

Exercise 1

$$\begin{aligned} \textcircled{1} \quad S &= 2+4+6+8+\dots+100 \\ &= 2 \times (1+2+3+\dots+50) \\ &= 2 \times \frac{50+51}{2} = 50 \times 51 = \underline{\underline{2550}} \end{aligned}$$

$$\begin{aligned} T &= 2+6+18+54+\dots+1062882 \\ &= 2 \times 3^0 + 2 \times 3^1 + 2 \times 3^2 + 2 \times 3^3 + \dots + 2 \times 3^{12} \\ &= \sum_{k=0}^{12} 2 \times 3^k \\ &= 2 \times \frac{1-3^{13}}{1-3} = 3^{13} - 1 = \underline{\underline{1594322}} \end{aligned}$$

$$\begin{aligned} \textcircled{2} \quad U &= u_0 + u_1 + \dots + u_{12} = \sum_{k=0}^{12} (-2+4k) + 2^k \\ &= \sum_{k=0}^{12} (-2+4k) + \sum_{k=0}^{12} 2^k \\ &= 13 \times \left(\frac{-2+46}{2} \right) + 2 \times \frac{1-2^{13}}{1-2} \\ &= (13 \times 22) + 2^{13} - 1 \\ &= 286 + 8192 - 1 \\ &= \underline{\underline{8477}} \end{aligned}$$