BRAC UNIVERSITY
Inspiring Excellence

Course : CSE461 (Introduction to Robotics)

Quiz-2 (Section-06)

Time: 30 minutes Marks: 15

[CO2]

Equipped with advanced sensory technology and basic GPS guidance, a team of robots embarks on a daring expedition into an uncharted rainforest. The dense foliage, twisting rivers, and unpredictable terrain present challenges that demand adaptive navigation. Robots have an encoder on the wheel that is why they can monitor their wheel movements precisely. Utilizing a sophisticated Localization system, these robots use a model to estimate their precise location within the jungle, compensating for GPS inaccuracies. Using a specialized sensor array capable of detecting objects and environmental cues, the robots maneuver through the jungle, dynamically adjusting their movements to overcome obstacles. Simultaneously, they employ a Mapping Algorithm to construct a rudimentary representation of the encountered terrain, continually updating their location estimates.

1. As the robot does not know the map and it has a sensor to detect the object then what mapping algorithm should it use to create a map and how? **[1+ 4= 5 Marks]**
2. Which localization technique should be used and how ? **[1+2=3 Marks]**
3. What is the strategy the robot may use to identify the unexplored areas and how? **[1+2 = 3 Marks]**
4. What localization technique can be used when no known landmarks are present in the environment ? Explain and state some limitations of this technique. **[4 Marks]**

NB: You have additional 5 minutes to scan and submit your answer scripts