

Review Questions

1. **Explain how a genetic algorithm was used to optimize radar placements. What were the key components of this algorithm?**
2. **What roles do crossover and mutation play in the genetic algorithm? How do they contribute to finding a solution in the radar placement problem?**
3. **Why is it important to ensure that all critical points are within the radar coverage? How did the fitness function help achieve this goal?**
4. **How does the fitness function evaluate the effectiveness of a given radar placement configuration?**
5. **Discuss the importance of population size in the genetic algorithm. How might changes to this parameter affect the results of the radar placement optimization?**
6. **Why was the random.seed function used in this project, and what would be the consequence of not using it?**

Development Questions

7. **If radars had variable ranges, how would you modify the genetic algorithm to accommodate different radar capabilities?**
8. **Consider a scenario where some areas of the grid are more critical than others. How would you adjust the fitness function to prioritize coverage of these areas?**
9. **Propose a method to minimize the overlap between radar coverage areas while still ensuring all critical points are covered. What changes to the fitness function would be necessary?**
10. **How would you modify the genetic algorithm to handle dynamic scenarios where critical points can move or change over time?**
11. **Suggest a way to integrate obstacle avoidance into the radar placement optimization. How would obstacles on the grid affect the fitness function and the overall genetic algorithm?**
12. **Design an extension to the current project where the algorithm also considers the cost of placing radars, with the goal of minimizing both the number of radars used and the total cost. What factors would you include in your new fitness function?**