SPIKE™ Prime de LEGO® Education

Programas en Python
Soluciones posibles

SPIKE™ Prime de LEGO® Education

¡Ayuda!

https://education.lego.com/es-mx/lessons/prime-invention-squad/help

```
from spike import PrimeHub, App, ColorSensor
from spike.control import wait_for_seconds

hub = PrimeHub()
app = App()
color_sensor = ColorSensor('B')

# Esta es la historia núm. 1: Kiki va a dar un paseo. Está fuera de casa, feliz, hasta que...
hub.left_button.wait_until_pressed()

color_sensor.wait_until_color('blue')
app.play_sound('Traffic')

color_sensor.wait_until_color('yellow')
app.play_sound('Ring Tone')

color_sensor.wait_until_color('green')
app.play_sound('Dog Bark 1')
app.play_sound('Dog Bark 1')

# Esta es la historia núm. 2.
hub.right_button.wait_until_pressed()

color_sensor.wait_until_color('blue')
app.play_sound('Door Knock')

color_sensor.wait_until_color('yellow')
app.play_sound('Glass Breaking')

color_sensor.wait_until_color('green')
app.play_sound('Dog Bark 3')
```

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Carrera de saltadores

https://education.lego.com/es-mx/lessons/prime-invention-squad/hopper-race

```
from spike import PrimeHub, MotorPair
from spike.control import wait_for_seconds


hub = PrimeHub()
hop_motors = MotorPair('E', 'F')


hop_motors.set_default_speed(50)


hub.light_matrix.write('3')
wait_for_seconds(1)

hub.light_matrix.write('2')
wait_for_seconds(1)

hub.light_matrix.write('1')
wait_for_seconds(1)

# Ajusta este valor para cambiar la distancia que abarcará el movimiento del saltador.
# --------------v
hop_motors.move(10, 'seconds')
```

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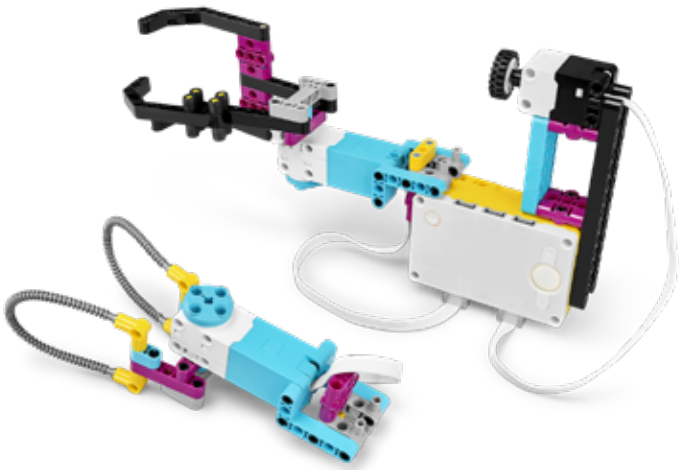
Superlimpieza

https://education.lego.com/es-mx/lessons/prime-invention-squad/super-cleanup



```
from spike import ForceSensor, Motor


force_sensor = ForceSensor('E')
grabber_motor = Motor('A')


while True:
    force_sensor.wait_until_pressed()
    grabber_motor.set_stall_detection(False)
    grabber_motor.start(-75)

    force_sensor.wait_until_released()
    grabber_motor.set_stall_detection(True)
    grabber_motor.start(75)
```

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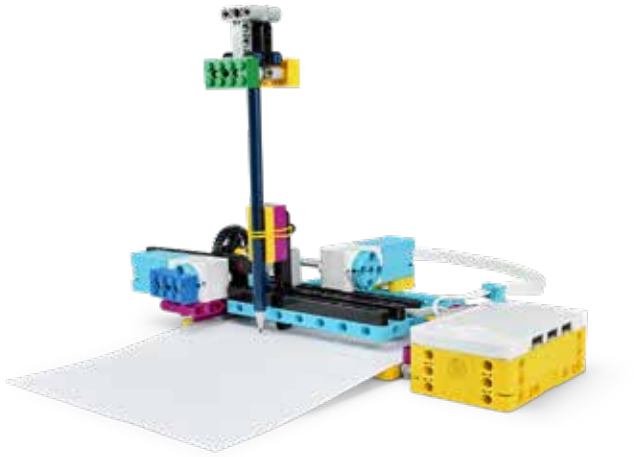
Roto

https://education.lego.com/es-mx/lessons/prime-invention-squad/broken



```
from spike import PrimeHub, Motor
from spike.control import wait_for_seconds
hub = PrimeHub()
x_motor = Motor('A')
y_motor = Motor('C')

hub.left_button.wait_until_pressed()
x_motor.set_default_speed(-100)
x_motor.run_for_seconds(1.5)
wait_for_seconds(1)

# Estas líneas deben “recortar” un cuadrado.
x_motor.set_default_speed(100)
y_motor.set_default_speed(100)
x_motor.run_for_degrees(400)
y_motor.run_for_degrees(575)
x_motor.run_for_degrees(-400)
y_motor.run_for_degrees(-575)

hub.right_button.wait_until_pressed()
x_motor.set_default_speed(100)
x_motor.run_for_seconds(1.5)

wait_for_seconds(1)
# Estas líneas deben “recortar” un rectángulo.
x_motor.run_for_degrees(-60)
x_motor.run_for_degrees(-400)
y_motor.run_for_degrees(-800)
x_motor.run_for_degrees(400)
y_motor.run_for_degrees(800)
```

