Started on	Sunday, 12 March 2023, 3:28 PM
State	Finished
Completed on	Sunday, 12 March 2023, 3:50 PM
Time taken	21 mins 30 secs
Marks	7.50/8.00
Grade	**9.38** out of 10.00 (**94**%)

Question **1**

Correct

Mark 1.00 out of 1.00

What is the big O time complexity of the following code?

```
int a = 0;
int i = 1;
while( i < N)
{
    a = a + 2*i
    i = i * 3
}
```

Select one:

- a. $O(lg(N))$ ✔
- b. $O(3^N)$
- c. $O(N)$
- d. $O(N^3)$

Your answer is correct.

In each iteration, the loop variable i is multiplied by 3 until it reaches N. Number of multiplications will be approximately $log_3(N)$. Hence the time complexity is O(lg(N))

The correct answer is:
$O(lg(N))$

Question 2

Correct

Mark 1.00 out of 1.00

Given f(n) = n^3 + 2n^2 + 1000n + 1 , which of the following is correct about f(n) ?

- [ ] a. Θ(n^4)
- [ ] b. o(n^3)
- [ ] c. ω(n^3)
- [x] d. Ω(n^2) ✔
- [x] e. O(n^4) ✔

The correct answers are: O(n^4), Ω(n^2)

Question 3

Correct

Mark 1.00 out of 1.00

Express the function $\frac{n^3}{1000} - 100n^2 - 100n + 3$ in terms of Θ-notation.

- ( ) a. $\Theta(n^2)$
- ( ) b. $\Theta(\sqrt{n})$
- (•) c. $\Theta(n^3)$ ✔
- ( ) d. $\Theta(\lg(n))$

The correct answer is: $\Theta(n^3)$

Question 4

Partially correct

Mark 0.50 out of 1.00

Arrange the following functions in the increasing order of asymptotic growth

$f(N) = 100N$

$g(N) = N^7 + 5N$

$h(N) = 500lg(N)$

$k(N) = 3^N$

h(N) ✔ < f(N) ✔ < k(N) ✖ *[g(N)]* < g(N) ✖ *[k(N)]*

Your answer is partially correct.

Question 5

Correct

Mark 1.00 out of 1.00

The worst case complexity of linear search algorithm is

- a. O(n) ✔
- b. O(log n)
- c. O(n log(n))
- d. $O(n^2)$

The correct answer is: O(n)

Question 6

Correct

Mark 1.00 out of 1.00

The space factor when determining the efficiency of algorithm is measured by

- a. Counting the average memory needed by the algorithm
- b. Counting the minimum memory needed by the algorithm
- c. Counting the maximum memory needed by the algorithm ✔
- d. Counting the maximum disk space needed by the algorithm

The correct answer is: Counting the maximum memory needed by the algorithm

Question 7

Correct

Mark 1.00 out of 1.00

Following is the execution time measurement taken for a sorting algorithm to sort an array with a random permutation of elements.

No. of elements in the array (N)	Execution time (micro seconds)
1024	51
2048	202
4096	805
8192	3227
16384	12900
32768	51592

What can be the possible average case time complexity of this sorting algorithm?

Select one:

- a. $O(Nlg(N))$
- b. $O(N)$
- c. $O(4N)$
- d. $O(N^2)$ ✔

Your answer is correct.

The correct answer is:
$O(N^2)$

Question 8

Correct

Mark 1.00 out of 1.00

The best case occur in binary search algorithm when

- a. Item is the middle element of the array ✔
- b. Item is the middle element of the array or is not there at all
- c. Item is not in the array at all
- d. Item is the first element in the array

The correct answer is: Item is the middle element of the array

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Data retention summary

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