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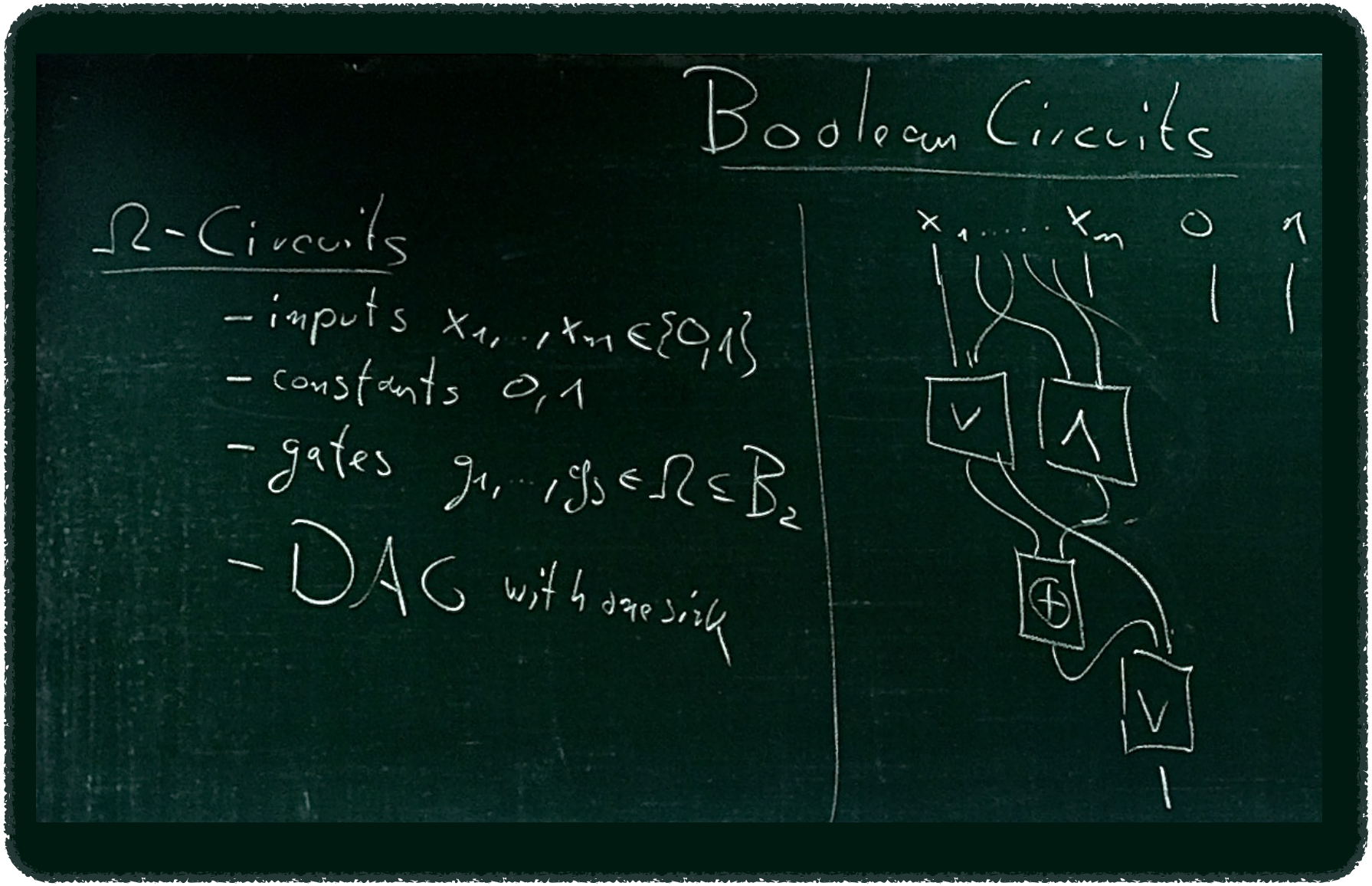
12 Boolean Circuit Size



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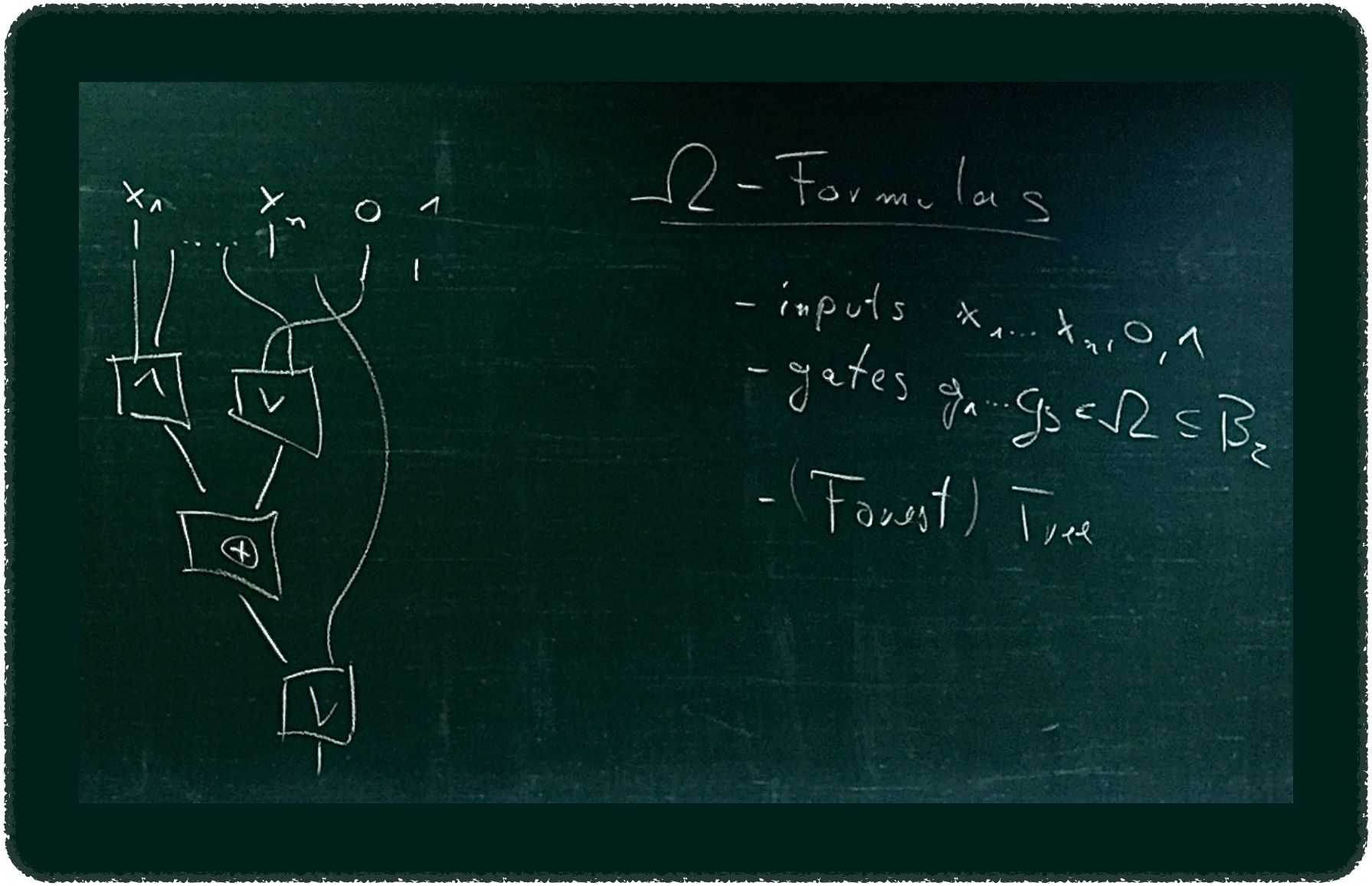
12 Boolean Circuit Size



