

Circle **T** or **F** for each of the following statements to indicate whether the statement is true or false.

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|----|----------|----------|---|
| 1  | <b>T</b> | <b>F</b> | Radix sort works correctly even if insertion sort is used as auxiliary sorting algorithm instead of counting sort.                            |
| 2  | <b>T</b> | <b>F</b> | The best case running time for Insertion sort to sort $n$ elements is $O(n)$ .  |
| 3  | <b>T</b> | <b>F</b> | A sorted array of $n$ elements can be sorted by quick-sort in $O(n \lg n)$ steps.   |
| 4  | <b>T</b> | <b>F</b> | The smallest element in a max-heap containing $n$ elements can be found in $O(\lg n)$ steps.  |
| 5  | <b>T</b> | <b>F</b> | By Master theory, the solution to the recurrence $T(n)=3T(n/3)+\lg n$ is $T(n)=\Theta(n \lg n)$ .   |
| 6  | <b>T</b> | <b>F</b> | Heap-sort is a sort in place sorting algorithm.   |
| 7  | <b>T</b> | <b>F</b> | $f(n)=\Theta(g(n))$ if and only if $f(n)=\Omega(g(n))$ .  |
| 8  | <b>T</b> | <b>F</b> | The lower bound of selecting the $m$ smallest elements of an array $A$ of $n$ integers is $O(n + m \lg n)$ in the worst-case.                 |
| 9  | <b>T</b> | <b>F</b> | $f(n)+g(n) = \Theta(\max (f(n) , g(n) ))$ .   |
| 10 | <b>T</b> | <b>F</b> | In spite of both Merge-sort and Heap-sort are running in $O(n \lg n)$ , Heap-sort is running faster than Merge Sort for the same Array $A(n)$ |
| 11 | <b>T</b> | <b>F</b> | The median of odd $n$ elements is the element $(n-1)/2$ .   |
| 12 | <b>T</b> | <b>F</b> | The selection problem can be solved in $O(n)$ in the average-case and can be solved in $O(n \lg n)$ in the worst-case.                        |
| 13 | <b>T</b> | <b>F</b> | In spite of the worst-case running time if Quick-sort is $O(n^2)$ , it considered practically as the best comparison sorting algorithm        |
| 14 | <b>T</b> | <b>F</b> | The maximum number of elements in a heap with height $h$ is $2^{h+1}$ .   |
| 15 | <b>T</b> | <b>F</b> | The recurrence equation is an equation describing the running time of recursive algorithms.   |