CSE 12 – Basic Data Structures and Object-Oriented Design
Lecture 10

Greg Miranda, Fall 2020

This lecture is being recorded

Announcements

- Quiz 10 due Monday @ 9am
- Survey 3 due tonight @ 11:59pm
- PA3 due Wednesday @ 11:59pm
- Exam 1 next Friday
  - Released @ 8am on Friday
  - Closes @ 12pm on Saturday
  - More details to be released on Piazza soon

Topics

- Questions on Lecture 10?
- Big O

Questions on Lecture 10?

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) = 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

Let f(n) = 3n3 + 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.legnth; 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. More than one 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. More than one 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. More than one of these