

Department of Computer Science & Engineering
National Institute of Technology Srinagar

Assignment No: 5

Due Date: 30/06/2020

(Theory of Computation)

- Q1. Obtain a PDA to accept the language $L(M) = \{ w \mid w \in (a + b)^* \text{ and } n_a(w) = n_b(w) \}$.
- Q2. Obtain a PDA to accept the language $L(M) = \{ w \mid w \in (a + b)^* \text{ and } n_a(w) > n_b(w) \}$.
- Q3. Obtain a PDA to accept a string of balanced parenthesis. The parenthesis to be considered are (,), [,]. Is the PDA deterministic?
- Q4. Obtain a PDA for the grammar given below:
- $S \rightarrow aABB \mid aAA$
- $A \rightarrow aBB \mid a$
- $B \rightarrow bBB \mid A$
- $C \rightarrow a$
- Q5. Obtain a TM to accept the language $L = \{ w \mid w \in (0+1)^* \text{ containing the substring } 001 \}$.
- Q6. Obtain a TM to accept the language $L = \{ w \mid w \text{ is even and } \sum = (a, b) \}$.
- Q7. Obtain a TM to accept a string w of a 's and b 's such that $n_a(w) = n_b(w)$.
- Q8. Obtain a TM to accept a palindrome consisting of a 's and b 's of any length.
- Q9. Obtain a TM that accepts the language of odd integers written in binary.
- Q10. Show that there exists a TM for which the Halting problem is unsolvable.