Khw Ge

CSC 2259 2/20/20

$H \stackrel{?}{=} W$

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for (int i=0; i<n; i++)
  if ... return(false);
return(true);
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$\to H[i] = W[i]$

m iterations return false

$1 \le m \le n$

n iterations true $H[i] = W[i]$

$\#((H,W)\text{-pairs}) = 2^n$

spiel about #(cases)

spiel about average

geometric series

$$1 + x + x^2 + \cdots + x^n = \frac{1-x^{n+1}}{1-x} = S$$

$$xS = x + x^2 + x^3 + \cdots + x^{n+1}$$

$$xS - S = x^{n+1} - 1$$

$$S(x-1) = x^{n+1} - 1$$

$$S = \frac{x^{n+1}-1}{x-1} = \frac{1-x^{n+1}}{1-x}$$

$$S = 1 + 2x + 3x^2 + \cdots + n x^{n-1}$$

$$xS = x + 2x^2 + 3x^3 + \cdots + nx^n$$

$$S - xS = 1 + x + x^2 + \cdots + x^{n-1} - nx^n$$

$$S(1-x)$$

$$S = \frac{1 + x + \cdots + x^{n-1} - nx^n}{1-x}$$

$$= \frac{1-x^n}{(1-x)^2} - n \cdot \frac{x^n}{1-x}$$

$$1 \cdot 2 \cdot 4^{n-1} + 2 \cdot 2^2 \cdot 4^{n-2} + \cdots + n \cdot 2^n + n \cdot 2^n$$

$$2 \cdot 4^{n-1}\left[1 + 2 \cdot \tfrac{2}{4} + 3 \cdot \tfrac{2^2}{4^2} + \cdots + n \cdot \tfrac{2^{n-1}}{4^{n-1}}\right] = 2 \cdot 4^{n-1}$$

$$x = \tfrac{1}{2}$$

$$2 \cdot 4^{n-1}\left[4\left(1 - \left(\tfrac{1}{2}\right)^n\right) - n\left(\tfrac{1}{2}\right)^n\right]$$

$$2\left(1 - \left(\tfrac{1}{2}\right)^n\right)$$

$$\frac{2(2^{n-1})}{4^{n-1}} = 2\left(\frac{1}{2}\right)^{n-1}$$

$$\frac{2^n}{4^{n-1}} = 2\cdot\left(\frac{1}{2}\right)^{n-1} \qquad \left(\frac{1}{2}\right)^{-1}\left(\frac{1}{2}\right)^{n-1}$$

$$= \left(\frac{1}{2}\right)^{n-2} \cdot \frac{1}{2^{n-2}}$$

$$\frac{2^n}{2^{2n-2}}$$

$$\frac{2^n}{2^{2n}\cdot 2^{-2}} = \left(\frac{1}{2}\right)^n \cdot 2^{-2}$$

$$\frac{2\cdot 2^{n-1}}{4^{n-1}} = 2\left(\frac{1}{2}\right)^{n-1} \qquad 2\left(\frac{1}{2}\right)^{n-1}$$

$$\frac{2^n}{4^{n-1}} = \frac{2^n}{2^{2n-2}} = \frac{2^n}{2^{2n}\cdot 2^{-2}}$$

$$=$$