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# FIND THE VICTIM

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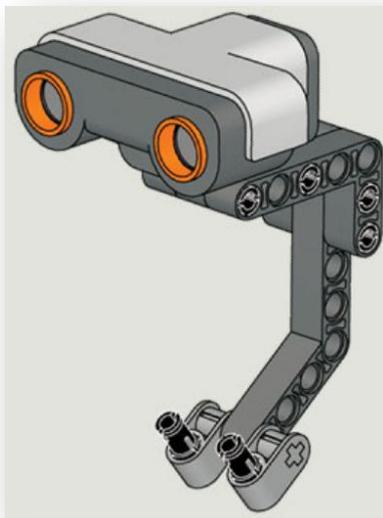
Once the Chemical Spill has been identified by the robot, it needs to go into a search mode to find the Victim.

There are a number of ways this can be achieved;

1. Random searching. Using this method the robot simply moves forward and backwards within the Chemical Spill and turning a little each time so that it covers the entire Chemical Spill and hopefully pushes the victim out of the Chemical Spill.
2. Use a light sensor and a light source. This method works extremely well but needs the addition of a light source such as a torch which needs to be small enough to fit within the size restriction of the rescue robot as well as being bright enough to reflect off the victim and back to a third light sensor. A Laser can also be used but caution needs to be taken with these potentially dangerous devices.
3. The supplied Ultra-Sonic sensor can also be used to detect the victim. One problem is that the victim is cylindrical and the Ultra-Sonic sensor does not see round objects well. However for this exercise it is a good option.

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### ULTRA-SONIC SENSOR



The Ultra-Sonic Sensor emits an inaudible sound and then listens for that sound with a microphone. Depending on how long the sound takes to travel out to the object and back again determines the distance it is away from the robot.

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Now the RoboCup Rescue rules state that the robot must not leave the Chemical Spill once it has been found. Therefore, the first thing the robot needs to do is to move forward a little distance so that when the robot starts searching for the Victim it will not move out of the Chemical Spill.

The process of finding the Victim using the Ultra-Sonic sensor is to swing the robot to the left of right and then make a slow 180 degree arc while check the Ultra-Sonic sensor for detection of the Victim. Now the Ultra-Sonic sensor does have distance limitation, so if the robot does not detect the Victim with the first scan, then the robot should move forward a short distance into the Chemical Spill and rescan for the Victim. It should take no more than two scans to detect the Victim.

When the Victim is detected by the Ultra-Sonic sensor, the robot should move forward, pushing the Victim out of the Chemical Spill. Once this is achieved the rescue is complete.

1. A simple Find the Victim program will contain the following Blocks.



**1a.** The first Move Block, moves the robot into the Chemical Spill a few centre metres.

**1b.** The second Move Block swings the robot to the right slightly less than 90 degrees.

**1c.** The third Move Block now swings back forever, waiting for the forth Block, the Wait for Ultrasonic Sensor Block. When the Ultrasonic sensor detects an object within 40cm the motors will stop.

**1d.** Due to the inaccuracy (wide scan) of the Ultrasonic Sensor the robot will stop before it is pointing directly at the Victim. To compensate for this the fifth Move Block swings the robot a little more toward the Victim before moving forward with the sixth Move Block, hopefully pushing the Victim out of the Chemical Spill.

### CHECKPOINT

The process of detecting the Victim with the Ultrasonic sensor is not precise as the angle the sensor has is too wide in its standard state. You can narrow its focus by shielding the Ultrasonic sensor with a paper tube.

A more accurate method is using a Light Sensor with a narrow beam light source.