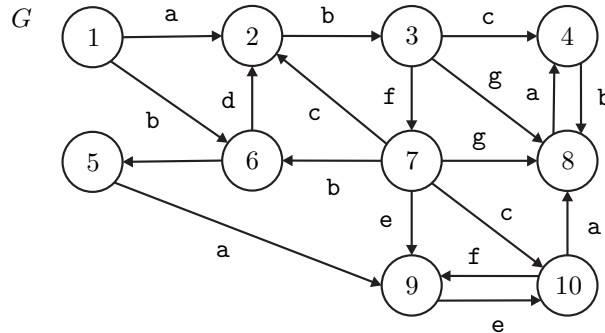


**Exercise Sheet 9: State Attraction****Problem 21:**

Consider the automaton  $G = (X, \Sigma, \delta, x_0, X_m)$  in the following figure.



- Find all strongly connected components of  $G$ .
- Consider the sets  $A_1 = \{4, 8\}$ ,  $A_2 = \{9, 10\}$  and  $A_3 = \{2, 3, 4, 8\}$ . Determine which of the sets is invariant in  $G$ .
- Find an as small as possible set  $A \subseteq X$  such that  $A$  is a strong attractor for  $X$  in  $G$ ?

**Problem 21:**

Consider the plant  $G$  in the previous figure with the set of uncontrollable events  $\Sigma_u = \{a, c, e\}$  and the invariant set  $A = \{4, 8\}$ .

- Determine the supremal set  $\Omega_G(A)$ .
- Determine a state-feedback supervisor  $S \sqsubseteq G$  such that  $A$  is a strong attractor for  $\Omega_G(A)$  in  $G$ .