Twierdzenie o rekursji uniwersalnej

Niech $T(n) = aT\left(\frac{n}{b}\right) + \Theta(n^k \log^p n)$ $\quad a, b, k, p \in \mathbb{R}$

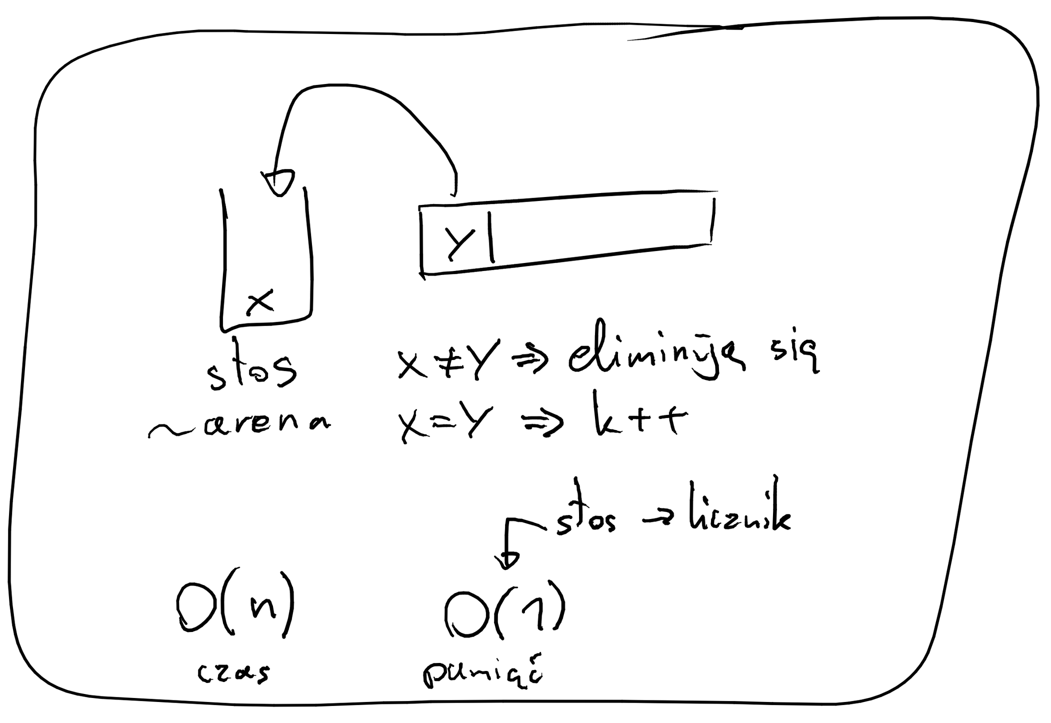
$a \geq 1 \quad b > 1 \quad k \geq 0$

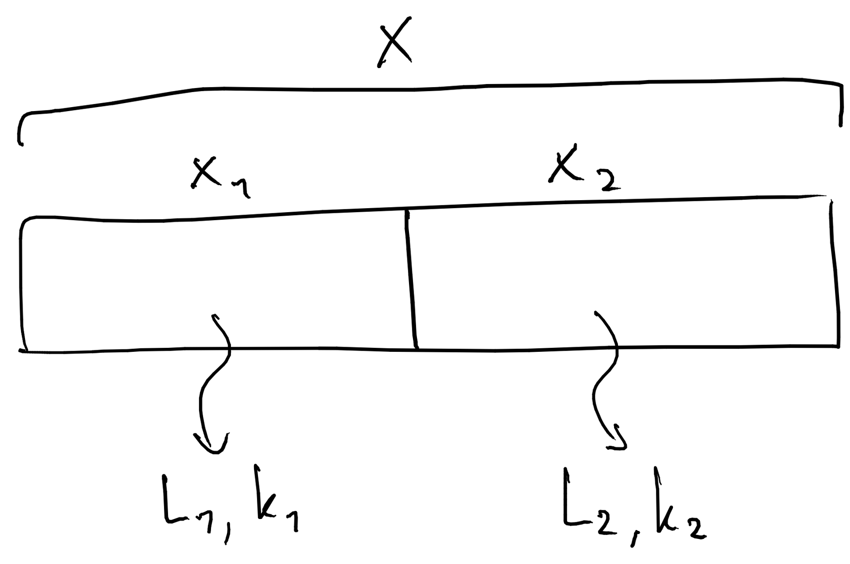
$$
\begin{cases}
a > b^k \Rightarrow T(n) \in \Theta(n^{\log_b a}) \\
a = b^k \Rightarrow T(n) \in \begin{cases} \Theta(n^{\log_b a} \log^{p+1} n) & p > -1 \\ \Theta(n^{\log_b a} \log \log n) & p = -1 \\ \Theta(n^{\log_b a}) & p < -1 \end{cases} \\
a < b^k \Rightarrow T(n) \in \begin{cases} \Theta(n^k \log^p n) & p \geq 0 \\ \Theta(n^k) & p < 0 \end{cases}
\end{cases}
$$

