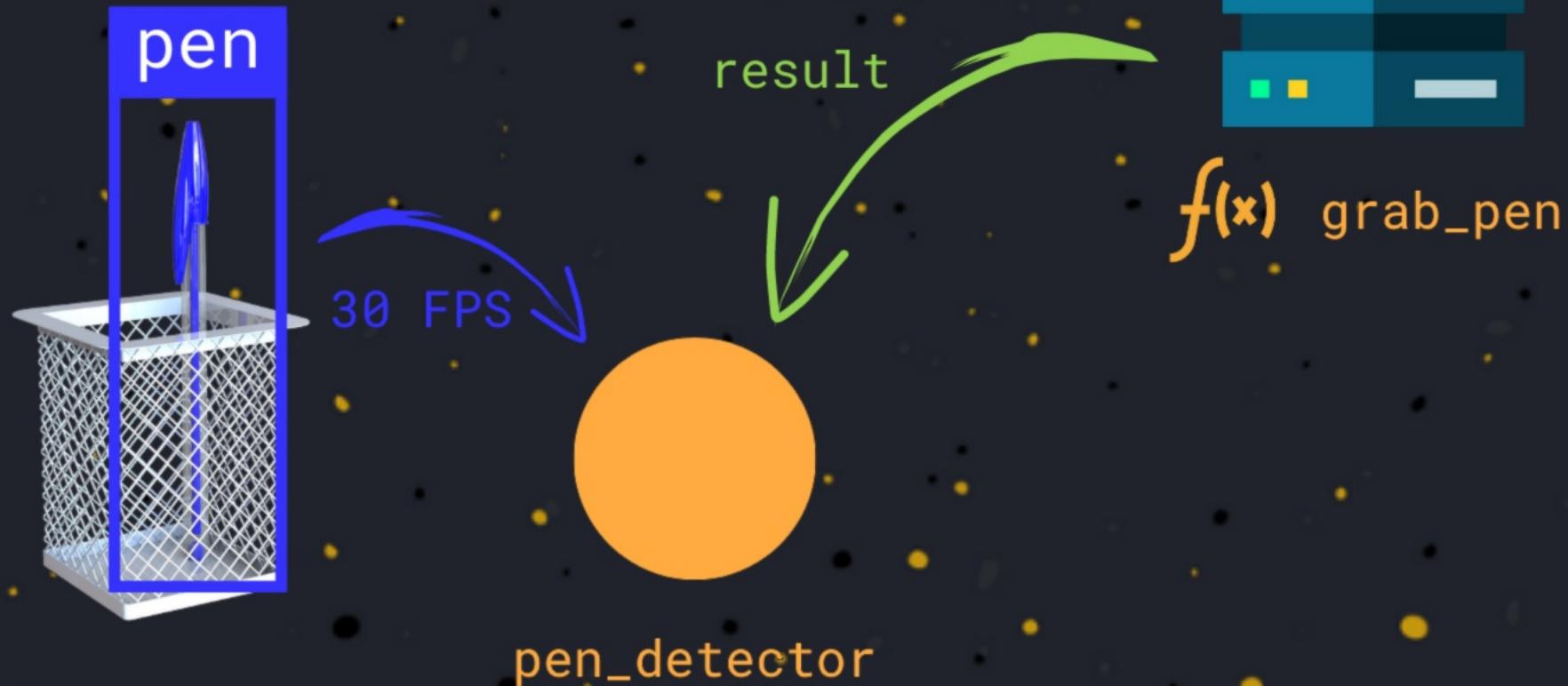




pen_detector

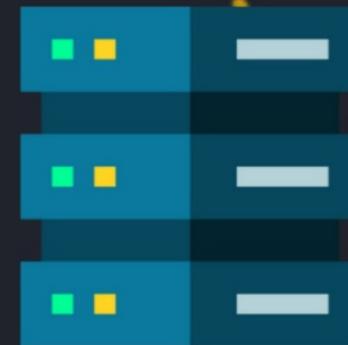


$f(\mathbf{x})$ grab_pen

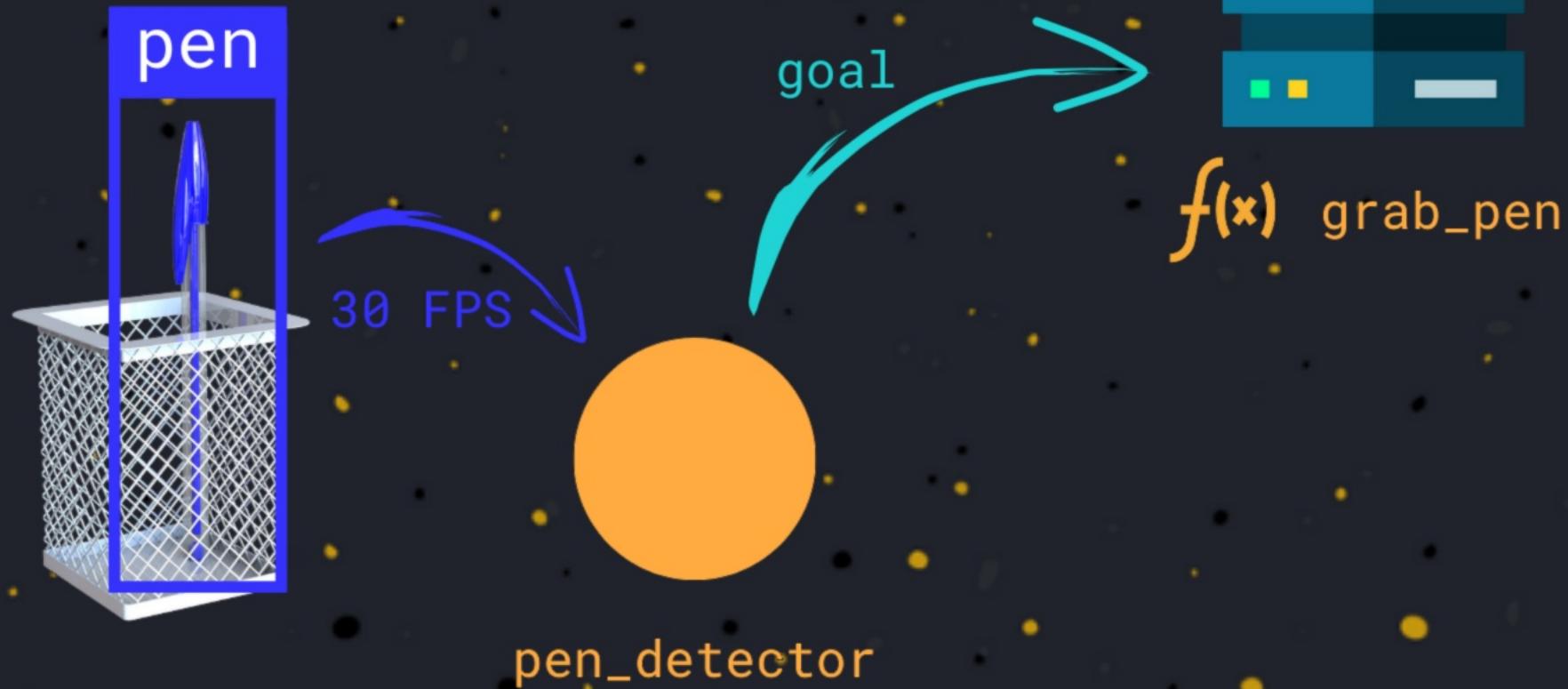


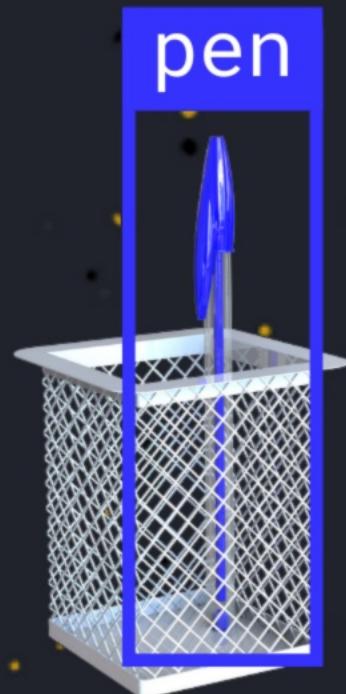


pen_detector



$f(\mathbf{x})$ grab_pen

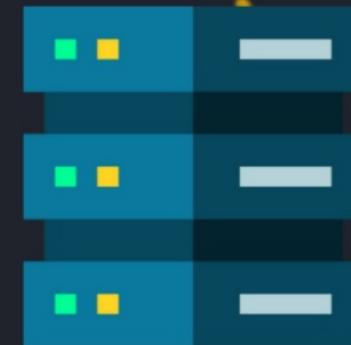




30 FPS

pen_detector

goal



