CS 1511 Homework 25

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51 a. u1 = 0 u2 = 1 u3 = 1

52. NP = L-PCP(log n)
NP = {L: there is a logspace machine M s.t x $\in$ L iff $\exists$ y : M accepts (x,y) }.
L-PCP(log n) = {L : there is a logspace machine M s.t x $\in$ L iff $\forall$ y : M accepts (x,y) with probability 1 and x $\notin$ L iff $\forall$ y : M rejects (x,y) with probability $\geq 1/2$}
We need to show two things

NP $\subseteq$ L-PCP(log n)
L $\in$ NP
$\exists$ M that decides L
This is simple, have the log space verifier tape of the NP machine M become the random bits that the L-PCP(log n) uses.
This will accept and reject with probability 1, which falls under the L-PCP(log n) conditions.
L $\in$ L-PCP(log n)

L-PCP(log n) $\subseteq$ NP
L $\in$ L-PCP(log n)
$\exists$ M that decides L
Run the machine and build a set R that is the random bits used when the machine accepts for a logirithmic sized R. Then use this set R to build the NP machine with R as the verifier tape.
L $\in$ NP