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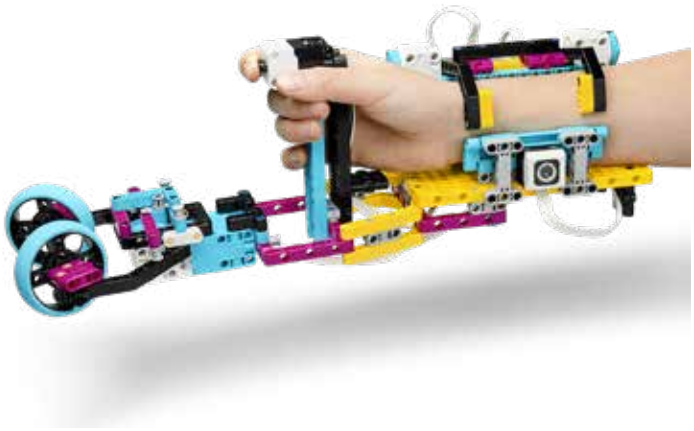
Diseñar para alguien

https://education.lego.com/es-mx/lessons/prime-invention-squad/design-for-someone



```
from spike import PrimeHub, Motor, ForceSensor
from spike.control import wait_for_seconds


hub = PrimeHub()
motor_a = Motor('A')
motor_e = Motor('E')
force_sensor = ForceSensor('B')


motor_a.set_default_speed(100)
motor_e.set_default_speed(-100)
motor_a.set_stall_detection(False)
motor_e.set_stall_detection(False)
motor_a.set_stop_action('hold')
motor_e.set_stop_action('hold')


motor_a.run_to_position(0)
hub.speaker.beep(60)
hub.speaker.beep(72)

# Haz que la prótesis se sujete en el brazo de alguien.
motor_a.run_for_seconds(1)
motor_e.run_for_seconds(1)

while True:
    if hub.right_button.was_pressed():
        # Haz que la prótesis se suelte.
        motor_a.run_to_position(0)
        motor_e.run_to_position(0)
        break

    if force_sensor.get_force_newton() > 5:
        hub.light_matrix.show_image('SQUARE')
    else:
        hub.light_matrix.off()

    wait_for_seconds(0.01)
```

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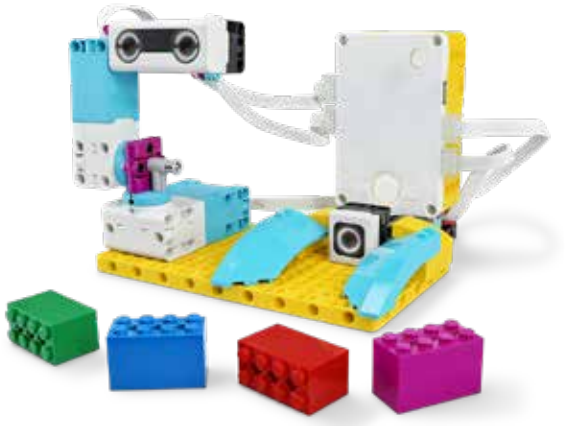
Haz tu pedido

https://education.lego.com/es-mx/lessons/prime-kickstart-a-business/place-your-order

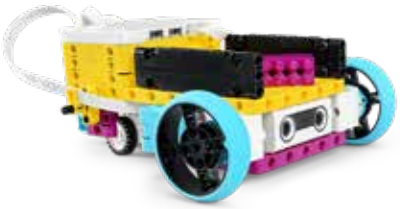


```
from spike import PrimeHub, App, ColorSensor, DistanceSensor, Motor
from spike.control import wait_for_seconds


hub = PrimeHub()
app = App()
distance_sensor = DistanceSensor('C')
color_sensor = ColorSensor('D')
arm_motor = Motor('A')
base_motor = Motor('F')


arm_motor.set_default_speed(50)
base_motor.set_default_speed(50)


arm_motor.run_to_position(350)
base_motor.run_to_position(350)

app.start_sound('Connect')
distance_sensor.light_up_all()

for x in range(10):
    hub.light_matrix.show_image('HEART')
    wait_for_seconds(0.5)
    hub.light_matrix.show_image('HEART_SMALL')
    wait_for_seconds(0.5)

hub.light_matrix.show_image('HEART')

while True:
    color_sensor.wait_until_color('violet')
    arm_motor.run_for_degrees(30)
    arm_motor.run_for_degrees(-60)
    arm_motor.run_for_degrees(60)
    arm_motor.run_for_degrees(-30)
    app.start_sound('Connect')
    hub.light_matrix.show_image('HEART')
```