$f(\mathbf{x})$ 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

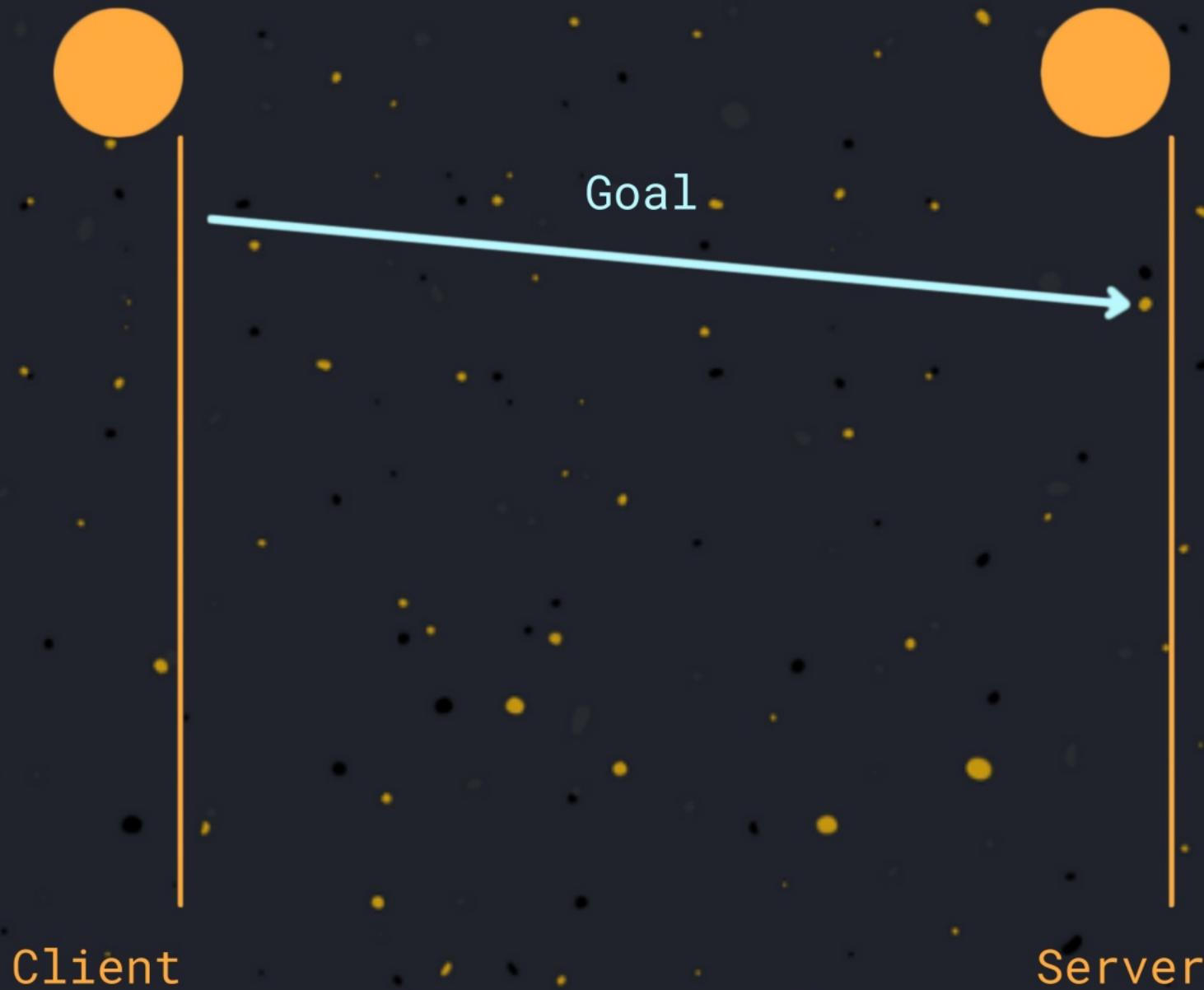


Client

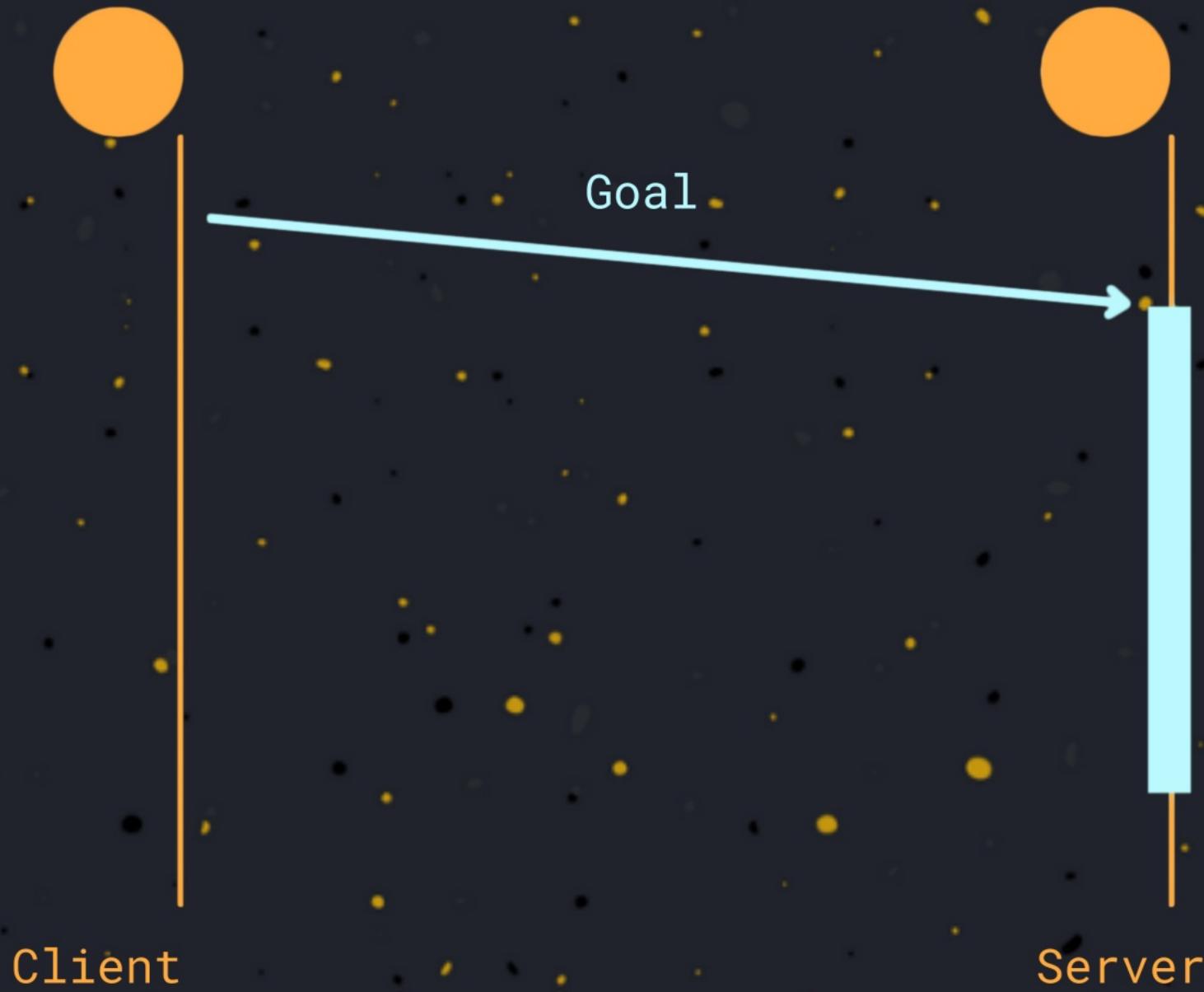


Server

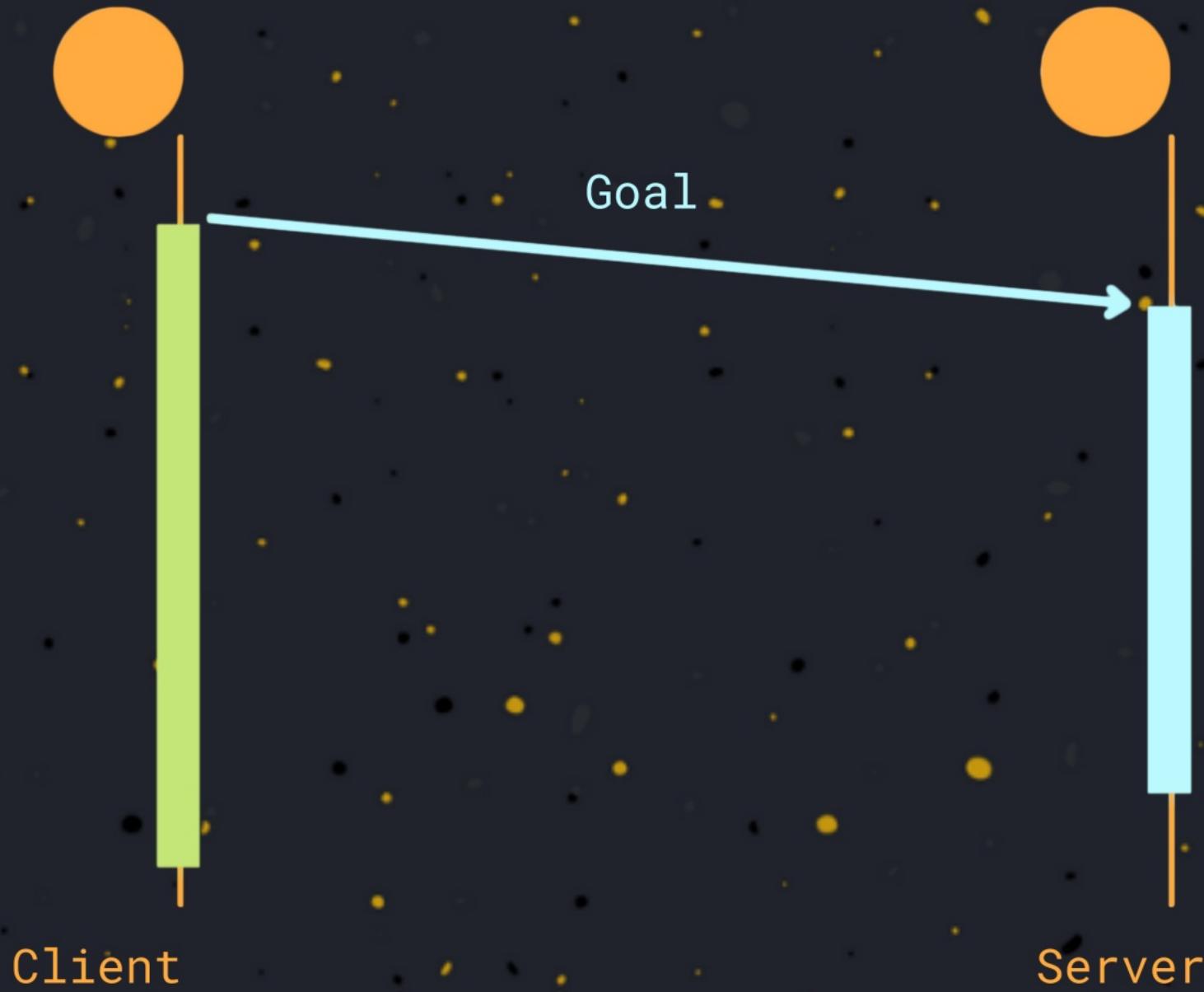
Action



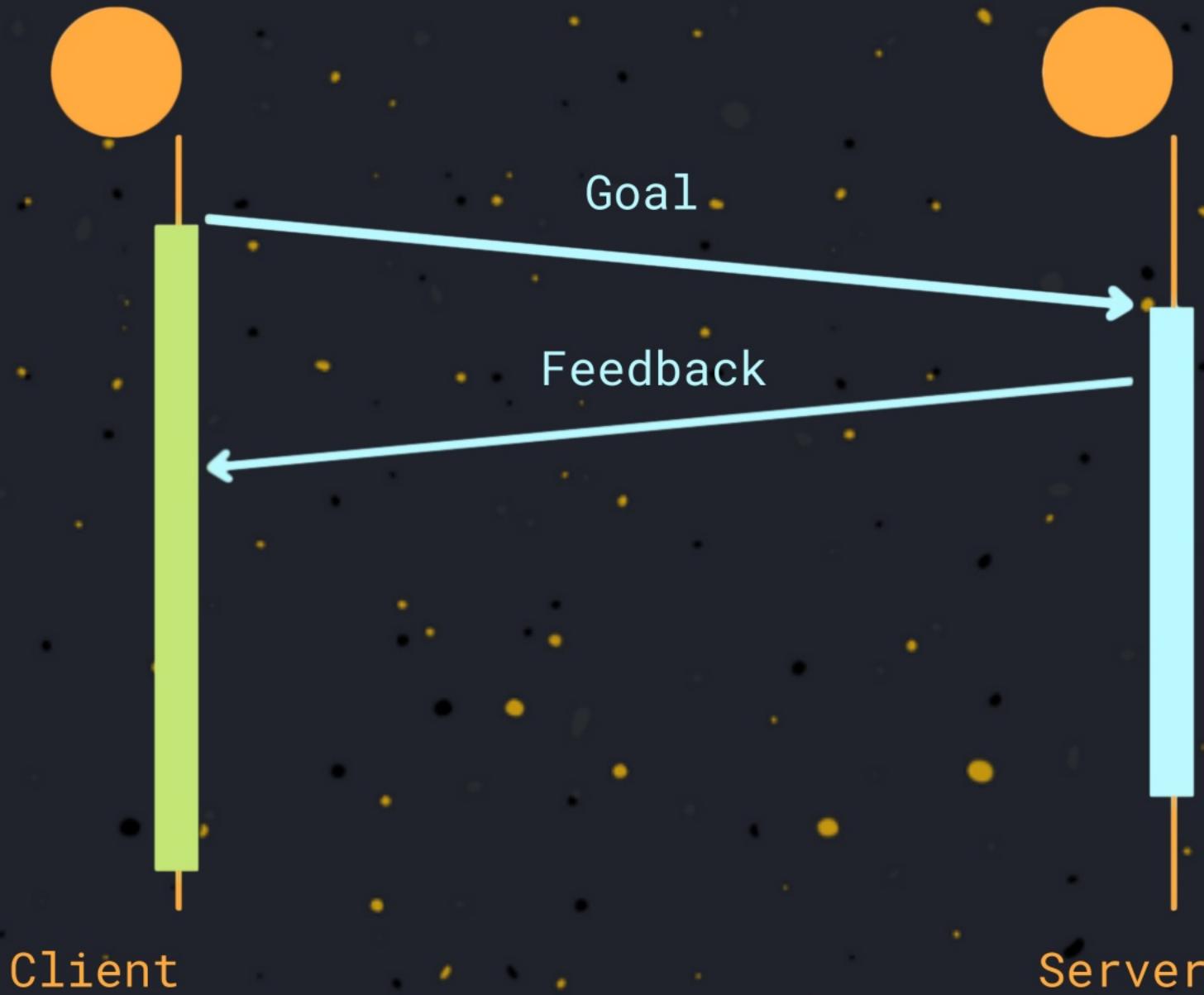
Action



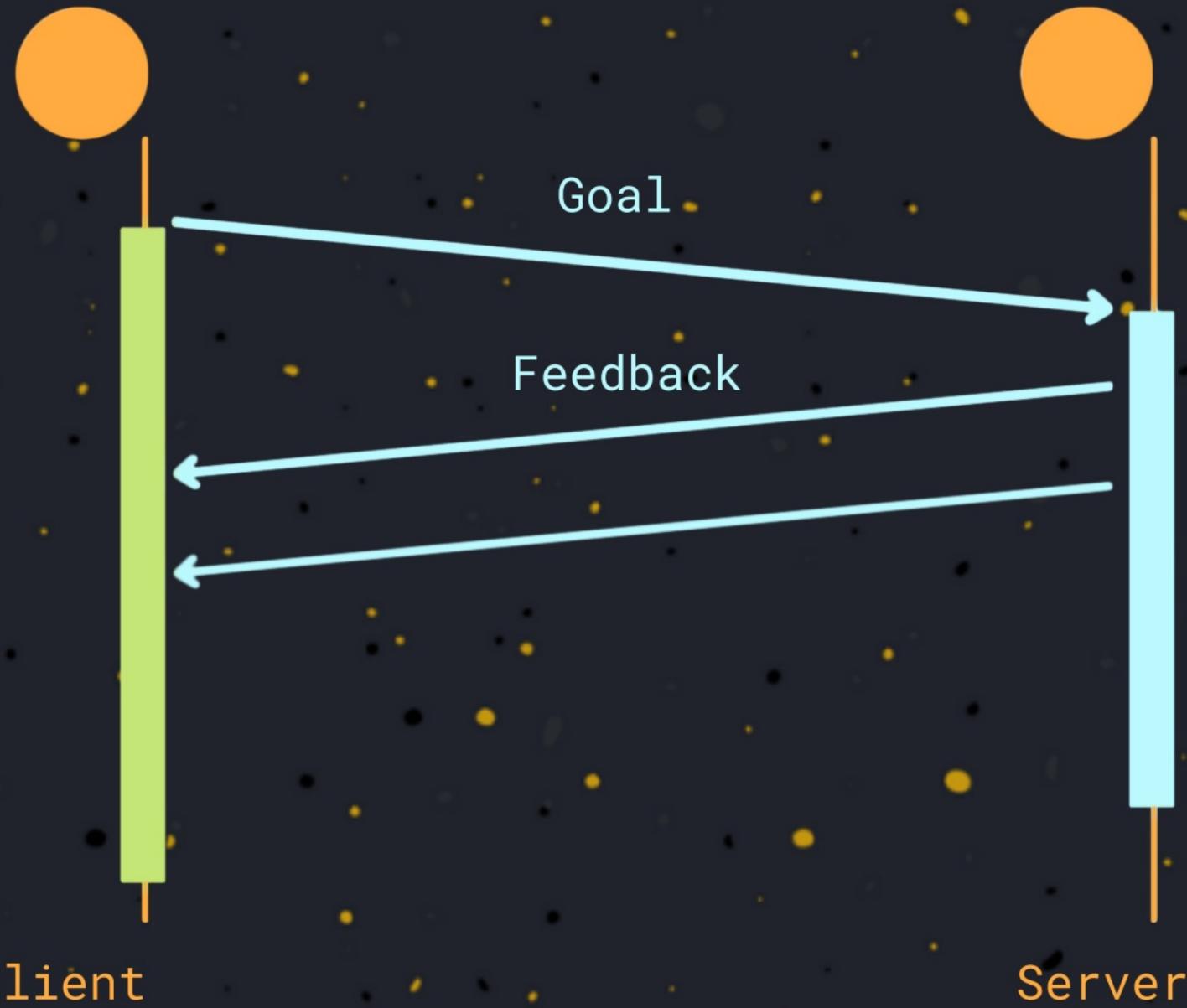
Action



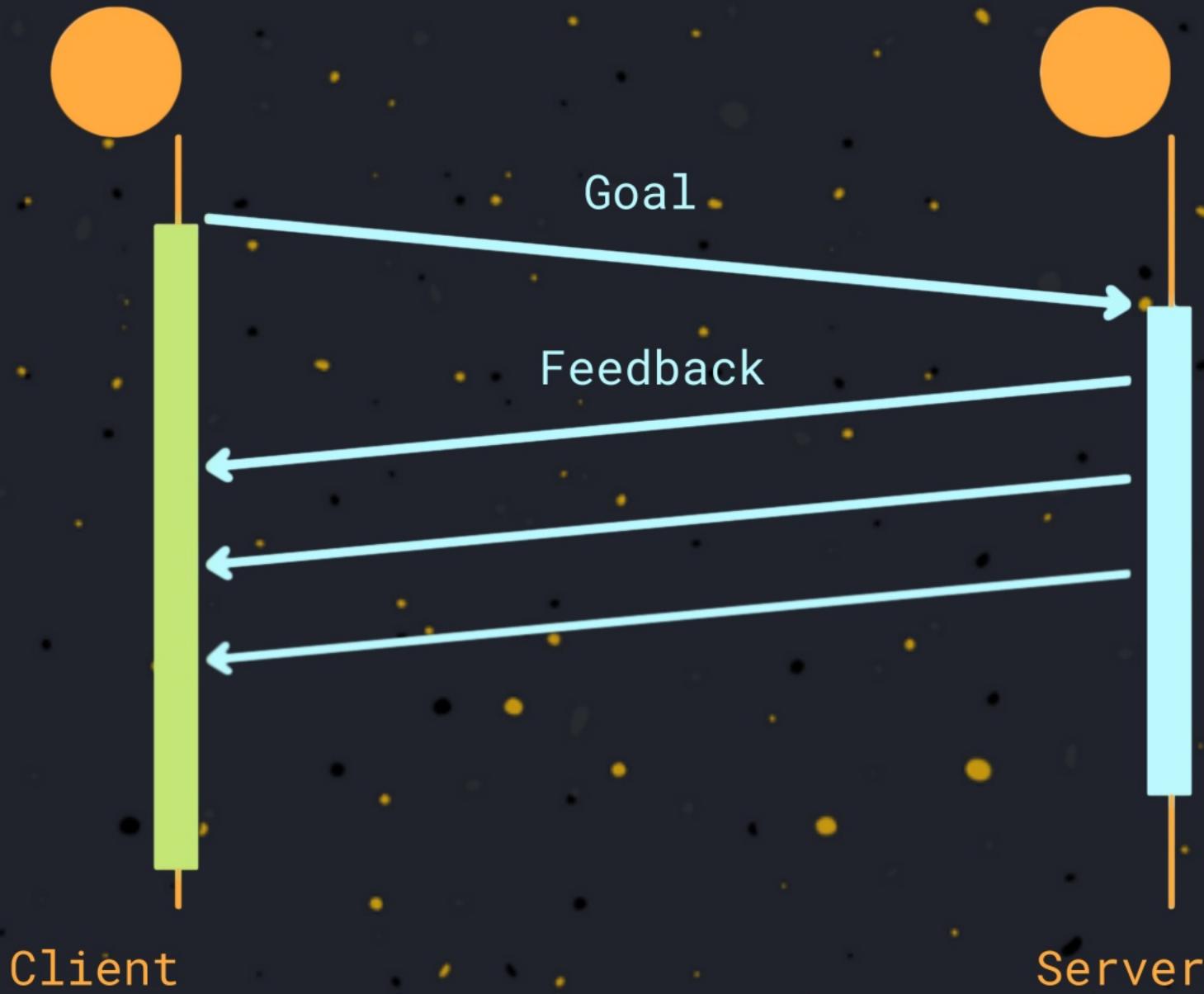
Action



