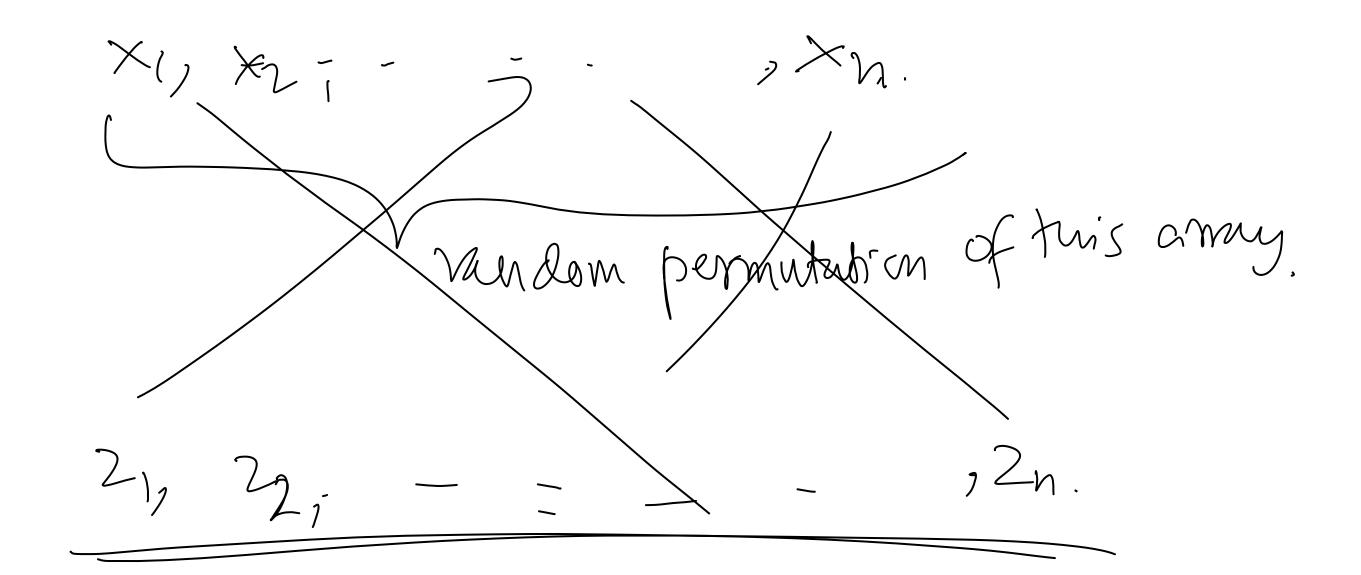
14.00.2014 Randomired algorithm algorithm + (toss random com) quick sort! f (input, random bits) random variable.

Swho low to high 3, 9, 6, 7, 12, 15, 52, 112 T(n) = T(n-1) +Worst cerrent of selections of a grille sort T(n) = 2T(n/2) +



•

generate randon permutations, ? n1 ophns. (each equally likely)

Sampling without

replacement)

(K+1){13,14,15,66} 2 +1, 2 × 2, --, 2 × -1

Coin with problem = b of seeing a head. How wany losh tosses do I need to see the figt held.? (Geometric Vardon variable) 1/p Samples in expectations? = roughly (2) fisses are needed in expectation 6 get a good number.

Howken for get he second number of permutation? --->XJ-1, XJ+1, X42-XJ3, X M. Choose one index from here without replacement. $\frac{1}{2} \frac{1}{2} \frac{1}$ $\begin{cases} 2_{1}, 2_{2}, & ---, 2_{h-1}, 2_{h} \end{cases}$ $\begin{cases} 1_{1}, 1_{1}, & 1_{2$

•

is the pivot Zi is the pirot for left port the sight powt. T(in): a mulon vansable. E averye behavior of many.

(in the limit of many.

Et Companisons. i 15 ever crompted noty In the algerithm what pan we compared? Dermins 6. -entrer i or j is chosen as a pivot.

Assumptions. No two ave same numbers Lue Bornes order. 1 ×1, --- >>) What is the probability that Xi & Xj will ever be compared during the algorithm?

 X_1 , X_1 , X_2 , X_3 , X_4 , X_5 , X_6 , X_6 , X_6 , X_8 , Come 1 c pivot is esteur left of Xi or right Conset is in between xi only cone mun X; 2 X; ill be componed.

ase 3 happens off

"xg or X; is chosen to be the
first prot within the subgroup

Li, Xiti, --. XII, XiJ

$$\frac{1}{2}\left(\frac{1}{2}-\frac{1}{1}+1\right)$$

 $Z_i^{\circ} = 1$ with prob. $Z_i^{\circ} = 1$ with remaining prob.

7 = 2 2 : 1j \bigvee $\langle \rangle$ $\frac{1}{2} \frac{1}{3} \frac{1}$ F/2/ = DE 213 1-14 $\frac{1}{2}$ $\frac{2}{4-1+1}$

121 7+1=1 121

10 g n 4