Quiz 8

Deadline	Monday, 21 October 2019 at 4:00PM
Latest Submission	Monday, 21 October 2019 at 11:21AM
Raw Mark	5.00/5.00 (100.00%)
Late Penalty	N/A
Final Mark	5.00/5.00 (100.00%)

Question 1 (1 mark)

Consider the following code (where L is a list of length n and x is an element of L):

```
partition(x,L):
    i = 0
    j = n-1
    while (i<j):
        while (L[i]≤x):
        i = i+1
        while (L[j]>x):
            j = j-1
        tmp = L[i]
        L[i] = L[j]
        L[j] = tmp
```

What is the running time of Partition(x,L) when run on a list of length n? Choose the best upper bound that applies.

(a) ○	O(log n)
(b) ●	O(n)
(c) ○	O(n log n)
(d) ○	O(n^2)

✓ Your response was correct.
Mark: 1.00

Question 2 (1 mark)

Consider the following code (where L is a list of length n):

```
mergesort(L):
    L1={}
    L2={}
    for i = 0 to n/2:
        L1[i] = L[i]
        L2[i] = L[i+n/2]
    mergesort(L1)
    mergesort(L2)
    return merge(L1,L2)
```

Assuming merge(L1,L2) takes O(n) time if L1 and L2 are lists of length n, which of the following recurrences best describes the running time, T(n), of Mergesort when run on a list of length n?

(a) ○	T(n) = 2T(n/2) + O(1)
(b) ○	T(n) = T(n/2) + O(n)
(c) ●	T(n) = 2T(n/2) + O(n)
(d) ○	T(n) = 2T(n-1) + O(n)
(e) ○	T(n) = T(n-1) + O(n)

✔ Your response was correct.
Mark: 1.00

Question 3 (1 mark)

Consider the following code:

```
myFunction(n):
    if n == 0:
        return 1
    else:
        return 2 * myFunction(n-1)
```

What is the running time of myFunction(n) in terms of n? Choose the best upper bound that applies.

(a) ●	O(n)
(b) ○	O(n log n)
(c) ○	O(n^2)
(d) ○	O(2^n)

✔ Your response was correct.
Mark: 1.00

Question 4 (1 mark)

Consider the following code (where L is a list of length n and 0≤i,j<n):

```
findPeak(L,i,j):
        if L[i] > L[i+1]:
                 return i
        else if L[j] > L[j-1]:
                return j
        else:
                m = (i+j)/2
                if L[m] > L[m-1] and L[m] > L[m+1]:
                        return m
                else if L[m] > L[m-1]:
                        return findPeak(L, i, m)
                else:
                        return findPeak(L, m, j)
```

What is the running time of findPeak(L,0,n-1) where L is a list of length n? Choose the best upper bound that applies

(a) ○	O(1)
(b) ●	O(log n)
(c) ○	O(n)
(d) ○	O(n log n)
(e) ○	O(2^n)

✔ Your response was correct.
Mark: 1.00

Question 5 (1 mark)

Consider the following code (where w and v are words over Σ*)

```
concat(w,v):
    if length(w) = 0:
        return v
    else:
        return concat(tail(w),v)
```

Assuming tail(w) takes a word of length n and returns a word of length n-1 in O(1) time, what is the running time of Concat(w,v) if w has length n and v has length m? Choose the best upper bound that applies

(a) ○	O(nm)

(b) ●	O(n)
(c) ○	O(m)
(d) ○	O(1)

✓ Your response was correct.
Mark: 1.00