

Slightly Harder (Spring 2017, MT2)

Give the runtime of the following functions in Θ or O notation as requested. Your answer should be as simple as possible with no unnecessary leading constants or lower order terms. For f5, your bound should be as tight as possible (so don't just put $O(N^{NM!})$ or similar for the second answer).

```
1 public static void f4(int N) {
2     if (N == 0) {return;}
3     f4(N / 2);
4     f4(N / 2);
5     f4(N / 2);
6     f4(N / 2);
7     g(N); // runs in  $\Theta(N^2)$  time
8 }
```

Runtime: $\Theta(\quad)$

```
1 public static void f5(int N, int M) {
2     if (N < 10) {return;}
3     for (int i = 0; i <= N % 10; i++) {
4         f5(N / 10, M / 10);
5         System.out.println(M);
6     }
7 }
```

Runtime: $O(\quad)$