How to allocate seats under d'Hondt PR

d'Hondt is a common approach to translating votes into seats under proportional representation. Below is a simple example of how the rule works in practice.

Imagine the following scenario:

- A 5 seat PR where seats are allocated according to d'Hondt
- 4 parties
    - Party A: wins 40% of the vote
    - Party B: 30%
    - Party C: 20.5%
    - Party D: 9.5%

Under d'Hondt each party receives an "a" (highest average) score, equal to the party's share of the vote divided by the sum of 1 & the number of seats it has already won (i.e., s+1). Whichever party has the highest "a" score receives the next seat.

So, at the start, we see that, because Party A has won 40% of the vote but has won 0 seats, it's "a" score is 40; Party B's score is 30; etc.

		Party A	Party B	Party C	Party D	
s	s+1	40.0%	30.0%	20.5%	9.5%	100.0%
0	1	40	30	20.5	9.5	

Because Party A has the highest "a" score, it gets the first seat (which I indicate by noting "(1)" next to its "a" score.

		Party A	Party B	Party C	Party D	
s	s+1	40.0%	30.0%	20.5%	9.5%	100.0%
0	1	40 (1)	30	20.5	9.5	

Remember, though, that the "a" score for any given party is equal to the vote percentage divided by the sum of 1 & the number of seats the party has won. So, now that Party A has won a seat, we need to recalculate its "a" score. Since Party A has won 1 seat, its "a" score is 20 [i.e., vote/(s+1) or 40/(1+1)].

		Party A	Party B	Party C	Party D	
s	s+1	40.0%	30.0%	20.5%	9.5%	100.0%
0	1	40 (1)	30	20.5	9.5	
1	2	20				

Now, look at the "a" scores: Party A's "a" score is now 20; Party B's is 30; Party C's is 20.5; Party D's is 9.5. Of them, Party B's score is the highest, so we award the second seat to Party B (indicated by the "(2)" next to its first "a" score). Again, after awarding a seat to Party B, we need to calculate a new "a" score for Party B.

		Party A	Party B	Party C	Party D	
s	s+1	40.0%	30.0%	20.5%	9.5%	100.0%
0	1	40 (1)	30 (2)	20.5	9.5	
1	2	20	15			

We continue to award seats according to whichever party has the highest "a" score until all 5 seats are allocated. Note that after we allocate Party A & Party B their second seats, we calculate a new "a" score by dividing their vote by 3 (i.e., s+1 or 2+1). If they won 3 seats, we would calculate their "a" score by dividing their vote by 4 (i.e., s+1 or 3+1).

		Party A	Party B	Party C	Party D	
s	s+1	40.0%	30.0%	20.5%	9.5%	100.0%
0	1	40 (1)	30 (2)	20.5 (3)	9.5	
1	2	20 (4)	15 (5)	10.25		
2	3	13.33	10			
3	4					

So, in the end, in this district with 5 total seats, we have the following distribution of seats:

- Party A: 2 seats
- Party B: 2 seats
- Party C: 1 seat
- Party D: 0 seats