1077-03-449   **Julia F. Knight*** (`knight.1@nd.edu`). *The universal Turing machine, and Turing operators.*
Before Turing, there were single-purpose computers, designed to compute a particular function. One of Turing's great contributions was the idea of a universal Turing machine, which could simulate any of the single-purpose machines, by taking as part of its input a set of instructions, a *program.* Modern computers implement this idea.

Turing also defined the notion of relative computability. He imagined a machine that would compute a function $f(n)$, given answers to questions about membership in a set X. Turing imagined the answers coming from an "oracle". We do not need a different computer for each set X. We can use our ordinary universal machine, with an interactive program that may include questions about the oracle set. We write φ_e^X for the function computed using program e with oracle X. A Turing operator is a function $\Phi = \varphi_e$, given by program e, such that for each set $X \subseteq \omega$, φ_e^X is the characteristic function of a set Y. We write $\Phi(X) = Y$.

I will describe some things that we can do with Turing operators, to compare classification problems for various classes of structures. (Received September 01, 2011)