SPIKE™ Prime de LEGO® Education

Fuera de servicio

https://education.lego.com/es-mx/lessons/prime-kickstart-a-business/out-of-order

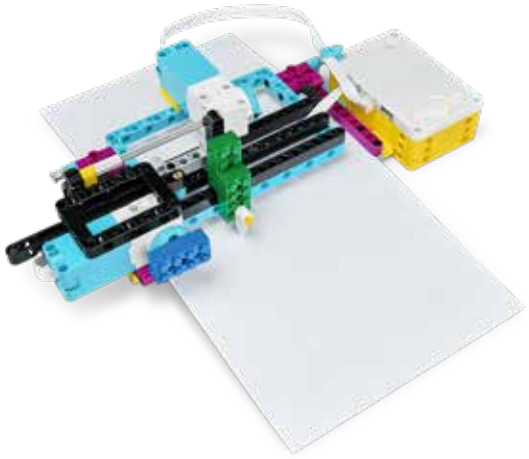


```
from spike import PrimeHub, DistanceSensor, Motor, MotorPair
from spike.control import wait_for_seconds

hub = PrimeHub()
distance_sensor = DistanceSensor('B')
drive_motors = MotorPair('A', 'E')
small_wheel_motor = Motor('C')


small_wheel_motor.set_default_speed(100)
drive_motors.set_default_speed(50)

hub.left_button.wait_until_pressed()
# Esta es una forma de depurar el primer programa.
small_wheel_motor.run_to_position(0)
drive_motors.start()
# Ajusta este valor --------------------------v
distance_sensor.wait_for_distance_closer_than(15, DistanceSensor.CM)
drive_motors.stop()



hub.right_button.wait_until_pressed()
# Esta es una forma de depurar el segundo programa.
small_wheel_motor.run_to_position(0)
drive_motors.start()
# Ajusta este valor --------------------------v
distance_sensor.wait_for_distance_closer_than(15, DistanceSensor.CM)
drive_motors.stop()
# Ajusta este valor --------------v
small_wheel_motor.run_to_position(20)
wait_for_seconds(1)
drive_motors.move(-50, DistanceSensor.CM)
drive_motors.stop()
small_wheel_motor.run_to_position(0)
wait_for_seconds(1)
# Ajusta este valor
# ----------------v
drive_motors.move(50, DistanceSensor.CM)
drive_motors.stop()
```

SPIKE™ Prime de LEGO® Education

Hacer un seguimiento de los paquetes

https://education.lego.com/es-mx/lessons/prime-kickstart-a-business/track-your-packages



```
from spike import PrimeHub, Motor
from spike.control import wait_for_seconds

hub = PrimeHub()
horizontal_motor = Motor('A')
vertical_motor = Motor('C')

horizontal_motor.set_default_speed(75)
vertical_motor.set_default_speed(75)


# Este programa hace el seguimiento del paquete en el mapa núm. 1.

hub.left_button.wait_until_pressed()
horizontal_motor.run_for_seconds(1)
wait_for_seconds(1)

vertical_motor.run_for_degrees(475)
horizontal_motor.run_for_degrees(-545)
vertical_motor.run_for_degrees(950)
horizontal_motor.run_for_degrees(550)
vertical_motor.run_for_degrees(380)

# Haz funcionar ambos motores al mismo tiempo para provocar un movimiento diagonal.
vertical_motor.start(speed=75)
horizontal_motor.run_for_degrees(-540, speed=50)
vertical_motor.stop()

vertical_motor.run_for_degrees(175)
```

SPIKE™ Prime de LEGO® Education

Un lugar seguro

https://education.lego.com/es-mx/lessons/prime-kickstart-a-business/keep-it-safe

```
from spike import PrimeHub, Motor, LightMatrix
from spike.control import wait_for_seconds, wait_until
from spike.operator import greater_than

hub = PrimeHub()
lock_motor = Motor('C')
dial_motor = Motor('B')
lock_motor.set_default_speed(50)

hub.speaker.beep(60)
hub.speaker.beep(72)

# Estas instrucciones cierran la puerta.
dial_motor.set_stop_action('coast')
dial_motor.run_to_position(0)
dial_motor.set_degrees_counted(0)
hub.light_matrix.show_image('NO')

# Estas instrucciones desbloquean la puerta cuando se pulsa el botón izquierdo del Hub.

hub.left_button.wait_until_pressed()
hub.speaker.beep(72)
wait_until(dial_motor.get_degrees_counted, greater_than, 180)
hub.speaker.beep(60)
lock_motor.run_for_seconds(1)
hub.light_matrix.show_image('NO')
wait_for_seconds(2)
hub.light_matrix.show_image('YES')
wait_for_seconds(5)
```

SPIKE™ Prime de LEGO® Education

¡Un lugar superseguro!

https://education.lego.com/es-mx/lessons/prime-kickstart-a-business/keep-it-really-safe

```
from spike import PrimeHub, App, Motor
from spike.control import Timer, wait_for_seconds

hub = PrimeHub()
app = App()
dial = Motor('B')
lock = Motor('C')
dial_cover = Motor('E')
timer = Timer()

dial.set_default_speed(75)
lock.set_default_speed(75)
dial_cover.set_default_speed(75)

def unlock():

while not hub.left_button.is_pressed() and dial.get_degrees_counted() < 180:
    hub.speaker.beep(60)
    dial_cover.run_for_degrees(15)
    wait_for_seconds(0.8)

    if timer.now() > 5:
        app.play_sound('Bonk')
        return

    hub.light_matrix.show_image('NO')
    wait_for_seconds(2)
    hub.light_matrix.show_image('YES')
    dial_cover.run_to_position(0)
    lock.run_for_seconds(1)
    app.play_sound('Wand')
    wait_for_seconds(5)

# Estas instrucciones bloquean la puerta e inician el mecanismo de protección adicional.

hub.speaker.beep(60)
hub.speaker.beep(72)
lock.run_for_seconds(-1)
dial.run_to_position(0)
dial_cover.run_to_position(0)
dial.set_degrees_counted(0)
dial.set_stop_action('coast')
hub.light_matrix.show_image('NO')
timer.reset()
unlock()
```

SPIKE™ Prime de LEGO® Education

¡Automatízalo!

