

## Sorting Practice

**P1. A)** (6 points) You are using count sort to sort an array of  $N$  numbers, where each number is from the range  $[0, M]$ . What is the time complexity (as Theta) of the number of data moves? (For example swapping two records requires 3 data moves.). Briefly justify your answer.

**B)** (2 points) Is quick sort stable? (No justification needed.)

**C)** (7 points) We make the call: `int res = partition(a, 0, 6);`

for each of the 2 example arrays **a** given in the table below. Show in the table below how the arrays look after the call and the value returned in `res`. Use the partition method from Cormen.

	0	1	2	3	4	5	6	res
Original array <b>a</b> example 1	<b>13</b>	<b>6</b>	<b>12</b>	<b>8</b>	<b>6</b>	<b>15</b>	<b>10</b>	
Array after partition								
Original array <b>a</b> example 2	<b>17</b>	<b>11</b>	<b>12</b>	<b>6</b>	<b>3</b>	<b>8</b>	<b>9</b>	
Array example 2 after partition								

**P2.** (4 points) What is the operation you do to map/scale values from range  $[A, B]$  to range  $[X, Y]$ ? You can assume that  $A < B$  and  $X < Y$ . (E.g.  $[47, 49] \rightarrow [20, 30]$ ,  $[5, 10] \rightarrow [21, 23]$ )