

Point Location

Kirkpatrick Structure

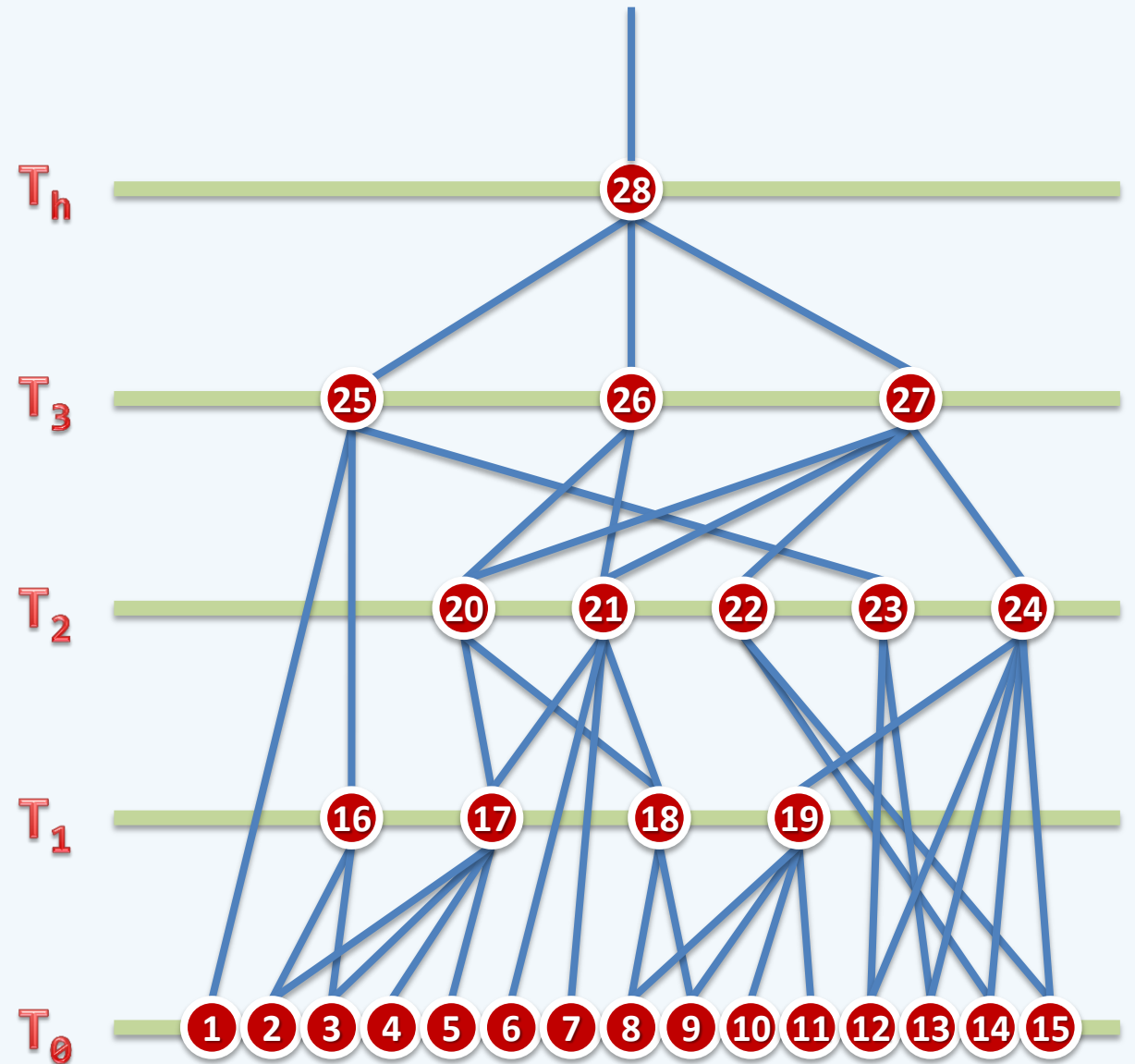
- DAG

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Kirkpatrick Structure

- ❖ Each triangle in T_{k+1} stores pointers to ≤ 8 triangles it overlaps in $T_{\leq k}$
- ❖ Note that a triangle may have more than 1 parent
- ❖ So this structure is actually a DAG instead of a TREE