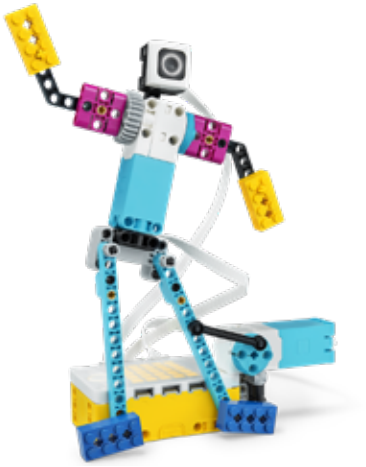
https://education.lego.com/es-mx/lessons/prime-kickstart-a-business/automate-it

```
from spike import App, Motor, ColorSensor
from spike.control import wait_for_seconds

app = App()
base_motor = Motor('A')
arm_motor = Motor('F')
color_sensor = ColorSensor('D')

base_motor.set_default_speed(25)
arm_motor.set_default_speed(25)

def check_color():
    # Estas instrucciones sirven para inspeccionar el color del paquete.
    arm_motor.run_to_position(235)
    wait_for_seconds(4)
    if color_sensor.get_color() == 'violet':
        base_motor.run_to_position(0)
        arm_motor.run_to_position(25)
        app.play_sound('Triumph')
        arm_motor.run_to_position(240)
    else:
        app.play_sound('Oops')
        arm_motor.run_to_position(25)
        for x in range(3):
            arm_motor.run_for_degrees(-100, speed=100)
            arm_motor.run_for_degrees(100, speed=100)

# Estas instrucciones activan el robot y hacen que sujete un paquete de cada lado.
base_motor.run_to_position(0)
arm_motor.run_to_position(240)

base_motor.run_to_position(90)
arm_motor.run_to_position(25)

check_color()

base_motor.run_to_position(0)
arm_motor.run_to_position(240)
base_motor.run_to_position(270)
arm_motor.run_to_position(25)

check_color()

base_motor.run_to_position(0)
arm_motor.run_to_position(240)
```

SPIKE™ Prime de LEGO® Education

Break dance

https://education.lego.com/es-mx/lessons/prime-life-hacks/break-dance



La sesión Break dance fue creada para nuestro lenguaje de programación de bloques de palabras. Actualmente no es posible utilizar exactamente el mismo flujo de la sesión con nuestra programación en Python.

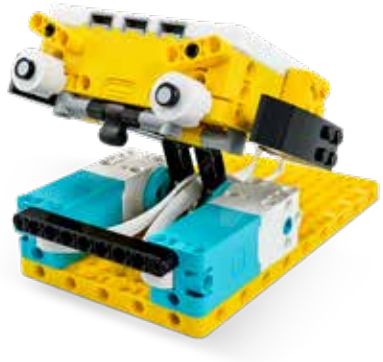
¡Este programa por lo menos hará que tu modelo se mueva!

```
from spike import PrimeHub, Motor, ColorSensor
from spike.control import wait_for_seconds


hub = PrimeHub()
leg_motor = Motor('F')
arm_motor = Motor('B')
color_sensor = ColorSensor('D')


leg_motor.set_default_speed(-80)
arm_motor.set_default_speed(-80)


leg_motor.run_to_position(0)
arm_motor.run_to_position(0)
wait_for_seconds(1)

for x in range(10):
    hub.light_matrix.write("1")
    leg_motor.start()
    arm_motor.run_for_rotations(1)
    leg_motor.stop()
    wait_for_seconds(0.45)

    hub.light_matrix.write("2")
    leg_motor.start()
    arm_motor.run_for_rotations(1)
    leg_motor.stop()
    wait_for_seconds(0.45)

    hub.light_matrix.write("3")
    leg_motor.start()
    arm_motor.run_for_rotations(1)
    leg_motor.stop()
    wait_for_seconds(0.45)
```

