Linear Hashing

No directory, but may have overflow area.
Assume bucket capacity = 1 & Family of hash functions = mod 2, mod 4, mod 8, mod 16, …
Sequence of keys inserted = 1, 2, 3, 5, 8, 13, …

Next bucket to split	0						
H(i, k)	mod(k,2)						
H(i+1, k)							

0	2
1	1

Read details of linear hashing (pp. 614-616) in textbook before proceeding.
Exercise: Show the sate of linear hashing file after insert(3) !
Hint: mod(3,2) = 1.
Overflow in bucket 1.
Split bucket 0 and redistribute its item using hash function mod(k,4)
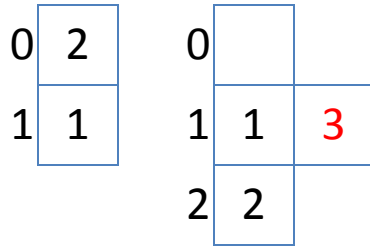Increment next bucket to split

Linear Hashing

No directory, but may have overflow area.
Assume bucket capacity = 1 & Family of hash functions = mod 2, mod 4, mod 8, mod 16, …
Sequence of keys inserted = 1, 2, 3, 5, 8, 13, …

Next bucket to split	0	1					
H(i, k)	mod(k,2)	mod(k,2)					
H(i+1, k)		mod(k,4)					

```
0 | 2 |      0 |   |
1 | 1 |      1 | 1 | 3
             2 | 2 |
```

Exercise: Show the sate of linear hashing file after insert(5) to above state
Hint: mod(5,2) = 1.
Overflow in bucket 1.
Split bucket 1 and redistribute its item using hash function mod(k,4)
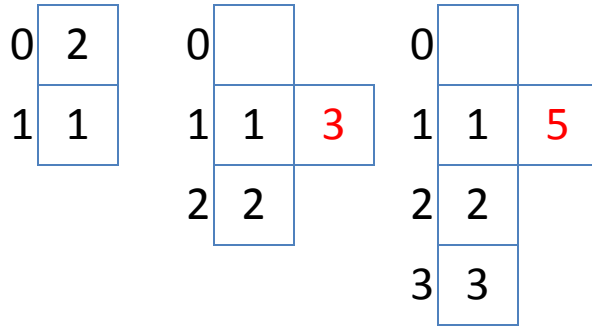Increment next bucket to split. Rest to 0 since all bucket for mod(k,2) have been split.

Linear Hashing

No directory, but may have overflow area.
Assume bucket capacity = 1 & Family of hash functions = mod 2, mod 4, mod 8, mod 16, …
Sequence of keys inserted = 1, 2, 3, 5, 8, 13, …

Next bucket to split	0	1	0				
H(i, k)	mod(k,2)	mod(k,2)	mod(k,4)				
H(i+1, k)		mod(k,4)					

```
0  2        0            0
1  1        1  1   3     1  1   5
           2  2         2  2
                        3  3
```

Exercise: Show the sate of linear hashing file after insert(8) to above state.
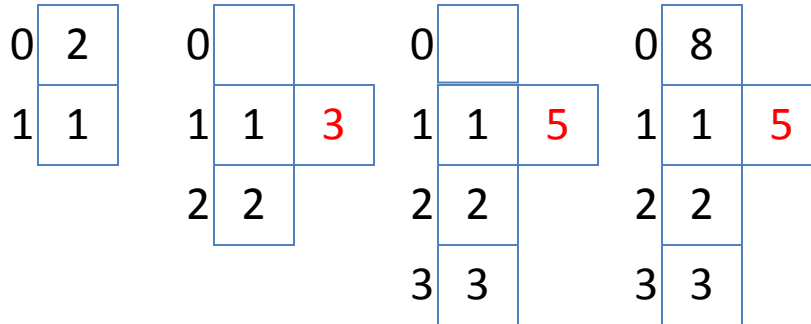Hint: mod(8,4) = 0.
No Overflow.

Linear Hashing

No directory, but may have overflow area.
Assume bucket capacity = 1 & Family of hash functions = mod 2, mod 4, mod 8, mod 16, …
Sequence of keys inserted = 1, 2, 3, 5, 8, 13, …

Next bucket to split	0	1	0	0			
H(i, k)	mod(k,2)	mod(k,2)	mod(k,4)	mod(k,4)			
H(i+1, k)		mod(k,4)					