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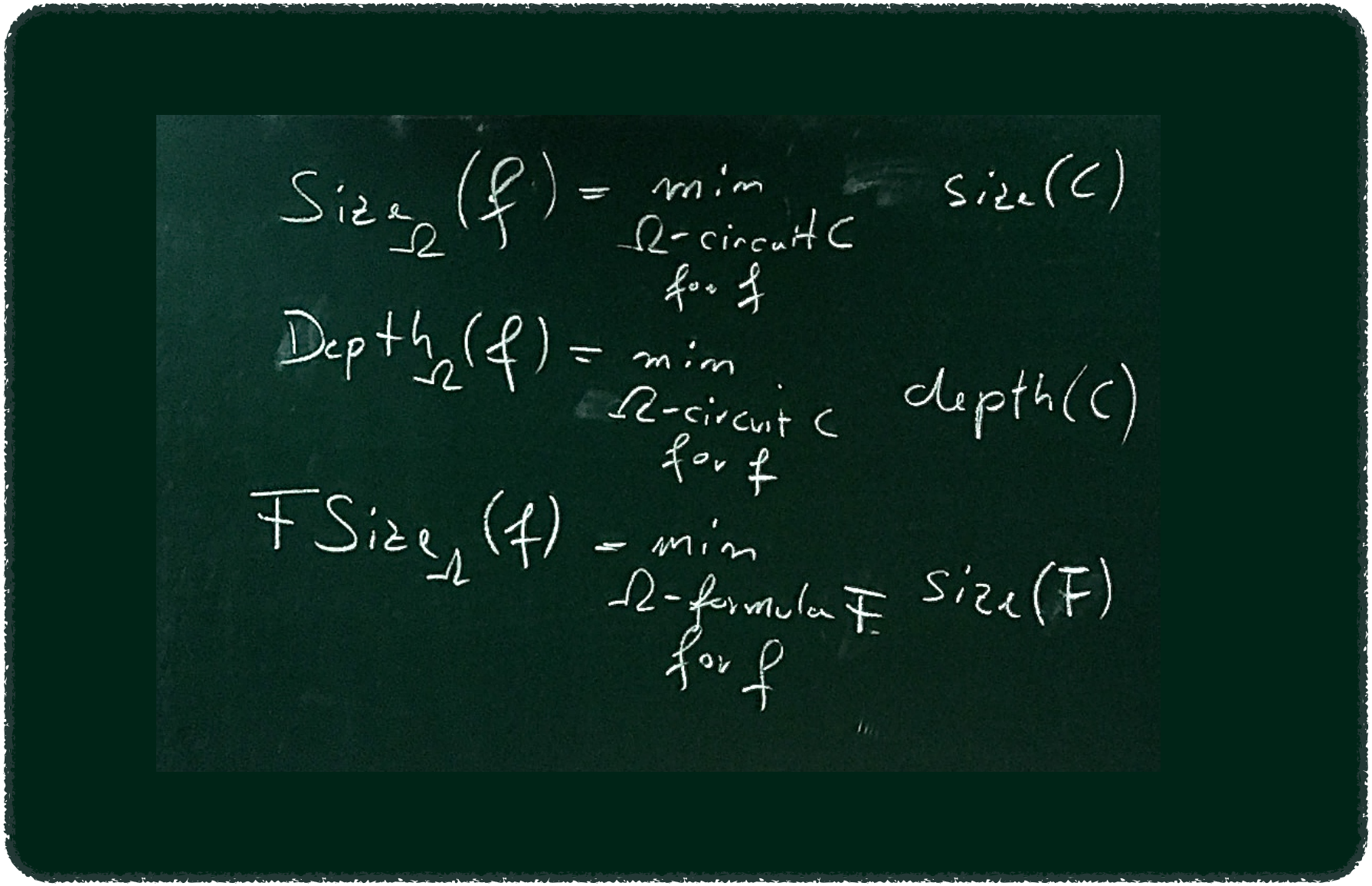
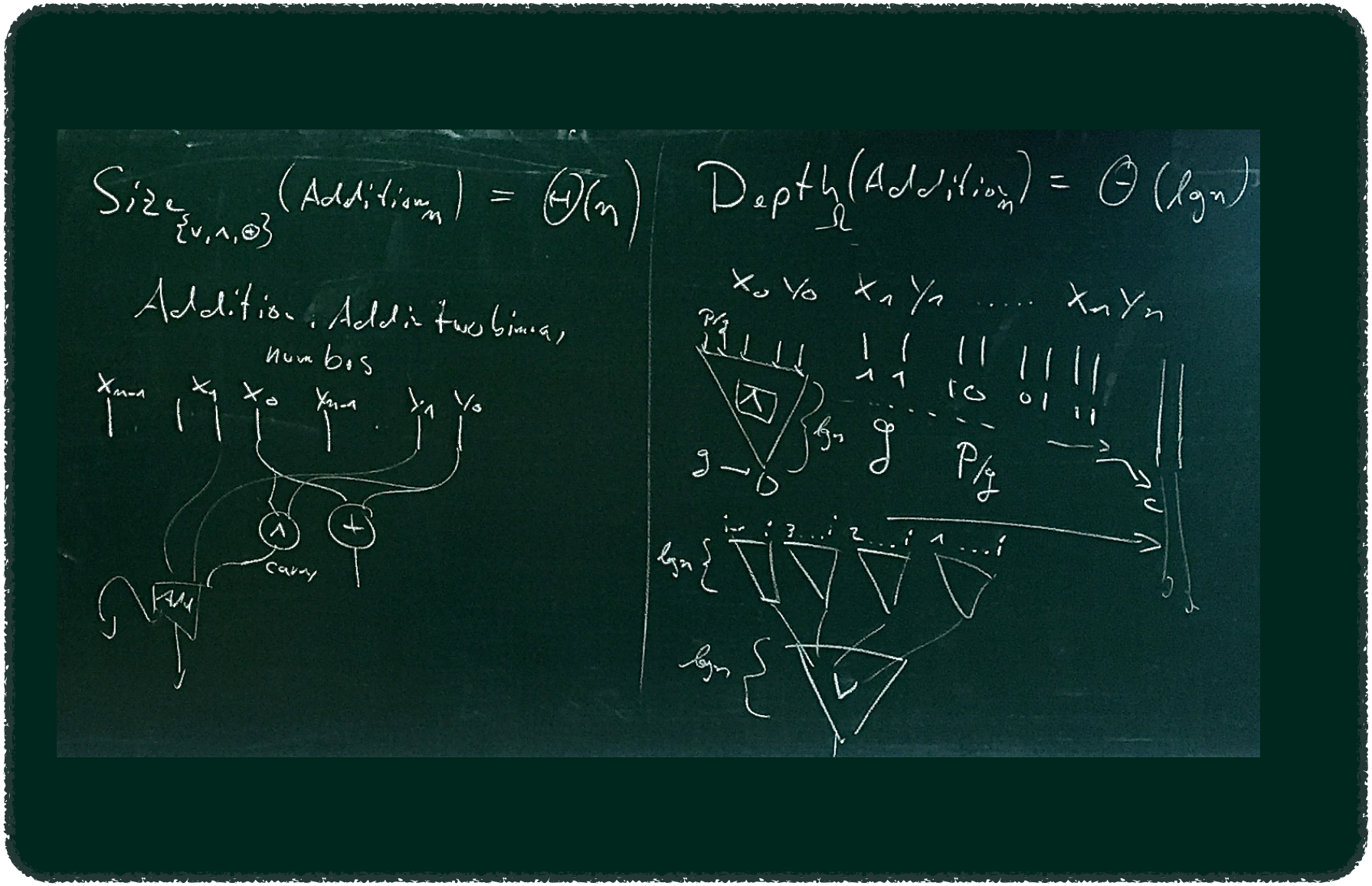
12 Boolean Circuit Size



