Conditionals:

Infrared Sensor:
Write a program that will move the robot forward 3 blocks and then use the Infrared sensor to check for an obstacle. If an obstacle is detected, turn right 2 steps and move forward 1 block otherwise, reverse 1 block.

LEDs:
Write a program that will move the robot to position (4,5) in the grid, and then generate a random number in the range [1,3]. If the number is 1, move the robot forward 1 block and flash the red LED light. If the number is 2, leave the robot where it is, and flash the blue LED light. If the number is 3, make the robot reverse 1 block and flash the yellow LED light.

Ultrasonic Sensor:
Write a program that will use the Ultrasonic sensor to detect the distance to the nearest object. If the object is further than 25cm, move forward 1 block. If the object is closer than 25cm, turn right 2 steps and move forward 1 block.

Camera:
Write a program that will pathfind to the following positions: [0,3], [1,5], and [4,5]. At each of these positions, use the camera to take a photo of the grid block and then detect the colour of the photo. If the photo is red, print "This is red!" to the terminal, if the photo is green, print "This is green!" and if the photo is blue, print "This is blue!".

Pathfinding hint: follow_path(pathfind([get_pos()], [goal x, goal y]))

For Loops:

Infrared Sensor:
Write a program that will loop 4 times. At each iteration:
- use the Infrared sensor to check for an obstacle
- If you detect an obstacle, reverse 1 block
- Otherwise, if there is no obstacle, move forward 1 block
- Finally, wait for one second before continuing on to the next iteration.

Once the loop has finished, if an obstacle has been detected at any time, reverse 1 block, and if not, move forward one block.

Hint: Use time.sleep(1) to insert a 1 second wait (don't forget to 'import time')

LEDs:
Write a program that will loop 4 times. At each iteration, move the robot forward, turn right 2 steps, and flash the LEDs in the order red -> blue -> yellow.

Ultrasonic Sensor:
Write a program that will loop 5 times. At each iteration use the Ultrasonic sensor to calculate the distance to the nearest object. Once all measurements have collected, calculate the average. If the average is greater than 30cm, move forward one block, otherwise reverse one block.

Camera:
Write a program that will loop 3 times. At each iteration, use the camera to take a photo and then detect the colour of the photo. Print the colour to the terminal, and then move the robot forward one block.

While Loops:

Infrared Sensor:
Write a program that will use a while loop. At each iteration, move the robot 1 block forward and use the Infrared sensor to detect obstacles. If an obstacle is detected, turn the robot 2 steps to the left. Once 2 obstacles have been detected, terminate the loop.

LEDs:
Write a program that will use a while loop. At each iteration, generate a random number in the range [1,3]. If the number is 1, flash the red LED, if the number is 2, flash the blue LED, if the number is 3, flash the yellow LED. Terminate the loop once the red LED has been flashed 5 times.

Ultrasonic Sensor:
Write a program that will use a while loop. At each iteration, move the robot 1 block forward and use the Ultrasonic sensor to calculate the distance to the nearest obstacle. If the obstacle is closer than 30cm, terminate the loop.

Camera:
Write a program that will use a while loop. At each iteration, move the robot 1 block forward, use the camera to take a photo, and then detect the colour of the photo, printing the colour to the terminal each time. Once a red block has been detected, terminate the loop.

Functions:

Infrared Sensor:
Write a function checkSafe(x) which will take an integer x as a parameter. The function must use the Infrared sensor to check for obstacles, wait for x seconds, and then check again. If an obstacle was detected both times, make the robot reverse one block, otherwise move forward one block.

LEDs:
Write a function lightShow() that will turn the LEDs on and off in a specific order. The order is entirely up to you, just try to keep your function under 25 lines of code.

Ultrasonic Sensor:
Write a function calcBlocks(x) which takes a float x as a parameter. Your program must measure distance measurement to the nearest obstacle using the Ultrasonic Sensor, and then pass the value to the function, which will then calculate the number of blocks to this obstacle, and then move forward that many blocks.
Hint: Each block is 20cm x 20cm big

Camera:
Write a function colourMove(x) which takes a string parameter. Your program must use the camera to detect the colour of the current block, and then pass this colour to the function to decide which action to take. If the image is red, move forward one block, if the image is blue, turn right 2 steps, and if the image is green, reverse one block.