

Name: _____

Paxton

Last Name: _____

Proctor

Question 1[40 Points]

As explained in class, step-by-step, properly explained, sort the following numbers using Counting Sort.

100 213 22 11 54 5 726 367 278 69

① min = 5; Range [5, 726]
max = 726

②

Val-num	5	11	22	54	69	100	213	278	367	726
of #	1	1	1	1	1	1	1	1	1	1
Addresses	1	1	1	1	1	1	1	1	1	1

③ Shift from L to R

Val-num

5	11	22	54	69	100	213	278	367	726
1	1+1	2+1	3+1	4+1	5+1	6+1	7+1	8+1	9+1
1	2	3	4	5	6	7	8	9	10

④ Shift by one pos R.

5	11	22	54	69	100	213	278	367	726
0	1	2	3	4	5	6	7	8	9

⑤

5	11	22	54	69	100	213	278	367	726
0	1	2	3	4	5	6	7	8	9

Name: PaxtonLast Name: ProudorQuestion 2[30 Points]

As explained in class, step-by-step, properly explained, sort the following numbers using Radix Sort. (Numbers MUST be properly aligned to avoid losing points)

100 213 22 11 54 5 726 367 278 69

① Identify the # with most digit

100 213

726 367 278

② Pad all others with zeros

100 213 022 011 054 005 726 367 278 069

③ Create labels 0 to 9

0 1 2 3 4 5 6 7 8 9

④ Analyze from left to right in this order

(ones) 100[↓] 213[↓] 022[↓] 011[↓] 054[↓] 005[↓] 726[↓] 367[↓] 278[↓] 069[↓]

100 022 213 054 005 726 367 278 069
0 1 2 3 4 5 6 7 8 9

(tens) [↓]100 [↓]022 [↓]213 [↓]054 [↓]005 [↓]726 [↓]367 [↓]278 [↓]069

005 100 213 022 054 726 367 278 069
0 1 2 3 4 5 6 7 8 9

(hundreds) [↓]100 [↓]005 [↓]213 [↓]022 [↓]726 [↓]054 [↓]367 [↓]069 [↓]278

069 100 213 022 726 054 367 069 278
0 1 2 3 4 5 6 7 8 9

005 022 054 069 100 213 278 367 726

[↓] [↓] [↓] [↓] [↓] [↓] [↓] [↓] [↓]

5 22 54 69 100 213 278 367 726

Worst Case

$O(d(n+b))$
 $O(3(n+10))$

$d = \# \text{ dis}$
 $b = \text{base}$

Name:

Paxton

Last Name:

Proctor

Question 3[30 Points]

As explained in class, step-by-step, properly explained, sort the following numbers using Quick Sort. (Numbers MUST be properly aligned to avoid losing points)

100 213 22 11 54 5 726 367 278 69

Handwritten work showing the steps of Quick Sort on the array [100, 213, 22, 11, 54, 5, 726, 367, 278, 69].

Initial array: 100 213 22 11 54 5 726 367 278 69

Step 1: Pivot 100. Array becomes: 278 213 22 11 54 5 726 367 100 69

Step 2: Pivot 278. Array becomes: 367 213 22 11 54 5 726 278 100 69

Step 3: Pivot 367. Array becomes: 726 213 22 11 54 5 367 278 100 69

Step 4: Pivot 726. Array becomes: 726 213 22 11 54 5 367 278 100 69

Step 5: Pivot 726. Array becomes: 726 213 22 11 54 5 367 278 100 69

Step 6: Pivot 726. Array becomes: 726 213 22 11 54 5 367 278 100 69

Step 7: Pivot 726. Array becomes: 726 213 22 11 54 5 367 278 100 69

Step 8: Pivot 726. Array becomes: 726 213 22 11 54 5 367 278 100 69

Step 9: Pivot 726. Array becomes: 726 213 22 11 54 5 367 278 100 69

Step 10: Pivot 726. Array becomes: 726 213 22 11 54 5 367 278 100 69

Step 11: Pivot 726. Array becomes: 726 213 22 11 54 5 367 278 100 69

Step 12: Pivot 726. Array becomes: 726 213 22 11 54 5 367 278 100 69

Step 13: Pivot 726. Array becomes: 726 213 22 11 54 5 367 278 100 69

Step 14: Pivot 726. Array becomes: 726 213 22 11 54 5 367 278 100 69

Step 15: Pivot 726. Array becomes: 726 213 22 11 54 5 367 278 100 69

Step 16: Pivot 726. Array becomes: 726 213 22 11 54 5 367 278 100 69

Step 17: Pivot 726. Array becomes: 726 213 22 11 54 5 367 278 100 69

Step 18: Pivot 726. Array becomes: 726 213 22 11 54 5 367 278 100 69

Step 19: Pivot 726. Array becomes: 726 213 22 11 54 5 367 278 100 69

Step 20: Pivot 726. Array becomes: 726 213 22 11 54 5 367 278 100 69

Step 21: Pivot 726. Array becomes: 726 213 22 11 54 5 367 278 100 69

Step 22: Pivot 726. Array becomes: 726 213 22 11 54 5 367 278 100 69

Step 23: Pivot 726. Array becomes: 726 213 22 11 54 5 367 278 100 69

Step 24: Pivot 726. Array becomes: 726 213 22 11 54 5 367 278 100 69

Step 25: Pivot 726. Array becomes: 726 213 22 11 54 5 367 278 100 69

Step 26: Pivot 726. Array becomes: 726 213 22 11 54 5 367 278 100 69

Step 27: Pivot 726. Array becomes: 726 213 22 11 54 5 367 278 100 69

Step 28: Pivot 726. Array becomes: 726 213 22 11 54 5 367 278 100 69

Step 29: Pivot 726. Array becomes: 726 213 22 11 54 5 367 278 100 69

Step 30: Pivot 726. Array becomes: 726 213 22 11 54 5 367 278 100 69

Sorted array: 5 11 22 54 69 100 213 278 367 726