Ben & Donald Pre-Lab 2

Random Wander Psuedocode

/* random wander will move the robot forward a random distance between 10 and 20 cm, and then turn the robot 15-60 degrees in either direction.
This function can be looped forever, and will return a 1 if an obstacle is found within tolerance, or 0 if no obstacle is found. */

Fcn: randomWander

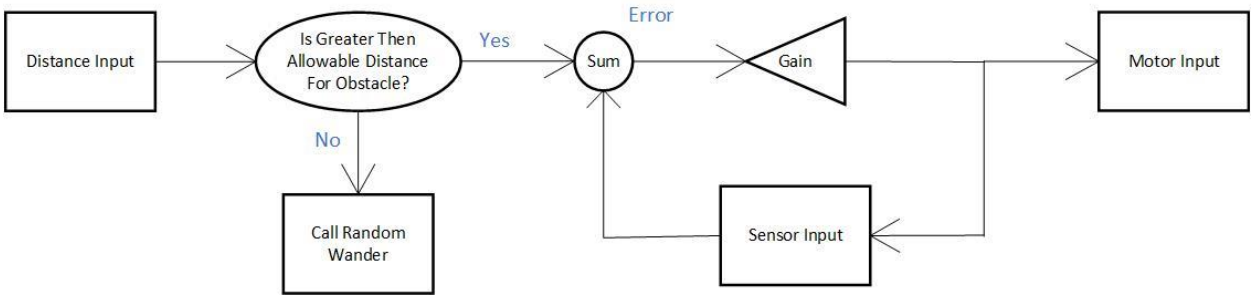
```
boolean randomWander() {
    int randomDistance = random * 10 + 20
    int randomAngle = random * 45 + 15
    goForward (randomDistance)
    goToAngle(randomAngle)
    // Check if obstacle
    If(obstacle == false) {
    Return 0
    } else {
    Return 1
    }
}
```

/* obstacleAvoidance should move the robot away from the obstacle, with larger changes in speed between the wheels being created by the P controller based off of the change in distance. Currently this does not take into account the idea of trying to avoid obstacles to the left or right

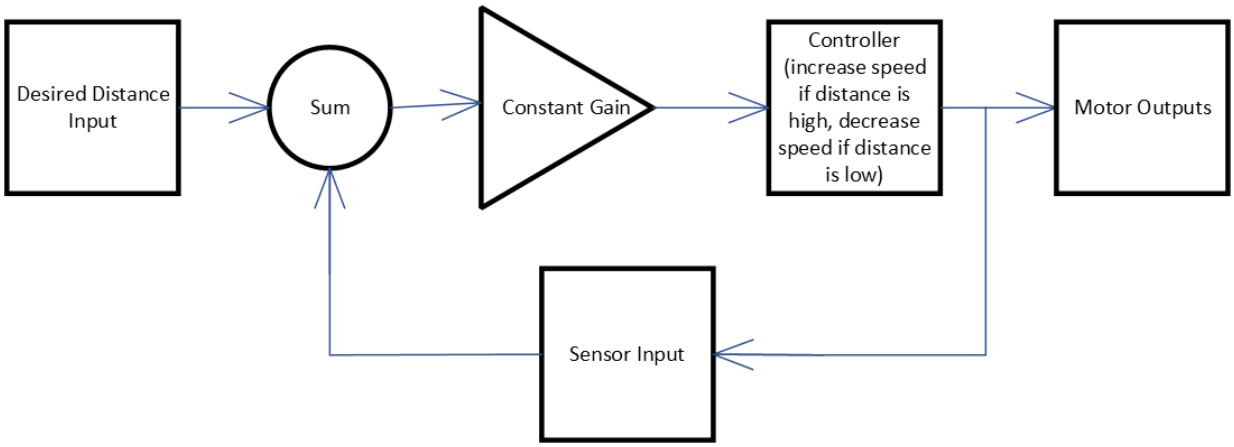
Fcn: obstacleAvoidance

```
boolean obstacleAvoidance() {
    while(objectDistance > threshold) {
        leftSpeed = baseValue + (idealDistance – actualDistance) * Gain
        rightSpeed = baseValue – (idealDistance – actualDistance) * Gain
    }
}
```

