Simon Chen
N10013388
sc4900
Homework 10

1) $O(n^2)$ If every stop is adjacent to each other, it'll run down the list adding them all n-1 times for every stop(n).

2) One obvious problem with this is that it will skip odd numbers, the hash table will never be filled at the odd number spot, because it's 4k and moding 20,40, or 200. This leads to the actual problem, which is that it will only fill the location that is a multiple of 4. In other words, there will be collision with the 5^{th} item if it is n is 20, 50^{th} if it is 200, 100^{th} if it is 400. You will only be using about 1/4th the space with a lot of collisions happening.

3)

a)

0	1	2	3	4
Null	4371	Null	6173	Null

4371 mod 5 = 1
6173 mod 5 = 3

0	1	2	3	4
Null	4371	Null	Forner	Null

Remove 6173

0	1	2	3	4
Null	4371	3327	26	Null

3327 mod 5 = 2
26 mod 5 = 1; move until an empty space, 3

0	1	2	3	4	5	6	7	8	9	10
Null	Null	Null	Null	4371	3327	26	Null	Null	Null	Null

Resize to M = 11

4371 mod 11 = 4
3327 mod 11 = 5
26 mod 11 = 4; move until an empty space, 6

0	1	2	3	4	5	6	7	8	9	10
Null	Null	Null	1323	4371	3327	26	4340	4199	Null	9679

Resize to M = 11

4199 mod 11 = 8
4340 mod 11 = 6; ; move until an empty space , 7
9679 mod 11 = 10
1323 mod 11 = 3

b) → means arrow to next, there is a link list in each section

0	1	2	3	4
Null	4371	1323 → 6173	4199 → 4344 → 9679	Null

4371 mod 5 = 1
1323 mod 5 = 3
6173 mod 5 = 3
4199 mod 5 = 4
4344 mod 5 = 4
9679 mod 5 = 4

0	1	2	3	4
Null	4371	1323	4199 → 4344 → 9679	Null

Remove 6173

0	1	2	3	4
Null	4371	1323	4199 → 4344 → 9679 → 3234	Null

3234 mod 5 = 4

0	1	2	3	4	5	6	7	8	9	10
3234	Null	Null	1323	4371	Null	Null	Null	4199	Null	4344 → 9679

Resize to 11

4371 mod 11 = 4
1323 mod 11= 3
4199 mod 11 = 8
4344 mod 11 = 10
9679 mod 11 = 10
3234 mod 11 = 0

0	1	2	3	4	5	6	7	8	9	10
3234	Null	Null	1323	4371	Null	Null	Null	4199	Null	4344 → 9679 → 10

21 mod 11 = 10