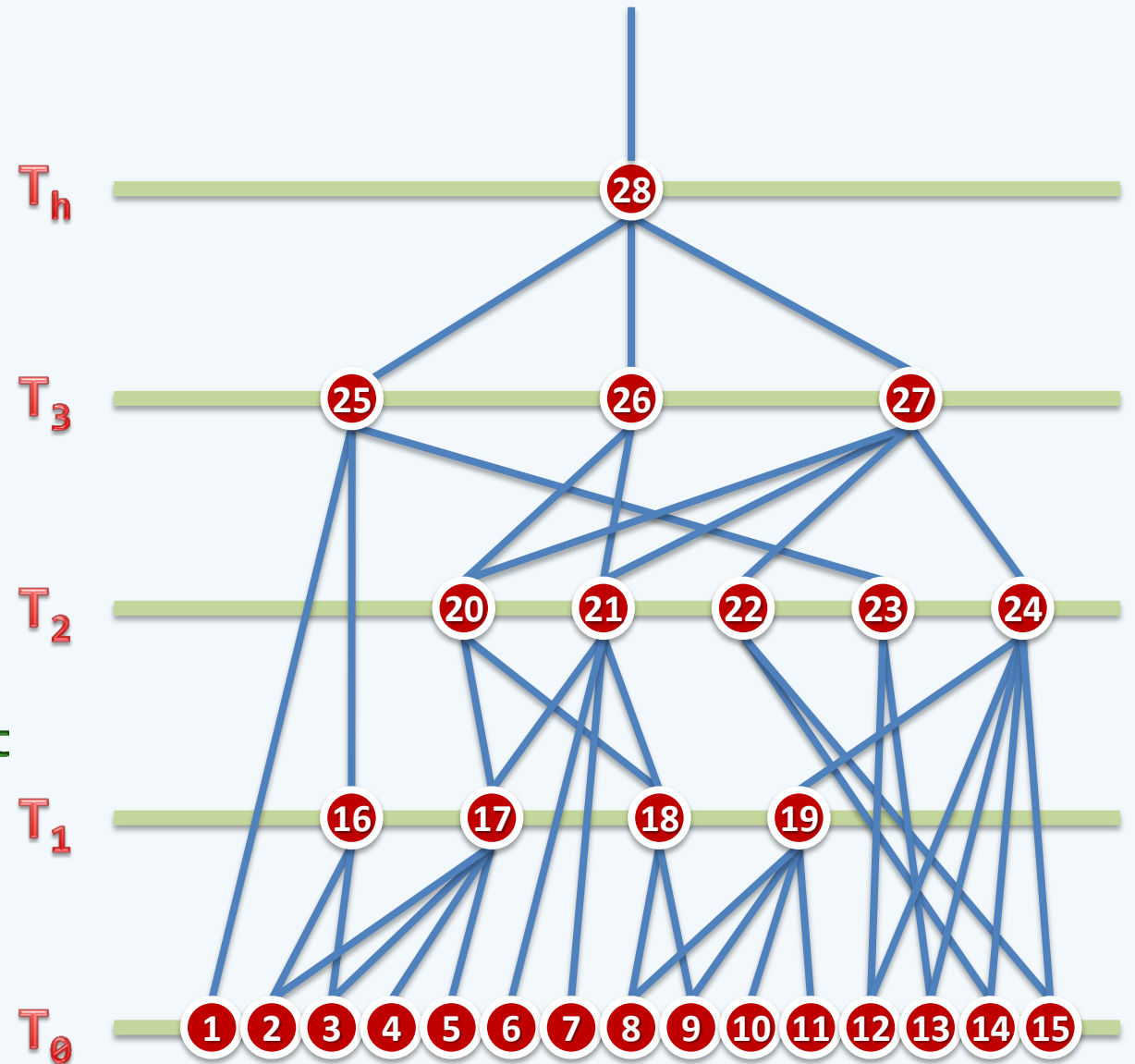


Construction Algorithm

❖ Start with T_0

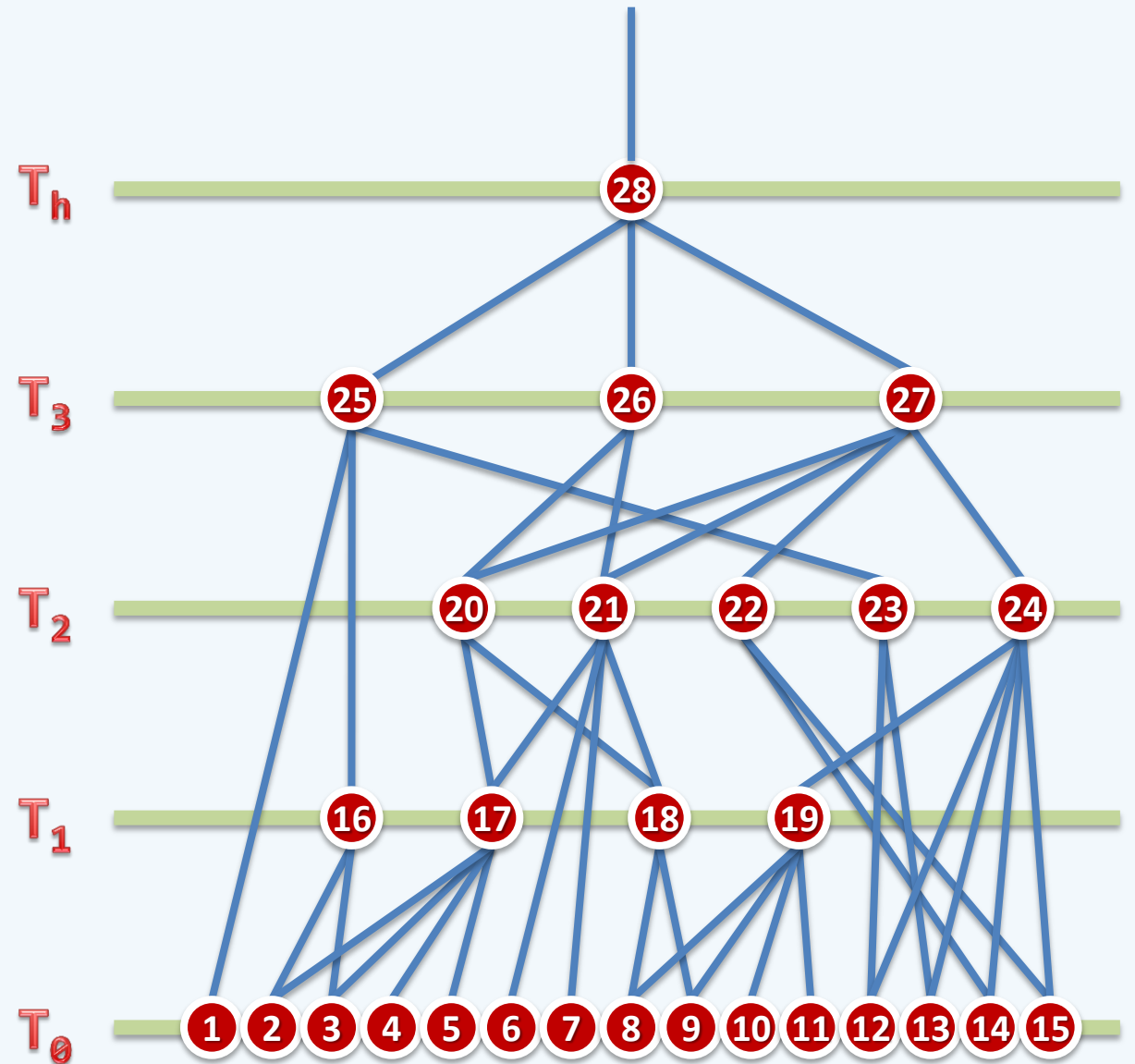
❖ Repeat { //construct T_{k+1} from T_k

- select an appropriate IS
 - delete the vertices of the subset
 - re-triangulate the holes left
- } until there is a single triangle // T_h



Degree

- ❖ Each triangle in T_{k+1}
can overlap at most
 $\boxed{8}$ triangles in $T_{\leq k}$
- ❖ Hence each node has
an (outgoing) degree of
no more than $\boxed{8}$



Height

- ❖ Each iteration eliminates a constant fraction of vertices
- ❖ The algorithm will terminate after

$\log_{\frac{18}{17}} n = \mathcal{O}(\log n)$

 iterations
- ❖ In other words, the hierarchical depth will be within $\mathcal{O}(\log n)$

