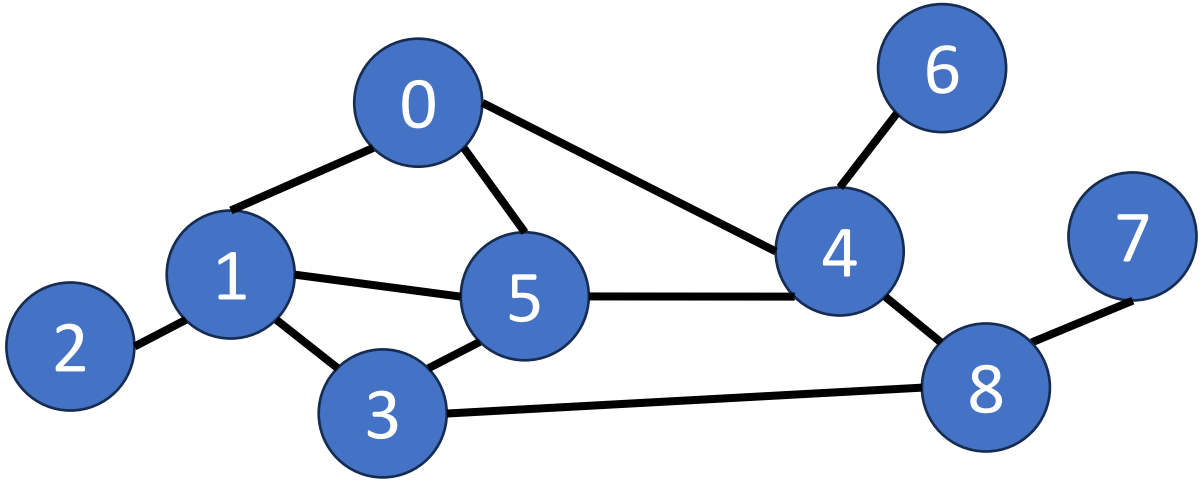
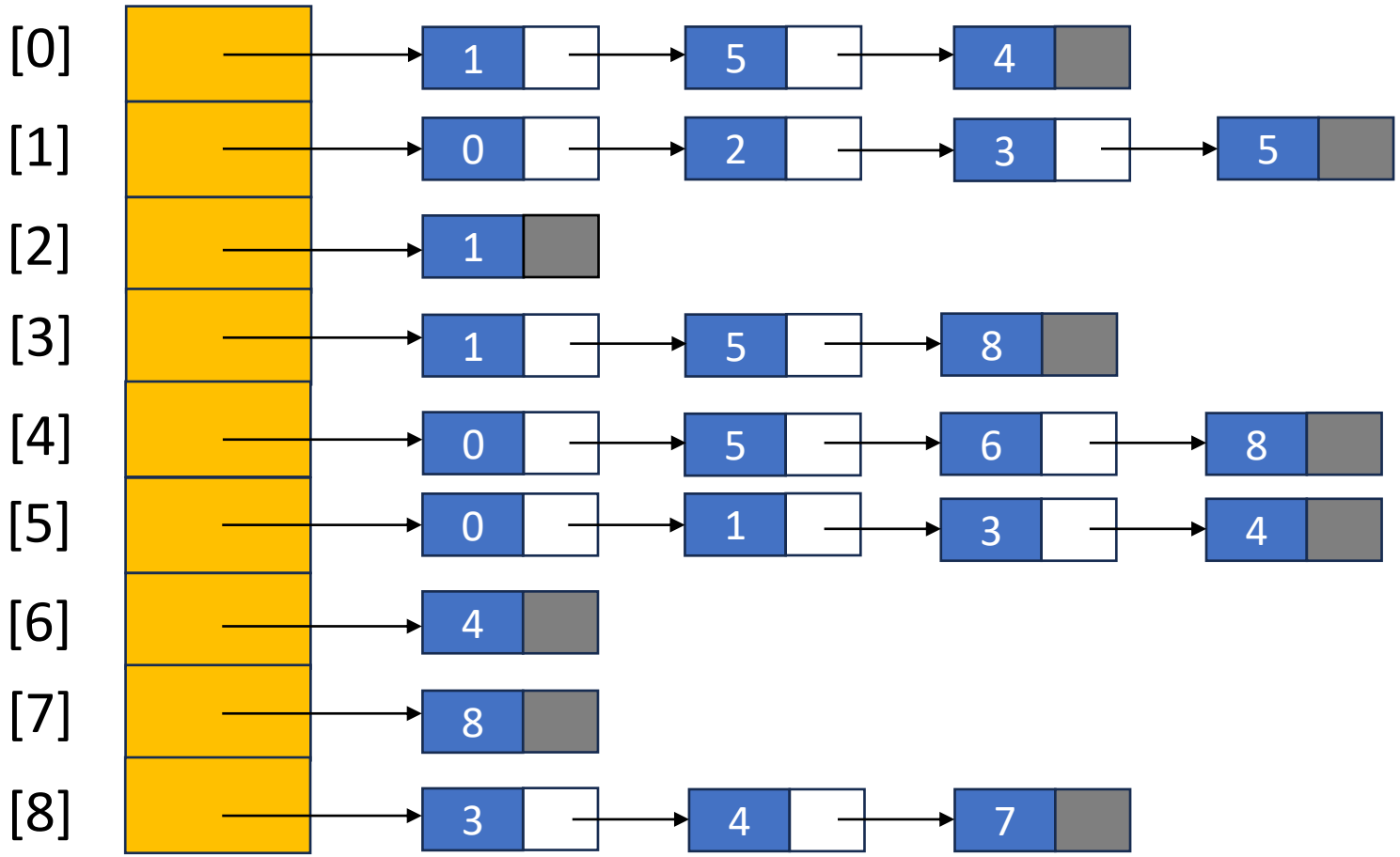
BFS DFS

