Lecture #10: First Hard Problems
What Will Happen During the Lecture

Remember... You Had Homework!

Students were asked to have worked through a set of notes before this first lecture:

- Lecture Notes — "First Hard Problems"

Of course, you may attend the lecture presentation if you have not worked through this material ahead of time — but it will not be repeated for you during the lecture presentation.

Problems To Be Solved

The preparatory reading for this lecture introduced ***computable sets*** and ***computably enumerable sets***. On the other hand, CPSC 351 (or 331) introduced ***decidable languages*** and ***recognizable languages***. Since all languages are sets — namely, sets of strings over an alphabet — these definitions may seem similar. The connection between them will be more precisely explained — and proved — in the lecture presentation.

The preparatory reading also introduced a ***Parameter Theorem*** — which concerned indices (that is, encodings for) $\mathcal{S}$-programs. Now, other versions of this course — and textbooks that support them — sometimes use *Turing machines* as the basic model of computation instead of $\mathcal{S}$-programs. With that noted, a ***Parameter Theorem for Turing Machines*** — which might be included in other version of this course — will be discussed.