¡Felicitaciones! ¡Aprobaste!

Calificación recibida 100 % **Para Aprobar** 80 % o más

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Module 3 Graded Quiz

Calificación de la entrega más reciente: 100 %

1. Which best describes the mission underlying an autonomous vehicle's mission planner? **1 / 1 punto**

- ○ Compute the optimal vehicle behaviour for a given driving scenario
- ○ Generate an optimal, collision-free path to the required destination
- ◉ Navigate a road network to the desired destination from the ego vehicle's position

Correcto
Correct, this is the underlying goal of mission planning.

2. Which of these are examples of good values to optimize in a mission planner's objective function? **1 / 1 punto**

- ☑ Distance travelled

Correcto
Correct, this is a good measure of the efficiency of a global path.

- ☐ Distance from obstacles
- ☐ Deviation from the speed limit
- ☑ Time to destination

Correcto
Correct, this is a good measure of the efficiency of a global path.

3. What is a graph in the mission planning context? **1 / 1 punto**

- ○ A plot of the car's throttle and steering actuation while executing a driving mission
- ○ A chart of the different speeds reached during different road segments in a road network
- ◉ A discrete mathematical structure used for representing the road network
- ○ None of the above

Correcto
Correct, we are referring to the graph commonly used in discrete math.

4. True or false, Breadth-First Search (BFS) will explore the graph using a "last-in-first-out" data structure known as a stack. **1 / 1 punto**

- ○ True
- ◉ False

Correcto
Correct, BFS uses a "first-in-first-out" data structure known as a queue during the search process.

5. True or false, Breadth-First Search (BFS) will always find the optimal (shortest) path in an unweighted graph. **1 / 1 punto**

- (•) True
- ( ) False

Correcto
Correct, BFS will explore all possible predecessors before reaching the goal node in an unweighted graph, and as a result will find the shortest path to the goal.

6. True or false, Breadth-First Search (BFS) will always find the optimal (shortest) path in a weighted graph. **1 / 1 punto**

- ( ) True
- (•) False

Correcto
Correct, BFS will not always be able to find the shortest path if the graph edges have weights.

7. In these graph search algorithms, what is the main purpose of keeping track of a "closed" set of graph vertices? **1 / 1 punto**

- (•) It allows us to avoid getting stuck in cycles
- ( ) It allows us to know how much of the graph has been searched
- ( ) It helps us keep track of which vertices we still need to search

Correcto
Correct, by keeping track of which vertices we have already processed, we can avoid re-searching another vertex if the graph contains cycles.

8. What is a min heap data structure? **1 / 1 punto**

- (•) A data structure that stores keys and values, and sorts the keys in terms of their associated values, from smallest to largest.
- ( ) A sorted list of autonomous driving mission priorities for a given driving scenario
- ( ) A data structure that stores keys and values, and sorts the keys in terms of their associated values, from largest to smallest.
- ( ) A block of memory useful for dynamic memory allocation

Correcto
Correct, this is the definition of a min heap.

9. True or false, in a min heap, the root of the heap (the first element) contains the node with the smallest value. **1 / 1 punto**

- (•) True
- ( ) False

Correcto
Correct, a min heap contains the node with the smallest value at the root.

10. In Dijkstra's algorithm, suppose during the process of adding vertices to the open set, we come across a vertex that has already been added to the open set. However, this time we have found a lower cost to reach this vertex than is presently stored in the open set's min heap. What should be done? **1 / 1 punto**

- ( ) Nothing, as the vertex is already in the open set

- ○ Close the vertex, as we have now seen it twice during exploration
- ◉ Update the cost of that vertex in the open set's min heap
- ○ Nothing, as this is impossible under Dijkstra's algorithm

Correcto
Correct, we will need to update the min heap to reflect the new path that we have found to that vertex for Dijkstra's algorithm to remain correct.

11. What is a search heuristic in the context of mission planning? **1 / 1 punto**

- ○ A tool that autonomous vehicle's use for quickly identifying traffic congestion at a given intersection
- ○ A method that allows the autonomous vehicle to quickly identify obstacles in its surroundings
- ○ Something that helps the autonomous vehicle efficiently change the autonomus driving mission depending on the situation
- ◉ An estimate of the remaining cost to reach the destination

Correcto
Correct, this cost-to-go helps guide our search to improve speed.

12. Suppose I have a vertex at location (2.0, 3.0) and another at location (4.0, 5.0). What is the Euclidean distance between these two points (to three decimal places)? **1 / 1 punto**

2.828

Correcto
Correct

13. True or false, an admissable heuristic to the A* search algorithm will never underestimate the cost to reach the goal vertex. **1 / 1 punto**

- ○ True
- ◉ False

Correcto
Correct, an admissable heuristic is required to never overestimate the cost to reach the goal vertex.

14. Is the heuristic function h(v) = 0 an admissible heuristic? **1 / 1 punto**

- ◉ Yes, and in this case A* degenerates in DIjkstra's
- ○ Yes, and in this case A* degenerates into BFS
- ○ No, as in this case A* degenerates into Dijkstra's
- ○ No, as in this case A* degenerates into BFS

Correcto
Correct, a zero-valued heuristic is admissible, and in this case A* is the same as Dijkstra's.

15. True or false, the min heap in A* contains the sum of the cost to reach each vertex plus the estimate of the cost to reach the destination from said vertex, according to the search heuristic. **1 / 1 punto**

- [x] True
- [ ] False

Correcto
Correct, this is required to take advantage of the search heuristic.