\[ n[i] = \min \{ n[j+1] + d[i,j] \mid i \leq j \leq n \} \]

**Algorithm Steps:**

1. Try all possible \( i \) and \( j \) on the 1st line.
2. Recursively find the minimum cost for \( i \) and \( j+1 \).
3. Save the minimum cost found.
4. Break if the current line is full or if there are no more words.

**Example:**
- \( w_1, w_2, w_3, w_4, w_5, w_6, w_7, w_8, w_9, w_{10} \)
- \( b, 4, 4, 6, 7, 9, 9, 11, 12 \)
merge sort

\[
t \text{time } M(n) = \begin{cases} 
\mathcal{O}(1) & \text{if } n = 1 \\
2M(n/2) + \mathcal{O}(n) & \text{if } n > 1 
\end{cases}
\]

\[M(n) = 2M(n/2) + \mathcal{O}(n)\]
Multiply 2 n-bit integers

\[ x, y \]
\[ A \]
\[ x_{n-1}, x_{n-2}, \ldots, x_1, x_0 \]
\[ y_{n-1}, y_0 \]

\[ 0(n^2) \]
Karatsuba - Ofman

\[
x = a \cdot 2^{n/2} + b
\]
\[
y = c \cdot 2^{n/2} + d
\]

Goal: \[x \cdot y = ac \cdot 2^n + (ad + bc) \cdot 2^{n/2} + bd\]

\[
m_1 = ac
\]
\[
m_2 = bd
\]
\[
m_3 = (a+b)(c+d) = ac + bc + ad + bd
\]
\[
m_3 - m_1 - m_2 = ad + bc
\]

\[M(n) = 3M(n/2) + O(n)\]
\[= O(n \log_2 3) < O(n^{1.59})\]