How does works sort () function in list

**1. Algorithm Overview (Tim sort):**

* **Hybrid Approach**: Tim sort combines elements of merge sort and insertion sort, making it efficient for partially sorted datasets.
* **Stability**: It is a stable sorting algorithm, meaning that it preserves the order of equal elements.

**2. Process of Sorting:**

* **Divide and Conquer**:
  + **Run Detection**: Tim sort looks for "runs," which are sequences of ordered elements. It identifies both ascending and descending runs.
  + **Sorting Runs**: If a run is found in descending order, it’s reversed to make it ascending.
* **Insertion Sort**:
  + For small runs (usually less than 32 elements), Tim sort uses insertion sort, which is efficient for small datasets.
* **Merging Runs**:
  + Once the list is divided into runs and sorted individually, Tim sort merges these runs in a manner similar to merge sort.

**3. Key Parameters**

* **Key Parameter**: You can specify custom sorting criteria by providing a function to the key parameter, which determines the sort order.
* **Reverse Parameter**: By setting reverse=True, the sorting order is flipped, resulting in a descending sort.

**4. Time Complexity**

* **Best Case**: O(n) when the list is already sorted.
* **Average/Worst Case**: O(n log n), which is efficient for larger datasets.

**5. Space Complexity**

* Tim sort requires O(n) additional space in the worst case for merging operations.