Dziel i zwyciężaj
- merge sort
- quick sort
- wyszukiwanie binarne
- alg Strassena $O(n^{\sim 2.8})$
- sortowanie bitoniczne
- FFT
- Drzewa van Emde Boasa

```
f(x - małe) = łatwe rozw.
f(x - duże) = do
    xs ← podziel x
    ys = map f xs
    return (join ys)
```

Lider w ciągu: występuje $> \frac{n}{2}$ razy

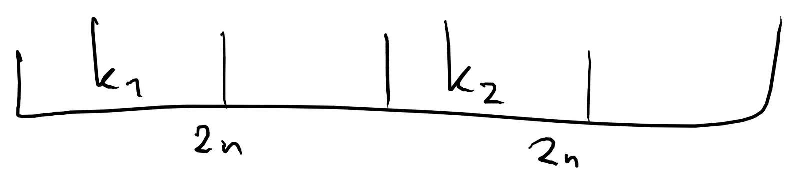




sprawdzamy, ile razy L_1 w X_2 $\quad k_1 \geq k_2$

L_2 w X_1 $\quad k_2 \geq k_1$

$\to$ Maybe (L, k)

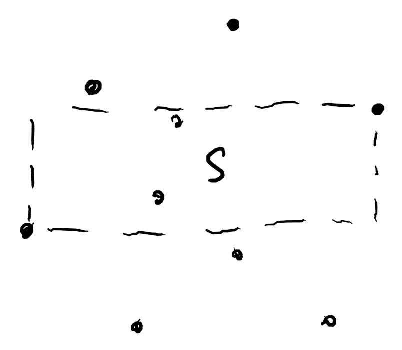


$k_2 \geq k_1 > n$

$2n - k_2 \leq 2n - k_1 < n < k_1 \leq k_2$

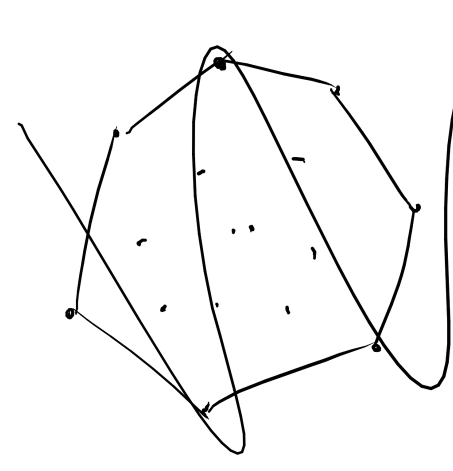
$k_1 + 2n - k_2 \leq 2n$ $\quad$ — L_1 nie będzie liderem

Prostokąty ortogonalne

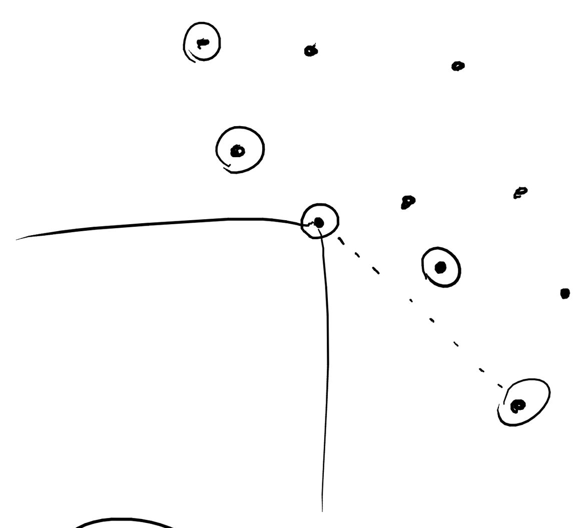


$\max\{S(x_i, x_j)\} \to x_i, x_j$

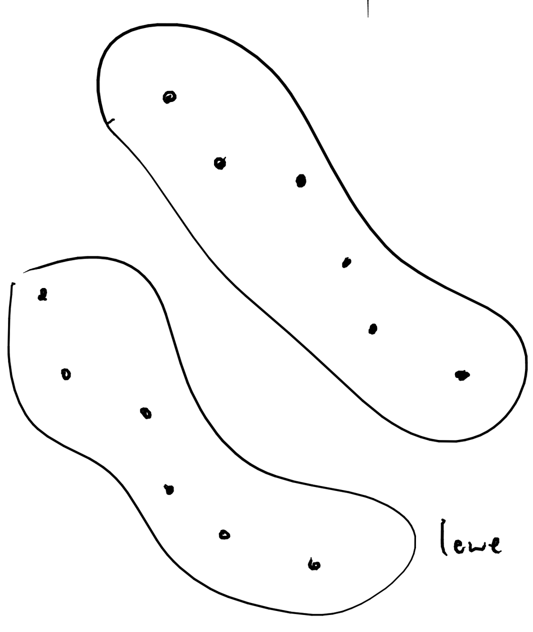
- skupmy się na jednej przekątnej, druga analogicznie

