regarded as a binary relation (denoted by *co* on the set of events $A = \{ e_1, e_2, \ldots \}$) which is (1) reflexive (e_i *co* e_i) and (2) symmetric (e_1 *co* e_2 implies e_2 *co* e_1), (3) but not transitive (e_1 *co* e_2 and e_2 *co* e_3 do not necessarily imply e_1 *co* e_3). For example, one may drive a car (event e_1) or walk (event e_3) while singing (event e_2), but one can not drive and walk concurrently.

Note that each place in the net shown in Fig. 2.4 has exactly one incoming arc and exactly one outgoing arc. The subclass of Petri nets with this property is known as marked graphs. Marked graphs allow representation of concurrency but not decisions (conflicts).

Two events e_1 and e_2 are *in conflict* if either e_1 or e_2 can occur but not both, and they are concurrent if both events can occur in any order without conflicts. A situation where conflict and concurrency are mixed is called a confusion. Two types of confusion are shown in Fig. 2.5. Fig. 2.5(a) shows a symmetric confusion, since two events t_1 and t_2 are concurrent while each of t_1 and t_2 is in conflict with event t_3. Fig. 2.5(b) shows an asymmetric confusion, where t_1 is concurrent with t_2 but will be in conflict with t_3 if t_2 fires first.

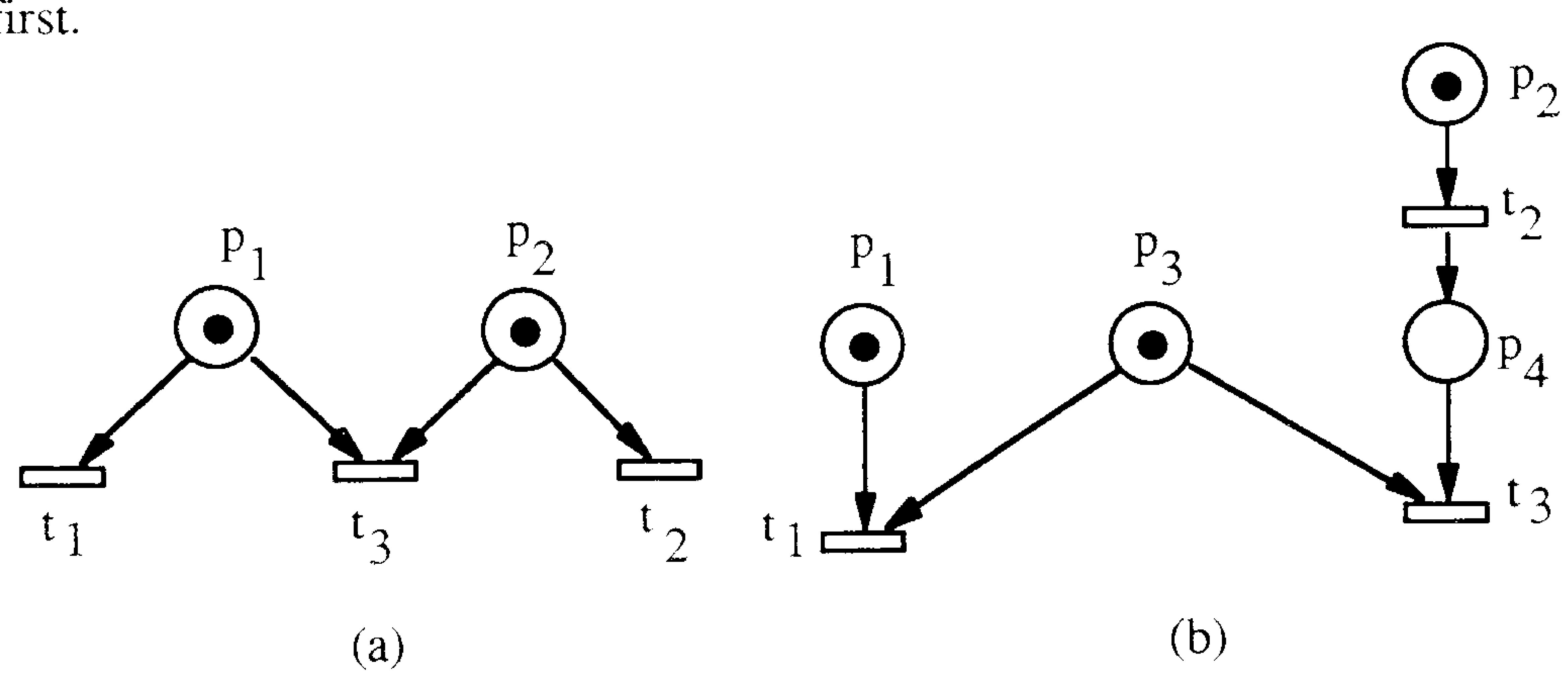

Fig.2.5. Two types of a confusion. (a) Symmetric confusion: t_1 and t_2 are concurrent as well as in conflict with t_3. (b) Asymmetric confusion: t_1 is concurrent with t_2 but will be in conflict with t_3, if t_2 fires before t_1.