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HW2

1. a) A discrete algorithm such as Dijkstra’s would be better for finding a driving route since it would choose the shortest path (optimal path) vs a sampling based continuous algorithm, which isn’t really designed to handle optimizations as well as A\* and Dijkstras, which will also have a cost / reward system.

b) Cost = L+ t

2. A\_free/A\_total

3. O(log\_k(n)) = L - \_k is base k to clarify and stands for division(quadtree,octree. Etc..)

L is Level or Depth

4. The bandwidth of an Ultra-sound based distance sensor descreases significantly when increasing the dynamic range since it takes the speed of sound to travel to the target, and then travel back to the sensor, so the wait time is the distance x2.

A lazer on the other hand travels at the speed of light so the delay difference would be the speed of light vs the speed of sound.

5. a) v = x/t so we have vt = x and then t = x/v

c = 300m/s x = 15

t = 15 / 300 = .05

this is only from the sensor to the target, but we have to account from the target back to sensor so:

0.05 x 2 = 0.1 seconds or 10 Hz.

b) The lazer scanner will return in 10 Hz which is 0.1 seconds.

6. a) Accuracy would be 30m

Precision would be 3m

b) 1800/(60\*60) => 1800/3600 => 0.5 readings/second or Hz