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Contraction Algorithm for RDLT

Algorithm 1 Matrix-based Contraction Path Generation

Given RDLT R; Pre-processing Steps:
Input: Expanded vertex simplification R_i of RDLT R
Output: Contraction Path P
Matrices: RV_{adj}^t and RV_{C}^t

Initialize Arc Connectivity Matrix RV_{adj}^0 of R_i
Initialize C-Attribute Matrix RV_C^0 of R_i
Let $s' \in V_i$ be the source and $f' \in V_i$ be the sink
Let $x = s'$
Initialize $P = \{x\}$
Let $t = 1$
while P does not contain f' **do**
    $\mathcal{Y} \leftarrow \{y \in V_i \mid RV_{\text{adj}}^{t-1}(x, y) \geq 1\}$
    Select any $y \in \mathcal{Y}$
    Let LHS $= RV_C^{t-1}(x, y) \cup \{\epsilon\}$
    $\mathcal{U} \leftarrow \{u \in V_i \mid u \neq x \wedge (RV_{\text{adj}}^{t-1}(u, y) \geq 1)\}$
    Let RHS $= \bigcup_{u \in \mathcal{U}} RV_C^{t-1}(u, y)$
    if LHS $\supseteq$ RHS **then**
        for all $u \in \mathcal{U}$ **do**
            $RV_C^{t-1}(u, y) = \epsilon$
        end for
        Let $z = x \wedge y$
        for all $w \in V_i$ **do**
            RowMerge_Adj: $RV_{\text{adj}}^t(z, w) = RV_{\text{adj}}^{t-1}(x, w) + RV_{\text{adj}}^{t-1}(y, w)$
            ColMerge_Adj: $RV_{\text{adj}}^t(w, z) = RV_{\text{adj}}^{t-1}(w, x) + RV_{\text{adj}}^{t-1}(w, y)$
        end for
        for all $w \in V_i$ **do**
            RowMerge_C: $RV_C^t(z, w) = RV_C^{t-1}(x, w) \cup RV_C^{t-1}(y, w)$
            ColMerge_C: $RV_C^t(w, z) = RV_C^{t-1}(w, x) \cup RV_C^{t-1}(w, y)$
        end for
        $V_i = (V_i \setminus \{x, y\}) \cup \{z\}$
        Create RV_{adj}^t as an $m \times m$ matrix where $m = n - t$ and as the submatrix of RV_{adj}^{t-1} with rows and columns indexed by updated vertex set V_i of R_i
        Create RV_C^t as an $m \times m$ matrix where $m = n - t$ and as the submatrix of RV_C^{t-1} with rows and columns indexed by updated vertex set V_i of R_i
        Let $x = z$
        Let $P = P \cup \{y\}$
        Let $t = t + 1$
    end if
end while
return P