Problem: the number of states grows factorially:

\[ N \text{ single particle states in } m \text{ particles} \]

\[ = \text{ we have } \binom{N}{m} \text{ states} \]

eg take \( n = 0, 1, 2, 3 \) then \( N = 40 \)

for \( m = 20 \) we have \( \binom{40}{20} = \frac{8.0.1}{20.120!} \approx 1.4 \times 10^{11} \)