12 Boolean Circuit Size



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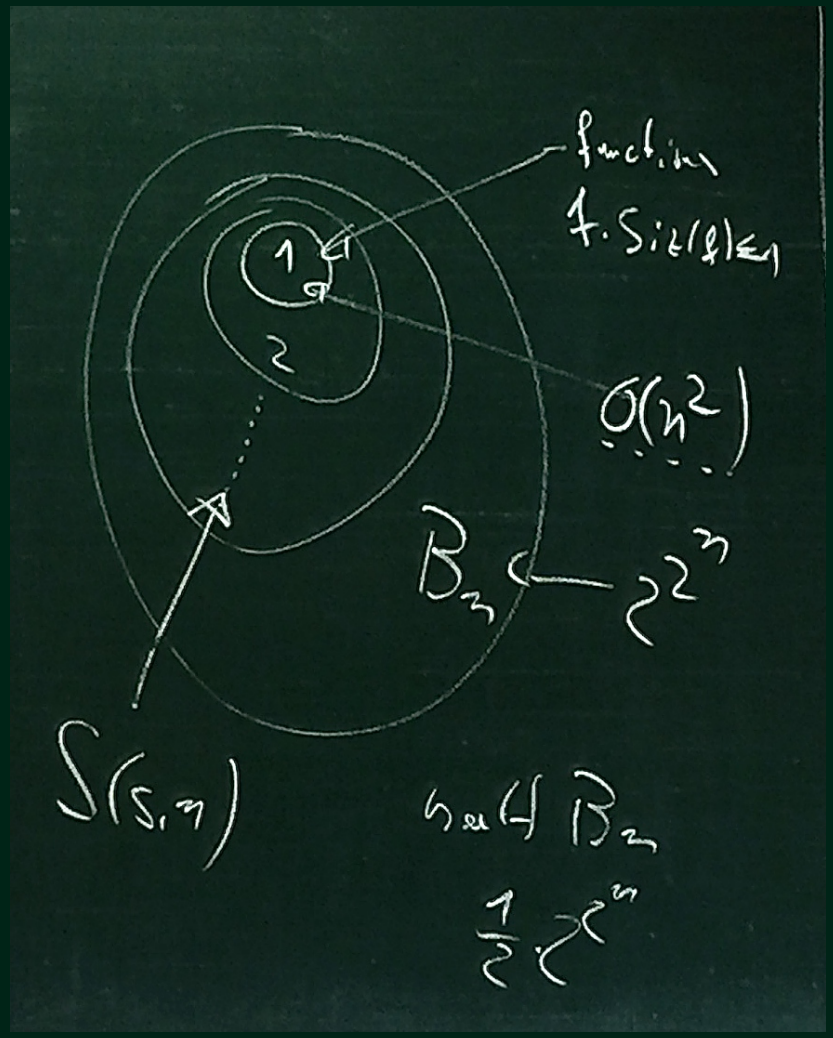
12 Boolean Circuit Size



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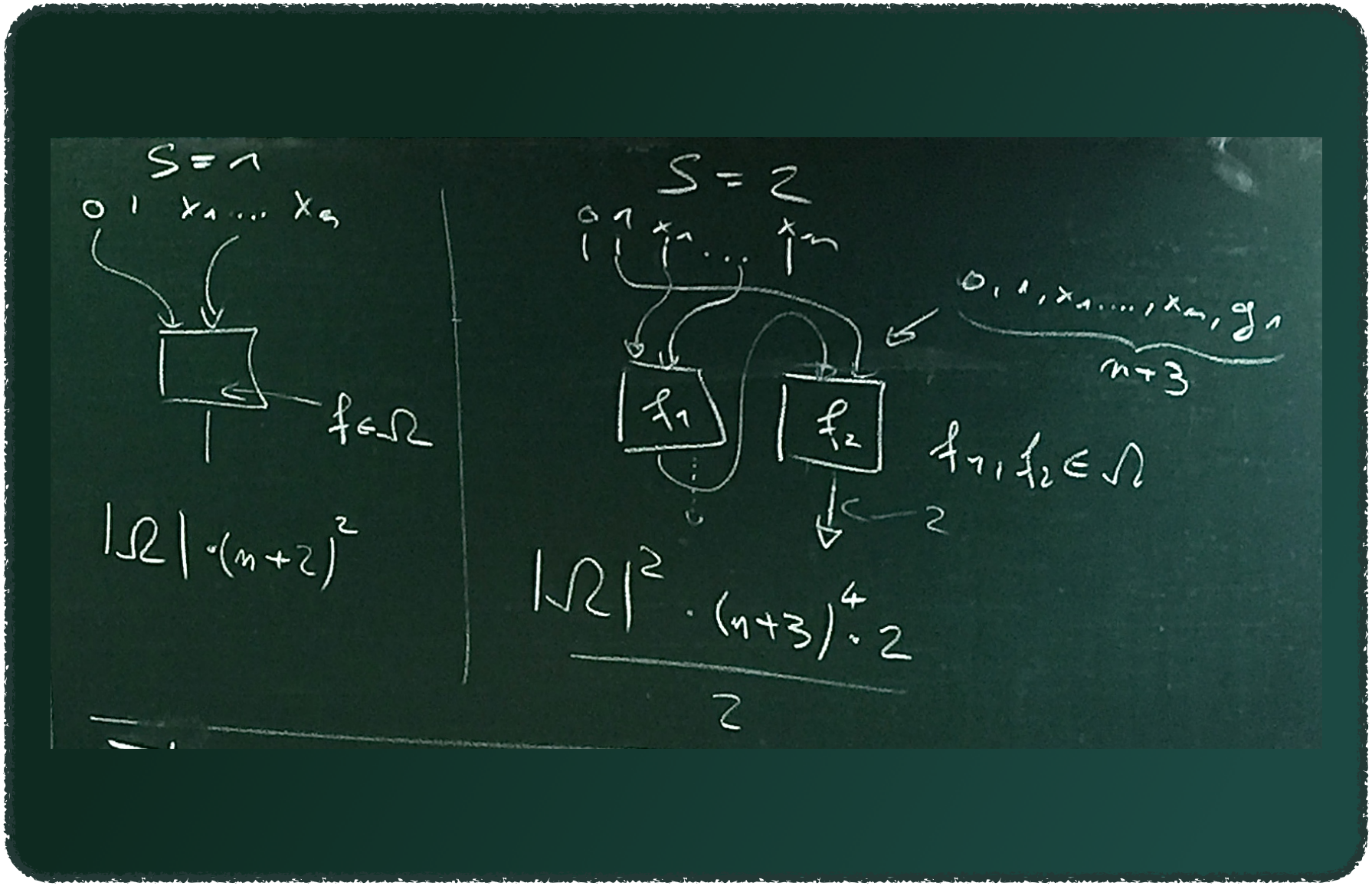

