Week 02 Quiz

Plagiarism declaration

By submitting work for this quiz I hereby declare that I understand the University's policy on **academic integrity (https://academicintegrity.unimelb.edu.au/)** and that the work submitted is original and solely my work, and that I have not been assisted by any other person (collusion) apart from where the submitted work is for a designated collaborative task, in which case the individual contributions are indicated. I also declare that I have not used any sources without proper acknowledgment (plagiarism). Where the submitted work is a computer program or code, I further declare that any copied code is declared in comments identifying the source at the start of the program or in a header file, that comments inline identify the start and end of the copied code, and that any modifications to code sources elsewhere are commented upon as to the nature of the modification.

Due Mar 19 at 23:59 **Points** 10 **Questions** 10
Available Mar 10 at 10:00 - Mar 19 at 23:59 10 days **Time Limit** None
Allowed Attempts Unlimited

Instructions

You should attempt the quiz after the lectures and your tutorial.

You must complete the weekly quiz by the end of the 'next week' -- ie Week 2 quiz must be completed by the end of Week 3

- You may attempt the quiz multiple times (if you happen to get a question wrong, you can do it again)
- Your score on the quiz will be recorded in the grade book -- there are 10 weekly quizzes, each worth 1%
- The quiz might not display equations correctly in some browsers. If you experience problems, we recommend that you try a different browser.

This quiz was locked Mar 19 at 23:59.

Attempt History

Attempt	Time	Score

	Attempt	Time	Score
LATEST	Attempt 1	43 minutes	9 out of 10

Score for this attempt: **9** out of 10
Submitted Mar 14 at 7:01
This attempt took 43 minutes.

Question 1

1 / 1 pts

On my machine, a certain $O(n^2)$ sorting algorithm takes one second to sort 1000 random items. Sorting 100,000 random items can be expected to take:

- 1-2 minutes
- 10-15 minutes

Correct!

- (•) 2-3 hours
- about one day
- almost one year

That's right. We would expect 100 times as many elements to take 100 x 100 = 10,000 times as long to be sorted.

Question 2

1 / 1 pts

If f(n) is O(g(n)) then f(n) grows asymptotically no faster than g(n).

Correct!

- (•) True

A function f(n) is O(g(n)) if g(n) defines an upper bound on the growth of f(n) as n becomes large

False

Question 3

1 / 1 pts

Consider the following statement:

$n(n+1) \in O(n^2)$

Correct!

True

If you expand n(n+1) out you get the quadratic expression $n^2 + n$. The dominant term in this expression is n^2 and consequently n(n+1) is $O(n^2)$.

False

Question 4

0 / 1 pts

Consider the function $t(n) = 57n^4 + 10n^2 + 75$.

$t(n) \in O(g(n))$ where g(n) is:

orrect Answer

n^7

Correct!

n^4

ou Answered

n^2

ou Answered

n

Question 5

1 / 1 pts

Which of the following claims about growth rate are correct:

- $(2n \log_2 n)^2 \in O(n^2)$
- $\sqrt{n} \in O(\log_{10} n)$
- $\log_2 n \in O\left(\frac{1}{\sqrt{n}}\right)$
- Correct! $3n^3 + n\sqrt{n} \in O(n^3)$
- $\sqrt{n} \in O(\sqrt[3]{n})$

That's right, only one of the statements is correct.

Question 6

1 / 1 pts

Which of the following claims are correct:

- Correct! $2^{n+1} \in \Theta(2^n)$
- $\sqrt{n} \in O(\log_{10} n)$
- $\log_2 n \in O\left(\frac{1}{\sqrt{n}}\right)$
- Correct! $3n^3 + n\sqrt{n} \in O(n^3)$

- [ ] $\sqrt{n} \in O(\sqrt[3]{n})$

That's right, only one of the statements is correct.

Question 7

1 / 1 pts

Which of the following claims are correct:

Correct!
- [x] $\sum_{i=1}^{n} 3^i \in \Theta(3^{n-1})$

Correct!
- [x] $\sum_{i=1}^{n} 3^i \in \Theta(3^n)$

Correct!
- [x] $\sum_{i=1}^{n} 3^i \in \Theta(3^{n+1})$
- [ ] $\sum_{i=1}^{n} 2^i \in \Theta(3^n)$

That's right.

Question 8

1 / 1 pts

2^{2n} is $O(2^n)$

- [ ] True

Correct!
- [x] False

That's correct!

2^{2n} is equivalent to 2^n 2^n. Consequently, 2^n is not an upper bound on 2^{2n}!

Question 9

1 / 1 pts

Given an array of n items, A, what is the Big-Θ complexity of retrieving the element at index k in the array (A[k])?

- Θ(n)
- Θ(1) — Correct!
- Θ(kn)
- Θ(logkn)

Correct!

Accessing the element at index k in an array is a constant time operation -- it does not depend on the number of items in the array.

Question 10

1 / 1 pts

$n^2 + 5n$ is Θ(g(n)) where g(n) is:

- 1

Correct!

- (●) n^2
- ( ) n
- ( ) Both n and n^2

Correct!

Recall that a function f(n) is Θ(g(n)) if and only if it is both Ω(g(n)) and O(g(n)).

Quiz Score: **9** out of 10