Homework #8 *due to be announced*

Question 1

Describe a *TM M* in both graphical and compositional tabular forms that *decides* the language

$L = \{u \in \Sigma_0^* \mid u = u^R \}$

(*Hint : you may use an extra symbol* $\$ \notin \Sigma_0$ *and choose as initial ID :* *(s, #u))*

Question 2

Describe a TM *M* in both graphical and compositional tabular forms that performs the following

computation :

(s, $w#) |---*_M (h, $u#)

where *u* is obtained from *w* by compressing all blank (#) symbols in *w* and *$* is a special symbol

not used in *w*.

Question 3

Construct a *TM M* (*multitape* and/or *nondeterministic* if necessary!) that decides the language

below (*specify the TM in tabular compositional form*).

$L_n = \{\omega \in (0+1)^* \mid w = u.u.u \ , \ u \in (0+1)^*\}$

Question 4

Construct a *TM M* (*multitape* and/or *nondeterministic* if necessary!) that decides the language

below (*specify the TM in tabular compositional form*).

$L_n = \{\omega \in (a+b+c+d)^* \mid w = a^n \ b^m \ c^n \ d^m \ , \ n, m > 0)$

Question 5

Construct *TMs* in compositional tabular forms (*multitape* and/or *nondeterministic* if necessary!)

that perform the following computations :

 (i) *(s, #w) |---*_M (h, #w^R)*

(ii) *(s, #w) |---*_M (h, #ww)*

(iii) *(s, #w) |---*_M (h, #w#w^R)*

(iv) *(s, #w) |---*_M (h, #a^n b^n)* *where the number of a*s *and b*s *in w are both equal to a fixed*

integer n > 0.