Discrete Assignment

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1) **Question 11.9.4.9**: Find the sum to n terms of the series whose nth term is given by $n^2 + 2^n$?
Solution:

TABLE I
INPUT PARAMETERS

Variable	Description	Value
$x(n-1)$	n-th term of sequence	$(n^2 + 2^n)u(n)$

$$x(n-1) = (n^2 + 2^n)u(n) \tag{1}$$

$$2^n \cdot u(n) \overset{Z}{\longleftrightarrow} \frac{1}{1 - 2z^{-1}} \tag{2}$$

$$\tag{3}$$

Refer equation(**??**),equation(**??**) from appendix and equation(2)

$$z^{-1}X(z) = \frac{z^{-1}(z^{-1} + 1)}{(1 - z^{-1})^3} + \frac{1}{1 - 2z^{-1}} \tag{4}$$

$$X(z) = \frac{z^{-1} + 1}{(1 - z^{-1})^3} + \frac{1}{z^{-1}(1 - 2z^{-1})}, \quad |z| > 2 \tag{5}$$

$$Y(z) = X(z)U(z) \tag{6}$$

$$Y(z) = \left(\frac{z^{-1} + 1}{(1 - z^{-1})^3} + \frac{1}{z^{-1}(1 - 2z^{-1})} \right)\left(\frac{1}{1 - z^{-1}} \right) \tag{7}$$
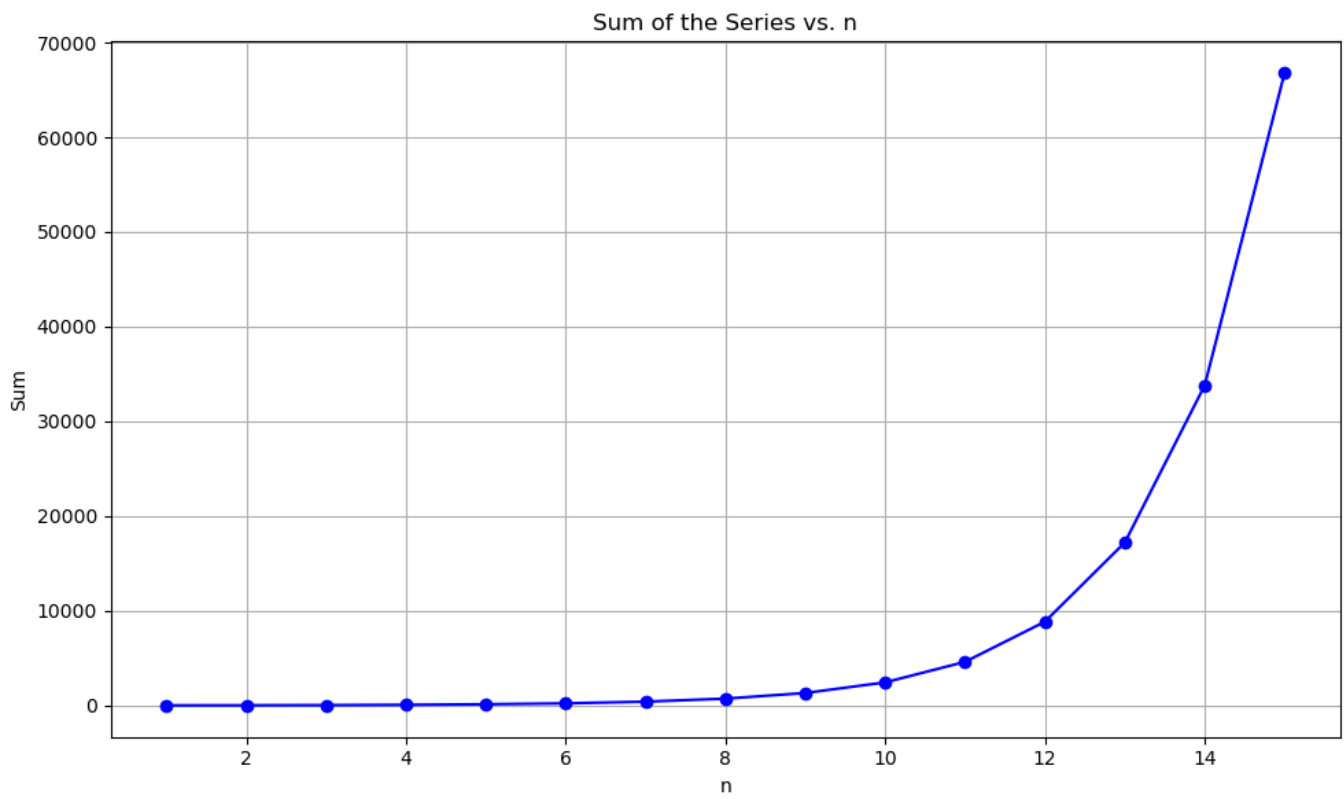
Fig. 1. Graph of $y(n)$ for $n \leq 15$ (Graph beyond $n = 29$ is not shown)