A Scalable DCEL implementation

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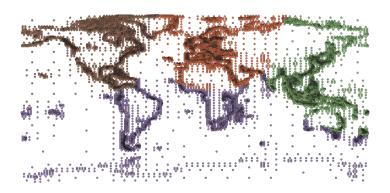
January 25, 2021

Working on CGAL sequential implementation...

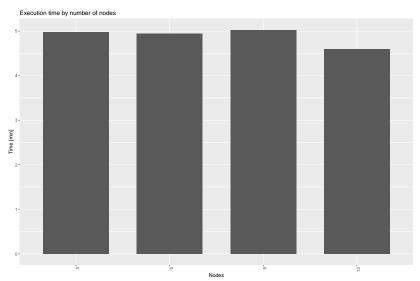
```
acald013@mr-hn:~/RIDIR/Code/CGAL/DCFL
                                                   acald013@mr-hn:~/RIDIR/Code/CGAL/DCEL 118x35
acald013@mr-hn DCEL]$ head nohup.out
2021-01-23 15:44:45.824|Reading A polygons...
2021-01-23 16:06:45.317 Polygon added (100/116995)
2021-01-23 16:08:06.477 Polygon added (200/116995)
2021-01-23 16:09:42.667 Polygon added (300/116995)
2021-01-23 16:11:48.716 Polygon added (400/116995)
2021-01-23 16:12:57.944|Polygon added (500/116995)
2021-01-23 16:13:20.274 Polygon added (600/116995)
2021-01-23 16:13:41.160 Polygon added (700/116995)
2021-01-23 16:14:14.578 Polygon added (800/116995)
acald013@mr-hn DCEL1$ tail nohup.out
2021-01-24 17:36:39.469|Polygon added (9500/116995)
2021-01-24 18:31:04.835 | Polygon added (9600/116995)
2021-01-24 19:09:04.996 Polygon added (9700/116995)
2021-01-24 19:53:40.222|Polygon added (9800/116995)
2021-01-25 01:02:25.338|Polygon added (9900/116995)
2021-01-25 04:19:50.104 Polygon added (10000/116995).
2021-01-25 05:17:41.117 Polygon added (10100/116995).
2021-01-25 06:14:46.184|Polygon added (10200/116995).
2021-01-25 07:38:50.488 Polygon added (10300/116995).
2021-01-25 09:14:07.881 Polygon added (10400/116995).
acald013@mr-hn DCEL1$
```

Scale up experiments in GADM Dataset...

▶ Each section has $\approx 8M$ edges for Layer A and $\approx 9M$ for Layer B.



Scale up experiments in GADM Dataset...



Experimental plan...

| Fig. 1 | | ExperimentalPlan_v2.0.ods - LibreOffice Calc | | A = 0 X |
|--|------------------------------|--|------------------------|---------|
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| B-6-8-000 x 0 6-4 | Z 5 - C - Q A - 1 - 1 - 4 4 | 4 9 2 M F Ω · · · □ □ □ ■ · □ / | | |
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| A17 ▼ f, ∑ • = Precision: 1e-3 | | | | · 1 |
| | A | В | C | 1 - |
| | neters | Alternatives | Performance Mea | |
| 2 Datasets: | | Scalable DCEL | Query Time | I. |
| 3 California Census 2000 | | CGAL 5.0.2 Arrangements | | 2 |
| | ins: 7028 | | | 0 |
| | : 999763 | | | fx |
| 6 California Census 2010 | | | | |
| | ns: 7028 | | | |
| | 2901758 | | | |
| Data distribution: non-uniform | | | | |
| 10 Global partitioning : Quadtree | | | | |
| 11 Local partitioning: None | | | | |
| 12 | | | | |
| 13 Global partitioning granularity: | | | | |
| 14 Max items per cell: 50, 100, 200, 500, 1000, 1500, 2000 | | | | |
| 15 Sample fraction: 1% | | | | |
| 16 Max Level: 8 | | | | |
| 17 Precision: 1e-3 | | | | |
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| H 4 > H + Setup | | | | |
| | Formatted Display Match Case | | | |
| Sheet 1 of 1 | Default | English (USA) | J D. Average: ; Serc 0 | |