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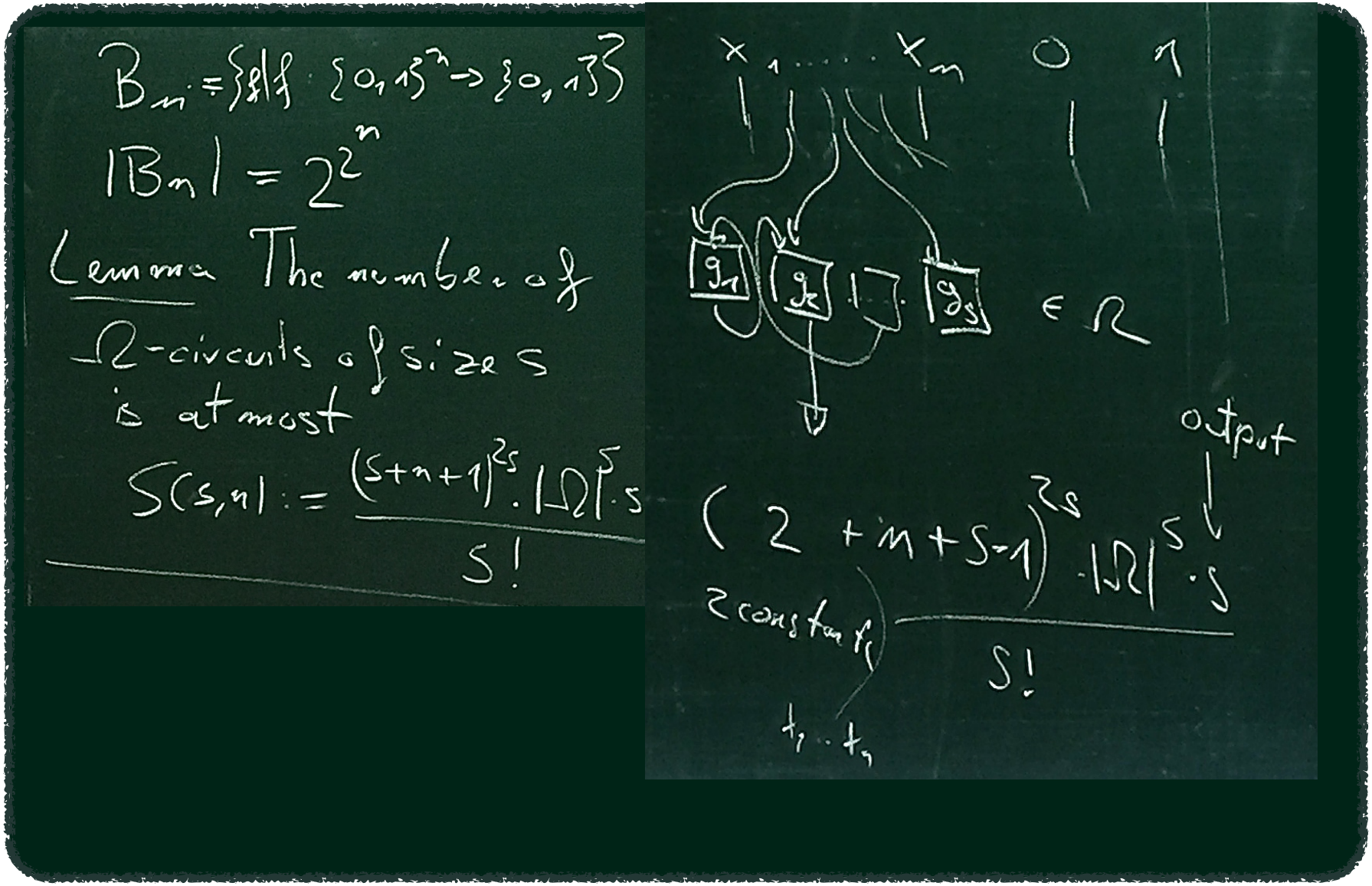
12 Boolean Circuit Size



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$$|B_n| \leq S(s, n)$$

$$2^{2^n} \leq \frac{(1+n+s)^{2s} \cdot |\Omega|^s \cdot s}{s!} \quad | \log_2$$

$$\Leftrightarrow 2^n \leq \log (\underbrace{1+n+s}_{\leq 2s})^{2s} + \log |\Omega|^s + \log s - \log s!$$

Stirling's formula

$$s! = \Theta\left(\sqrt{2\pi s} \cdot \left(\frac{s}{e}\right)^s\right)$$

$$\log s! = \frac{1}{2}\log s + \frac{1}{2}\log 2\pi + s\log s - s\log e + \Theta(1)$$