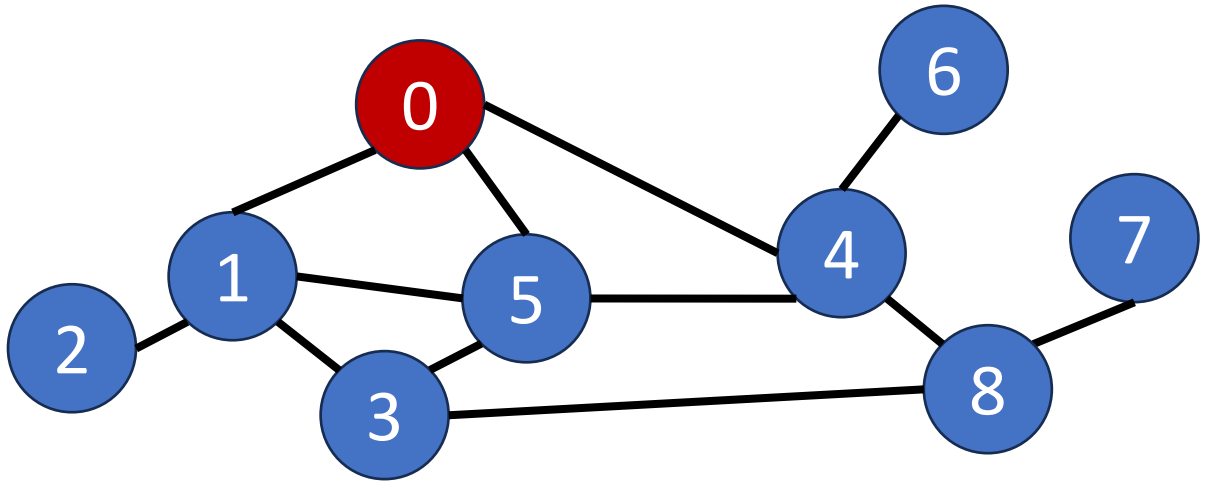


adjLists



- Q1: Write out the results of DFS starting at vertex 0.
- Q2: Write out the results of BFS starting at vertex 0.

DFS



DFS(0)

0,1,2,3,5,4,6,8,7

Answers needed to be corrected:

