Algorithm 1 DFS

Input: $L_{G,s} = (V, E)$, a lifted hypergraph
Output: $Motif(L_{G,s})$, a motif

$E' \leftarrow \emptyset$
$V' \leftarrow \emptyset$

For each edge set $E \in \mathcal{E}$
  
  Mark $E$ as NotVisited
  
Pick an edge set $E_i \in \mathcal{E}$
Pick an edge $e_i \in E_i$

Enqueue $\{(E_i, e_i)\}$ into Queue

Mark $E_i$ as Visited

While Queue $\neq \emptyset$
  
  Dequeue $(E, e)$ from head of Queue
  
  $E' \leftarrow E' \cup \{e\}$
  
For each node $v$ connected by $e$
  
  $V' \leftarrow V' \cup \{v\}$
  
  Let $V_v \in V$ be the node set containing $v$
  
  For each edge set $E_j \in \mathcal{E}$ incident to $V_v$
    
    If $E_j$ is NotVisited
      
      Pick an edge $e_j \in E_j$ that is incident to $v$ (an $e_j$ exists by Proposition 1)
      
      Enqueue $\{(E_j, e_j)\}$ into Queue
      
      Mark $E_j$ as Visited
    

Add edges in $E'$ as literals to $Motif(L_{G,s})$

Return $Motif(L_{G,s})$