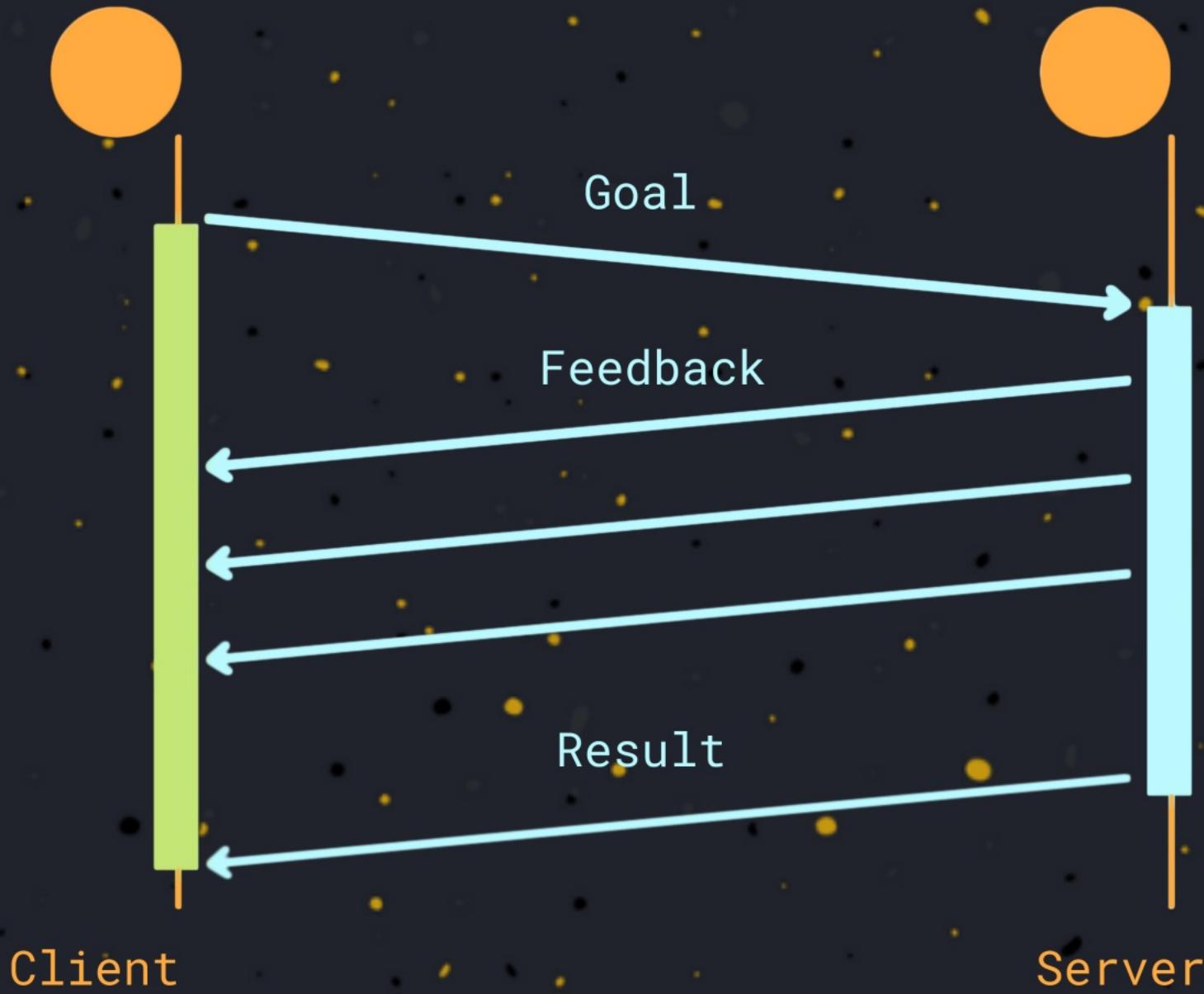
Action



Action



Action



Action

Client

Server

Action

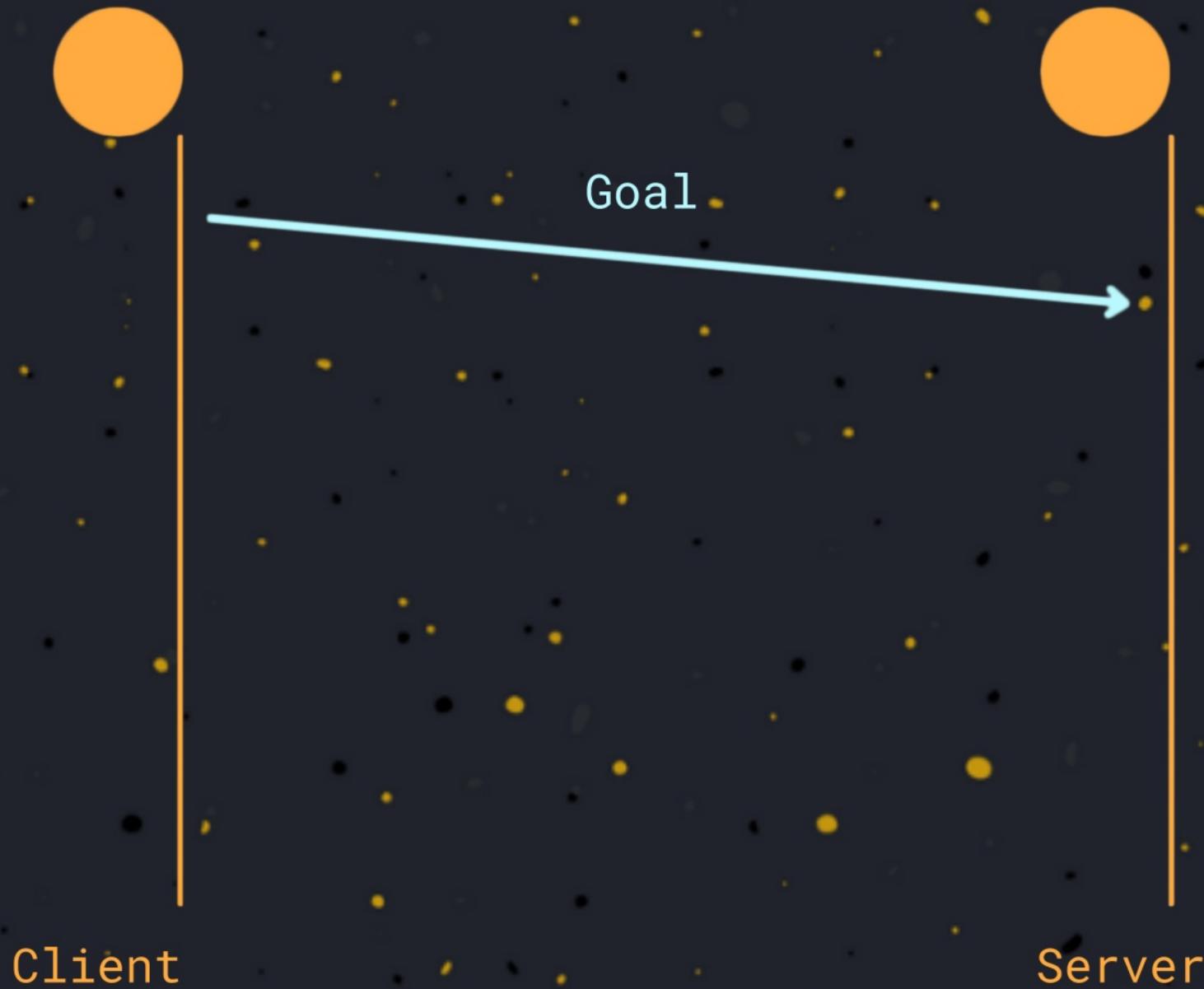


Client

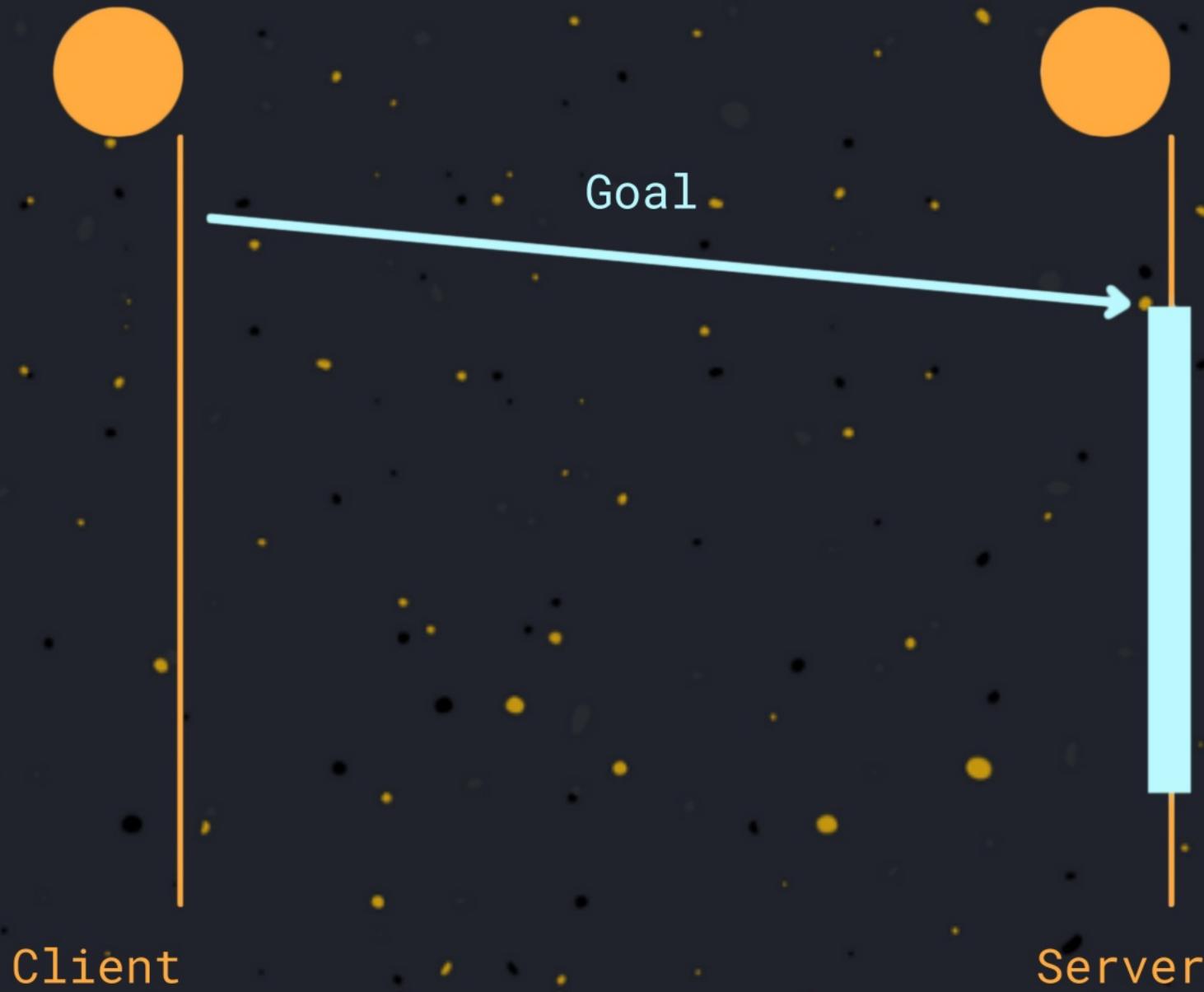


Server

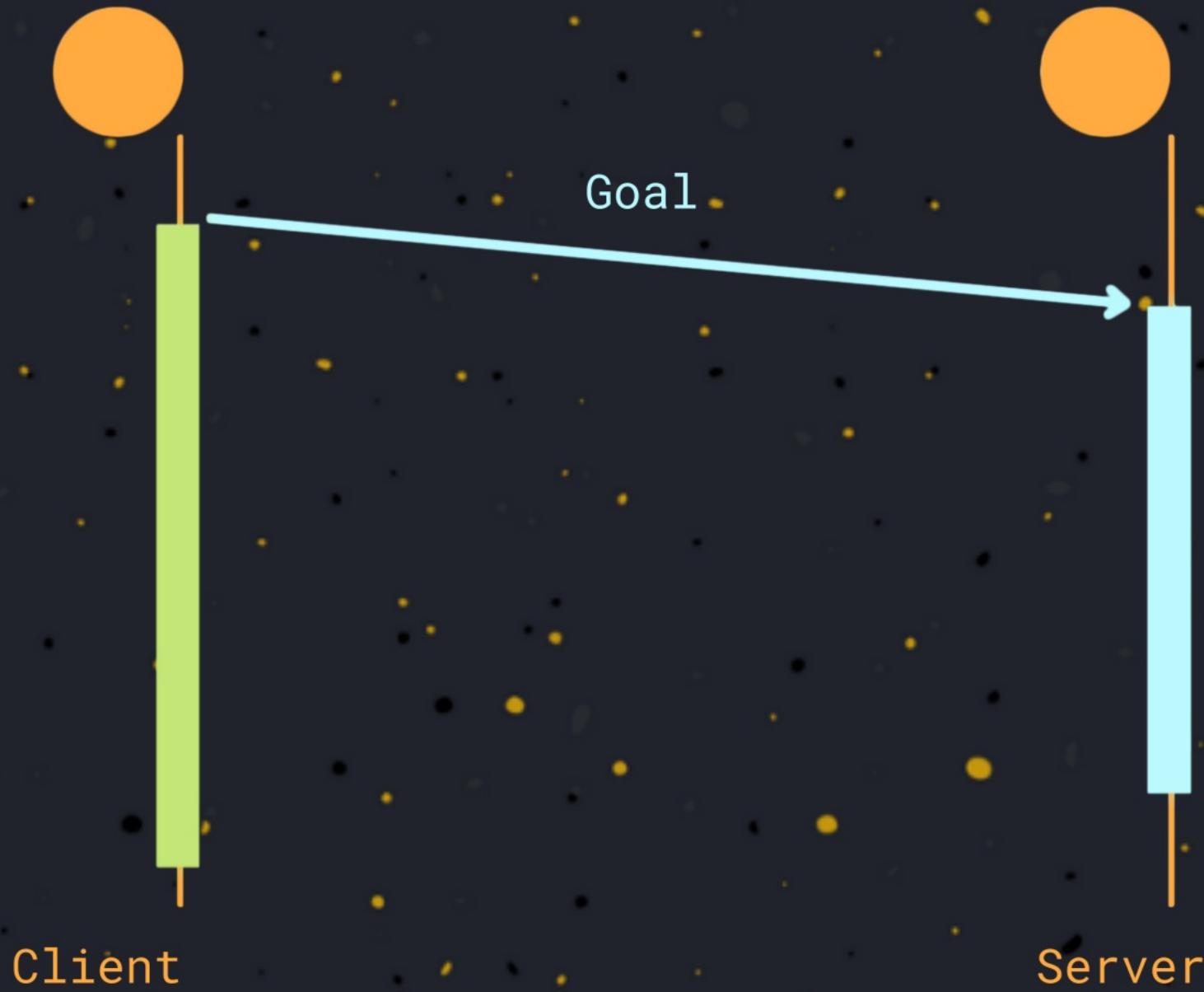
Action



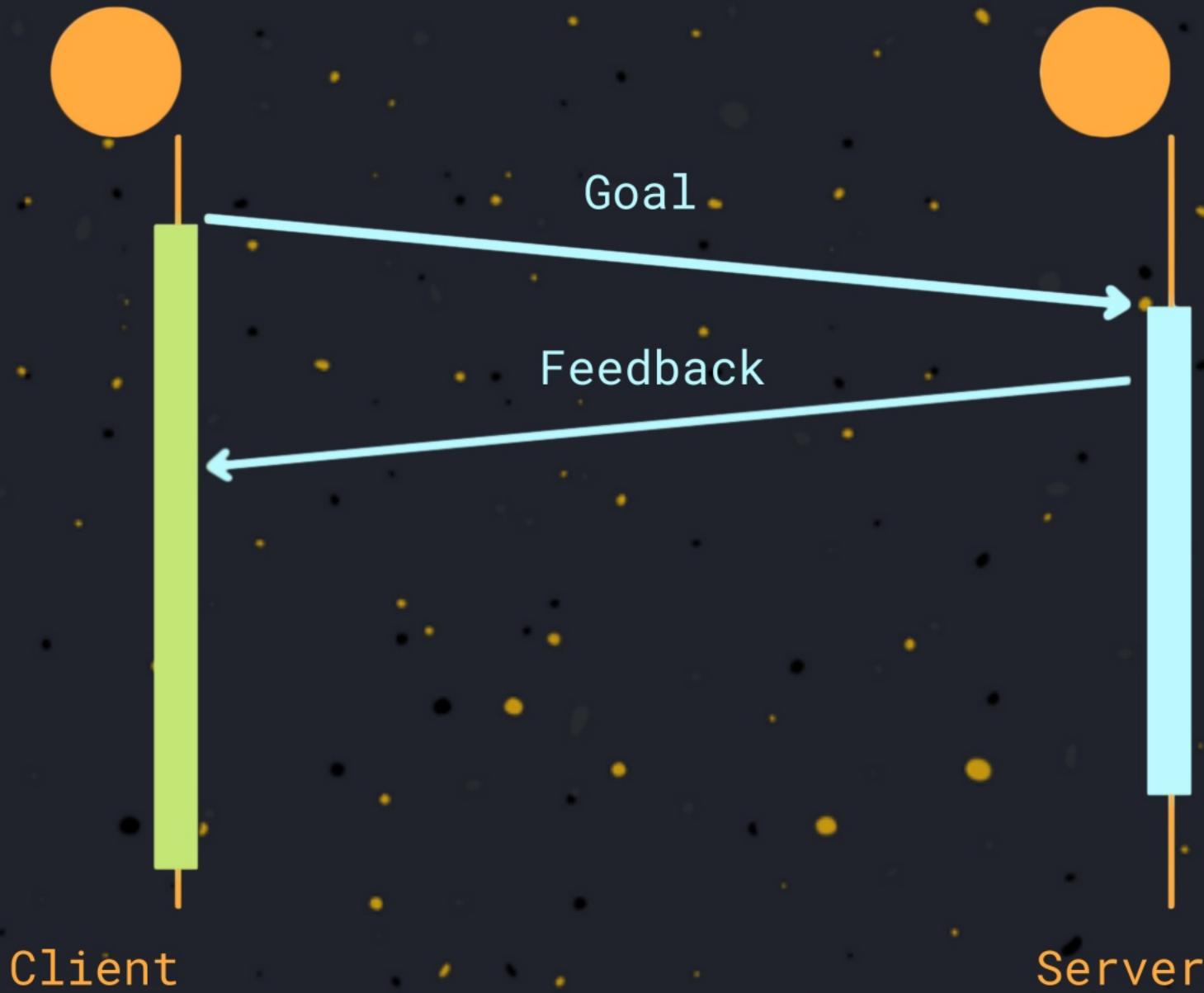
Action



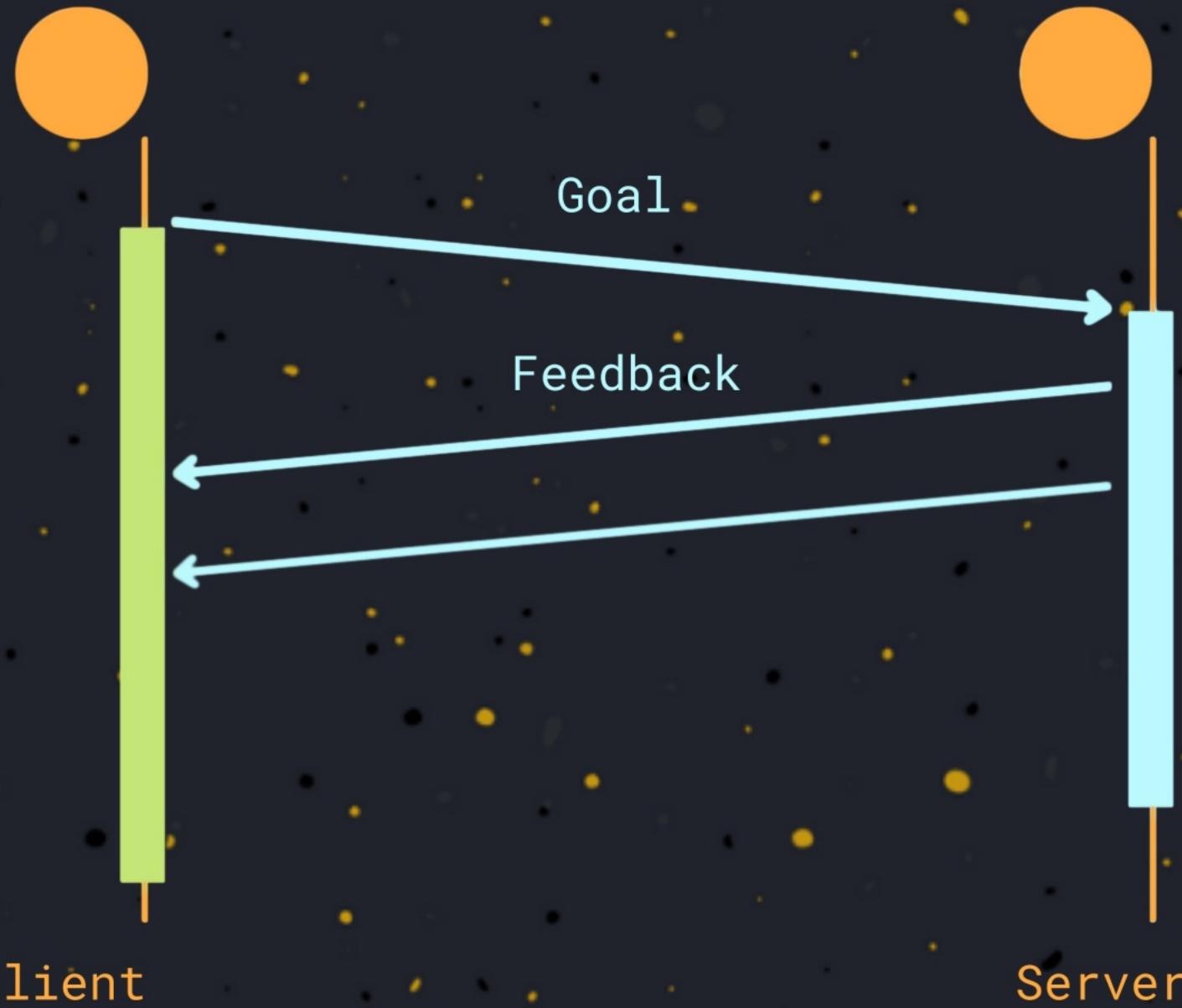
Action



