# QuickSort: Partition By Hand

Starting with the array pictured below, show how the array’s contents are changed during the execution of the Partition method (and only the Partition method – you do NOT need to demonstrate all of QuickSort for this exercise).

Copy the array into the blank array below it *after* each and every ‘swap’ is done. (To save space, only copy the array when it is changed)

You should use the first element in the array as the pivot.

You will start your 'trace' as follows:

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Array Index: | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Value: | 100 | 101 | -10 | 301 | 12 | 201 | 18 | 901 |

Example of redrawing the array after the first swap:  
(Note that 101 and 18 have been swapped)

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Array Index: | 0 | 1 | | 2 | 3 | 4 | 5 | 6 | 7 |
| Value: | 100 | 18 | -10 | | 301 | 12 | 201 | 101 | 901 |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Array Index: | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Value: | 100 | 18 | -10 | 301 | 12 | 201 | 101 | 901 |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Array Index: | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Value: | 100 | 18 | -10 | 101 | 12 | 201 | 301 | 901 |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Array Index: | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Value: | 100 | 18 | -10 | 101 | 12 | 201 | 301 | 901 |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Array Index: | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Value: | 100 | 18 | -10 | 12 | 101 | 201 | 301 | 901 |

**Using the following array, partition the array using only those elements in the subsection of the array found in array[4] through array[10].**

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Array Index: | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| Value: | 20 | 18 | 25 | 50 | 75 | 99 | 86 | 74 | 53 | 128 | 64 |

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Array Index: | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| Value: | 20 | 18 | 25 | 50 | 75 | 99 | 86 | 74 | 53 | 128 | 64 |

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Array Index: | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| Value: | 20 | 18 | 25 | 50 | 74 | 64 | 53 | 75 | 86 | 128 | 99 |

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Array Index: | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| Value: | 20 | 18 | 25 | 50 | 53 | 64 | 74 | 75 | 86 | 128 | 99 |

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Array Index: | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| Value: | 20 | 18 | 25 | 50 | 53 | 64 | 74 | 75 | 86 | 99 | 128 |

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Array Index: | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| Value: |  |  |  |  |  |  |  |  |  |  |  |

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Array Index: | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| Value: |  |  |  |  |  |  |  |  |  |  |  |

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Array Index: | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| Value: |  |  |  |  |  |  |  |  |  |  |  |

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Array Index: | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| Value: |  |  |  |  |  |  |  |  |  |  |  |