



CodeAIR Mission 5 Assignment	Name: 
Pre-Mission Preparation	
What are some of the things you coded in the safety.py program?	<p>Answers will vary. They can include:</p> <ul style="list-style-type: none"> • Blinking an LED and waiting for B0 to be pressed • Setting pixels Yellow and sounding beeps to indicate armed • Debouncing the button • Blinking an LED and waiting for B0 or B1 to be pressed. • If B1 is pressed, prepare for launch • Run test code to run two motors
What are some safety precautions you should take before flying a drone?	<p>Answers will vary but should include:</p> <ul style="list-style-type: none"> • Wear protection for eyes and face • Have supervision • Avoid contacting moving parts • Use a clear flying area
Mission 5 Checks – Hovering Flight	
Objective #1 How do you make your safety.py program into a custom module?	<p>Make a few changes to the original safety program so that it is a function without test code. Add some other strange object-oriented code to the end of the file. Load the file on CodeAIR and then import the file.</p>
Objective #2 The sensors for altitude are:	Pressure sensor, laser rangers
The sensor for tracking and holding position is:	Optical flow sensor
What are three commands the MotionCommander executes?	<p>Answers should be three of the following:</p> <ul style="list-style-type: none"> • fly.take_off(height_meters) • fly.steady(seconds) • fly.turn_right(degrees) • fly.land()
Objective #3 What is the difference between a blocking function and a non-blocking function?	Blocking functions do not run the next instruction until the current function is completed, like sleep(). A non-blocking function will start a movement and then return while the movement is still happening, so the next instruction can be executed.
What are distance and velocity measured in?	Distance in meters, velocity in meters per second.
Objective #4 What component is used to keep the drone flying at a desired altitude?	Laser rangers
What line of code returns its data?	get_data(RANGERS)

<p>Objective #5</p> <p>Click on  variable. Give at least one fact you learned from the toolbox.</p> <p>What code unpacks the tuple returned by get_data()?</p>	<p>Answers will vary, but should be more than “a box with a label on it.”</p> <hr/> <p>fwd, up, down = get_data(RANGERS)</p>
<p>Objective #6</p> <p>Describe the algorithm for polling you coded in poll_sensors(timeout)</p>	<p>Answers will vary but should be similar to:</p> <ul style="list-style-type: none"> • Calculate the ticks by multiplying time by 10 • Start a for loop with ticks as the range • Fly steady for 0.1 seconds • Read and unpack the data from RANGERS • If up is less than too_close, return True • Otherwise, return False
<p>Objective #7</p> <p>What is the sensor and actuator for the Theremin project?</p> <p>What argument will cause a speaker tone to play continuously?</p>	<p>The sensor is the laser ranger, and the actuator is the speaker.</p> <hr/> <p>Duration = 0 speaker.beep(tone, 0)</p>
<p>Objective #8</p> <p>The HallMonitor program uses two variables that are updated during execution. List each variable and the information it stores.</p> <p>What concept is discussed in CodeTrek?</p>	<p>person_detected is a Boolean variable that keeps track of a person being detected (True / False) so one person isn't counted multiple times.</p> <hr/> <p>count is an integer that keeps track of the number of detected persons</p> <hr/> <p>Logical Operators: the “not” logical operator negates a boolean, changing true to false or false to true.</p>
<p>Objective #9</p> <p>Three new fly functions are used. Explain each function.</p>	<p>fly.start_forward() is a non-blocking function that starts the motion of moving forward at the default velocity.</p> <hr/> <p>fly.stop() is a non-blocking function that stops any motion and hovers.</p> <hr/> <p>fly.turn_left(degrees) is a blocking function that turns the drone degrees left.</p>
<p>Objective #10</p> <p>What is REPL short for? What can you do in the REPL?</p> <p>Several options are given for fixing the bug. If you could program a different fix, what would you do?</p>	<p>Repeat evaluate print loop. In REPL, on the console, you can:</p> <ul style="list-style-type: none"> • Output messages using the print function • Test Python functions, expressions and data types • Import libraries and experiment with APIs • Use it as a calculator <hr/> <p>Answers will vary. They can include any given in the objective, or one of their own. Graceful surrender was done so shouldn't be an option.</p> <ul style="list-style-type: none"> • Reset the count back to 0 when it reaches 8 • Leave as is and say the drone is knocked • A creative solution by the student

Post-Mission Reflection

A lot of new information was introduced during this mission. What are three things you learned?

Answers will vary. Some topics discussed include:

- Using a custom module
- Blocking and non-blocking functions
- Debouncing a button
- Using the laser ranger sensors
- Using a condition or branching in code
- Polling algorithm
- Updating a variable
- Using REPL

