Started on	Sunday, 4 February 2024, 6:04 PM
State	Finished
Completed on	Sunday, 4 February 2024, 6:10 PM
Time taken	6 mins 46 secs
Marks	7.67/8.00
Grade	**9.58** out of 10.00 (**95.83**%)

Question 1

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. $O(N)$

b. $O(Nlg(N))$

c. $O(N^2)$ ✔

d. $O(4N)$

Your answer is correct.

The correct answer is:

$O(N^2)$

Question 2

Partially correct

Mark 0.67 out of 1.00

For the functions, $\log_2(n)$ and $\log_8(n)$, what is the asymptotic relationship between these functions?

- a. $\log_2(n)$ is $O(\log_8(n))$
- b. $\log_2(n)$ is $\Theta(\log_8(n))$ ✔
- c. $\log_2(n)$ is $\Omega(\log_8(n))$ ✔

The correct answers are: $\log_2(n)$ is $O(\log_8(n))$, $\log_2(n)$ is $\Omega(\log_8(n))$, $\log_2(n)$ is $\Theta(\log_8(n))$

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

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

Question 4

Correct

Mark 1.00 out of 1.00

The best case occur in binary search algorithm when

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

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

Question 5

Correct

Mark 1.00 out of 1.00

What is the time complexity of the following code?

```
int i, j, k = 0;
for (i = N / 2; i <= N; i++) {
   for (j = 2; j <= N; j = j * 2) {
      k = k + N/ 2;
   }
}
```

a. O(N)

b. O(N*N)

c. O(N*log(N)) ✔

d. O(N*Sqrt(N))

The correct answer is:
O(N*log(N))

Question 6

Correct

Mark 1.00 out of 1.00

What are the factors that affect the running time of a program?

a. CPU speed

b. Nature of input data set

c. Memory

d. All of the above ✔

The correct answer is: All of the above

Question 7

Correct

Mark 1.00 out of 1.00

What is the time complexity of the following code?

```
int a = 0;
for (i = 0; i < N; i++) {
   for (j = N; j > i; j--) {
      a = a + i + j;
   }
}
```

a. O(N*Sqrt(N))

b. O(N*N) ✔

c. O(N*log(N))

d. O(N)

The correct answer is: O(N*N)

Question 8

Correct

Mark 1.00 out of 1.00

The worst case complexity of Bubble sort algorithm is

a. O(log(n))

b. $O(n^2)$ ✔

c. O(n log(n))

d. O(n)

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