

CS 561, HW2

Prof. Jared Saia, University of New Mexico

Due: Sept. 27th

Please use no outside references in solving these problems.

1. Consider the recurrence $T(n) = 3T(n/4) + \log^2 n$
 - (a) Use the Master method to get a general solution to this recurrence.
 - (b) Now use annihilators (and a transformation) to get a tight upper bound on the solution to this recurrence. Show your work. (Note that your two bounds should match)
2. Consider the following function:

```
int f (int n){
    if (n==0) return 3;
    else if (n==1) return 5;
    else{
        int val = 3*f (n-1);
        val = val - 2*f (n-2);
        return val;
    }
}
```

 - (a) Write a recurrence relation for the *value* returned by f . Solve the recurrence exactly. (Don't forget to check it)
 - (b) Write a recurrence relation for the *running time* of f . Get a tight upperbound (i.e. big-O) on the solution to this recurrence.
3. Exercise 6.1-4
4. Exercise 6.1-5

5. Exercise 6.4-2
6. Exercise 6.5-5
7. Problem 6-3
8. Exercise 7.1-3
9. Problem 7-1
10. Problem 7-2
11. Problem 7-3