Assignment # 8.1 Sample

1. Use reduction from Halt to show that one cannot decide REPEATS, where REPEATS = { f | for some x and y, $x \neq y$, $\varphi_f(x)\downarrow$, $\varphi_f(y)\downarrow$ and $\varphi_f(x) == \varphi_f(y)$ }
2. Show that REPEATS reduces to Halt. (1 plus 2 show they are equally hard)
3. Use Reduction from Total to show that DOUBLES is not even re, where DOUBLES = { f | for all x, $\varphi_f(x)\downarrow$, $\varphi_f(x+1)\downarrow$ and $\varphi_f(x+1)=2*\varphi_f(x)$ }
4. Show DOUBLES reduces to Total. (3 plus 4 show they are equally hard)
5. Use Rice's Theorem to show that REPEATS is undecidable
6. Use Rice's Theorem to show that DOUBLES is undecidable