SPIKE™ Prime de LEGO® Education

Repetir 5 veces

https://education.lego.com/es-mx/lessons/prime-life-hacks/repeat-5-times



```
from spike import PrimeHub, App, Motor
from spike.control import wait_until, wait_for_seconds
from spike.operator import equal_to


hub = PrimeHub()
app = App()
left_leg_motor = Motor('B')
right_leg_motor = Motor('F')
left_leg_motor.set_default_speed(50)
right_leg_motor.set_default_speed(-50)
left_leg_motor.start()
right_leg_motor.start()

wait_until(hub.motion_sensor.get_orientation, equal_to, 'leftside')
right_leg_motor.stop()
left_leg_motor.stop()

app.play_sound('Sport Whistle 1')

for count in range(5):
    left_leg_motor.set_default_speed(-50)
    right_leg_motor.set_default_speed(50)
    left_leg_motor.start()
    right_leg_motor.start()
    wait_until(hub.motion_sensor.get_orientation, equal_to, 'front')
    right_leg_motor.stop()
    left_leg_motor.stop()
    app.start_sound('Male Jump 1')
    hub.light_matrix.write(count + 1)
    wait_for_seconds(0.5)
    left_leg_motor.set_default_speed(50)
    right_leg_motor.set_default_speed(-50)
    left_leg_motor.start()
    right_leg_motor.start()
    wait_until(hub.motion_sensor.get_orientation, equal_to, 'leftside')
    right_leg_motor.stop()
    left_leg_motor.stop()
    wait_for_seconds(0.5)

app.play_sound('Sport Whistle 2')
```

SPIKE™ Prime de LEGO® Education

¿Lluvia o sol?

https://education.lego.com/es-mx/lessons/prime-life-hacks/rain-or-shine

La sesión ¿Lluvia o sol? fue creada para nuestro lenguaje de programación de bloques de palabras. Actualmente no es posible utilizar las funciones del pronóstico meteorológico con nuestra programación en Python.

¡Este programa hará que el meteorólogo se mueva!

```
from spike import PrimeHub, App, Motor
from spike.control import wait_for_seconds

hub = PrimeHub()
app = App()
umbrella_motor = Motor("B")
glasses_motor = Motor("F")
YOUR_LOCAL_FORECAST = "sunny"

umbrella_motor.set_default_speed(100)
glasses_motor.set_default_speed(100)


# Estas instrucciones hacen que el robot se coloque en la posición inicial correcta.
umbrella_motor.run_to_position(45)
glasses_motor.run_to_position(300)

hub.speaker.beep(60, seconds=0.1)
hub.speaker.beep(72, seconds=0.1)

if YOUR_LOCAL_FORECAST == "sunny":
    # Si está soleado, entonces ponte anteojos de sol.
    glasses_motor.run_to_position(0)
    hub.light_matrix.show_image("SQUARE")
    wait_for_seconds(2)
    glasses_motor.run_to_position(300)
elif YOUR_LOCAL_FORECAST == "rainy":
    # O, si llueve, levanta el paraguas.
    umbrella_motor.run_to_position(340)
    app.play_sound("Rain")
    umbrella_motor.run_to_position(45)
else:
    # En cualquier otro caso, muestra X.
    hub.light_matrix.show_image("NO")
```

SPIKE™ Prime de LEGO® Education

Velocidad del viento

https://education.lego.com/es-mx/lessons/prime-life-hacks/wind-speed

La sesión Velocidad del viento fue creada para nuestro lenguaje de programación de bloques de palabras. Actualmente no es posible utilizar las funciones del pronóstico meteorológico con nuestra programación en Python.

¡Este programa por lo menos hará que tu modelo se mueva!

```
from spike import App, Motor
from spike.control import wait_for_seconds

tilt_motor = Motor("A")
WIND_SPEED_FORECAST = 8

tilt_motor.set_default_speed(20)
tilt_motor.run_to_position(5)


if WIND_SPEED_FORECAST < 5.5:
    tilt_motor.run_for_degrees(30)
    wait_for_seconds(1)
    tilt_motor.run_for_degrees(-30)
else:
    tilt_motor.run_for_degrees(60)
    wait_for_seconds(1)
    tilt_motor.run_for_degrees(-60)
```

SPIKE™ Prime de LEGO® Education

Amor vegetariano

https://education.lego.com/es-mx/lessons/prime-life-hacks/veggie-love

La sesión Amor vegetariano fue creada para nuestro lenguaje de programación de bloques de palabras. Actualmente no es posible utilizar las funciones del pronóstico meteorológico con nuestra programación en Python.

¡Este programa por lo menos hará que tu modelo se mueva!

```
from spike import PrimeHub, App, Motor

hub = PrimeHub()
app = App()
pointer_motor = Motor("E")
pointer_motor.set_default_speed(-50)

WEEK_RAIN = 50
ROTATION = 0


hub.left_button.wait_until_pressed()
pointer_motor.run_for_seconds(2)
pointer_motor.set_degrees_counted(0)
pointer_motor.set_default_speed(50)
pointer_motor.run_for_seconds(2)
hub.light_matrix.write(abs(pointer_motor.get_degrees_counted()))
rotation = int(week_rain * abs(pointer_motor.get_degrees_counted()) / 60)
print(ROTATION)


hub.right_button.wait_until_pressed()
pointer_motor.set_degrees_counted(0)
pointer_motor.set_default_speed(-50)
pointer_motor.run_for_degrees(ROTATION)
hub.light_matrix.write(WEEK_RAIN)
print(WEEK_RAIN)
```

