Algorithm 1 DIALIGN-TX \((s_1, \ldots, s_k)\)

\[
F \leftarrow \emptyset
\]

for all \(s_i, s_j\) such that \(i < j\) do

\[
F \leftarrow F \cup \text{PAIRWISE\_ALIGNMENT}(s_i, s_j, \emptyset)
\]
end for

\/* initial computation of \(A_1\): original DIALIGN alignment */

\[
A_1 \leftarrow \emptyset
\]

\[
A_1 \leftarrow \text{GREEDY\_ALIGNMENT}(A_1, F)
\]

\/* initial computation of \(A_0\): "progressive DIALIGN" alignment */

\[
a = \text{AVERAGE}(w(f) | f \in F)
\]

\[
F_0 = \{ f \in F | w(f) < a \}
\]

\[
F_1 = \{ f \in F | w(f) \geq a \}
\]

\[
T = \text{BUILD\_UPGMA}(F)
\]

while there is an unprocessed non-leaf node in \(T\) do

Let \(p\) be an unprocess non-leaf node such that the child-nodes are either marked as processed or are leaf.

\[
A'(p) \leftarrow \text{MERGE}(p, F_i)
\]

\[
\text{PROCESSED}(p) \leftarrow \text{TRUE}
\]
end while

\[
A_0 \leftarrow A'(\text{ROOT}(T))
\]

\[
A_0 \leftarrow \text{GREEDY\_ALIGNMENT}(A_0, F_0)
\]

\/* adding further fragments to \(A_1\) */

while additional fragments can be found do

\[
F \leftarrow \emptyset
\]

for all \(s_i, s_j\) such that \(i < j\) do

\[
F \leftarrow F \cup \text{PAIRWISE\_ALIGNMENT}(s_i, s_j, A_1)
\]
end for

\[
A_1 \leftarrow \text{GREEDY\_ALIGNMENT}(A_1, F)
\]
end while

\/* adding further fragments to \(A_0\) */

while additional fragments can be found do

\[
F \leftarrow \emptyset
\]

for all \(s_i, s_j\) such that \(i < j\) do

\[
F \leftarrow F \cup \text{PAIRWISE\_ALIGNMENT}(s_i, s_j, A_0)
\]
end for

\[
A_0 \leftarrow \text{GREEDY\_ALIGNMENT}(A_0, F)
\]
end while

if \(W(A_0) > W(A_1)\) then

\[
\text{RETURN} \leftarrow A_0
\]
else

\[
\text{RETURN} \leftarrow A_1
\]
end if