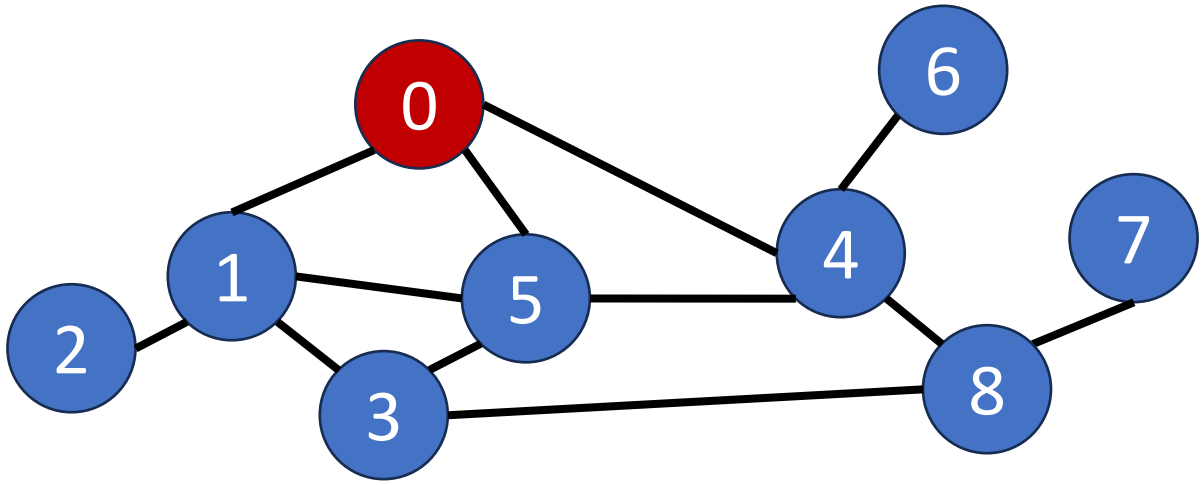
0,1,2,3,8,7 5,4,6

After visiting 7, we go back to 8 and then visit one of its unvisited neighbors, this is, 4.

0,1,2,3,5,4,6,7,8

After visiting 6, we go back to 4 and visit one of its unvisited neighbors, this is, 8.

BFS



BFS(0)

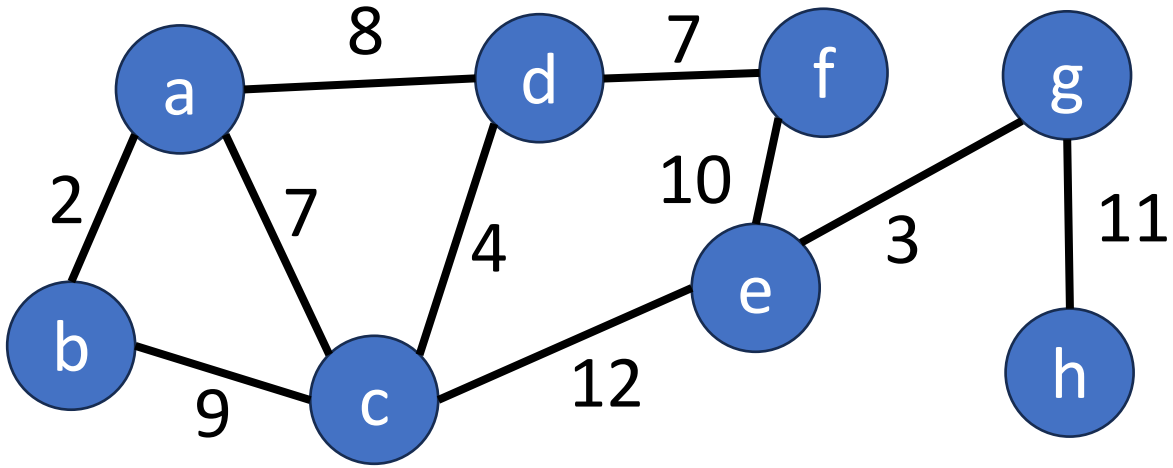
0,1,4,5,2,3,6,8,7

Answers needed to be corrected:

0,1,5,4,6,8,3,7,2

After visiting 4, the FIFO queue should have [2,3,6,8] (or [3,2,8,6]) and thus the next vertex to be visited is 2 (or 3).

