

## Group 9 Final Project Proposal

### Terminology and Assumptions

“Good” Frequency: Frequency of the Finish Beacon

“Bad” Frequencies: Frequencies of the Mine Beacons

Assumption: At the start at least one frequency beacon is audible to the bot.

### Algorithm

1. Scan for Beacon frequencies
2. If “good” frequency is found and within distance of 30cm  
    Stop and blink the Finish-LED in continuous ON
3. Else  
    Check distance  
    If too close to a beacon (within 15 cm)  
        Then move backwards  
    Else If the bot is within the range of the beacon (15 - 25 cm),  
        Then check the current Target Frequency with the highest magnitude of  
        current frequencies received (having index i), and if they match, change  
        the Target Frequency to index (i+1)  
        Avoid beacon  
    Else  
        Turn Left until the magnitude of Target falls  
        During Left Turn, if distance is below 15cm, move backwards  
        Update the target if a higher frequency if found  
        Turn Right until the magnitude of target fall  
        During Right Turn, if distance is below 15cm, move backwards  
        Update the target if a higher frequency if found  
        Turn Left again  
        Move straight  
        Before moving straight, if distance is below 15cm, move backwards
4. Go to Step 1.

Avoid beacon:

- Test distance both left side and right side
  - If right distance smaller than right and greater than safe value(50cm)
    - Move straight right
  - Else if left distance greater than safe value(50cm)
    - Move straight left
  - Else keep turning left until safe value detected

## Raw Materials

The goal in this part of the design was to minimize weight by selecting minimal and lightweight parts. Additionally, power requirements were defined and met as closely as possible given the available parts. The group proposes to expand on the basic design with an additional voltage source, and an ultrasonic sensor.

Name	Vendor	Part Number	Unit Price	Quantity	Cost	Running Total
Motor Driver + Vehicle	Amazon	B06XZC2XDV	\$19.95	1	\$19.95	\$19.95
Microphone Circuit	Amazon	B00SLYAI9K	\$10.83	1	\$10.83	\$30.78
Microcontroller	Tinkersphere	TS1227	\$19.79	1	\$19.79	\$50.57
9 V Battery	Tinkersphere	TS811	\$3.99	1	\$3.99	\$54.56
5 V Regulator	Tinkersphere	TS261	\$1.49	11	\$1.49	\$56.05
LED	-----	-----	-----	2	-----	\$56.05
3D-Printed Cone	NYU Tandon Makerspace	-----	-----	1	-----	\$56.05
Ultrasonic Sensor	Amazon	B01M13S26V	\$6.84	1	\$6.84	\$62.89

Table 1 - Bill of Materials