

# 1.1.1  $J_1 > J_2 \Rightarrow J_1 : H$

Grouping: 2 more weight

to find the heavier one

# 1.1.2  $J_1 = J_2$ ; then weights  $J_3 / J_4$  to find  
the lighter one, just like the step  
in # 1.1.1

# 1.2  $G_1 = G_2$ , Grouping

$K_1 : 7, 8, 9, 10, 11, 12$

$K_2 = G_3 = 14, 15, 16, 17, 18, 19$

if  $K_1 > K_2$ , then find the lighter  
coin in  $K_2$ , following same idea

$\therefore \# 1.1 \rightarrow \# 1.1.1$

Time Complexity:  $5 \Rightarrow O(\log_3(2N+1)+1)$   
 $\Rightarrow O(\log_3 N)$