

The graph illustrates the time complexity of the tim sort algorithm for various values of the parameter  $k$ . The x-axis represents the 'Length of array' from 0 to 200, and the y-axis represents the 'Time complexity' from 0 to 100. The legend identifies ten data series: 'tim sort, k = 0' (blue), 'tim sort, k = 25' (orange), 'tim sort, k = 50' (green), 'tim sort, k = 75' (red), 'tim sort, k = 100' (purple), 'tim sort, k = 125' (brown), 'tim sort, k = 150' (pink), 'tim sort, k = 175' (grey), and 'tim sort, k = 200' (olive). The lines show that as  $k$  increases, the time complexity also increases, with the  $k = 200$  series reaching the highest values, peaking near 100 at an array length of 175.

