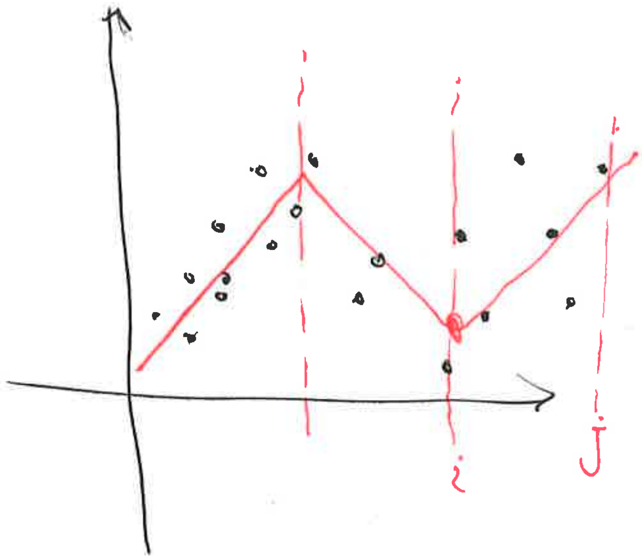

opt(n) : optimal Solution

$\underline{e(i,j)}$

$SSE(i,j) + Opt(i-1) + C$

$$opt(j) = \begin{cases} 0 & j = 0 \\ \min\limits_{i \le j} \left(e(i,j) + opt(i-1) + C \right) \end{cases}$$

Opt(n):

```
for i = 1 to n-1
    for j = i+1 to n
        e(i,j) = SSE_opt(i,j)
```

?$O(n)$

$O(n^3)$

```
M[0] = 0
for j = 1 to n
    min = ∞
    for i = 1 to j
        tmp = e[i,j] + M[i-1] + C
        if(tmp < min)
            min = tmp
    M[j] = min
return M[n]
```

$O(n^2)$

$\boxed{O(n^3)}$

$$X = \sum x_i$$

$$Y = \sum Y_i$$

$$\overline{XY} = \sum x_i y_i$$

$$X_2 = \sum x_i^2$$

$$Y_2 = \sum y_i^2$$

$$X = X + x_j$$

$$Y = Y + y_j$$

...

$$b = \frac{Y - a X}{n}$$

$$a = \frac{n \overline{XY} - X \cdot Y}{n X_2 - X^2}$$

$$\sum (y_i - a x_i - b)(y_i - a x_i - b)$$

$$= \sum y_i^2 + a^2 \sum x_i^2 + n b^2$$

$$- 2a \sum x_i y_i + 2ab \sum x_i - b \sum y_i$$

$$\boxed{= Y_2 + a^2 X_2 + n b^2 - 2a \overline{XY} + 2ab X - bY}$$