

C\*. Solve Lunar's problem and display your computation (As usual upload the resulting pdf document on the appropriate *Canvas* Assignment link):

The Osceola jail contains a row of 10 cells. Each of 10 inmates is randomly assigned to exactly one of those side-by-side cells. None of the 10 prisoners are exhibiting symptoms of the COVID-19 disease. However, unbeknownst to the correction officers who manage the jail, 5 of the 10 prisoners are carriers of the COVID-19 virus. Lunar would like to determine the probability of the event that no uninfected person occupies a cell next to an uninfected person.

---

Sample response:

There are  $10!$  ways for 10 persons to be arranged in the 10 jail cells. In order that no uninfected person is neighboring an infected person, the uninfected people must either occupy positions 1, 3, 5, 7, and 9 or occupy positions 2, 4, 6, 8, and 10. There are  $2 \times (5!) \times (5!)$  (i.e., 28800) such events.  $|\Omega| = {}_{10}P_{10} = 10! = 3628800$ .  
 $\therefore$  The probability that Lunar seeks is  $28800 \div 3628800 = 1/126 \approx 0.008$

---