Sorting Detective

Your goal is to identify which sorting algorithm is being used in which case. The first column in the table below contains an unsorted list of names. The last column contains a sorted list of names. Each intermediate column contains a partially sorted list of names.

Each intermediate column was constructed by beginning with the unsorted list and running one of the sorting algorithms that we learned about in class, stopping at some point before it finishes. Identify, below, which column was (partially) sorted with which algorithm.

*Hint: Do not just execute each sorting algorithm, step-by-step, until it matches one of the columns. Instead, think about the invariants that are true at every step of the sorting algorithm*.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Unsorted** | **A** | **B** | **C** | **D** | **E** | **Sorted** |
| Carol | Bob | Alice | Bob | Bob | Alice | Alice |
| Linda | Carol | Bob | Carol | Carol | Bob | Bob |
| Patty | Eddie | Carol | Eddie | Eddie | Carol | Carol |
| Bob | Kelly | Dave | Alice | John | Gina | Dave |
| Eddie | Linda | Eddie | John | Kelly | Eddie | Eddie |
| Noah | Noah | Noah | Gina | Linda | Fred | Fred |
| Kelly | Patty | Kelly | Dave | Noah | Harry | Gina |
| John | John | John | Harry | Patty | Dave | Harry |
| Alice | Alice | Patty | Fred | Alice | Ina | Ina |
| Mary | Mary | Mary | Kelly | Dave | Mary | John |
| Gina | Gina | Gina | Ina | Gina | Linda | Kelly |
| Dave | Dave | Linda | Linda | Mary | John | Linda |
| Harry | Harry | Harry | Mary | Harry | Kelly | Mary |
| Fred | Fred | Fred | Noah | Fred | Noah | Noah |
| Ophelia | Ophelia | Ophelia | Ophelia | Ophelia | Ophelia | Ophelia |
| Ina | Ina | Ina | Patty | Ina | Patty | Patty |

\_\_\_\_\_ : BubbleSort

\_\_\_\_\_ : SelectionSort

\_\_\_\_\_ : InsertionSort

\_\_\_\_\_ : MergeSort

\_\_\_\_\_ : QuickSort (with first element pivot)