04_01_while_student_hs_

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1 While Loops with Crazyflie – Student Version

In this notebook, you'll learn how to repeat drone actions using **while loops**.

A `while` loop keeps running **as long as a condition is true**. You'll use this to repeat motion until a timer ends or a sensor detects something!

1.1 Motion and Sensor Command Reference Table

Command	Description	Parameters (units/type)
`takeoff()`	Drone takes off and hovers	height (m/float), speed (m/s/float)
`land()`	Lands the drone	speed (m/s/float)
`forward()`	Move forward	distance (m/float), speed (m/s/float)
`backward()`	Move backward	distance (m/float), speed (m/s/float)
`left()`	Move left	distance (m/float), speed (m/s/float)
`right()`	Move right	distance (m/float), speed (m/s/float)
`rotate()`	Rotate (yaw change)	angle (degrees/int), duration (s/float)
`get_position()`	Get drone's X, Y coordinates	None
`get_height()`	Get current height	None
`get_yaw()`	Get current yaw angle (rotation)	None
`get_velocity()`	Get drone's speed	None
`get_status()`	Returns whether drone is flying or landed	None
`get_log()`	Shows history of commands sent	None
`detect_obstacle()`	Returns True if an obstacle is detected	None
`get_distances()`	Returns all MultiRanger sensor values as a dictionary	None
`get_distances()['left']`	Distance to the left object (in meters)	None

Command	Description	Parameters (units/type)
`get_distances()['front']`	Distance to the object in front (in meters)	None

1.2 Reminder: `while` loop syntax

```
while condition:
    # repeat this code
```

[ ]:
```
#  Setup the drone simulator
from crazyflie_sim import CrazyflieSimulator
import time
drone = CrazyflieSimulator(real=False)
```

1.3 Common Use Cases for While Loops

- Repeat a movement for a set amount of time
- Loop until a wall is detected
- Fly in a pattern until a counter reaches a number
- Continuously read sensor values

1.4 Example: Move in a circle until 3 seconds pass

```
start = time.time()
while time.time() - start < 3:
    drone.rotate(30, 0.5)
```

1.5 Exercise 1: Takeoff and repeat forward motion

Take off and then fly **forward 0.2 meters** over and over again for **3 seconds**.

[ ]:
```
# Your code here:
```

1.6 Exercise 2: Use a counter

Repeat a movement **4 times** using a counter variable like `i = 0`.

[ ]:
```
# Your code here:
```

1.7 Exercise 3: Loop with obstacle check

Fly forward in a loop **until** an obstacle is detected using `drone.detect_obstacle()`. *Hint: Use `break` to stop the loop.*

[ ]:
```
# Your code here:
```

1.8 Exercise 4: Rotate left until yaw is over 90 degrees

Use `drone.get_yaw()` to check angle, and rotate slowly until you reach 90.

[ ]:
```
# Your code here:
```

1.9 Exercise 5: Create a patrol loop

Loop through this pattern **3 times**: - Forward 0.2m - Rotate 90° - Forward 0.2m - Rotate -90°

[ ]:
```
# Your code here:
```