Merge Sort

Brian E. Lavender

April 15, 2016

# Merge Sort Concept

Sorts an array of values

* **Divide and Conquer**:
* **Recursive Routine**
* **Complexity**. O(Nlog2N)
* **Disadvantage**: auxiliary array

# Merge two sorted halves Example

Two sorted arrays of size *k/2*.
**Merge** them to destination of size *k*.

min(4,8)?

Left Half (size 4)

|  |  |  |  |
| --- | --- | --- | --- |
| 0 | 1 | 2 | 3 |
| **4** | 15 | 16 | 50 |

Right Half (size 4)

|  |  |  |  |
| --- | --- | --- | --- |
| 0 | 1 | 2 | 3 |
| **8** | 23 | 42 | 108 |

Destination (size 8)

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| \_ | \_ | \_ | \_ | \_ | \_ | \_ | \_ |

# Merge Half Arrays To Destination (Step 1)

Move *4* from left\_half to destination

min(15,8)?

Left Half (size 4)

|  |  |  |  |
| --- | --- | --- | --- |
| 0 | 1 | 2 | 3 |
| \* | **15** | 16 | 50 |

Right Half (size 4)

|  |  |  |  |
| --- | --- | --- | --- |
| 0 | 1 | 2 | 3 |
| **8** | 23 | 42 | 108 |

Destination (size 8)

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 4 |  |  |  |  |  |  |  |