Course: CS131 Artificial Intelligence

Assignment: Behavior Tree

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Design Part:

1. Follow the general Behavior Tree class design (like Professor’s PPT).
2. Add a TaskNode class to show the Blackboard values changes
3. Choose UnitlSuccess based on the assignment requirement
4. Accept Blackboard with 5 elements
5. The home-path is set as ‘Earth’
6. The name of sequences, tasks, timers, conditions, and selections are according to the branches of robot’s behavior tree.
7. If the battery is below 30 but the robot has work to do, it will still go charging first. (Task 6)
8. The Clean Floor task might fail based on the requirement, then the robot will loop to do Clean Floor until it succeeds.
9. When the robot executes General Cleaning branch to Dusty Spot, it will check the battery to determine if it could execute Dusty Spot task.
10. Every move will be printed to show the robot moving process to make it visible including the battery change
11. Every cleaning job will cost 5 battery electricity
12. Clean Spot costs 20s and Clean Dusty Spot costs 35s, those time cost will be shown to the users but not really 20s and 35s for not wasting your time
13. There are 6 tests to test the program

Test Part:

Test 1: Battery < 30

As the requirement, the BATTERY\_LEVEL is below 30, then the robot will execute the sequence 1 – task1: find home - go home - dock, and charging itself to 100.

Test 2: Battery Good, find Spot and do Spot cleaning, no other work

Since the battery condition is fine and we set SPOT\_CLEANING as True, and other work as False, the robot will execute the sequence 1 – task2: clean spot - done spot

Test 3: Battery Good, no Spot found, do General Cleaning and Dusty Spot Found and Clean Floor

Since the batter condition is fine and we set SPOT\_CLEANING as False, GENERAL\_CLEANING and DUSTY\_SPOT as True, the robot will execute the sequence 2-2 and sequence 2-2-2-1-1-1 and sequence 2-2-2-1-2: general cleaning - clean dusty spot – done dusty spot – clean floor, and eventually done general

Test 4: Battery Good, no Spot found, no Dusty Spot found, only General and Clean Floor

Since the batter condition is fine and we set SPOT\_CLEANING as False, GENERAL\_CLEANING as True and DUSTY\_SPOT as False, the robot will execute the sequence 2-2 and sequence 2-2-2-1-2: general cleaning – clean floor, and eventually done general

Test 5: Battery Good, do nothing

Since the batter condition is fine and we set SPOT\_CLEANING as False, GENERAL\_CLEANING as False and DUSTY\_SPOT as False, the robot will execute Sequence 1 - task3: do nothing.

Test 6: Low Battery, but need to do Spot cleaning

Since the batter is below 30, even we set SPOT\_CLEANING as True, the robot will still go charging first: execute Sequence 1 – task1: find home – go home - dock.