SPIKE™ Prime de LEGO® Education

Juego mental

https://education.lego.com/es-mx/lessons/prime-life-hacks/brain-game

```
from spike import PrimeHub, App, Motor, ColorSensor
from spike.control import wait_for_seconds


hub = PrimeHub()
app = App()
mouth_motor = Motor('A')
color_sensor = ColorSensor('B')
candy1 = []
candy2 = []


while True:
    hub.left_button.wait_until_pressed()

    # Estas instrucciones hacen que el director de juego se coma la barra de caramelo, detecte su secuencia de colores y la registre en la lista llamada “caramelo1”.
    hub.light_matrix.off()
    candy1.clear()
    mouth_motor.set_default_speed(-50)
    mouth_motor.run_for_seconds(2)
    app.play_sound('Bite')
    app.play_sound('Bite')

    for x in range(5):
        candy1.append(color_sensor.get_color())
        wait_for_seconds(1)
        mouth_motor.set_default_speed(50)
        mouth_motor.run_for_degrees(95)
        wait_for_seconds(1)

    hub.right_button.wait_until_pressed()


    # Estas instrucciones hacen que el director de juego se coma la barra de caramelo, detecte su secuencia de colores y la registre en la lista llamada “caramelo2”.
    candy2.clear()
    mouth_motor.set_default_speed(-50)
    mouth_motor.run_for_seconds(2)
    app.play_sound('Bite')
    app.play_sound('Bite')

    for x in range(5):
        candy2.append(color_sensor.get_color())
        wait_for_seconds(1)
        mouth_motor.set_default_speed(50)
        mouth_motor.run_for_degrees(95)
        wait_for_seconds(1)

    # Haz que se ilumine la posición de los ladrillos rojos si es la misma en ambas barras de caramelo.
    candy1_red_index = candy1.index('red')
    candy2_red_index = candy2.index('red')
    for x in range(5):
        print(candy1[x])


    if candy1_red_index == candy2_red_index:
        for x in range(5):
            hub.light_matrix.set_pixel(x, candy1_red_index)
        app.play_sound('Win')
    else:
        app.play_sound('Oops')
```

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El entrenador

https://education.lego.com/es-mx/lessons/prime-life-hacks/the-coach

```
from spike import Motor
from spike.control import Timer, wait_for_seconds

left_leg_motor = Motor('F')
right_leg_motor = Motor('B')
timer = Timer()
left_leg_motor.run_to_position(0)
right_leg_motor.run_to_position(0)

while True:
    while timer.now() < 5:
        left_leg_motor.start_at_power(-80)
        right_leg_motor.start_at_power(80)
        wait_for_seconds(0.1)
        left_leg_motor.start_at_power(80)
        right_leg_motor.start_at_power(-80)
        wait_for_seconds(0.1)
```

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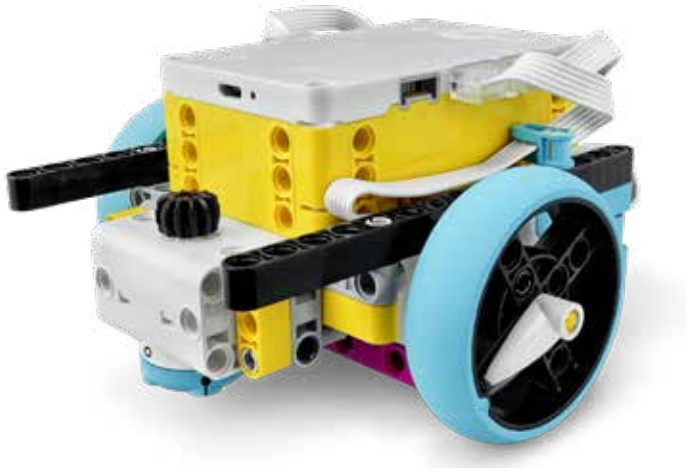
Campo de entrenamiento 1

https://education.lego.com/es-mx/lessons/prime-competition-ready/training-camp-1-driving-around



```
from spike import MotorPair
from spike.control import wait_for_seconds


drive_motors = MotorPair('C', 'D')


drive_motors.set_default_speed(30)
drive_motors.set_motor_rotation(17.5, 'cm')


wait_for_seconds(1)

for x in range(4):
    drive_motors.move(10, 'cm')
    wait_for_seconds(0.5)
    drive_motors.move(182, 'degrees', steering=100)
```

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Campo de entrenamiento 2

https://education.lego.com/es-mx/lessons/prime-competition-ready/training-camp-2-playing-with-objects

```
from spike import PrimeHub, MotorPair, Motor, DistanceSensor
from spike.control import wait_for_seconds


hub = PrimeHub()
drive_motors = MotorPair('C', 'D')
grabber_motor = Motor('E')
distance_sensor = DistanceSensor('F')


drive_motors.set_default_speed(30)
drive_motors.set_motor_rotation(17.5, 'cm')
grabber_motor.set_default_speed(-20)
grabber_motor.run_for_seconds(1)
grabber_motor.set_default_speed(20)
grabber_motor.run_for_degrees(75)

hub.speaker.beep(60)
hub.speaker.beep(72)

hub.right_button.wait_until_pressed()

wait_for_seconds(1)

drive_motors.start()
distance_sensor.wait_for_distance_closer_than(10, 'cm')
drive_motors.stop()

grabber_motor.run_for_degrees(-75)

hub.speaker.beep(60)
hub.speaker.beep(72)

drive_motors.move(-20, 'cm')
```

