Daniel Regan
CSC6013
Week 5 Project Output

1)
- dregan17@Danny-Mac Week 5 % /usr/local/bin/python 3
  "/Users/dregan17/Desktop/MC Code/6013 Algorithms and Discrete
  Structures/Week 5/Regan_Week5_Project/binaryExpansion.py"
  **9**
  **10**

2)
- dregan17@Danny-Mac Week 5 % /usr/local/bin/python 3
  "/Users/dregan17/Desktop/MC Code/6013 Algorithms and Discrete
  Structures/Week 5/Regan_Week5_Project/sumOfSquares.py"
  **650**
  **2870**

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(1.3) Recurrence relation for binary expansion problem.

$$T(n) = T\left(\frac{n}{2}\right) + 1 \quad \text{and} \quad T(1) = 1$$

$a = 1$
$b = 2$
$d = 0$

$\log_b a = \log_2 1 = 0$

$d = \log_b a \quad \text{so} \quad O\left(n^d \log n\right) = \boxed{O(\log n)}$

(2.3) Recurrence relationship for sum of squares algorithm.

$$T(n) = T(n-1) + 1$$

$a = 1$
$b = 1$
$d = 0$

$\log_1 1 = 1$

$d < \log_b a$

$0 < 1 \quad \text{so} \quad O\left(n^{\log_b a}\right) = O\left(n^1\right) = \boxed{O(n)}$