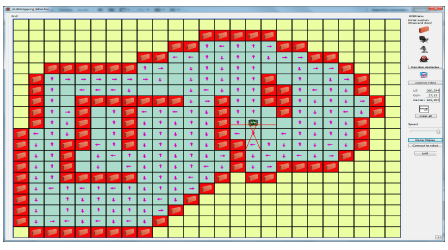
BRAC UNIVERSITY
Inspiring Excellence

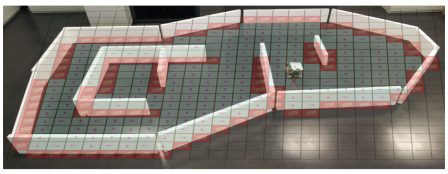
Course : CSE461 (Introduction to Robotics)

Quiz-2 (Section-03)

Time: 30 minutes Marks: 15



(a)



(b)

Warehouse

[CO2] You are a robotics engineer working for a logistics company that operates a large warehouse (Like the Given Figure). Your company has invested in a delivery robot that is designed to autonomously navigate through the warehouse, pick up packages from designated locations, and deliver them to different areas within the facility. The robot must navigate around obstacles such as pallets, boxes, and other equipment, while also avoiding collisions with people working in the warehouse. Your task is to design a navigation system that will enable the robot to efficiently and effectively complete its delivery tasks.

1. What approach is taken to mapping the warehouse environment? Explain the mapping algorithm. **[5 marks]**
2. How Frontier Based Exploration helps the robot discover new areas of the warehouse that it has not yet visited? How would you balance exploration with the robot's primary task of delivering packages? **[5 marks]**
3. What localization technique can be used when no known landmarks are present in the environment ? Explain briefly. **[3 Marks]**
4. What path planning algorithm will you use if a robot only knows the distance to its goal, and the direction ? Describe briefly. **[2 Marks]**