**IM 39003**

**Assignment 7: Ant Colony Optimization**

**Due Date: Mar 11, 2021 Time: 11:59 PM**

*Instructions:*

*1. Submit this assignment via MS teams by turn- in/hand-in*

*2. You need to submit 2 files in zip file format: 1) Report 2) Code. Name your zip file as <your first name\_your rollnumber>*

*3. In case of copying you will get a 0 grade for this assignment.*

**Activity 1:** Based on the code provided, prepare a report on following

1. Change the number of iteration 50, 100, 200, 400 and find optimal iteration number
2. Try to update the pheromone by changing the number of ants 10:20:100.
3. Change Pheromone Exponential Weight α from 1 to 0.5, 1, 2, 3
4. Change Heuristic Exponential Weight β from 1 to 0.5, 1, 2, 3
5. Change evaporation Rate(ρ) : 0.01:0.02:0.1
6. Change Q (multipler) value 10 :1:15 times proportionate to number of ant

***Activity 2:***  Write a code for Job Sequencing Problem given below with proper commenting.

|  |  |  |
| --- | --- | --- |
| Job | Processing Time | Due date |
| 1 | 6 | 18 |
| 2 | 2 | 6 |
| 3 | 3 | 9 |
| 4 | 4 | 11 |
| 5 | 5 | 8 |

Use following parameters

1. Initialize parameters
   * 1. Number of ants = 100
     2. Alpha=1
     3. Beta=1
     4. Evaporation Coefficient = 0.0 (for simplicity)
     5. Initial pheromone = 100
2. Pheromone deposit function:

Y = 100/T(x)

Where T(x) is total tardiness (remember tardiness?).

---xxx---