Too many summits to label all

- **Rationale:**
  - Break up map space into 1-inch pieces at given scale (hexagons).
  - Allow only one summit (for labeling) per hexagon.
  - Designate “visibility” for labeling in a new attribute (à la “Thin Road Network”).
Too many summits to label all

• Rationale:
  • Summit chosen is that one which is most prominent.

  \[ \text{Prominence} = (\text{summit elevation}) - (\text{local elevation minimum}) \]

  -- from Chaudhry & Mackaness 2008, who use lowest encircling contour height.

• “Local” defined around each summit by radius of circumcircle around given hexagon size.
  e.g., if hex width is 127,00 m (for 1:500,000), “local” radius is 7,332 m.
Use Fishnet tool for rectangles, then again with an offset. Use centroids as points from which to draw Thiessen polygons --> hexagons! 😊
- Python script tool
  - Uses GNIS summits and NED DEM
  - Accepts list of summits to keep no matter what (e.g., Mt. St. Helen’s).
  - Does most work with attribute table cursors.
**Attribute table after thinning.**

<table>
<thead>
<tr>
<th>FEATURE_ID</th>
<th>FEATURE_NAME</th>
<th>STATE</th>
<th>COUNTY</th>
<th>ELEV_IN_M</th>
<th>ELEV_IN_FT</th>
<th>MAP_NAME</th>
<th>DATE_CREA</th>
<th>DATE_EDT</th>
<th>SumlmQ</th>
<th>uHexID</th>
<th>uPtID</th>
<th>Visibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>178433</td>
<td>Pawnee Peak</td>
<td>Summit</td>
<td>CO</td>
<td>Boulder</td>
<td>3957</td>
<td>12917</td>
<td>Monarch Lake</td>
<td>10/13/1978</td>
<td>&lt;Null&gt;</td>
<td>823.1943</td>
<td>62</td>
<td>0</td>
</tr>
<tr>
<td>178434</td>
<td>Little Pawnee Peak</td>
<td>Summit</td>
<td>CO</td>
<td>Boulder</td>
<td>3753</td>
<td>12313</td>
<td>Ward</td>
<td>10/13/1978</td>
<td>&lt;Null&gt;</td>
<td>491.8831</td>
<td>62</td>
<td>1</td>
</tr>
<tr>
<td>178195</td>
<td>Mount Adams</td>
<td>Summit</td>
<td>CO</td>
<td>Grand</td>
<td>2835</td>
<td>9301</td>
<td>Monarch Lake</td>
<td>10/13/1978</td>
<td>&lt;Null&gt;</td>
<td>293.3027</td>
<td>58</td>
<td>2</td>
</tr>
<tr>
<td>178435</td>
<td>Mount Toll</td>
<td>Summit</td>
<td>CO</td>
<td>Boulder</td>
<td>3942</td>
<td>12983</td>
<td>Monarch Lake</td>
<td>10/13/1978</td>
<td>&lt;Null&gt;</td>
<td>844.85</td>
<td>62</td>
<td>3</td>
</tr>
<tr>
<td>178554</td>
<td>Nugget Hill</td>
<td>Summit</td>
<td>CO</td>
<td>Boulder</td>
<td>2609</td>
<td>8586</td>
<td>Gold Hill</td>
<td>10/13/1978</td>
<td>&lt;Null&gt;</td>
<td>605.1489</td>
<td>69</td>
<td>4</td>
</tr>
<tr>
<td>178436</td>
<td>Pikes Peak</td>
<td>Summit</td>
<td>CO</td>
<td>Boulder</td>
<td>3966</td>
<td>13012</td>
<td>Monarch Lake</td>
<td>10/13/1978</td>
<td>&lt;Null&gt;</td>
<td>981.874</td>
<td>62</td>
<td>5</td>
</tr>
<tr>
<td>178596</td>
<td>Walker Mountain</td>
<td>Summit</td>
<td>CO</td>
<td>Boulder</td>
<td>2662</td>
<td>8799</td>
<td>Gold Hill</td>
<td>10/13/1978</td>
<td>&lt;Null&gt;</td>
<td>54.9918</td>
<td>69</td>
<td>6</td>
</tr>
<tr>
<td>178497</td>
<td>Mount Audubon</td>
<td>Summit</td>
<td>CO</td>
<td>Boulder</td>
<td>4026</td>
<td>13209</td>
<td>Ward</td>
<td>10/13/1978</td>
<td>&lt;Null&gt;</td>
<td>827.0261</td>
<td>52</td>
<td>7</td>
</tr>
<tr>
<td>205014</td>
<td>Thunderbolt Peak</td>
<td>Summit</td>
<td>CO</td>
<td>Grand</td>
<td>3631</td>
<td>11913</td>
<td>Monarch Lake</td>
<td>10/13/1978</td>
<td>&lt;Null&gt;</td>
<td>939.0869</td>
<td>55</td>
<td>8</td>
</tr>
<tr>
<td>178711</td>
<td>Haystack Mountain</td>
<td>Summit</td>
<td>CO</td>
<td>Boulder</td>
<td>1690</td>
<td>5545</td>
<td>Niwot</td>
<td>10/13/1978</td>
<td>&lt;Null&gt;</td>
<td>129.1316</td>
<td>78</td>
<td>9</td>
</tr>
<tr>
<td>202550</td>
<td>Overland Mountain</td>
<td>Summit</td>
<td>CO</td>
<td>Boulder</td>
<td>2651</td>
<td>8697</td>
<td>Gold Hill</td>
<td>10/13/1978</td>
<td>&lt;Null&gt;</td>
<td>468.7532</td>
<td>1</td>
<td>10</td>
</tr>
<tr>
<td>202594</td>
<td>Standley Hill</td>
<td>Summit</td>
<td>CO</td>
<td>Boulder</td>
<td>1562</td>
<td>5125</td>
<td>Erie</td>
<td>10/13/1978</td>
<td>&lt;Null&gt;</td>
<td>61.28931</td>
<td>84</td>
<td>13</td>
</tr>
</tbody>
</table>
Demonstration.
hex = 6,350 m, map at scale (1:250,000)
hex = 6,350 m, map at scale (1:250,000)
All the summits in the area.
Elimination of summits at hexagon width = 2500 m.
(Green points retained)
Labels for visible on (but map not to scale).
Labels for visible on (map to scale).

hex = 2,500 m, scale 1:98,425.
Labels for visible on (map to scale).

hex = 2,500 m, scale 1:98,425.
Thinning through scale.
hex = 610 m
hex = 1,270 m
$\text{hex} = 3,810 \text{ m}$
hex = 6,350 m
hex = 12,700 m
hex = 25,400 m
Maps and thinnings at scale.
hex = 1,270 m, map at scale (1:50,000)
hex = 3,810 m, map at scale (1:150,000)
hex = 6,350 m, map at scale (1:250,000)
hex = 12,700 m, map at scale (1:500,000)
hex = 25,400 m, map at scale (1:1,000,000)
hex = 6,350 m, map at scale (1:250,000)
hex = 6,350 m, map at scale (1:250,000)
Can approach by star or ladder. Ladder would ensure peaks don’t “flicker” across scales.

Processing extent defined by input DEM.

Speed up when using larger hexagon sizes with coarser DEM (faster Focal Stat. calc.)
Hexagons don’t nest; “flicker” of summits possible with star, but eliminated with ladder approach.
fin