Exercise: Show the sate of linear hashing file after insert(13) to above state.
Hint: mod(13,4) = 1.
Overflow in bucket 1.
Split bucket 0 and redistribute its item using hash function mod(k,8)
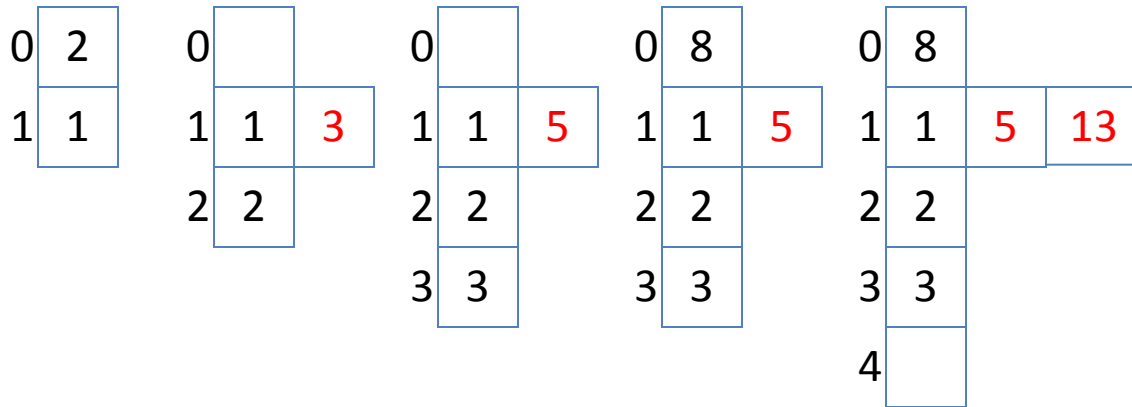Increment next bucket to split.

Linear Hashing

No directory, but may have overflow area.
Assume bucket capacity = 1 & Family of hash functions = mod 2, mod 4, mod 8, mod 16, …
Sequence of keys inserted = 1, 2, 3, 5, 8, 13, 21, …

Next bucket to split	0	1	0	0	1		
H(i, k)	mod(k,2)	mod(k,2)	mod(k,4)	mod(k,4)	mod(k,4)		
H(i+1, k)		mod(k,4)			mod(k,8)		

State 1:
0 | 2
1 | 1

State 2:
0 |
1 | 1 | 3
2 | 2

State 3:
0 |
1 | 1 | 5
2 | 2
3 | 3

State 4:
0 | 8
1 | 1 | 5
2 | 2
3 | 3

State 5:
0 | 8
1 | 1 | 5 | 13
2 | 2
3 | 3
4 |

Exercise: Show the sate of linear hashing file after insert(21) in to above state.
Hint: mod(21,4) = 1.
Overflow in bucket 1.
Split bucket 1 and redistribute its item using hash function mod(k,8)
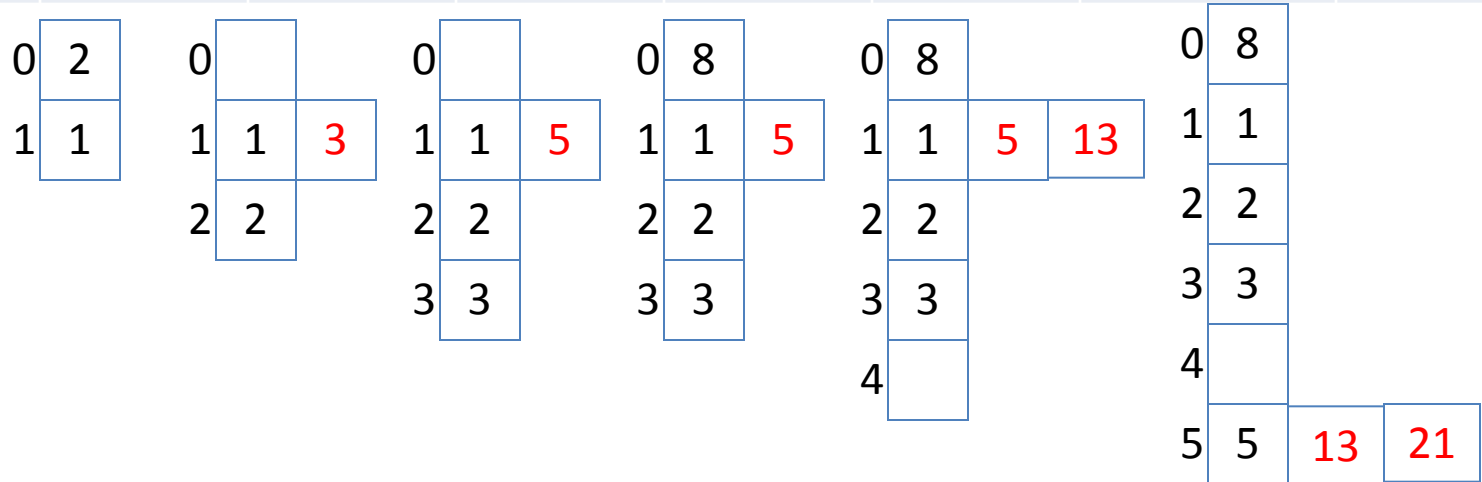Increment next bucket to split.

Linear Hashing

No directory, but may have overflow area.
Assume bucket capacity = 1 & Family of hash functions = mod 2, mod 4, mod 8, mod 16, …
Sequence of keys inserted = 1, 2, 3, 5, 8, 13, 21, 34, 55, …

Next bucket to split	0	1	0	0	1	2	
H(i, k)	mod(k,2)	mod(k,2)	mod(k,4)	mod(k,4)	mod(k,4)	mod(k,4)	
H(i+1, k)		mod(k,4)			mod(k,8)	mod(k,8)	

Exercise: Show the sate of linear hashing file after insert(34) and insert(55)
in to above state.