1. Define $C= \left\{p \right| $ Run($p$, “aa”) $≅0$ and Run($p,$ “bb”) $≅1$}. Show that $C$ is not computable.
2. Let $A= \left\{p \right|$ Run($p$, “bbb”)$\downright $ }. Give a mapping reduction from $A$ to HLT.
3. Recall that $L(p)$ is the set of all strings on which program $p$ stops and returns 1. Define $B=\left\{p \right| L(p)$ is a regular language}. Is $B$ computable? Justify your answer.
4. For the purposes of this exercise, assume that the output of a program is an integer. Suppose $A=\left\{p \right| $Run($p,0) ≅5\}$ and $B=\left\{p \right| $Run($p,0) ≅10\}$. Give a mapping reduction from $A$ to $B$. Be sure that you know what properties the reduction needs to have before you start to describe the reduction.