

[illegible]

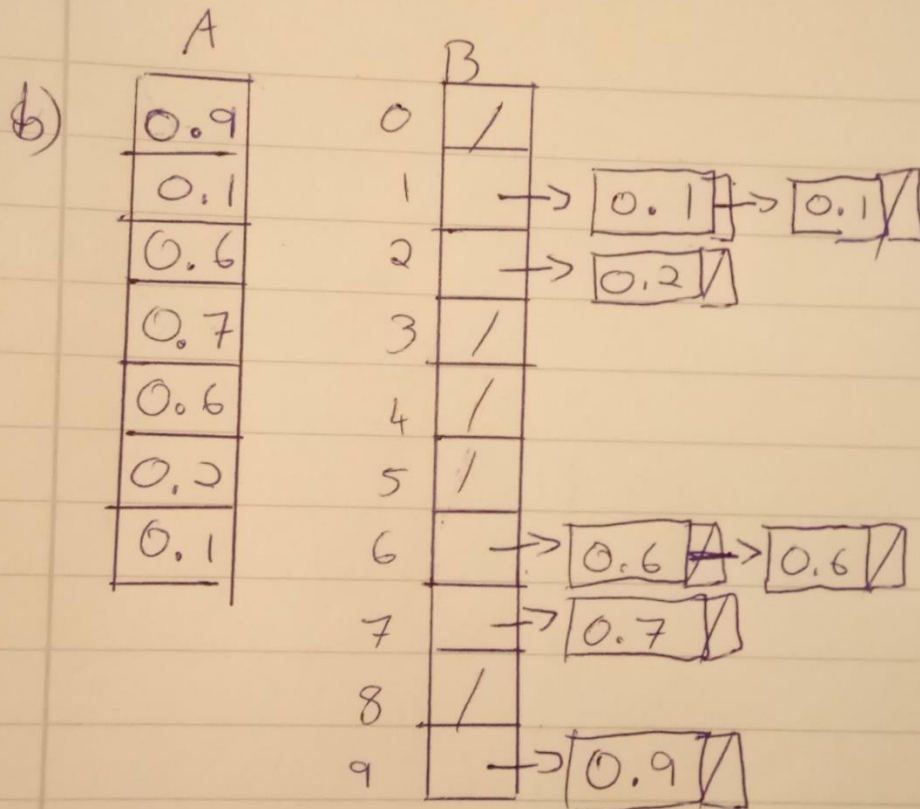
0 1 2 3 4 5 6 7 8 9
c [0] [0] [0] [0] [0] [0] [0] [0] [0] [0] - c initialized to zero

	0	1	2	3	4	5	6	7	8	9
C	0	2	1	0	0	0	2	1	0	1

	0	1	2	3	4	5	6	7	8	9
C	0	2	3	3	3	3	5	6	6	7

1	2	3	4	5	6	7	8	9	10
0	1	1	2	6	6	7	9	10	11

[illegible]



Output = {0.1, 0.1, 0.2, 0.6, 0.6, 0.7, 0.9}

c) Algorithm is the same as counting sort except for line 7, 8 we have:

for $i = a$ to b

$$C[i] = C[i] - C[a-1] \quad // C[-1] = 0$$

e) If the algorithm puts all the elements in the same bucket, then the linked list needs to be traversed every time an element is added.

$$\therefore T(n) = \sum_{i=0}^n A[i] = (n^2 + n) \cdot \frac{1}{2} = \underline{O(n^2)}$$

f) Pass the points x and y through a function to determine which bucket they will go into:

chooseBucket(x, y, n) // coordinates x & y

distance = $(x * x) + (y * y)$

return floor(distance * n) // n is the number of points

Problem 2

- a) Please find attached C++ file.
- b) The storage of the implementation is $\Theta(n)$ for the original array plus $\Theta(10)$ for array C plus $\Theta(n)$ for the output array. Therefore, the asymptotic storage space is $S(n) = 2n + 10 \rightarrow \Theta(n)$.
 $T(n) = \Theta(n \log n)$.

P.S. I have not attached the medical excuse because I didn't download the scan within the time period of 3 days.

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