ComSS 331 Fall 2017 Name:_____

HW 13 Due 8 dec 2017

1. Define an unrestricted grammar for the language $\{ww : w \in \{0,1\}^*\}$ 50

2. Are the following languages Turing decidable, Turing acceptable but not Turing-decidable, or not even Turing acceptable?

   - $L = \{\rho(M)\rho(w) : M$ uses a finite number of tape cells when running on input $w\}$.
   - $L = \{\rho(M)\rho(w)01^n0 : M$ uses at most n tape cells when running on input $w\}$.

   Here, "using n cells" means that the head of the (deterministic) TM M reaches the n-th cell from the left during its computation. Justify your answers clearly: both exercises require careful thinking. 100