Chapter 1, problems 3, 5(iv) (read the sample solution to 5(i)), 7.

4. In class we showed that $H(x, x)$ is undecidable, that is there is no program that for all $x$ can output TRUE if program $P_x$ halts on input $x$ and outputs FALSE if program $P_x$ does not halt on input $x$. Now show that $H(x, 2x)$ is undecidable, i.e. show there is no program that for all $x$ can output TRUE if program $P_x$ halts on input $2x$ and outputs FALSE if program $P_x$ does not halt on input $2x$.

Hint: You will want to build a program $E$ (analogous to $D$ for the solution shown in class), but what matters particularly is the action of $E$ on even valued inputs.