| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |

Quiz: Asymptotic Notations and Correctness of Algorithms Results for Doshna Umma Reddy (She/Her/Hers)

[tate.edu/courses/1810910/quizzes/2660438/submissions/17228545/log)](https://canvas.oregonstate.edu/courses/1810910/quizzes/2660438/submissions/17228545/log)

Score for this attempt: **10** out of 10
Submitted Apr 8 at 2:27pm
This attempt took 1 minute.

▶
Correct!

| **Question 1** | 1 | / 1 pts |

Is the following a property that holds for all non-decreasing positive functions f and g? (True=Yes/ False=No)

If $f(n) = O(n^2)$ and $g(n) = \text{Theta}(n^2)$, then $f(n) = O(g(n))$.

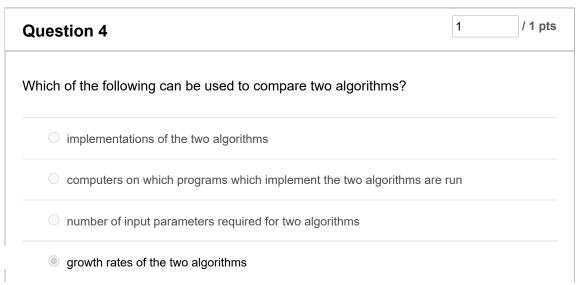⦿ True

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◯ False

Additional Comments:

| **Question 2** | 2 | / 2 pts |

Rank the following functions by increasing order of growth:

$\log(n!)$, $10000n^2$, $\log(n^3)$, 2^n, $n^2\log(n)$

◯ $n^2\log(n)$, $\log(n!)$, $10000n^2$, $\log(n^3)$, 2^n

Correct!

⦿ $\log(n^3)$, $\log(n!)$, $10000n^2$, $n^2\log(n)$, 2^n

○ log(n!), n^2log(n), 10000n^2, log(n^3), 2^n
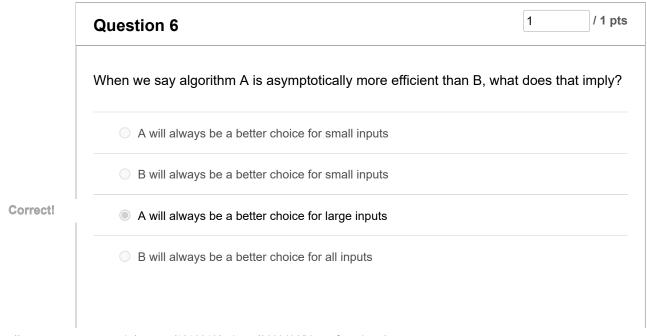
Additional Comments:

Question 3   [1]   / 1 pts
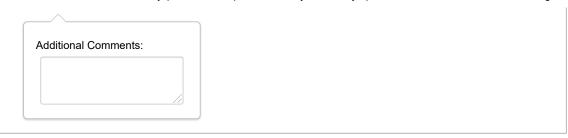
Let W(n) and A(n) denote respectively, the worst case and average case running time of an algorithm executed on an input of size n. which of the following is ALWAYS TRUE?

○ None of the options

Correct!

◉ $A(n) = O(W(n))$

○ $A(n) = \Omega(W(n))$

○ $A(n) = \Theta(W(n))$

Additional Comments:

Question 4   [1]   / 1 pts

Which of the following can be used to compare two algorithms?

○ implementations of the two algorithms

○ computers on which programs which implement the two algorithms are run

○ number of input parameters required for two algorithms

Correct!

◉ growth rates of the two algorithms

Additional Comments:

Question 5

1　/ 1 pts

If you are given different versions of the same algorithm with the following complexity classes, which one would you select?

Correct!

◉ Logarithmic

○ Polynomial

○ Quadratic

○ Linear

▶

Additional Comments:

Question 6

1　/ 1 pts

When we say algorithm A is asymptotically more efficient than B, what does that imply?

○ A will always be a better choice for small inputs

○ B will always be a better choice for small inputs

Correct!

◉ A will always be a better choice for large inputs

○ B will always be a better choice for all inputs

Additional Comments:

Question 7

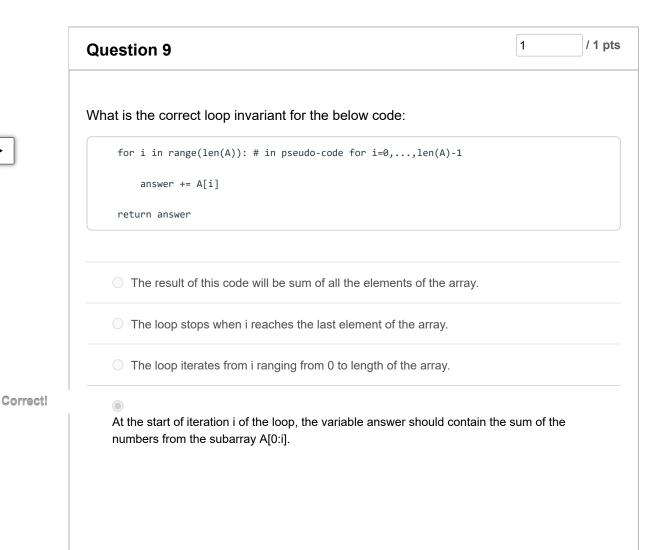1   / 1 pts

Consider the following algorithm

```
1 Bubble-sort(a)
2   for i = a.length() to 1
3       for j = 1 to i-1
4               if a[j]>a[j+1]
5                       swap(a[j],a[j+1]);
6               end if
```

What is its basic operation (write the line number of code which would define the execution time of the code)?

▶

Correct!

4

Correct Answers   4 (with margin: 0)

Additional Comments:

Question 8

1   / 1 pts

What is the basic operation (that which is executed maximum number of times) in the following code?

```
reverse(a):
    for i = 1 to len(a)-1
        x = a[i]
        for j = i downto 1
            a[j] = a[j-1]
        a[0] = x
```

Correct!

   ◉ a[j] = a[j-1]

   ○ x = a[i]

   ○ for j = i to 1

   ○ a[0] = x

Additional Comments:

Question 9

`1` / 1 pts

What is the correct loop invariant for the below code:

```
for i in range(len(A)): # in pseudo-code for i=0,...,len(A)-1

    answer += A[i]

return answer
```

○ The result of this code will be sum of all the elements of the array.

○ The loop stops when i reaches the last element of the array.

○ The loop iterates from i ranging from 0 to length of the array.

Correct!

◉
At the start of iteration i of the loop, the variable answer should contain the sum of the numbers from the subarray A[0:i].

Read the exploration: Proving Correctness of an Algorithm

Additional Comments:

Fudge Points: | -- | (?)

Final Score: 10 out of 10

Update Scores

▶