Minimum-cost spanning tree

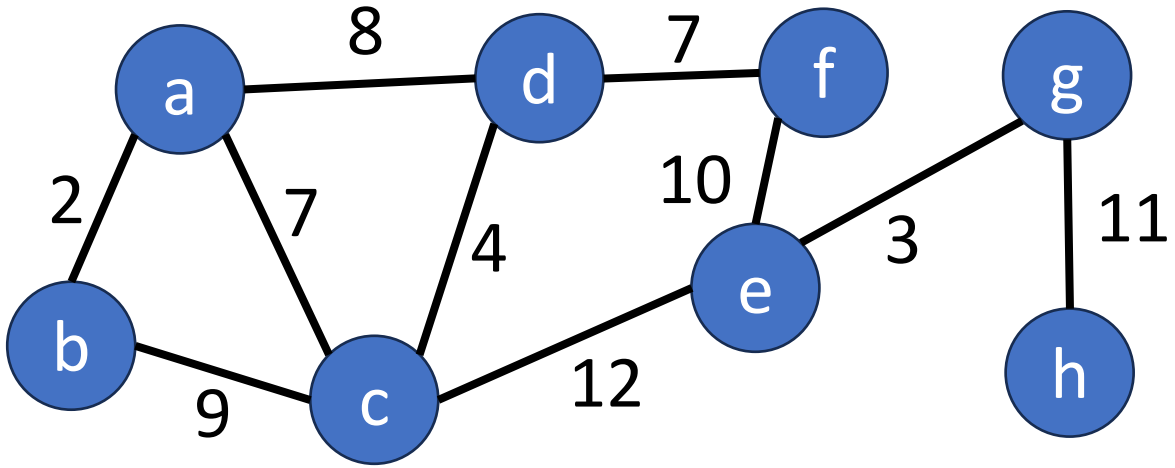


Write out the sequence of edges in the generation of minimum-cost spanning tree:

- Q3: When Kruskal's algorithm is used.
- Q4: When Kruskal's algorithm is used. (Start from vertex a)

- Q5: The cost of minimum cost spanning tree.

Kruskal's algorithm



(a,b):2
(e,g):3
(c,d):4
(d,f):7
(a,c):7
(e,f):10
(g,h):11

Answers needed to be corrected:

2 3 4 7 7 10 11

They are weights of edges.

b,a,c,d,f,e,g,h Or h,g,e,f,d,c,a,b

The path of minimum cost spanning tree. Not the sequence of edges during running the algorithm.

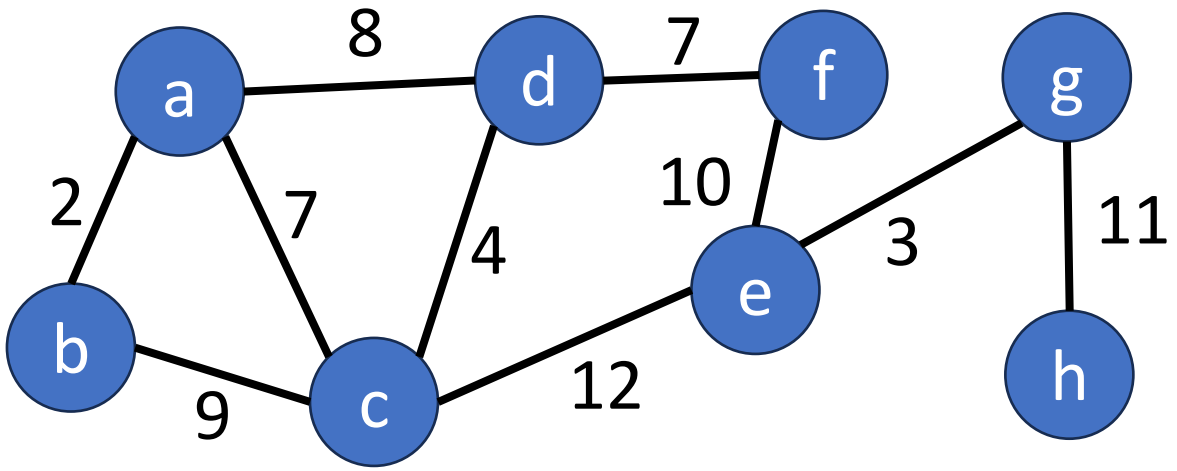
(a,b) (a,c) (c,d) (d,f) (e,f) (e,g) (g,h)

2,7,4,7,10,3,11

ab eg cd df gh 2,3,4,7,7,8,9,10,11,12

Number of selected edges should be number of vertices – 1.

