

Lecture V

BASIC RESULTS IN THE TURING MODEL

Honors Theory, Spring'02.

§1. OVERVIEW

This is a reading guide to Chapter 2 of the complexity textbook. It is a long chapter, so we hope the following will make it more manageable.

Generally speaking, you know know the basic statements of the results, but not necessarily master all the proof techniques.

Sections 1, 2, 3: these are just definitions, and are essential.

Sections 4: Linear Reduction of Complexity. The main message you need to get away from this section is that time and space complexity for Turing machines is only meaningful up to Θ -order. This is embodied Corollaries 2 and 4. Skip theorem 5 and following.

Section 5: Tape reduction. You need to know the use of this theorem, and theorem 7 is all that you need.

Section 6, 7, 8: These are simulations by time, space and reversal respectively. Generally, you can omit any proofs in these sections that relate to reversals. But know some basic facts about them (e.g., the beginning of section 8 shows why reversal can be surprising).

Section 9: Complements of space classes. The two main theorems you must know are theorems 43 and 47. Theorem 47 is a major result, and its proof is very interesting, but you don't have to read it.

Sections 10 and 11: Skip.