COMP-2540: QUIZ 1 (0.5%)

Please select the most appropriate answer for each question. Remember to fill in the scantron. There are 10 questions in total, and the overall score constitutes 0.5 % of your grade.

Q1. In Assignment 1, what is the time complexity for the program `count_LINKED_LIST_BAD`?

(A) $O(n)$
(B) $O(n \log n)$
(C) $O(nm)$
(D) $O(nmm)$
(E) $O(nnm)$

Q2. In Assignment 1, what should be the time complexity for `count_LINKED_LIST_GOOD`?

(A) $O(n)$
(B) $O(n \log n)$
(C) $O(nm)$
(D) $O(nmm)$
(E) $O(nnm)$

Q3. In Assignment 1, what is the time complexity for `count_ARRAY`?

(A) $O(n)$
(B) $O(n \log n)$
(C) $O(nm)$
(D) $O(nmm)$
(E) $O(nnm)$

Q4. Given the following recursive program,

```
boolean x(int[] data,int target,int low,int high) {
  if (low>high) return false;
  int mid = (low + high) / 2;
  if (target == data[mid]) return true;
  if (target < data[mid])
      return x(data, target, low, mid - 1);
  return x(data, target, mid + 1, high);
}
```

It's recurrence relation is

(A) $T(n) = T(n-1) + 1$
(B) $T(n) = T(n-1) + n$
(C) $T(n) = T(n/2) + 1$
(D) $T(n) = 2T(n/2) + n$
(E) $T(n) = T(n-1) + T(n-2) + 1$

Q5. For the above program, it's time complexity is

(A) $O(n)$
(B) $O(n^2)$
(C) $O(\log n)$
(D) $O(n \log n)$
(E) $O(2^n)$

Q6. What is the time complexity of searching for an element in a sorted array of size n using binary search?

(A) $O(1)$
(B) $O(\log n)$
(C) $O(n)$
(D) $O(n \log n)$
(E) $O(n^2)$

Q7. What is the worst-case time complexity of deleting the tail node in a singly linked list with n nodes?

(A) $O(1)$
(B) $O(\log n)$
(C) $O(n)$
(D) $n \log n$
(E) $O(n^2)$

Q8. Which of the following operations on an array has a time complexity of $O(1)$ in the worst case?

(A) Searching for an element.
(B) Deleting an element.
(C) Inserting an element at a given index.
(D) Accessing an element at a specific index.

Q9. Given the recurrence relation $T(n) = 2T(n/2) + n$. What is the closed-form upper bound solution for $T(n)$?

(A) $O(n)$
(B) $O(n^2)$
(C) $O(n \log n)$
(D) $O(\log n)$
(E) $O(2^n)$

Q10. Given the recurrence relation $T(n) = T(n/2) + 1$. What is the closed-form upper bound solution for $T(n)$?

(A) $O(n)$
(B) $O(n^2)$
(C) $O(n \log n)$
(D) $O(\log n)$
(E) $O(2^n)$