$$\log a \cdot b = \log a + \log b$$

$$\log a^b = b \cdot \log a$$

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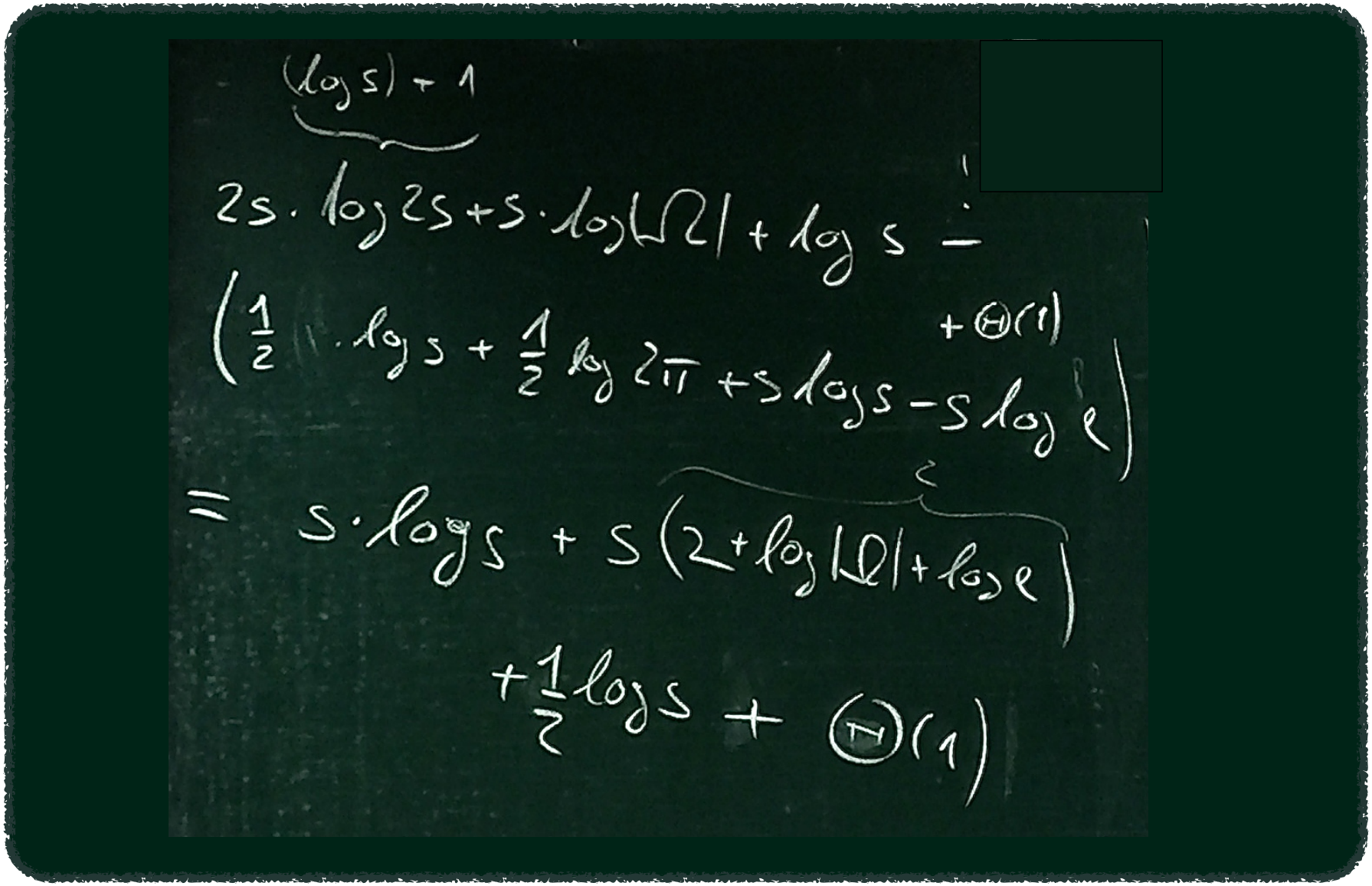

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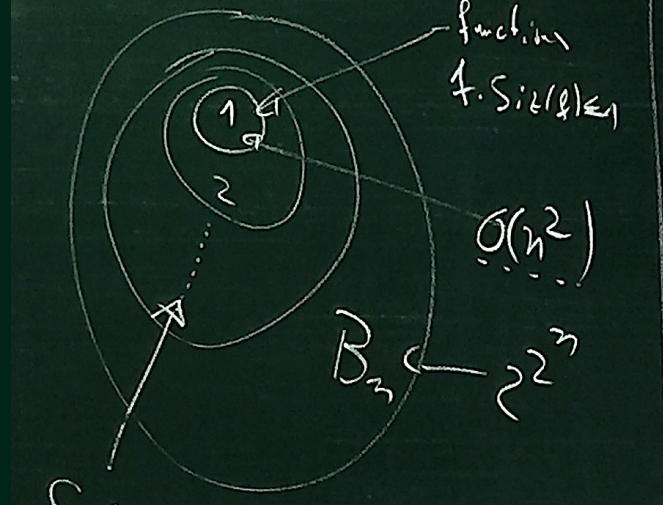
Theorem For large enough n there are functions $f \in B_n$ with $size(f) \geq \frac{2^n}{n}$



$2^n \leq s \cdot \log s + c \cdot s$

$\Rightarrow s \geq \frac{2^n}{n}$

$s = \frac{2^n}{n} \quad \log s = n - \log n$

$\frac{2^n}{n}(n - \log n) + c\frac{2^n}{n}$

$2^n\left(1 - \frac{\log n}{n} + \frac{c}{n}\right)$

out of B_n $\frac{1}{2}2^{2^n}$

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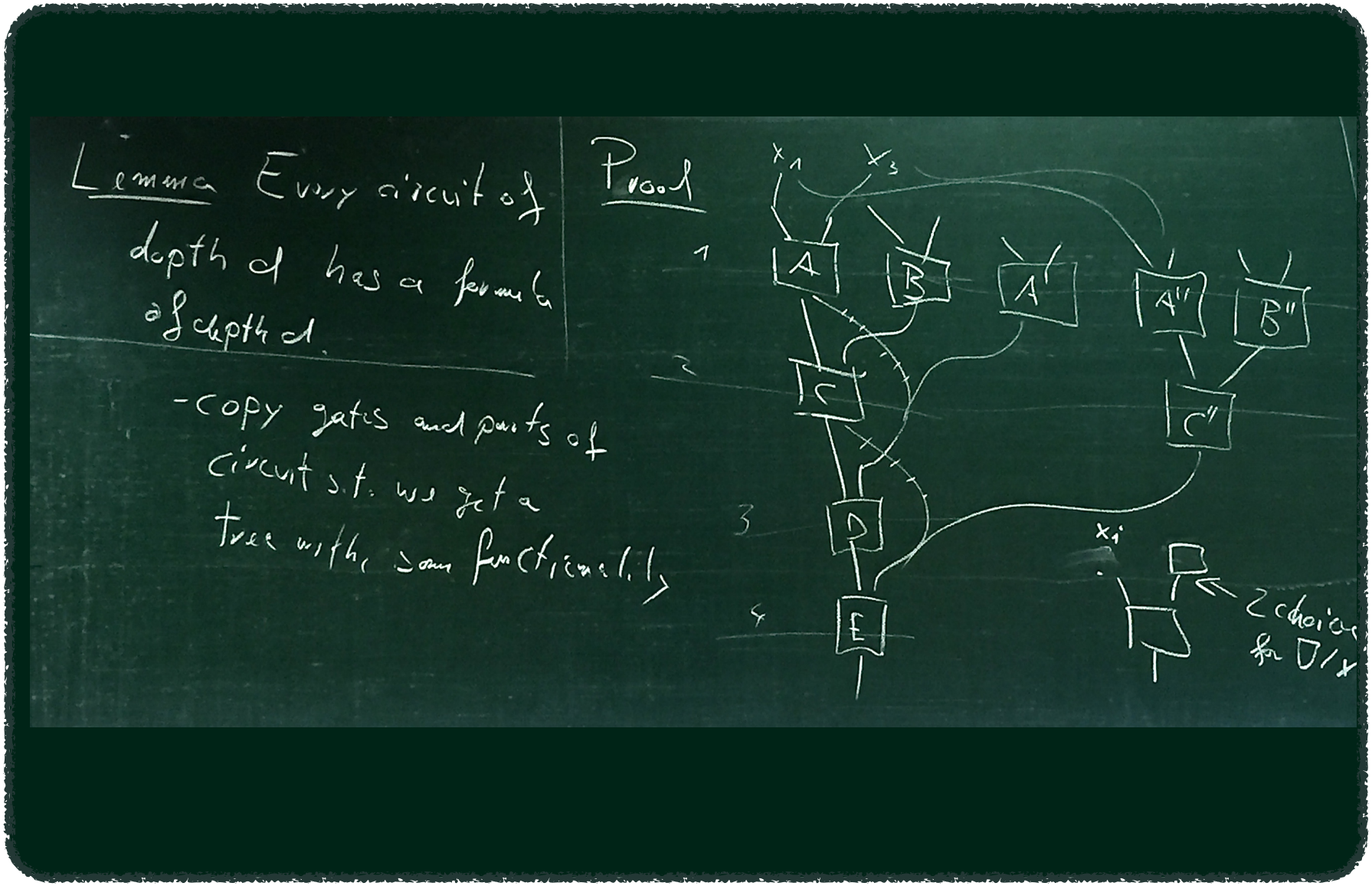

