Valence-based compression

- Revised Edgebreaker code: $C_v (C + \text{valence}), S_o (S + \text{offset})$
- L, R, E no longer needed
- Valence – number of outgoing edges from a vertex
- Stick-out edge – edge known to exist (from vertex valence) but not yet traversed (i.e. unprocessed)
- S-offset: instead of number of vertices skipped, count number of “stick-out” edges crossed
- S triangle will know how many “stick-out” edges it has remaining on the other side of the split
- Compressibility of new code depends on distribution of valences but is often very good because regular meshes have most vertex valences = 6

Example:

New Encoding: $S_{10} C_5 C_4 C_5 C_6 C_5$
Original Edgebreaker encoding: $S C R C C R C R R R R E C R R R E$
Handles

No Handle: S-triangle splits loop and virgin region

Handle: S-triangle splits loop but not region

Strategy:
1) Assume S
2) Before going left, check if left neighbor triangle has been visited
3) If not visited, no handle, continue
   If visited,
   ▪ Call original triangle S*
   ▪ Encode (c.p, c.p.o)
   ▪ Send these S* pairs first
   ▪ Decoder uses these pairs to fill in its V/O tables
   ▪ Compression scheme must keep track of the corner IDs the decompressor will use
Holes

- Insert dummy vertices into holes and create triangle fans
- Possible encoding strategy: instead of CCCCCCCC, use $H_9$ meaning “Hole with 9 triangles”

Simplification

Edge collapse:
  o Representation: Instead of changing V/O tables, add a “parent” column to the vertex table
  o Parent of vertex represents ID of vertex with which it will merge
  o Possible extensions:
    - Arrange V table & geometry table in order of importance
    - Maintain an “ancestor” table to avoid chasing parents of parents of parents
  o Next lecture: how to determine best edge to collapse