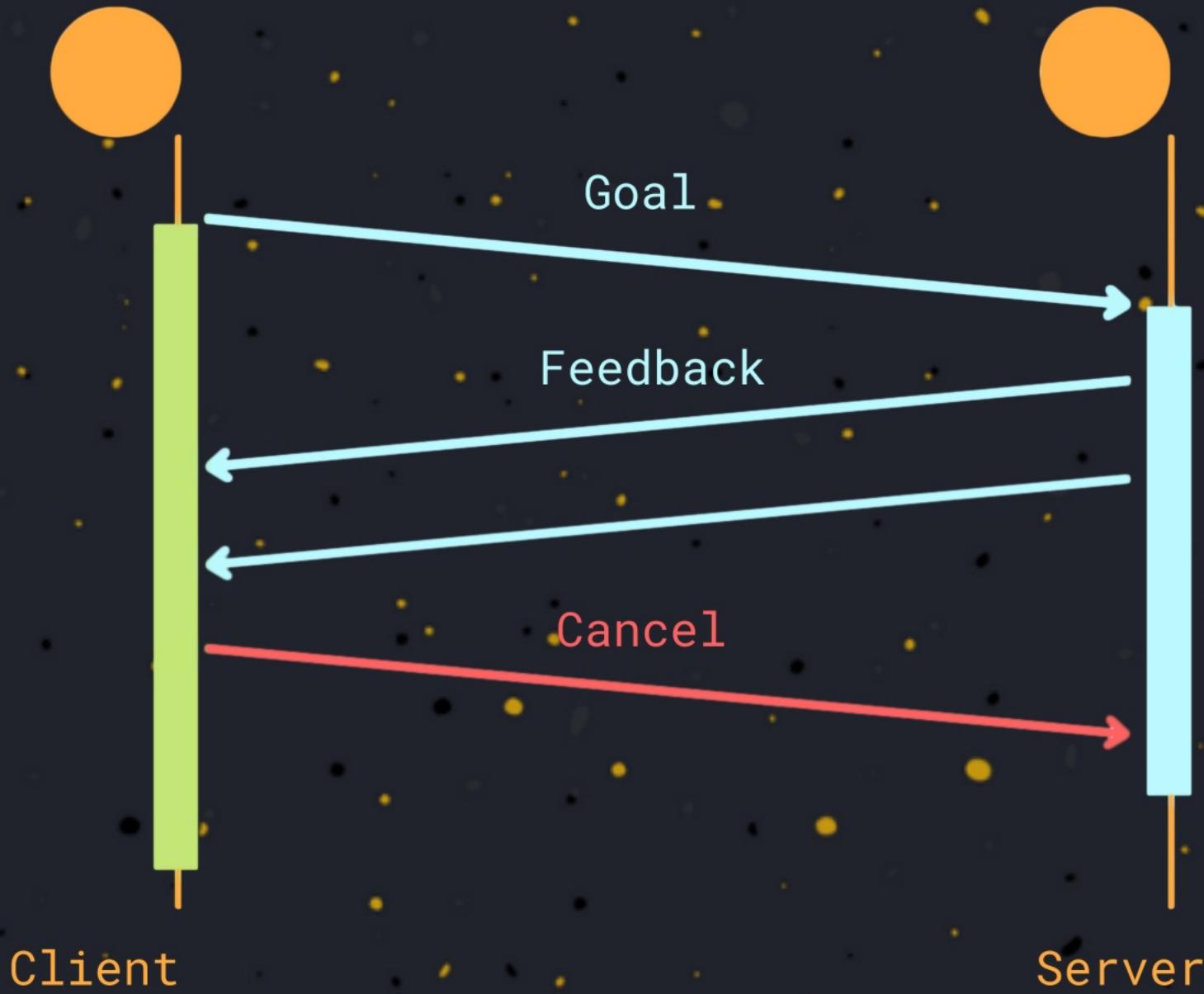
Action



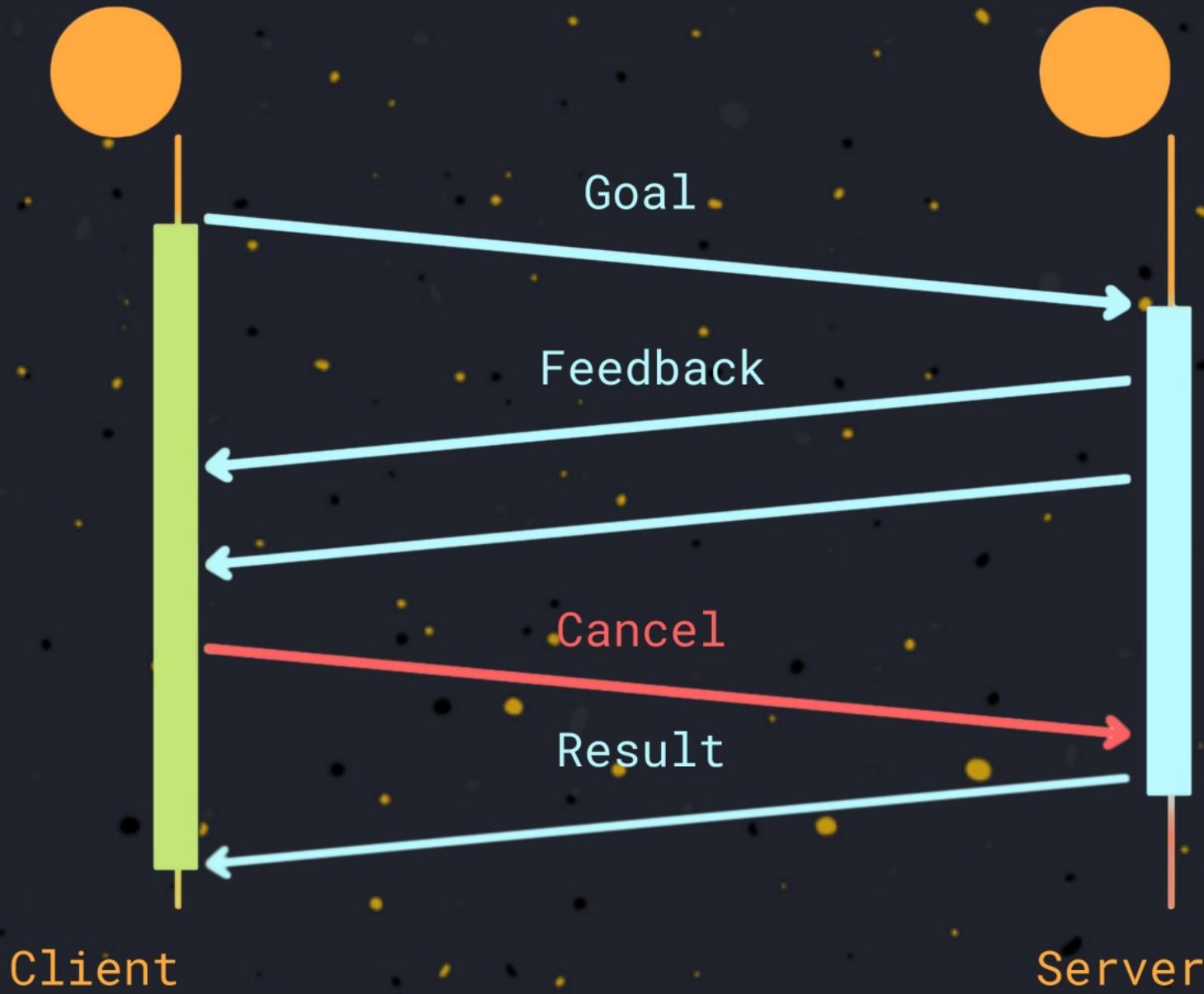
Action



Action



Action





30 FPS

pen_detector

result

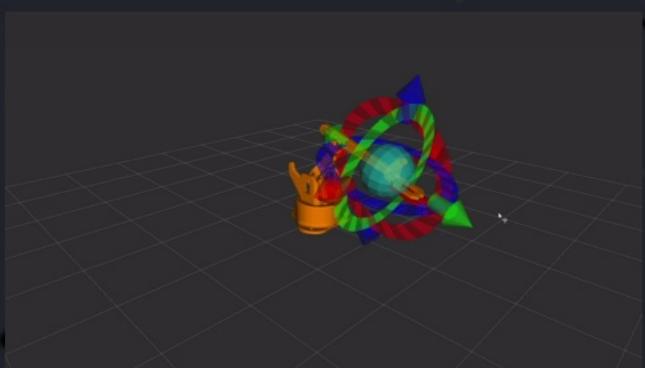


$f(\mathbf{x})$ grab_pen

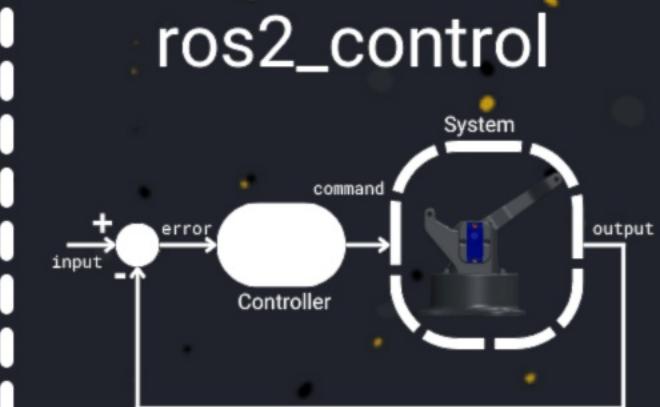
Application



Kinematics



Control



Digital Twin

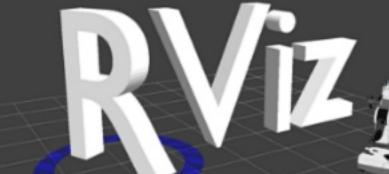


