Problem 2 :

Description : The acceptable strings of the language are ε (Null string), aa, bb, aaaaabbbb, babbabb etc.

Non acceptable strings are aaaaaaaba bbbbbbbaba abababab etc

Deterministic finite automata for the given language is given above:

$DFAM = (Q, \Sigma, \delta, Q_0, F)$ where

Q = set of all states
$$= \{Q_0, Q_1, Q_2, Q_3, Q_4\}$$

Σ = input Alphabet = $\{a, b\}$

Start state is Q_0

F = Set of all states = $\{Q_2, Q_4\}$ and the transitions are defined in the transition diagram

Test cases :

Input 1 — aabb   output - string accepted

Input 2 — aaab   output - string not accepted

Input 3 — aaaa   output - string accepted

Input 4 — aaa   output - string not accepted