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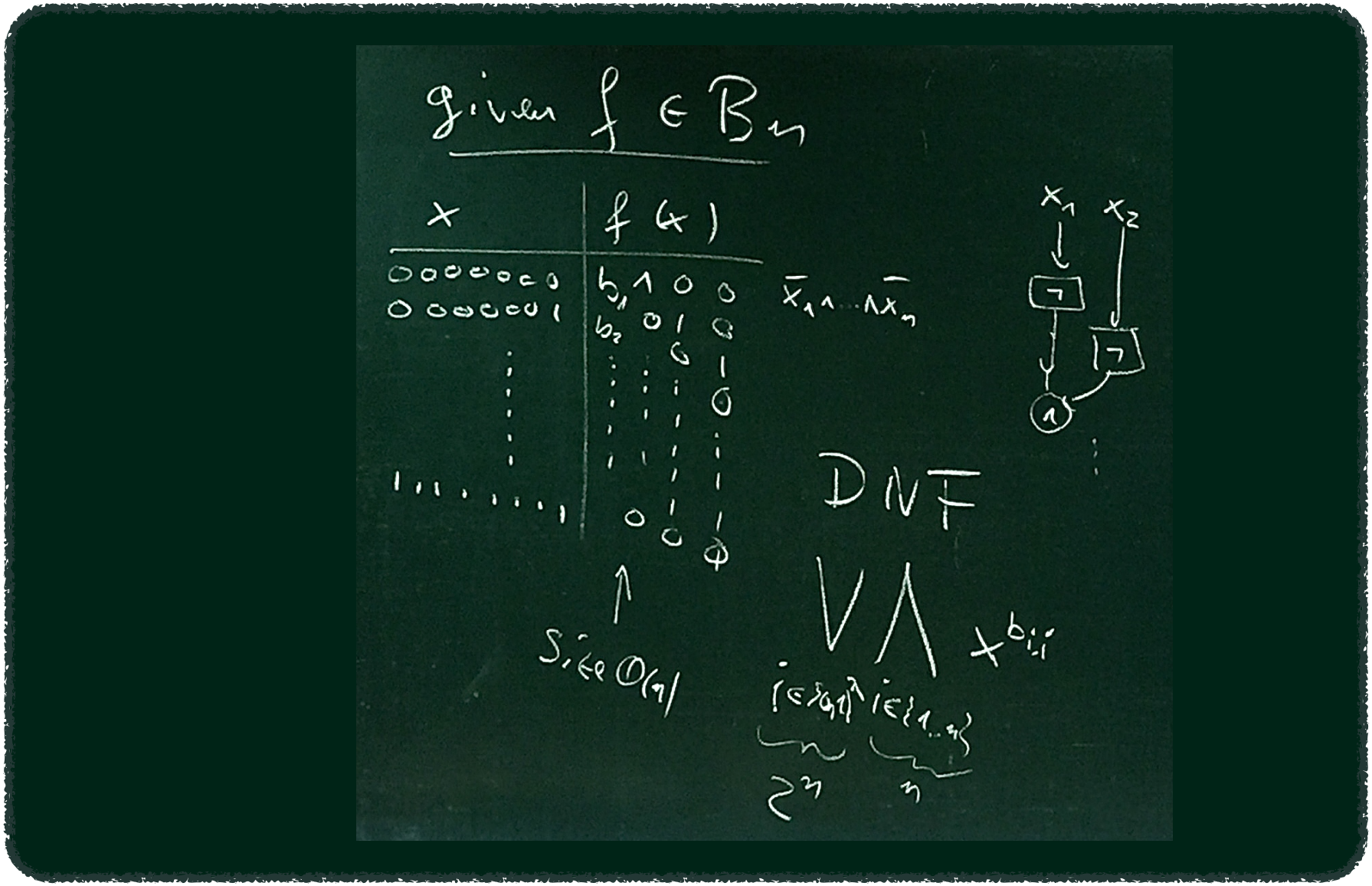

