

Complexity of Selection Sort

for (i=1; i ≤ n-1; i++) { → n

min_index = i; → n-1

for (j=i+1; j ≤ n; j++) { → $\frac{n(n-1)}{2}$

if (a[j] < a[min_index]) { → $\frac{(n-1)(n-2)}{2}$

min_index = j; → x

}

}

if (min_index != i) { → n-1

temp = a[i]; → n-p

a[i] = a[min_index]; → n-p

a[min_index] = temp; → n-p

}

}

$$\frac{(n-1)(n-2)}{2} = \frac{n^2 - 3n + 2}{2}$$

Now we get,

$$C_1 n + C_2 n - C_2 + \frac{C_3 n^2}{2} - \frac{C_3 n}{2} + \frac{C_4 n^2}{2} - \frac{C_4 3n}{2} + C_4 + C_5 x$$

$$+ C_6 n - C_6 + C_7 n - C_7 p + C_8 n - C_8 p + C_9 n - C_9 p$$

$$= 2C_1 n + 2C_2 n - 2C_2 + C_3 n^2 - C_3 n + C_4 n^2 - 2C_4 n + 2C_4 + 2C_5 x + 2C_6 n - 2C_6 - 2C_7 p + 2C_8 n - 2C_8 p + 2C_9 n - 2C_9 p$$

$$= n^2(c_3 + c_4) + n(2c_1 + 2c_2 - c_3 - 3c_4 + 2c_6 + 2c_7 + 2c_8 + 2c_9) \\ + 2c_5x - p(2c_7 + 2c_8 + 2c_9) + (2c_4 - 2c_6 - 2c_2)$$

$$= n^2 c_{10} + n c_{11} + 2c_5x - p c_{12} + c_{13}$$

$$\therefore f(n) = n^2 c_1 + n c_2 + x c_3 - p c_4$$

$$\therefore y \propto n^2$$