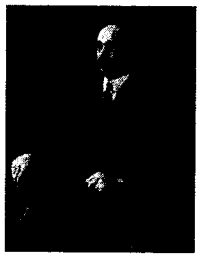
Huntington-Hill Method

also called the "method of equal proportions"



1. Calculate SD.
2. Calculate SQ.
3. Round according to geometric means. $\sqrt{UQ \cdot LQ}$
4. if # seats = total assigned, you're finished
5. if not: find a modified divisor (MD) to use in place of SD so that the modified quotas (MQ) when rounded according to the geometric means and totaled equal the # of seats which need to be assigned

$SQ < GM \Rightarrow LQ$

$SQ > GM \Rightarrow UQ$

Example 1 (The Can Problem) Ms. Powell's ICM class is having a canned food drive to help support 3 local agencies. At the end of the week they must deliver all of the cans collected. Suppose that they collected 100 cans. Apportion the cans to each agency using each method.

$SD = \frac{1300}{100} = 13$

choose a divisor smaller than SD

SD= 13

MD = 12.7

agency	# served	SQ	LQ	Hamilton Apportionment	MQ	Jefferson Apportionment
#1	1000	76.92	76 +1	77	78.74	78
#2	200	15.38	15	15	15.75	15
#3	100	7.69	7 +1	8	7.87	7
TOTAL	1300	100	98	100	13 → 98 12 → 107 12.7 → 100	100

77
15
8
100

MD = _____

MD = _____

agency	UQ	MQ	Webster Apportionment	GM	MQ	Huntington-Hill Apportionment
#1	77		77	76.498		77
#2	16		15	15.492		15
#3	8		8	7.483		8
TOTAL	101		100			100

77
15
8
100

Example 2 Planet Powell is a new republic located in the Milky Way. It is made up of six states: Airhead, Butterfinger, Chiclets, DumDums, Eclipse, and ~~FunDip~~. According to the constitution of Planet Powell, the Congress will have 250 seats, divided among the 6 states according to their populations. Use each ~~method to~~ apportion the seats to each state.

		SD = 50000			MD = 49500	
states	population	SQ	LQ	Hamilton Apportionment	MQ	Jefferson Apportionment
A	1,646,000	32.92	32 +1	33	33.25	33
B	6,936,000	138.72	138 +1	139	140.12	140
C	154,000	3.08	3	3	3.11	3
D	2,091,000	41.82	41 +1	42	42.24	42
E	685,000	13.7	13	13	13.84	13
F	988,000	19.76	19 +1	20	19.96	19
TOTAL	12,500,000	250	246	250		250

$SD = \frac{12500000}{250} = 50000$

50000 → 246
45000 → 275
49000 → 252
49500 → 250

		MD = 50250			MD = 50100	
states	UQ	MQ	Webster Apportionment	GM	MQ	Huntington-Hill Apportionment
A	33	32.76	33	32.496	32.85	33
B	139	138.03	138	138.499	138.44	138
C	4	3.065	3	3.464	3.07	3
D	42	41.61	42	41.497	41.74	42
E	14	13.63	14	13.491	13.67	14
F	20	19.66	20	19.494	19.72	20
TOTAL	252		250			250

33
139
3
42
14
20
251

50250 → 250

33
139
3
42
14
20
251

50100
33
138
3
42
14
20
250