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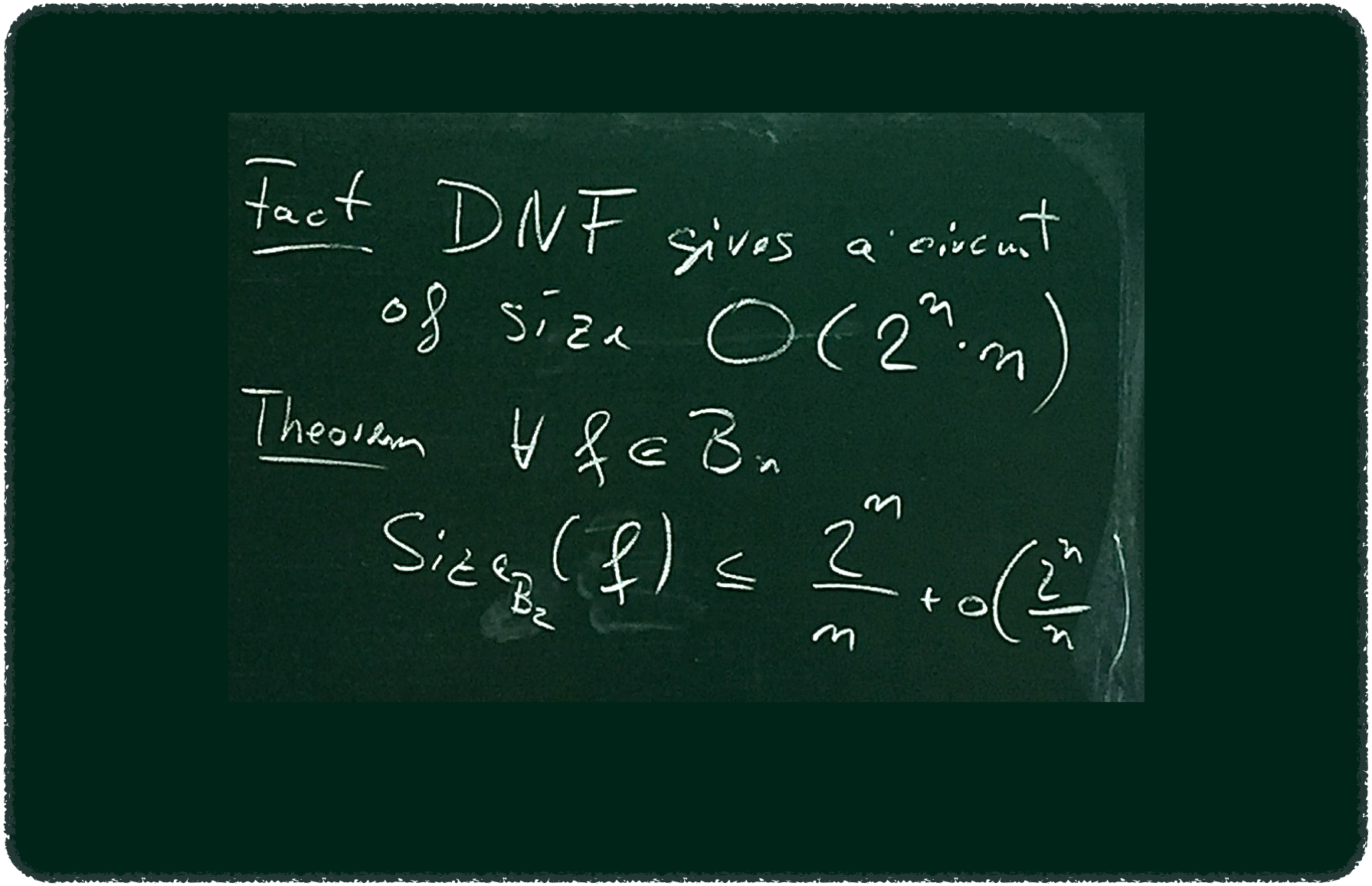

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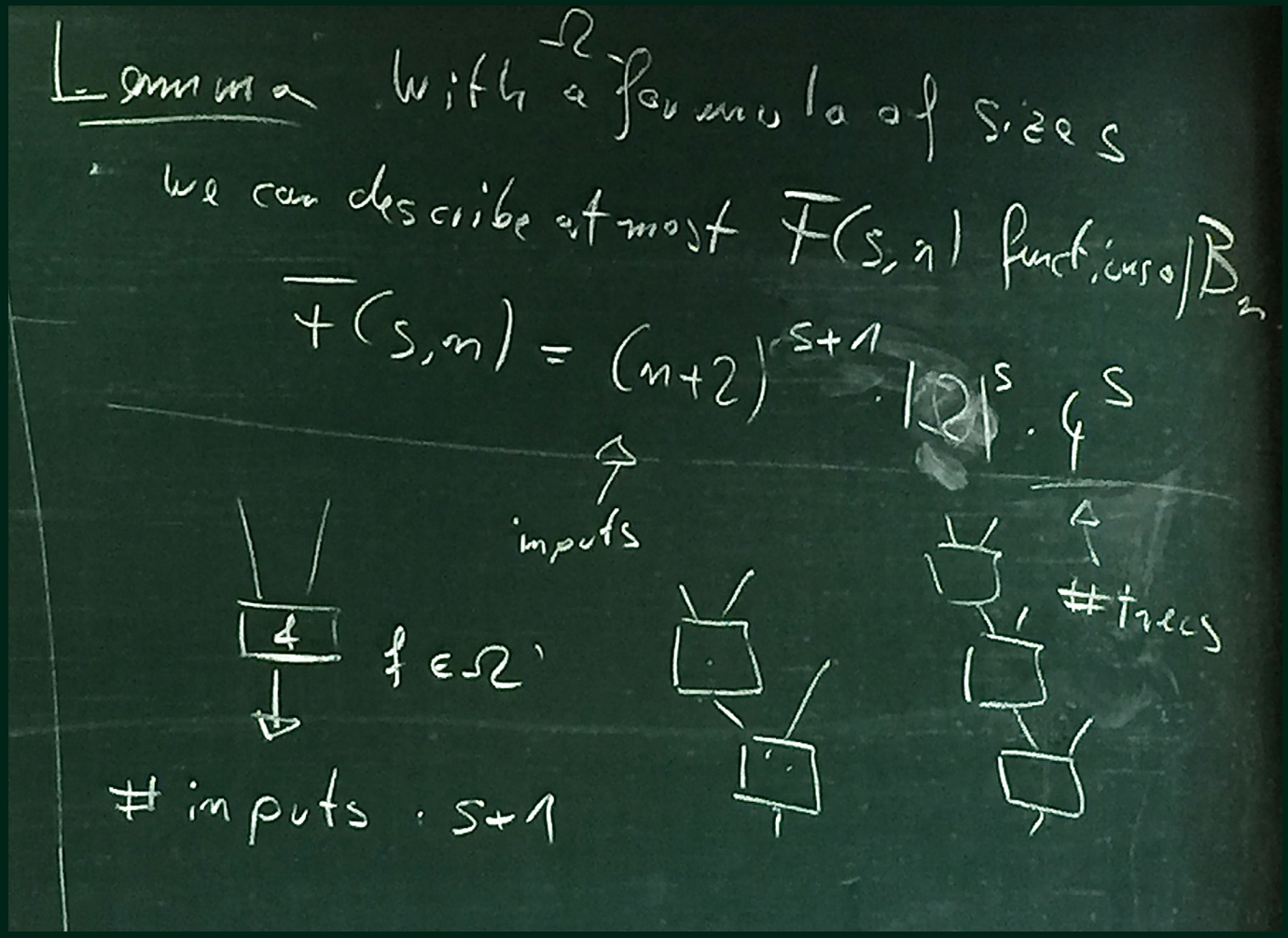