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Campo de entrenamiento 3:

https://education.lego.com/es-mx/lessons/prime-competition-ready/training-camp-3-react-to-lines

```
from spike import PrimeHub, MotorPair, ColorSensor
from spike.control import wait_for_seconds

hub = PrimeHub()
drive_motors = MotorPair('C', 'D')
color_sensor = ColorSensor('B')

drive_motors.set_default_speed(50)
POWER = 50

while True:
    if hub.left_button.was_pressed():
        drive_motors.start()
        color_sensor.wait_until_color('black')
        drive_motors.stop()

    if hub.right_button.was_pressed():
        while True:
            drive_motors.start_tank_at_power(0, POWER)
            color_sensor.wait_until_color('black')
            drive_motors.start_tank_at_power(POWER, 0)
            color_sensor.wait_until_color('white')
```

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Montar una Base motriz avanzada

https://education.lego.com/es-mx/lessons/prime-competition-ready/assembling-an-advanced-driving-base

```
from spike import PrimeHub, MotorPair
from spike.control import wait_for_seconds, wait_until
from spike.operator import greater_than, less_than


hub = PrimeHub()
drive_motors = MotorPair('A', 'E')


drive_motors.set_default_speed(50)
drive_motors.set_motor_rotation(27.63, 'cm')


wait_for_seconds(1)

drive_motors.move(20, 'cm')
drive_motors.move(-20, 'cm')

drive_motors.move(20, 'cm', steering=-40)

hub.motion_sensor.reset_yaw_angle()

drive_motors.start(steering=100)
wait_until(hub.motion_sensor.get_yaw_angle, greater_than, 90)
drive_motors.stop()

drive_motors.start(steering=-100)
wait_until(hub.motion_sensor.get_yaw_angle, less_than, 0)
drive_motors.stop()
```

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Mi código, nuestro programa

https://education.lego.com/es-mx/lessons/prime-competition-ready/my-code-our-program

```
from spike import PrimeHub, MotorPair
from spike.control import wait_for_seconds


hub = PrimeHub()
drive_motors = MotorPair('A', 'E')


drive_motors.set_default_speed(50)
drive_motors.set_motor_rotation(27.63, 'cm')


def square():
    for x in range(4):
        drive_motors.move(1.5, 'rotations')
        drive_motors.move(0.365, 'rotations', steering=100)


def triangle():
    for x in range(3):
        drive_motors.move(1.5, 'rotations')
        drive_motors.move(0.486, 'rotations', steering=100)


def circle():
    drive_motors.move(3, 'rotations', steering=60)


wait_for_seconds(1)

square()
hub.speaker.beep()

triangle()
hub.speaker.beep()

circle()
hub.speaker.beep()
```

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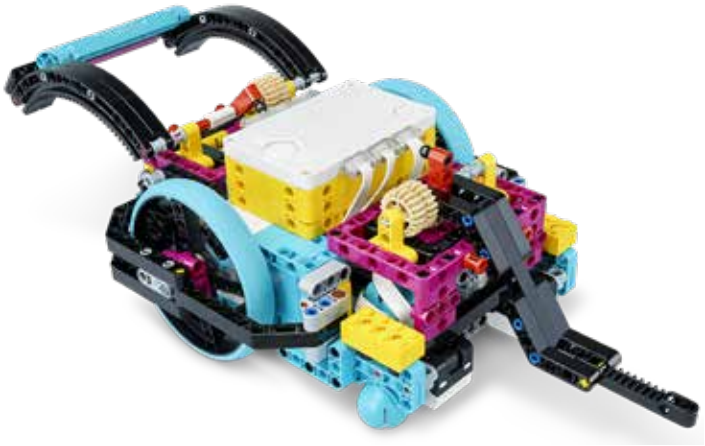
¡Hora de mejorar!

https://education.lego.com/es-mx/lessons/prime-competition-ready/time-for-an-upgrade



```
from spike import PrimeHub, Motor


hub = PrimeHub()
lift_arm_motor = Motor('D')
dozer_blade_motor = Motor('C')


lift_arm_motor.set_default_speed(-100)
lift_arm_motor.run_for_seconds(1)
dozer_blade_motor.set_default_speed(-100)
dozer_blade_motor.run_for_seconds(1)

lift_arm_motor.set_default_speed(100)
lift_arm_motor.run_for_degrees(70)
dozer_blade_motor.set_default_speed(100)
dozer_blade_motor.run_for_degrees(70)
hub.speaker.beep()

lift_arm_motor.run_for_degrees(180)
lift_arm_motor.run_for_degrees(-180)
dozer_blade_motor.run_for_degrees(180)
dozer_blade_motor.run_for_degrees(-180)
hub.speaker.beep()

lift_arm_motor.run_for_degrees(180, speed=15)
lift_arm_motor.run_for_degrees(-180, speed=15)
dozer_blade_motor.run_for_degrees(180, speed=15)
dozer_blade_motor.run_for_degrees(-180, speed=15)
```

