

# EECS 281: Data Structures and Algorithms

## *Practice Midterm Exam*

Name: \_\_\_\_\_

Student ID: \_\_\_\_\_

1. (2 points) Master Theorem: Which of the following recurrence relations can one solve by applying the Master Theorem?

- A.  $T(n) = \frac{1}{2}T\left(\frac{n}{4}\right) + \Theta(n)$
- B.  $T(n) = T\left(\frac{n}{2}\right) + \Theta(n \log_2^n)$
- C.  $T(n) = 4T(n-1) + \Theta(1)$
- D.  $T(n) = 4T\left(\frac{n}{2}\right) + 2T\left(\frac{n}{4}\right) + \Theta(n^2)$
- E. None of the above.

2. (2 points) Consider the following function:

```
int func( double m, double n) {  
    int c = 0;  
    while (m > n) {  
        m = m/2;  
        for (int i = 1; i < n; i *=3;)  
            ++c;  
    }  
    return c;  
}
```

What best characterizes the running time of a call to this function?

- A.  $O(n \log m)$
- B.  $O\left(\frac{m}{n} \log n\right)$
- C.  $O(\log m / n \log n)$
- D.  $O(mn \log(mn))$
- E.  $O(mn \log(m) \log(n))$