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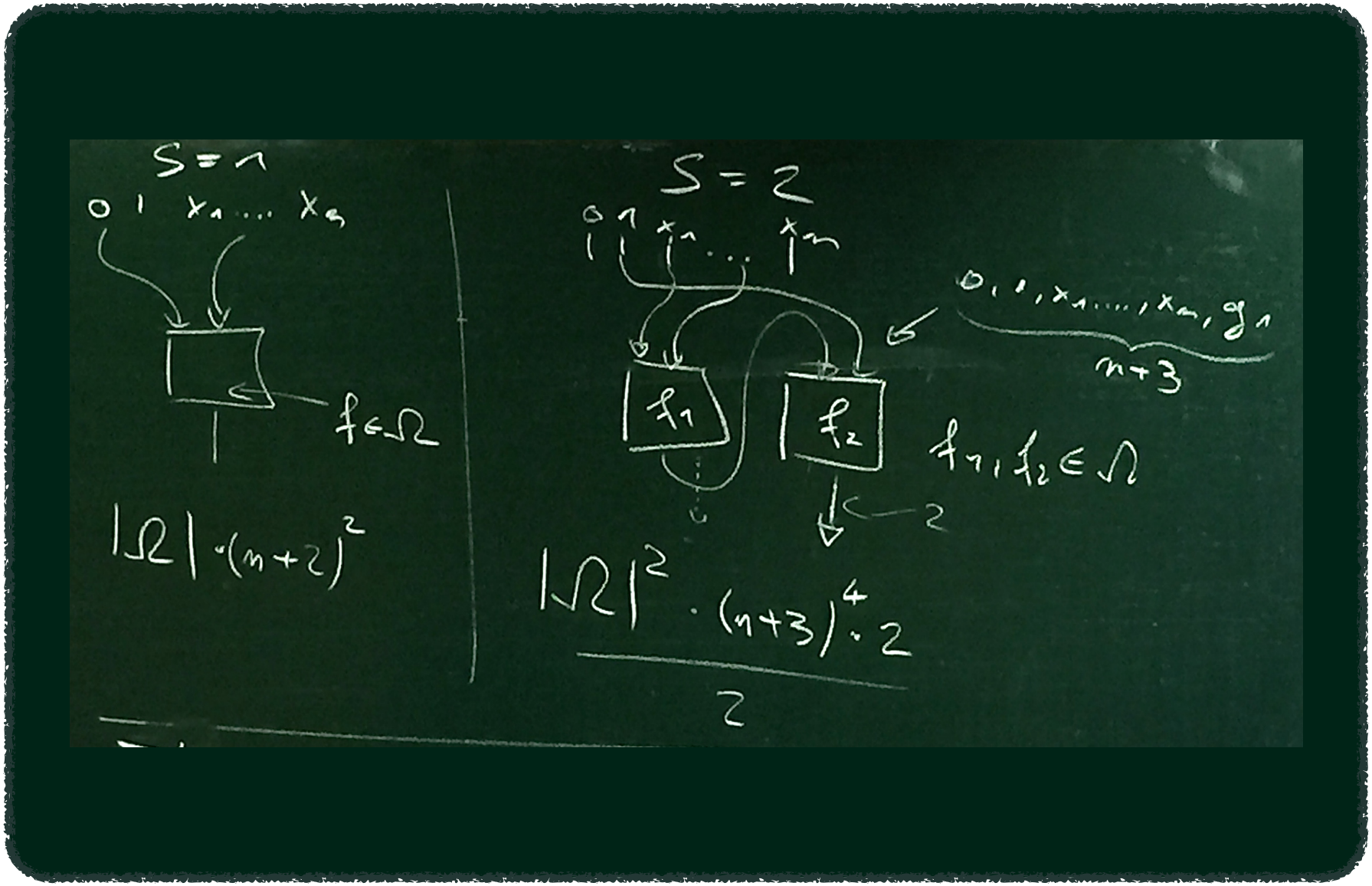

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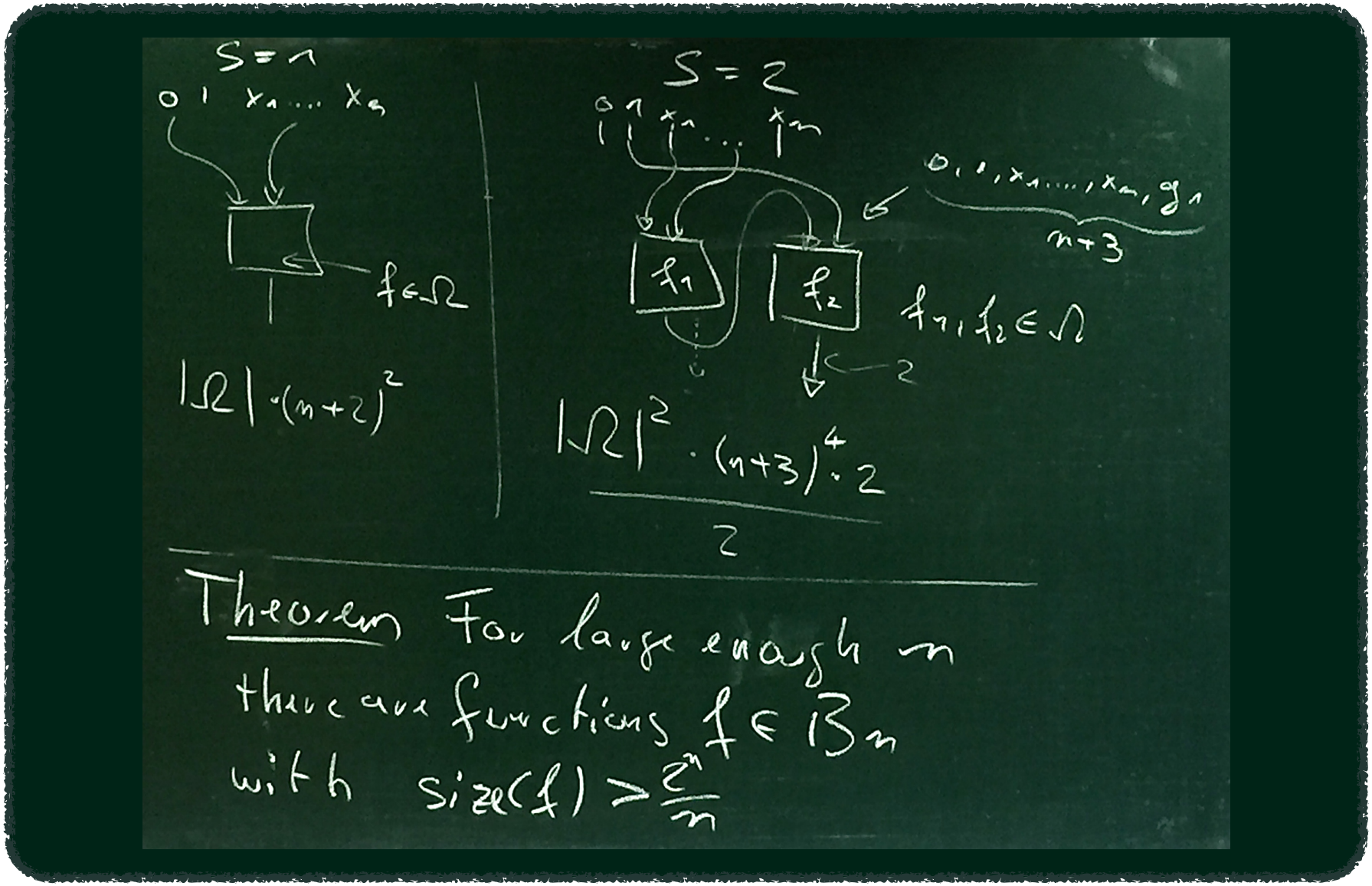

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