The logo for MoveIt 2 features a blue wrench icon positioned to the left of the text "MoveIt2". The "2" is in a bold, blue, sans-serif font.

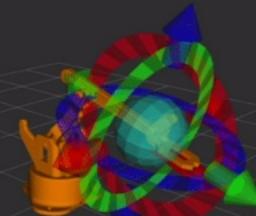
MoveIt2

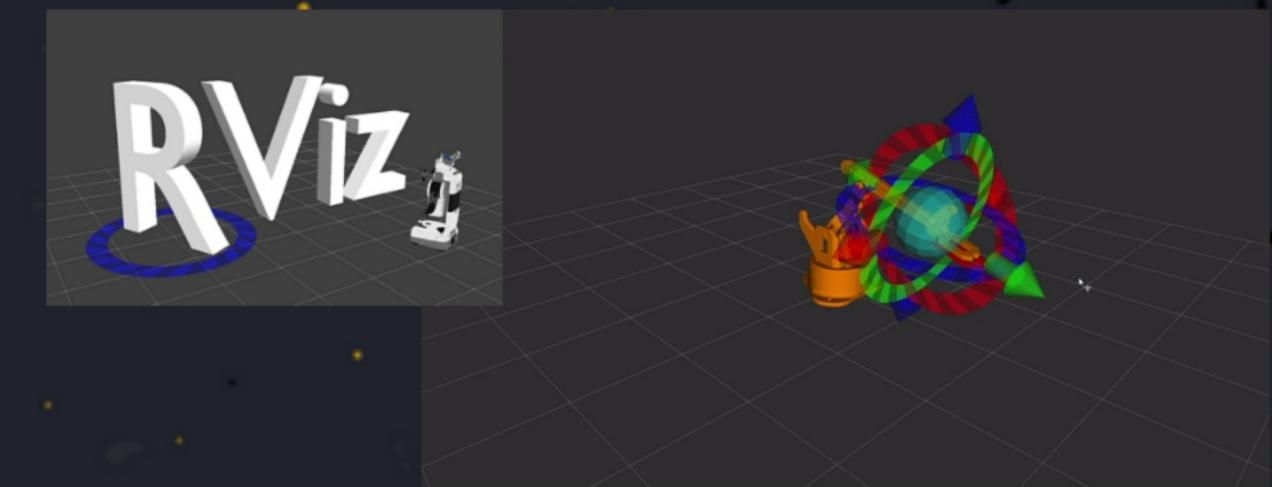


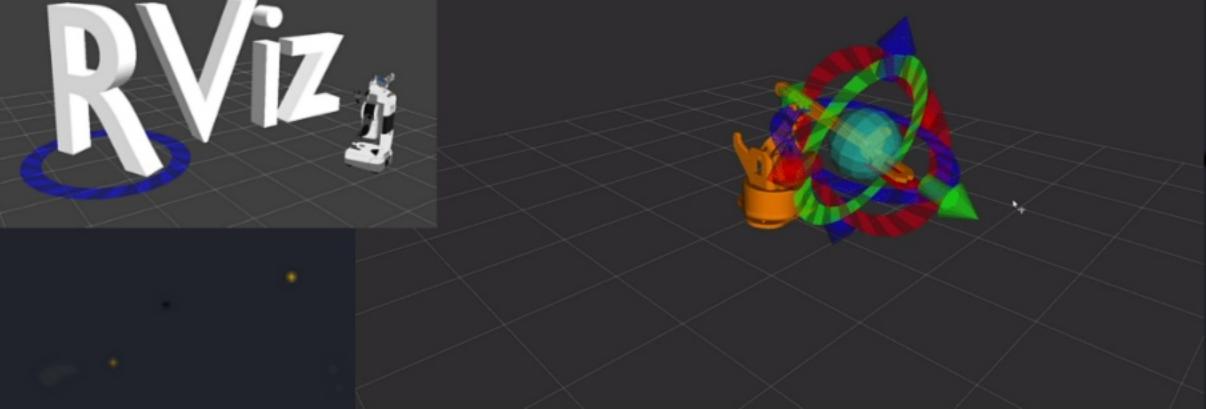
MoveIt²



RViz







MoveIt2



$f(\mathbf{x})$ task_server



$f(\star)$ task_server

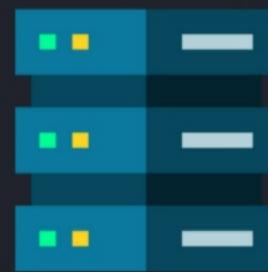
 **MoveIt2**



$f(x)$ task_server



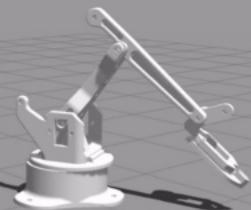
MoveIt2

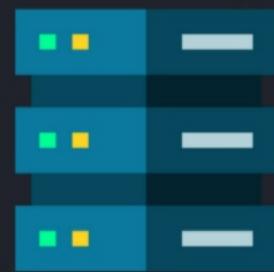


$f(x)$ task_server

The MoveIt2 logo, which consists of the word "MoveIt2" in a large, bold, white sans-serif font. To the left of the text is a blue and purple gear icon with the word "API" in the center.