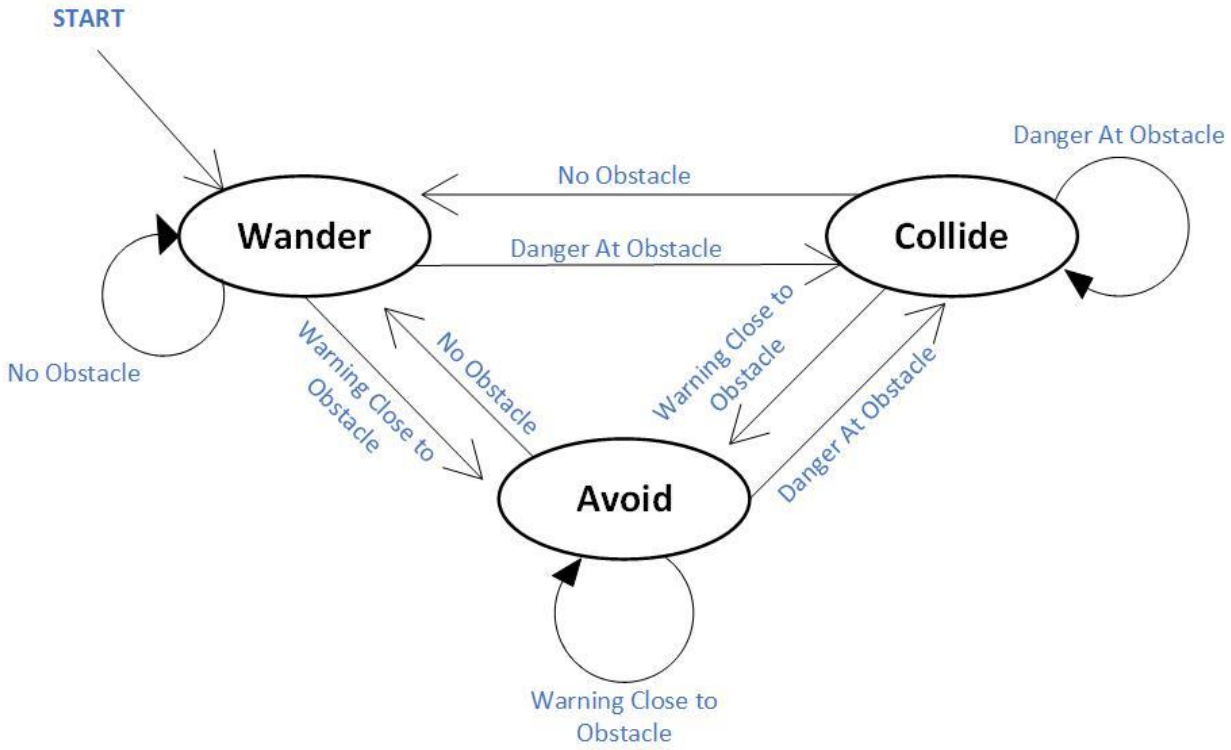
Flowchart for a proportional controller with sensor feedback to avoid obstacle behavior



Flowchart for a proportional controller with sensor feedback to follow object behavior

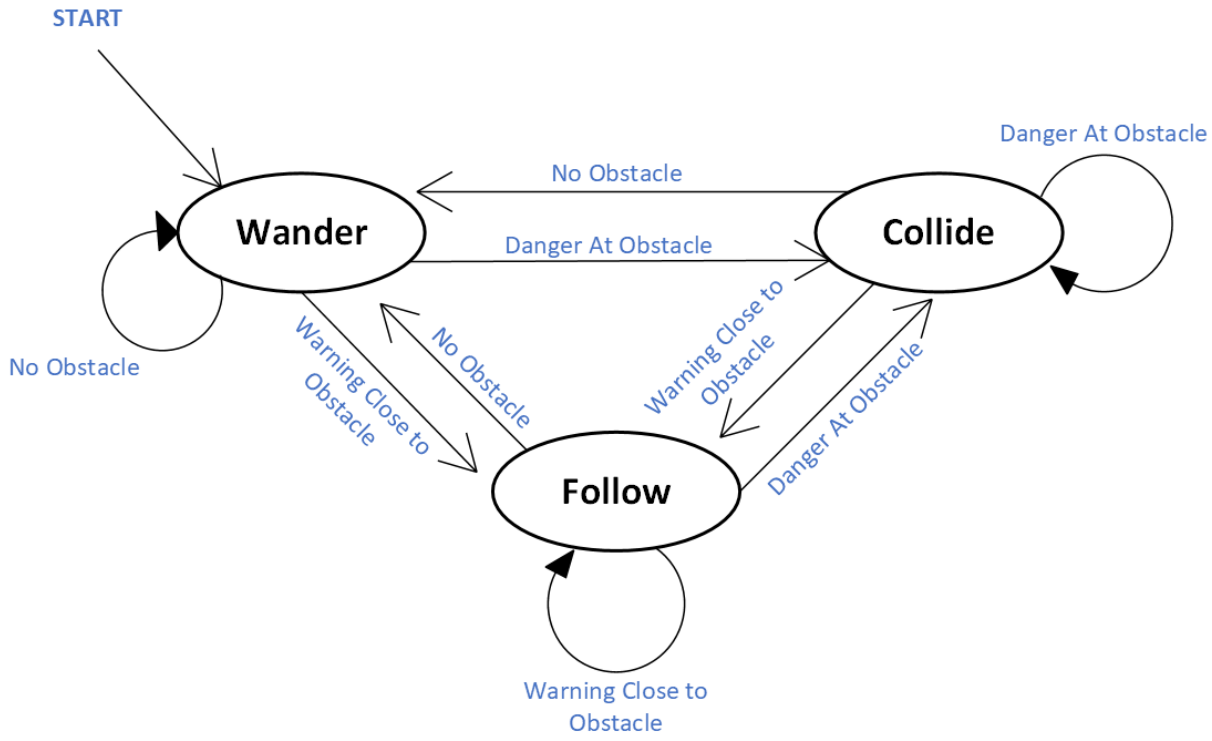


State diagram for smart wander random wander, collide, and avoid obstacle



Input	Current State	New State
No Obstacle	Wander	Wander
No Obstacle	Avoid	Wander
No Obstacle	Collide	Wander
Warning Close to Obstacle	Wander	Avoid
Warning Close to Obstacle	Avoid	Avoid
Warning Close to Obstacle	Collide	Avoid
Danger at Obstacle	Wander	Collide
Danger at Obstacle	Avoid	Collide
Danger at Obstacle	Collide	Collide

State diagram for smart wander random wander, collide, and avoid obstacle



Input	Current State	New State
No Obstacle	Wander	Wander
No Obstacle	Follow	Wander
No Obstacle	Collide	Wander
Warning Close to Obstacle	Wander	Follow
Warning Close to Obstacle	Follow	Follow
Warning Close to Obstacle	Collide	Follow
Danger at Obstacle	Wander	Collide
Danger at Obstacle	Follow	Collide
Danger at Obstacle	Collide	Collide