

1 | CITY ARENA

START

FINISH

1. Basic Navigation Road following & Path re-routing	4. Object Recognition -Trees, Buildings - Face Recognition: Humans/ Pedestrians	5. Human Gesture/ Body Control - Stop Gesture - Robot stop - Human Following (1 Specific Person)	8. Robot to robot communication - Node to node communication Car 1 waits for Car 2 to cross a narrow path/ bridge from a certain distance, priority for the car that is nearest to the path
2. Obstacle Detection & Avoidance - Traversing avoiding the obstacle on the arena/ path. - Maze Solver	3. Sign board detection (Intersection Handling) - T Junction & Crossroads (L: Left, R: Right, S: Stop) - Traffic Light Detection (R: Stop, Y: Stop, Green: Move) - Autonomous Parking (P - Parking) - Crosswalks/ Zebra Crossing	6. Waypoint Navigation - Traversing to different checkpoints (Home, School, Hospital, Store) - Voice command	7. Arm Control - Pick and Place objects while traversing to different checkpoints (Home, School, Hospital, Store) - Home to School to Store - Voice command

2 | WAREHOUSE ARENA

START

FINISH

1. Basic Navigation <ul style="list-style-type: none">- Line following & Path re-routing- Navigate a simple path with route optimization (shortest path)	4. Object Recognition <ul style="list-style-type: none">- Identify and classify objects in the warehouse (Packages, Pallets, Aisle markings)	5. Dynamic Obstacle Avoidance <ul style="list-style-type: none">- Detecting motion and dynamically avoid collisions with moving objects (humans, other bots) over the arena	8. Robot to robot communication <ul style="list-style-type: none">- Node to node communicationWork with another robot to transport a large object or coordinate tasks and vice versa
2. Obstacle Detection & Avoidance <ul style="list-style-type: none">- Traversing avoiding static obstacles on the arena/ path- Narrow passages requiring precise navigation with mecanum wheels	3. QR Detection (Intersection Handling) <ul style="list-style-type: none">- Detect and navigate through intersections (T Junction or Crossroads: Left, Right, Stop)- Autonomous Parking	6. Waypoint Navigation <ul style="list-style-type: none">- Navigate to multiple locations- Checkpoints - Package Pickup, Delivery Area, Charging Station- Voice command	7. Arm Control <ul style="list-style-type: none">- Navigate to a shelf/ place and pick/place an item- Low-height racks/ shelves and / or checkpoints in the arena with items marked with identifiers for pick-up/ placement