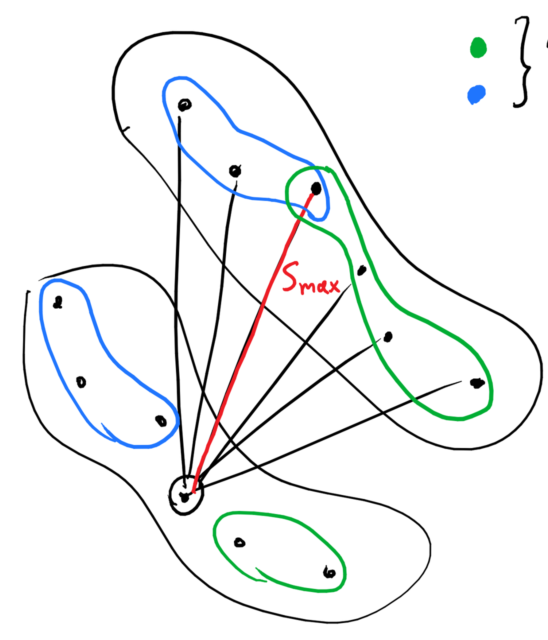


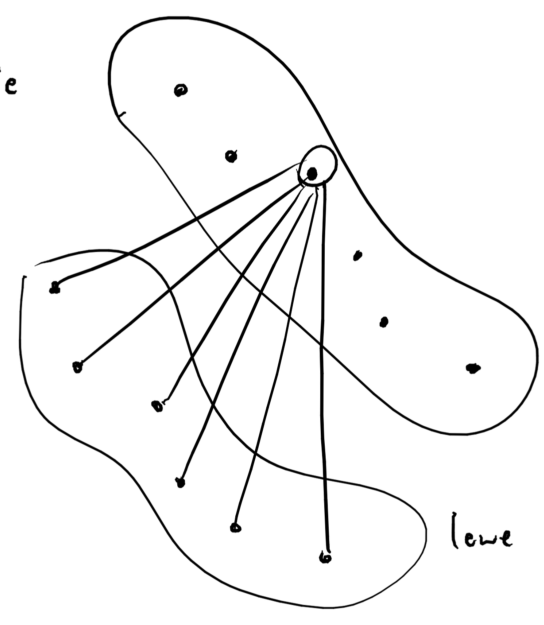
- punkty w środku otoczki na pewno są złe

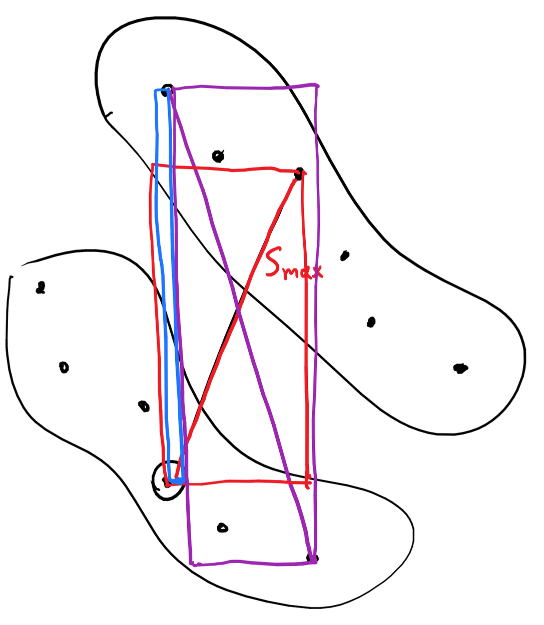


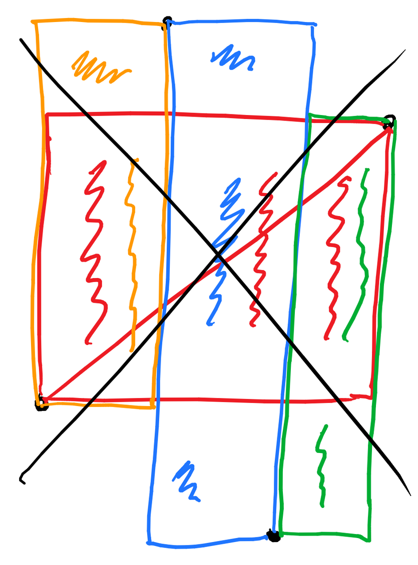
⊙ – te punkty mają sens być lewym dolnym rogiem











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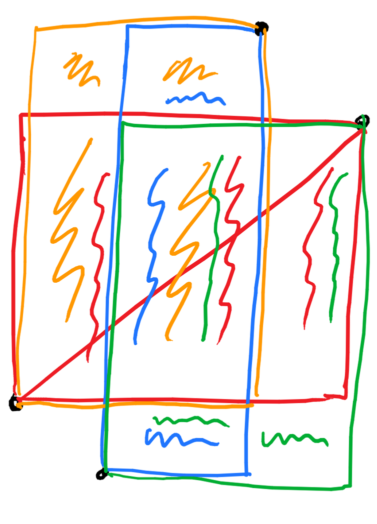
nie te rogi



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