Assiut University
Third Year (وتخلفات)
Term Test, Dec 2005

Faculty of Computers
Algorithms Analysis & Design
Time: 20 min.

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

1	**T**	**F**	Radix-sort works correctly even if Insertion-sort is used as an auxiliary sorting algorithm instead of Counting-sort.
2	**T**	**F**	The best case running time for Insertion-sort to sort n elements is $O(n)$.
3	**T**	**F**	A sorted array of n elements can be sorted by quick-sort in $O(n \lg n)$ steps.
4	**T**	**F**	The smallest element in a max-heap containing n elements can be found in $O(\lg n)$ steps.
5	**T**	**F**	By Master theory, the solution to the recurrence $\mathrm{T}(n)=3\mathrm{T}(n/3)+\lg n$ is $\mathrm{T}(n)=\Theta(n \lg n)$.
6	**T**	**F**	Heap-sort is a sort in place sorting algorithm.
7	**T**	**F**	$f(n)=\Theta(g(n))$ if and only if $f(n)=\Omega(g(n))$.
8	**T**	**F**	The lower bound of selecting the m smallest elements of an array A of n integers is $\mathrm{O}(n + m \lg n)$ in the worst-case.
9	**T**	**F**	$f(n)+g(n) = \Theta(\max (f(n) , g(n)))$.
10	**T**	**F**	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	**T**	**F**	The median of odd n elements is the element (n-1)/2.
12	**T**	**F**	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	**T**	**F**	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	**T**	**F**	The maximum number of elements in a heap with height h is 2^{h+1}.
15	**T**	**F**	The recurrence equation is an equation describing the running time of recursive algorithms.

With my best wishes
Dr. Tarek Hagras

إســم الطالب:.. رقم الجلوس:.............. الفصل:.........