

CSE 12 – Basic Data Structures and Object-Oriented Design

Lecture 10

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Announcements

- Quiz 10 due Wednesday @ 12pm
- PA3 due Wednesday @ 11:59pm (open collaboration)
- Survey 4 due Friday @ 11:59pm
- Exam 1 on Friday (no class)
 - Released @ 2pm on Friday
 - Closes @ 6pm on Saturday
 - More details to be released on Piazza soon
 - Lectures 1 – 8
 - Up to and including PA3
 - 90 minutes
 - No make-ups

Topics

- Questions on Lecture 10?
- Big O

Let $f(n) = 100$

- Which of the following is NOT a correct bound?
 - A. $f(n)$ is $O(2^n)$
 - B. $f(n)$ is $O(n^2)$
 - C. $f(n)$ is $O(n)$
 - D. $f(n)$ is $O(n^{100})$
 - E. None of these

For each function in the list below, it is related to the function below it by O , and the reverse is **not** true. That is, n is $O(n^2)$ but n^2 is **not** $O(n)$.

- $f(n) = 1/(n^2)$
- $f(n) = 1/n$
- $f(n) = 1$
- $f(n) = \log(n)$
- $f(n) = \text{sqrt}(n)$
- $f(n) = n$
- $f(n) = n^2$
- $f(n) = n^3$
- $f(n) = n^4$
- ... and so on for constant polynomials ...
- $f(n) = 2^n$
- $f(n) = n!$
- $f(n) = n^n$

$$\text{Let } f(n) = 3n^3 + 2n + 7$$

- Which of the following is a correct bound?
 - A. $f(n)$ is $O(\log(n))$
 - B. $f(n)$ is $O(n^2)$
 - C. $f(n)$ is $O(n)$
 - D. $f(n)$ is $O(n^3)$
 - E. None of these

```
void printAllElementOfArray(int[] arr) {  
    for (int i = 0; i < arr.length; i++) {  
        printf("%d\n", arr[i]);  
    }  
}
```

- Which of the following is a correct bound?

A. $f(n)$ is $O(\log(n))$

B. $f(n)$ is $O(n^2)$

C. $f(n)$ is $O(n)$

D. $f(n)$ is $O(n^3)$

E. None of these

```
void printAllPossibleOrderedPairs(int arr[]) {  
    for (int i = 0; i < arr.length; i++) {  
        for (int j = 0; j < arr.length; j++) {  
            printf("%d = %d\n", arr[i], arr[j]);  
        }  
    }  
}
```

- Which of the following is a correct bound?

- A. $f(n)$ is $O(\log(n))$
- B. $f(n)$ is $O(n^2)$
- C. $f(n)$ is $O(n)$
- D. $f(n)$ is $O(n^3)$
- E. None of these


```
int fibonacci(int num) {  
    if (num <= 1) return num;  
    return fibonacci(num - 2) + fibonacci(num - 1);  
}
```

- Which of the following is a correct bound?

- A. $f(n)$ is $O(2^n)$
- B. $f(n)$ is $O(n^2)$
- C. $f(n)$ is $O(n)$
- D. $f(n)$ is $O(n^3)$
- E. None of these