

Set II : Average Case
Complexity

$(n-1)$
 Best
 Case

$\frac{n(n-1)}{2}$
 Worst
 Case

— A1s 2
 A1s 1

↓
 Avg. Case.

$$\begin{array}{c}
 a_1 \quad a_2 \quad a_3 \\
 \hline
 x_1 + \dots + x_6 \\
 \hline
 6 \\
 a_1 \dots a_n \\
 x_1 + x_2 + \dots + x_{n!} \\
 \hline
 n!
 \end{array}$$

$$\begin{array}{c}
 a_1 < a_2 < a_3 \quad \text{--- } x_1 = 0 \\
 \hline
 a_1 < a_3 < a_2 \quad \text{--- } x_2 = 1 \\
 a_2 < a_1 < a_3 \quad \text{--- } x_3 = 0 \\
 a_2 < a_3 < a_1 \quad \text{--- } x_4 = 1 \\
 a_3 < a_1 < a_2 \quad \text{--- } x_5 = 2 \\
 a_3 < a_2 < a_1 \quad \text{--- } x_6 = 2
 \end{array}$$

$$f(n) = (n-1)$$

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

$$f(3)$$

$$= 1 + \frac{1}{2} + \frac{1}{3}$$

$$= 1 + \frac{1}{2} + \frac{1}{3} = \frac{5}{6}$$

$A_1 \Rightarrow \text{Comparison} \Rightarrow n^2$

$$D_1: \frac{a_1 \ a_2 \dots \ a_n}{\approx}$$

$$D_2: \frac{b_1 \ b_2 \dots \ b_n}{\approx}$$

$$k_{j+1} < k_j$$

$$i = \frac{1 \dots (n-1)}{}$$

$$\frac{n(n-1)}{2}$$

$$j = 1 \dots (n-i) \rightarrow \text{Flag}$$

$$\boxed{k_{j+1} : k_j}$$

$$\frac{(n-1) + (n-2) + \dots + 1}{}$$

Steps after first iterch: $\Rightarrow n-1$

$$\text{" " " " " " } \Rightarrow \frac{n(n-1)}{2}$$