task_0



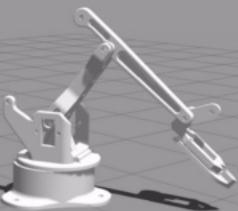


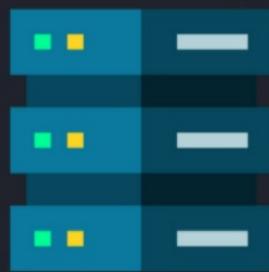
$f(x)$ task_server



task_0

task_1

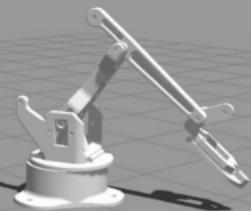




$f(x)$ task_server



task_0

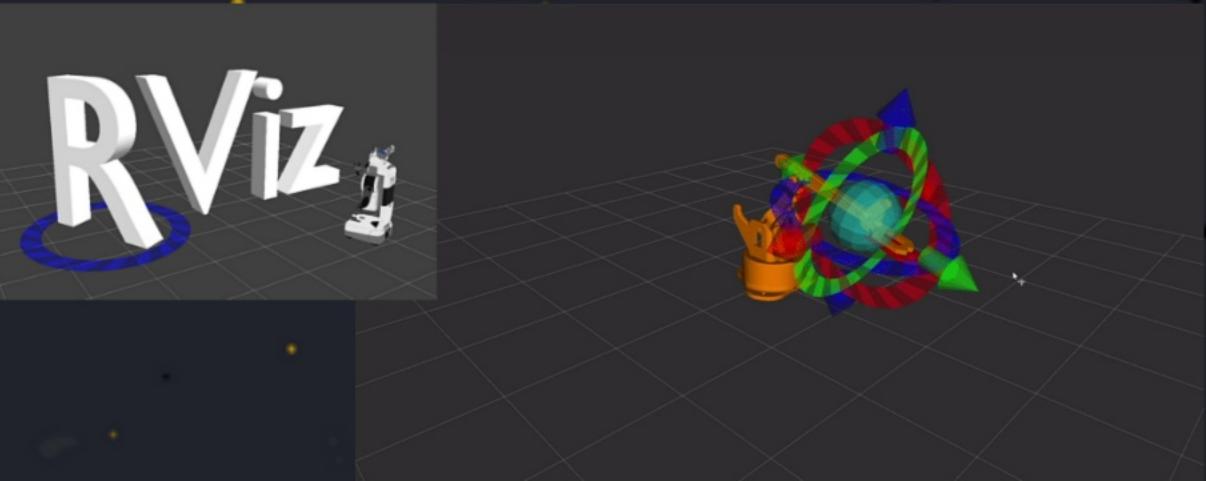
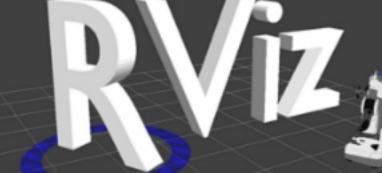


