

Assignment 7

Due: 11:59 PM, April 17

Implement the two parallel programs below in Python using mpi4py.

1. Compute $\int_0^1 x^2 dx$ based on the Trapezoidal rule. Choose the value of n as 10, 100, 1000, and 10000, respectively, and compare it with the theoretical value of the integral. Submit your code, and a screenshot of the outputs of running the code with different values of n above and the theoretical value of the integral.
2. Implement the odd-even transposition sorting algorithm to sort an array of 16 numbers with 4 processes as follows.

Time	Process			
	0	1	2	3
Start	15, 11, 9, 16	3, 14, 8, 7	4, 6, 12, 10	5, 2, 13, 1
After Local Sort	9, 11, 15, 16	3, 7, 8, 14	4, 6, 10, 12	1, 2, 5, 13
After Phase 0	3, 7, 8, 9	11, 14, 15, 16	1, 2, 4, 5	6, 10, 12, 13
After Phase 1	3, 7, 8, 9	1, 2, 4, 5	11, 14, 15, 16	6, 10, 12, 13
After Phase 2	1, 2, 3, 4	5, 7, 8, 9	6, 10, 11, 12	13, 14, 15, 16
After Phase 3	1, 2, 3, 4	5, 6, 7, 8	9, 10, 11, 12	13, 14, 15, 16

Submit your code, and a screenshot including outputs of the order of local array on each process after each step.