Hand written notes

The workflow of mapping voting results from precincts to block groups

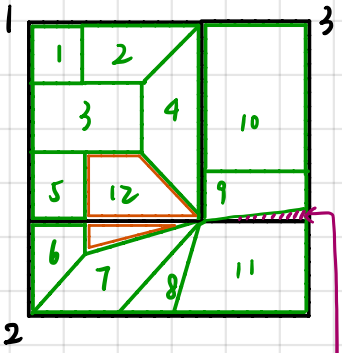
— Texas as an example

Goal : Voting results are available at the precinct level ; I want to map them to block group level.
Since blocks are the building block of block groups and, for the most part, precincts. I do the mapping through blocks.
Texas is taken as an example.

Texas has 914,231 blocks. (block area sum = 66.0542207032)
15,811 block groups. (block group area sum = 66.0541912298)
8,832 precincts. (precinct area sum = 66.0543122844)

Blocks vs. Precincts

In texas, block are nested with precincts for the most part, but this is not always true ; consider the graph below
- blank lines represent precinct boundaries. There are 3 precincts
- green lines represent block boundaries.



Two blocks are split into two parts : block 11 and 12
The rest are uniquely contained within precincts.

One problem in determining whether blocks are contained in precincts is that block boundaries and precinct boundaries overlap; this displaces the contain-within relationship.
So I trim the blocks a little bit (by -0.0000001). Trimmed blocks are contained in precincts.
Also, if a block has 90% of its area in one precinct, I assign it to that precinct.

Even though block 12 overflows a little bit to the next precinct, I ignore this bc 99% block 12 are inside of precinct 12

I intersect blocks with precincts. If a block is (considered) uniquely contained inside of one precinct, then a block will correspond to one precinct. (This will be the case for all except block 12 in the above example).
If a block spreads across x precincts, it will correspond to x precincts.
Block 12 in the example above spreads across precinct 1 and 2.
The intersections are marked by orange)

⇒ The intersection dataset will contain 13 rows because block 12 brings 2 rows to the dataset

In Texas,

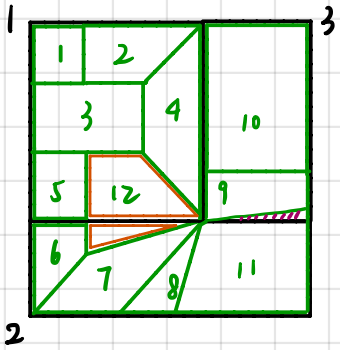
out of 914231 blocks
- 873323 uniquely contained in precincts
- 40908
  - 28359 each has 99% of its area in one precinct
  - 12549

The "intersection" dataset has 928817 rows

= 901882 + 27135

= 873323 + 28359 + 27135

The intersection dataset below corresponds to the example map:



The logic of mapping is also summarized in the intersection table

intersect	block	precinct	block % in Precinct	block Pop	intersect Pop
1	1	1	100%	Pop 1	= 100% Pop 1
2	2	1	100%	Pop 2	= 100% Pop 2
3	3	1	100%	Pop 3	= 100% Pop 3
⋮	⋮	⋮	⋮	⋮	⋮
10	10	3	100%	Pop 10	= 100% Pop 10
11	11	2	100%	Pop 11	= 100% Pop 11
12	12	1	70%	Pop 12	= 70% Pop 12
13	12	2	30%	Pop 13	= 30% Pop 12

precinct Pop
Est Pop 1
Est Pop 1
Est Pop 1
Est Pop 3
Est Pop 2
Est Pop 1
Est Pop 2

precinct Voting Results
Voting 1
Voting 1
Voting 1
Voting 3
Voting 2
Voting 1
Voting 2

intersect Voting
Est Voting 1
Est Voting 2
Est Voting 3
⋮
Est Voting 10
Est Voting 11
Est Voting 12
Est Voting 13

estimate precinct population size

$$\frac{\text{intersect Pop}}{\text{Est Precinct Pop}} \cdot \text{precinct Voting Results}$$

aggregate to block level, I get block voting results.

Further aggregate to block group level gives me block group voting results