

Tutorial 09: Nov 15

1. **Kd-tree Construction**

Give an algorithm to construct a kd-tree in worst case $\Theta(n \log(n))$ time.

2. **KMP**

Let $P[0\dots 8] = \text{abacabaca}$ and let $T[0\dots 13] = \text{abacabacdabaca}$.

- a) Compute the KMP failure array $F[0\dots 8]$ for the pattern P .
- b) Show the search for P in T using the KMP algorithm. Place each character of P in the column of the compared-to character of T . Put round brackets around characters if an actual comparison was not performed.

3. **Boyer-Moore**

Let $P[0\dots 5] = \text{dayday}$ and let $T[0\dots 12] = \text{daysaymayaaay}$.

- a) Compute the suffix skip array $S[0\dots 5]$ for the pattern P .
- b) Compute the last occurrence array $L[0\dots 5]$ for the pattern P .
- c) Show the search for P in T using the Boyer-Moore algorithm. Place each character of P in the column of the compared-to character of T . Put round brackets around characters which are known to be matched based on the suffix skip array (even if the algorithm matches them again.) Put square brackets around characters which are known to be matched based on the last occurrence function (even if the algorithm matches them again.) Note that some lines in the table might require both square and round brackets.