

Problem Set 1

DSME 6756: Business Intelligence Techniques and Applications (Winter 2023)

Due at 9:30AM, Monday, December 11, 2023

Please read the Jupyter Notebook of Session 1 and finish the questions below. Submit a Jupyter Notebook of your solutions with code on Blackboard. The total achievable points are 6 for this problem set. Please name your Jupyter Notebook as

- YourLastName_YourFirstName_PS1.ipynb (e.g., Zhang_Renyu_PS1.ipynb)

1. Writing Python Functions (6 points)

- (a) (2 points) A sequence $\{A_n : n \geq 1\}$ satisfies that $A_1 = 1$, $A_2 = 1$, and $A_{n+2} = A_{n+1} + A_n + 2n$ for $n \geq 1$. Write a Python function to find the value of A_n for a given positive integer n . Compute A_{50} .
- (b) (2 points) We define $\binom{n}{m}$ as the coefficient of binomial expansion for $(1+x)^n$ ($m = 0, 1, 2, \dots, n$). Hence, $\binom{n}{m}$ is the coefficient of x^m in $(1+x)^n$, where $m = 0, 1, 2, \dots, n$. We know from the property of binomial coefficients that $\binom{n}{m} + \binom{n}{m+1} = \binom{n+1}{m+1}$ for all n and all $0 \leq m \leq n-1$. Please calculate $\binom{n}{m}$ for any $n \geq m \geq 0$. Compute $\binom{40}{20}$.
- (c) (2 points) Find the least common multiple of (p, q, r) given that p , q , and r are positive integers. Compute the least common multiple of $(123, 234, 345)$.