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Listo para la misión

https://education.lego.com/es-mx/lessons/prime-competition-ready/mission-ready

```
from spike import Motor, MotorPair
from spike.control import wait_for_seconds


dozer_blade_motor = Motor('C')
lift_arm_motor = Motor('D')
drive_motors = MotorPair('A', 'E')


drive_motors.set_default_speed(25)
drive_motors.set_motor_rotation(27.63, 'cm')


dozer_blade_motor.start(-100)
lift_arm_motor.start(-100)
wait_for_seconds(1)
dozer_blade_motor.stop()
lift_arm_motor.stop()

dozer_blade_motor.run_for_degrees(70, speed=100)
lift_arm_motor.run_for_degrees(20, speed=100)

drive_motors.move(-2, 'cm')
drive_motors.move(10.5, 'cm')

dozer_blade_motor.run_for_degrees(180, speed=40)

drive_motors.move(-6, 'cm')

dozer_blade_motor.run_for_degrees(-180, speed=60)
dozer_blade_motor.run_for_degrees(180, speed=60)

drive_motors.move(7, 'cm')

dozer_blade_motor.run_for_degrees(-180, speed=60)

drive_motors.move(0.405, 'rotations', steering=-100)
drive_motors.move(60.5, 'cm', steering=-30)
drive_motors.move(34, 'cm')
drive_motors.move(32, 'cm', steering=-50)
drive_motors.move(17.5, 'cm')
drive_motors.move(0.415, 'rotations', steering=-100)
drive_motors.move(32, 'cm')
```

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Pasa el ladrillo

https://education.lego.com/es-mx/lessons/prime-extra-resources/pass-the-brick

```
from spike import Motor, PrimeHub


hub = PrimeHub()
grabber_motor = Motor('F')


# Esta instrucción hace que la mano se abra una vez para comenzar.
grabber_motor.run_for_seconds(1)

while True:
    # Estas instrucciones hacen que la mano se cierre cuando estás pulsando el botón izquierdo del Hub.
    hub.left_button.wait_until_pressed()
    grabber_motor.set_stall_detection(False)
    grabber_motor.start(-75)

   # Estas instrucciones hacen que la mano se abra cuando sueltas el botón izquierdo del Hub.
    hub.left_button.wait_until_released()
    grabber_motor.set_stall_detection(True)
    grabber_motor.start(75)
```

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Ideas, ial estilo LEGO!

https://education.lego.com/es-mx/lessons/prime-extra-resources/ideas-the-lego-way

```
from spike import PrimeHub
from spike.control import wait_for_seconds


hub = PrimeHub()


while True:
    if hub.left_button.was_pressed():
        hub.light_matrix.write('3')
        wait_for_seconds(1)
        hub.light_matrix.write('2')
        wait_for_seconds(1)
        hub.light_matrix.write('1')
        wait_for_seconds(1)
        hub.light_matrix.off()
        hub.speaker.beep(60, 0.5)
        hub.speaker.beep(72, 0.5)

    if hub.right_button.was_pressed():
        hub.light_matrix.write('5')
        wait_for_seconds(60)
        hub.light_matrix.write('4')
        wait_for_seconds(60)
        hub.light_matrix.write('3')
        wait_for_seconds(60)
        hub.light_matrix.write('2')
        wait_for_seconds(60)
        hub.light_matrix.write('1')
        wait_for_seconds(60)
        hub.light_matrix.off()
        hub.speaker.beep(60, 0.5)
        hub.speaker.beep(72, 0.5)
```

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¿En qué consiste?

https://education.lego.com/es-mx/lessons/prime-extra-resources/what-is-this

```
from spike import Motor


motor = Motor('F')


motor.set_stall_detection(False)

for x in range(5):
    motor.set_default_speed(50)
    motor.run_for_seconds(2)
    motor.set_default_speed(-50)
    motor.run_for_seconds(2)
```

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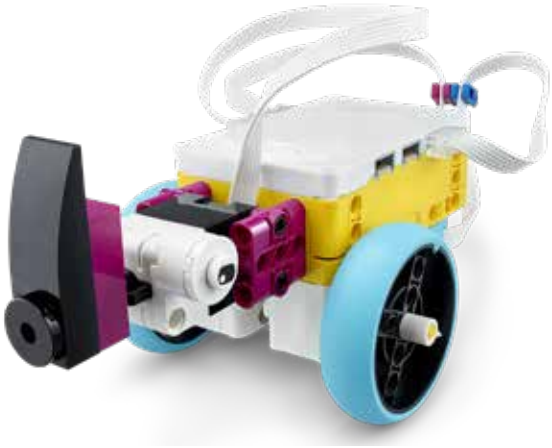
Recorrer una distancia

https://education.lego.com/es-mx/lessons/prime-extra-resources/going-the-distance



```
from spike import MotorPair

drive_motors = MotorPair('B', 'A')

drive_motors.set_default_speed(50)

drive_motors.move(10, 'rotations')
drive_motors.stop()
```

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¡Gol!

https://education.lego.com/es-mx/lessons/prime-extra-resources/goal

```
from spike import PrimeHub, Motor
from spike.control import wait_for_seconds


hub = PrimeHub()
kicker = Motor('A')
kicker.set_default_speed(100)


while True:
    kicker.run_to_position(0)

    hub.left_button.wait_until_pressed()
    kicker.run_for_rotations(1)
    wait_for_seconds(1)
```