1.

O(n) time

20 4 8 3 7 2 6 1 5 1 5 6 2 4 8 3 7 9 10 10 9

oh no

8 7 5 2 4 1 3 6 7

Oh no

8 5 1 2 2 4 4 1 5

Good

10 2 3 4 4 5 5 3 8 8 2

Good

2.





3.

Map

13 Alice Bob Charlie Alice Dave Alice Dave Alice Dave Charlie Dave Dave Alice

5 1 2 5

13 David James William James Michael Michael William David James Michael James William David

3 4 3 3

4.

10 3 5 2 6 1 9 8 4 7 3 10

6 6 9 9 9 8 7 10

7 2 6 7 5 4 3 2 1

7 7 5 4 3 2

8 1 2 3 4 4 3 2 6 1

2 3 4 4 3 2 6 1

5

O(n) time

Hashing set

6 4 2 -3 1 6 -7

Found

7 -2 5 -1 -3 2 4 1

No

8 2 1 -5 4 -3 2 -1 3

Found

6

priority

queue

2 2 3 4 4 q

34

5 3 2 4 6 7 q

68

8 12 16 24 32 36 42 50 52 60 68 72 80 88 q

2304

7 11 13 21 25 28 33 36 41 45 50 55 60 65 70 q

2085

7

List

2 5 1 2 3 4 5 6 7 8 9 10 q

1 5 4 3 2 6 7 8 9 10

4 9 3 6 9 12 15 18 21 24 27 30 q

3 6 9 27 24 21 18 15 12 30

1 1 1 2 3 4 5 q

1 2 3 4 5

8

5 4 3 2 1 q

-1 -1 -1 -1 -1

3 5 2 4 6 8 1 9 q

-1 3 -1 2 4 6 -1 1

2 5 3 7 9 1 q

-1 2 2 3 7 -1