Meta heuristics Final exam

1. Solve the TSP with GA. Distance in hundreds of miles. Generate an initial population of size 5. Use one point cross over and 1 mutation per iteration. Use cross over rate of 0.8. Perform at least 5 iterations

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | NY | Miami | Dallas | Chicago | LA | Seattle |
| New York | 0 | 13 | 16 | 8 | 18 | 14 |
| Miami | 13 | 0 | 14 | 15 | 20 | 25 |
| Dallas | 16 | 14 | 0 | 9 | 14 | 17 |
| Chicago | 8 | 15 | 9 | 0 | 13 | 11 |
| LA | 18 | 20 | 14 | 13 | 0 | 8 |
| Seattle | 14 | 25 | 17 | 11 | 8 | 0 |

1. Consider the following data on demand, capacity, inventory holding cost, and set up cost. Solve for
   1. Rotation schedule with no set up times
   2. Rotation schedule with setup times (sequence independent)
   3. Arbitrary schedule that minimizes the cost with setup times

Items 1 2 3 4 5

qj 300 300 400 400 600

dj 60 60 80 80 100

hj 20 30 40 20 20

cj 3000 2000 800 4000 1500

sj  0.6 0.4 0.2 0.8 0.4

1. Consider a car rental agency with the following reservations. There are 3 types of cars (1,2,3) and only one of each type. Schedule the cars.
   1. Does every customer get a car of their choice?
   2. Are there any possibilities to maximize the number of times cars are rented by offering a different type of car other than what is requested?

Jobs 1 2 3 4 5 6 7 8

pj 4 3 10 9 4 6 5 3

wj 3 2 3 3 2 1 2 3

rj 8 5 0 2 3 2 4 5

dj 12 12 10 20 15 18 19 14

Mj 2 1,3 1,2 1,2,3 2,3 1 1,2 1,2

1. Consider a hub and spoke flight operation. Every city must be covered only once by a flight. Determine the routes that minimize the total cost of crew scheduling.

hub

4

5

3

10

12

2

2

2

1

8

10

8

If city A has to be covered twice in a day then how would you solve the problem using metaheuristics (You do not have to solve it) just describe.

5} Problem 13.3 page 340 of text.

6) Apply graph coloring heuristic to find the make span to schedule these tasks

tool 1 2 3 4 5 6 7 8 9 10

task

1 0 0 1 0 0 1 1 0 0 1

2 1 0 0 0 0 1 0 1 0 0

3 1 0 0 1 0 0 1 0 1 0

4 0 1 1 1 1 0 0 1 0 0

5 0 1 1 0 1 1 1 0 0 1