Question 12

Initial ~~ste~~ setup

Bucket size 3

initial hash function : $hash_1$ = index key mod 2

Given input index keys

15, 14, 12, 5, 7, 9, 6, 3, 1, 13, 8, 17.

Round 0: using initial Hash function to distribute keys int bucket.

15 % 2 = 1

14 % 2 = 0

12 % 2 = 0

5 % 2 = 0

5 % 2 = 1

7 % 2 = 1

6 % 2 = 0

3 % 2 = 1

1 % 2 = 1

13 % 2 = 1

8 % 2 = 0

17 % 2 = 1

Buckets after Round 0:

Bucket 0: 14, 12, 6, 8

Bucket 1: 15, 5, 7, 9, 3, 1, 13, 17.

Buckets are overflow now new $hash_2$ = index key mod 4

15 % 4 = 3

14 % 4 = 2

12 % 4 = 0

5 % 4 = 0

7 % 4 = 3

17 % 4 = 1

9 % 4 = 1

6 % 4 = 2

3 % 4 = 3

1 % 4 = 1

13 % 4 = 1

8 % 4 = 0

Bucket after Round 1:

Bucket 0: 12, 8

Bucket 1: 5, 9, 1, 13, 17.

Bucket 2: 14, 16

Bucket 3: 15, 7, 3

Bucket 1 overflows so we need to rehash

new hash $hash_3$ = index key mod 8

~~Final 1~~:

15 % 8 = 7

14 % 8 = 6

12 % 8 = 4

5 % 8 = 5

7 % 8 = 7

9 % 8 = 1

3 % 8 = 6

6 % 8 = 6

1 % 8 = 1

13 % 8 = 5

17 % 8 = 1

Final ~~Buckets~~ Hash table.

Bucket 0 = 8

Bucket 1 = 9, 17

Bucket 2 = empty

Bucket 3 = 3

Bucket 4 = 12

Bucket 5 = 5, 13

Bucket 6 = 14, 6

Bucket 7 = 15, 7.