task_1



task_2



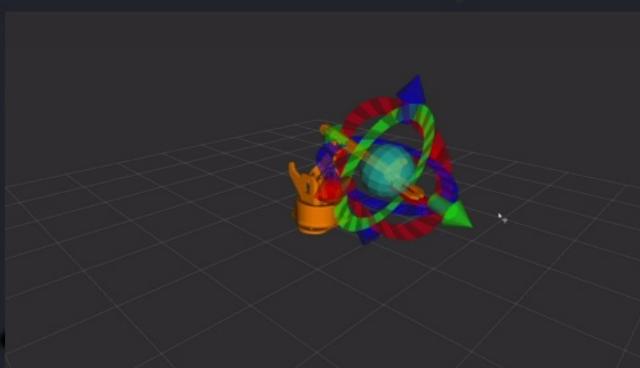


MoveIt2

Application

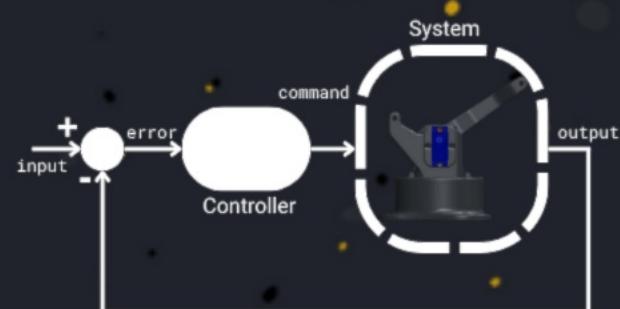


Kinematics

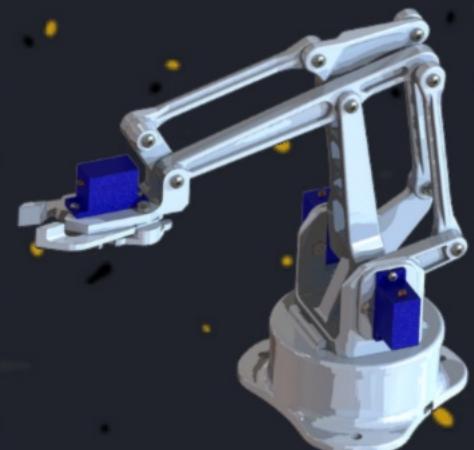


Control

ros2_control



Digital Twin



Fibonacci Sequence

0 1

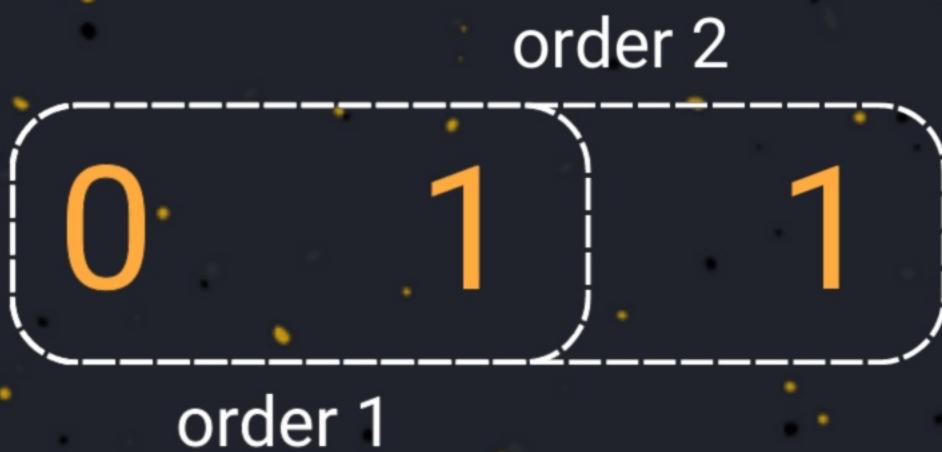
Fibonacci Sequence



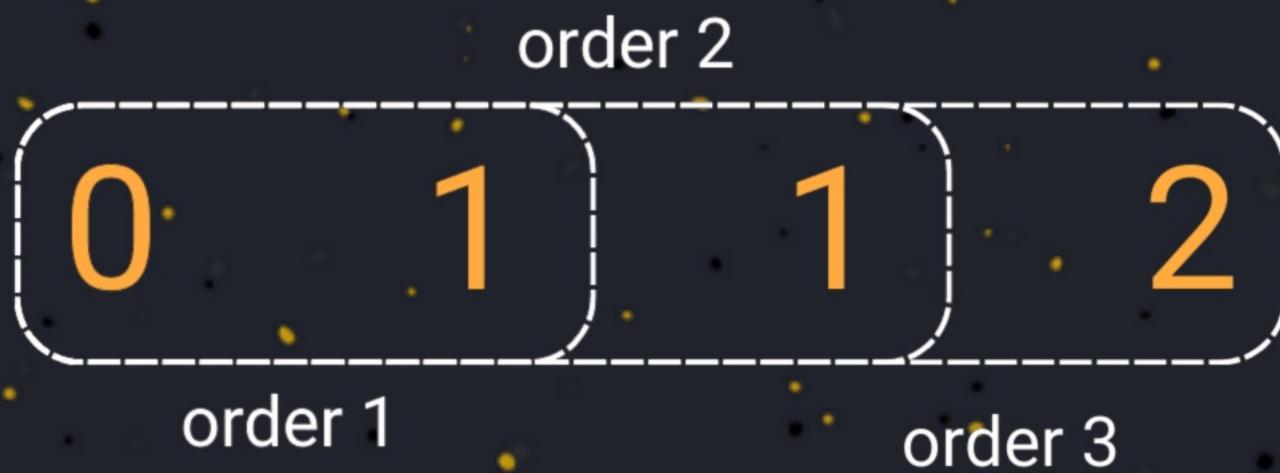
0 1

order 1

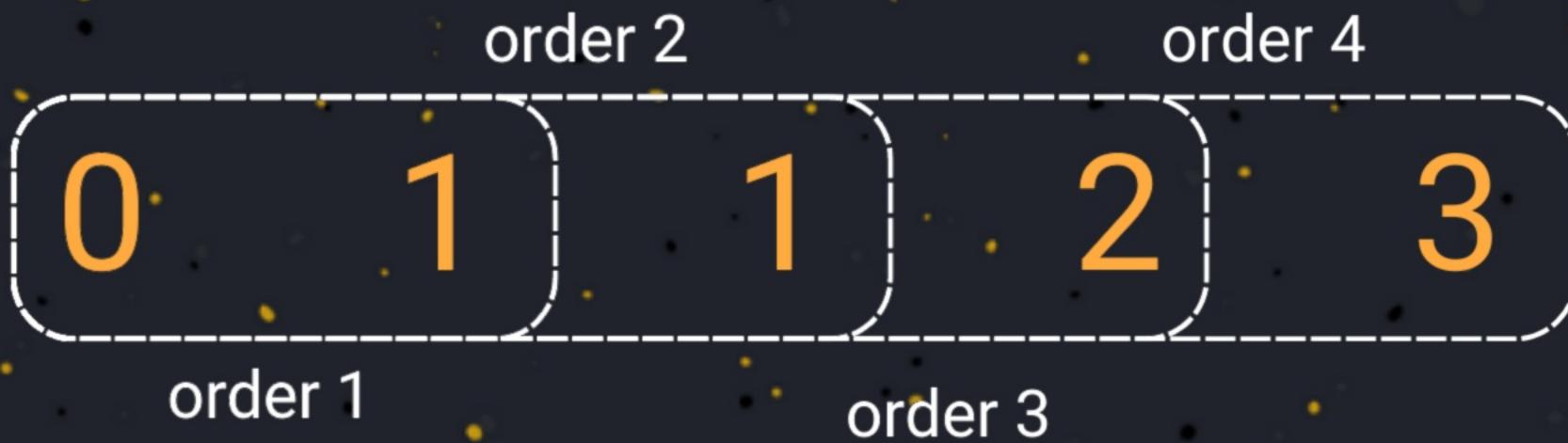
Fibonacci Sequence



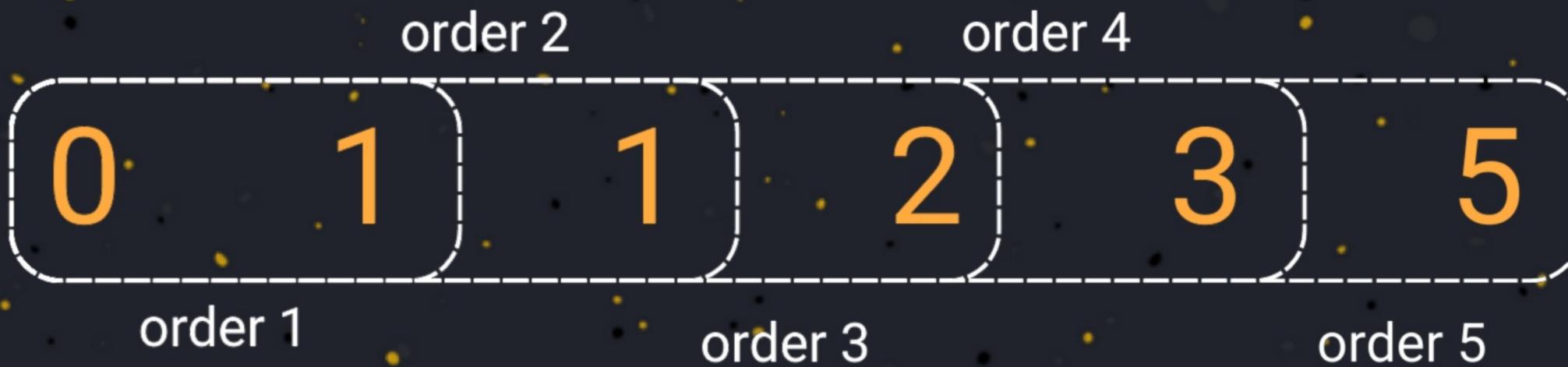
Fibonacci Sequence



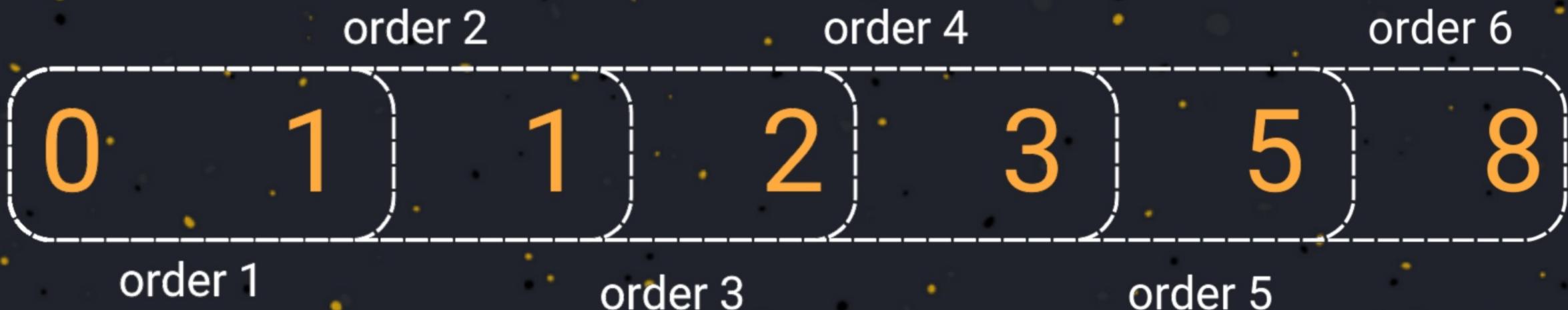
Fibonacci Sequence



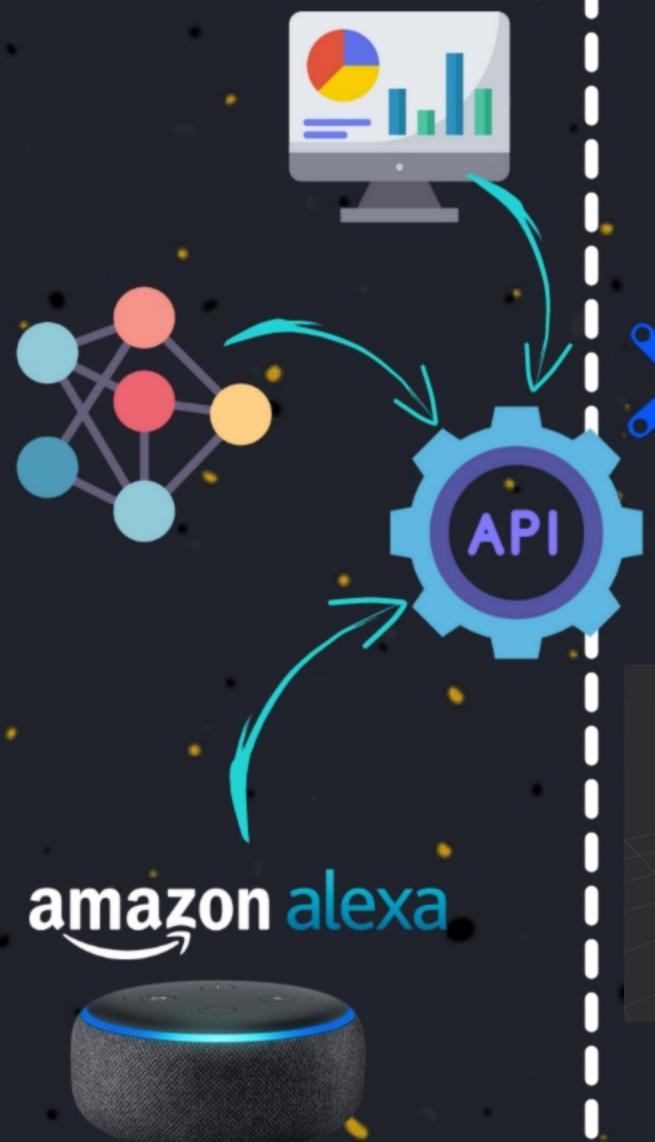
Fibonacci Sequence



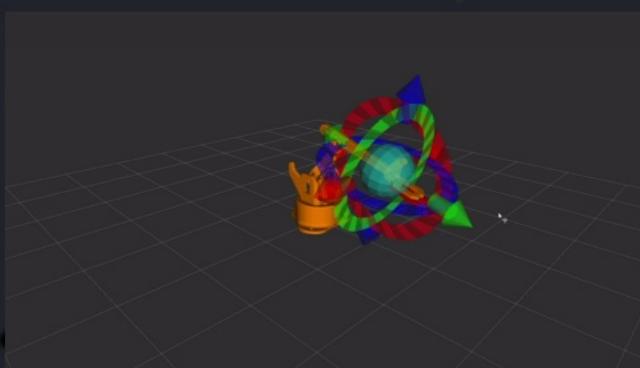
Fibonacci Sequence



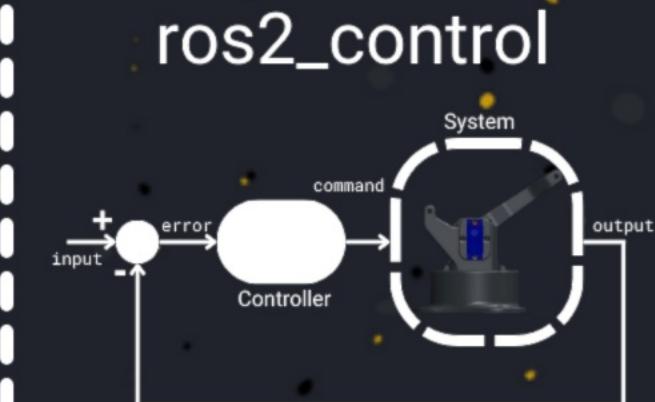
Application



Kinematics



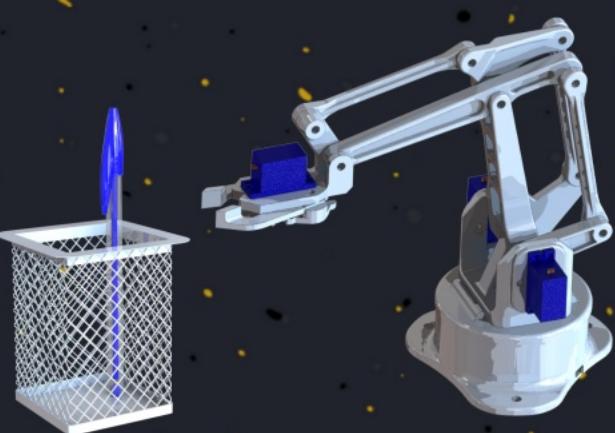
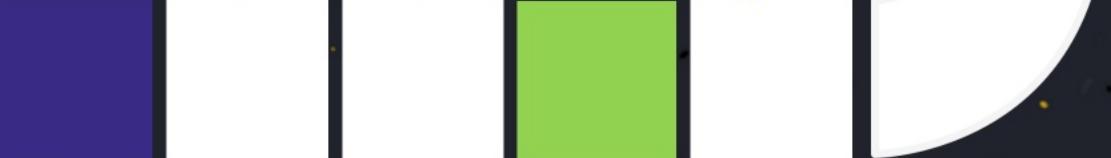
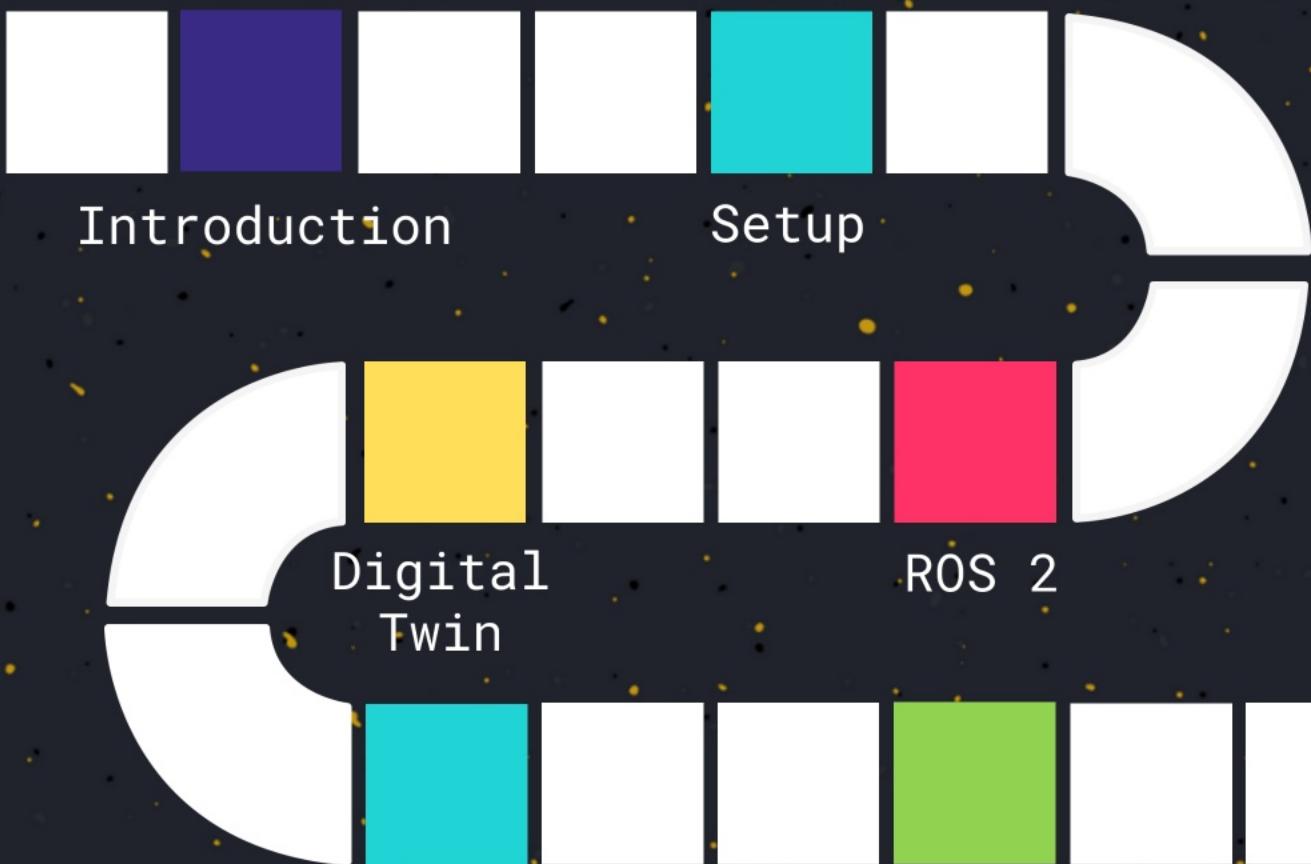
Control



Digital Twin



Arduinobot



Conclusions Build