Prim's algorithm



(a,b):2
(a,c):7
(c,d):4
(d,f):7
(e,f):10
(e,g):3
(g,h):11

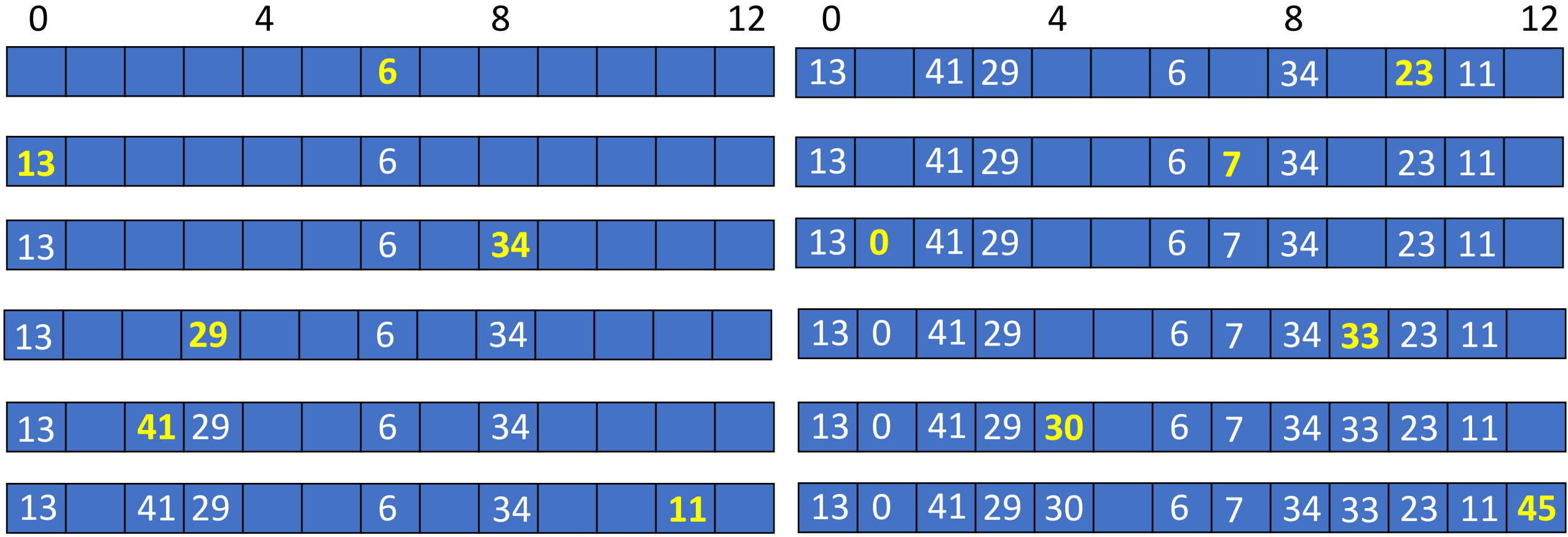
Answers needed to be corrected:

2 7 4 7 10 3 11 They are weights of edges.

abcdfegh The cost along this path is 2+9+4+7+10+3+11=46, which is not minimum cost.

Hashing

- Q6: Hash function = key % 13, number of buckets = 13. Using linear probing to insert pairs whose keys are 6, 13, 34, 29, 41, 11, 23, 7, 0, 33, 30, 45. Write out the hash table.



Hashing

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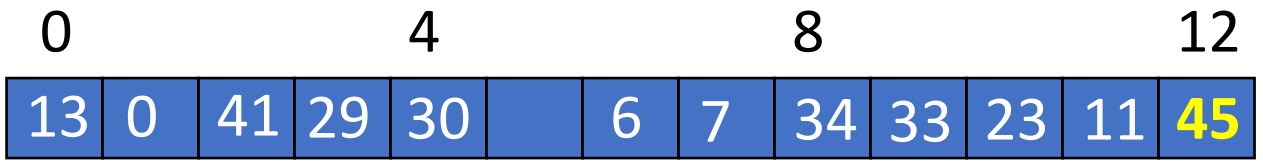

Answers needed to be corrected:

13 0 41 29 30 6 7 34 33 23 11 45

There should be a **null** in the bucket[5].

Bucket 0: (13, ...), (0, ...) Bucket 1: Bucket 2: (41, ...) Bucket 3: (29, ...) Bucket 4: (30, ...) Bucket 5: Bucket 6: (6, ...), (45, ...) Bucket 7: (7, ...), (33, ...) Bucket 8: (34, ...) Bucket 9: Bucket 10: (23, ...) Bucket 11: (11, ...)

Writing the pairs is good. However, we assume that the number of slot is 1 and linear probing is used to to handle overflow.

Hashing

- Q7: A hash function h defined as key % 7 with linear probing. Insert the keys 37, 38, 72, 48, 98, 11, and 56 into a table. Where will be 11 in the table?