

PRG101 INTRO TO ROBOTICS & CODING

REPEAT (FOREVER) LOOP

Repeats the actions within the orange loop.

In this example, the robot drives forward for 3 rotations at a speed of 50 and turns left by 0.7 rotations (max speed = 100). After turning left, the program goes back up to the top and repeats these two commands forever

```
repeat (forever) {
  forward ( 3 , rotations , 50 );
  turnLeft ( 0.7 , rotations , 50 );
}
```

SETMOTOR

The SetMotor command moves the motor the smallest possible rotation so only speed needs to be specified (not rotations). This command is useful when using sensors as it allows sensors to be checked after every tiny motor movement.

In this example, the robot drives forward forever (by repeating tiny left and right wheel rotations)

```
repeat (forever) {
  setMotor ( leftMotor , 50 );
  setMotor ( rightMotor , 50 );
}
```

IF STATEMENT *using a bumper sensor*



A conditional statement that only performs an action if the condition is true. The first box in the IF statement is the type sensor you want to use, followed by an operator (math symbol) and a value

In this example, the robot moves forward if the bumper sensor is NOT pressed (==0) and moves backward then turns left when the bumper is pressed (==1). This repeats forever

```
repeat (forever) {
  if ( getBumperValue(BumperSensor) == 0 ) {
    setMotor ( leftMotor , 50 );
    setMotor ( rightMotor , 50 );
  }
  if ( getBumperValue(BumperSensor) == 1 ) {
    backward ( 1 , rotations , 50 );
    turnLeft ( 0.7 , rotations , 50 );
  }
}
```

Coding with the COLOUR SENSOR



The colour sensor has three LEDs that are used to detect colour. Each LED is sensitive either to Red, Green or Blue (primary colours) and can inform the robot the colour of any object placed in front of it

In the example, if the sensor detects the colour Green, the robot will drive forward. When the colour is Red, the robot will not move

```
repeat (forever) {
  if ( getColorName(ColourSensor) == colorGreen ) {
    setMotor ( leftMotor , 50 );
    setMotor ( rightMotor , 50 );
  }
  if ( getColorName(ColourSensor) == colorRed ) {
    stopAllMotors ( );
  }
}
```

Coding with the ULTRASONIC SENSOR



This sensor uses echo-location (similar to bats and dolphins) to measure distance. It sends out ultrasonic sound waves through one of its speakers and calculates distance (in millimeters) based on how long the sound waves take to reflect back into its other speaker.

In the example, if the distance is greater than 150, drive forward at full speed (100). If distance is less than 150, the robot stops moving. This repeats forever

Mathematical Symbols for Equality/Inequality

"==" equal to

">" greater than

"<" less than

```
repeat (forever) {
  if ( getDistanceValue(DistanceSensor) > 150 ) {
    setMotor ( leftMotor , 100 );
    setMotor ( rightMotor , 100 );
  }
  if ( getDistanceValue(DistanceSensor) < 150 ) {
    stopAllMotors ( );
  }
}
```

AND Logic for Multiple Conditions



To check multiple conditions at the same, we use two IF statements where one IF is placed inside the other IF. This is useful when creating a condition for a specific range of numbers or when you want to check two sensors at the same time

In the first example, if the distance is between 100 and 200mm (greater than 100 AND less than 200), the light will turn yellow and the robot will turn right. The light is turned off after turning

In the second example, if the bumper sensor is pressed AND the distance sensor is less than 150mm, the robot will move backwards then turn LEFT.

If the bumper sensor is pressed AND the distance is greater than 150mm, the robot moves backwards then turns RIGHT

```
repeat (forever) {
  if ( getDistanceValue(DistanceSensor) > 100 ) {
    if ( getDistanceValue(DistanceSensor) < 200 ) {
      setTouchLEDColour ( Light , colorYellow );
      turnRight ( 0.7 , rotations , 50 );
      setTouchLEDColour ( Light , colorNone );
    }
  }
}
```

```
repeat (forever) {
  if ( getBumperValue(BumperSensor) == 1 ) {
    if ( getDistanceValue(DistanceSensor) < 150 ) {
      backward ( 0.5 , rotations , 50 );
      turnLeft ( 0.7 , rotations , 50 );
    }
  }
  if ( getBumperValue(BumperSensor) == 1 ) {
    if ( getDistanceValue(DistanceSensor) > 150 ) {
      backward ( 0.5 , rotations , 50 );
      turnRight ( 0.7 , rotations , 50 );
    }
  }
}
```