Sequence Analysis SS 2013

Freie Universität Berlin, Institut für Informatik
Knut Reinert, Sandro Andreotti
Sommersemester 2013

9. Exercise sheet, July 5th, 2013
Discussion: July 10th, 2013

Exercise 1.

Minimal Resolved Match Refinement

Prove the following Lemma:

Lemma 1. *There exists a unique resolved refinement $\bar{\mathcal{S}}$ of $\mathcal{S}$ of minimal cardinality.*

Proof: Sketch: Consider two different resolved refinements $\mathcal{S}_1$ and $\mathcal{S}_2$ of $\mathcal{S}$,both of minimal cardinality. Divide proof into two cases. 1) ($supp_A(\mathcal{S}_1) \neq supp_A(\mathcal{S}_2)$ 2) $supp_A(\mathcal{S}_1) = supp_A(\mathcal{S}_2)$, $supp_B(\mathcal{S}_1) = supp_B(\mathcal{S}_2)$

Exercise 2.

Match Refinement Example

Given Sequences A=`AAGCGCCCGCG` and B=`AAGCGGGGCCCGCG` and the projection maps:

$$\begin{aligned} \alpha_{S_1}[0,5] &\rightarrow [0,5] \\ \alpha_{S_2}[2,5] &\rightarrow [11,14] \\ \alpha_{S_3}[8,11] &\rightarrow [2,5] \\ \alpha_{S_4}[5,11] &\rightarrow [8,14] \end{aligned} \qquad \begin{aligned} \beta_{S_1}[0,5] &\rightarrow [0,5] \\ \beta_{S_2}[11,14] &\rightarrow [2,5] \\ \beta_{S_3}[2,5] &\rightarrow [8,11] \\ \beta_{S_4}[8,14] &\rightarrow [5,11] \end{aligned}$$

a) Draw the two sequences and their corresponding segment matches.

b) Compute the minimal resolved refinement by applying the algorithm from the lecture.