concepts to nets as in an unconditionally fair net. That is, a Petri net (N, M_0) is said to be *strongly fair* or *weakly fair* if every firing sequence $\sigma \in L(M)$, $M \in R(M_0)$, is strongly fair or weakly fair, respectively.

From the above definitions, the following property is obvious:

Property 3.1. Unconditional fairness => Strong fairness => Weak fairness. That is , the unconditional fairness is strongest and implies the others.

Example 3.7: The converse of Property 3.1 is not true. For example in the net shown in Fig. 3.6(a), the firing sequence $<t_1, t_2, t_3>^\infty$ is strongly fair (since t_4 is never enabled in this sequence), but it is not unconditionally fair. In the net shown in Fig. 3.6(b), the firing sequence $<t_2, t_3, <t_3, t_4>^\infty>$ is weakly fair since the transitions t_1 and t_2 are not continuously enabled. However, it is not strongly fair since t_1 is enabled infinitely often but it is never fired in $<t_2, t_3, <t_3, t_4>^\infty>$. The firing sequence $<t_3, t_4>^\infty$ for the net shown in Fig.3.6(b) is neither weakly fair, nor strongly fair. The firing sequence $<t_2, t_1>^\infty$ in Fig. 3.4(d) is not unconditionally fair, nor strongly fair since t_3 is infinitely enabled but never fires; but it is weakly fair since there is no continually enabled transition. *In this book, the symbol* $<\sigma>^\infty$ *denotes an infinite sequence repeating* σ *infinitely.*

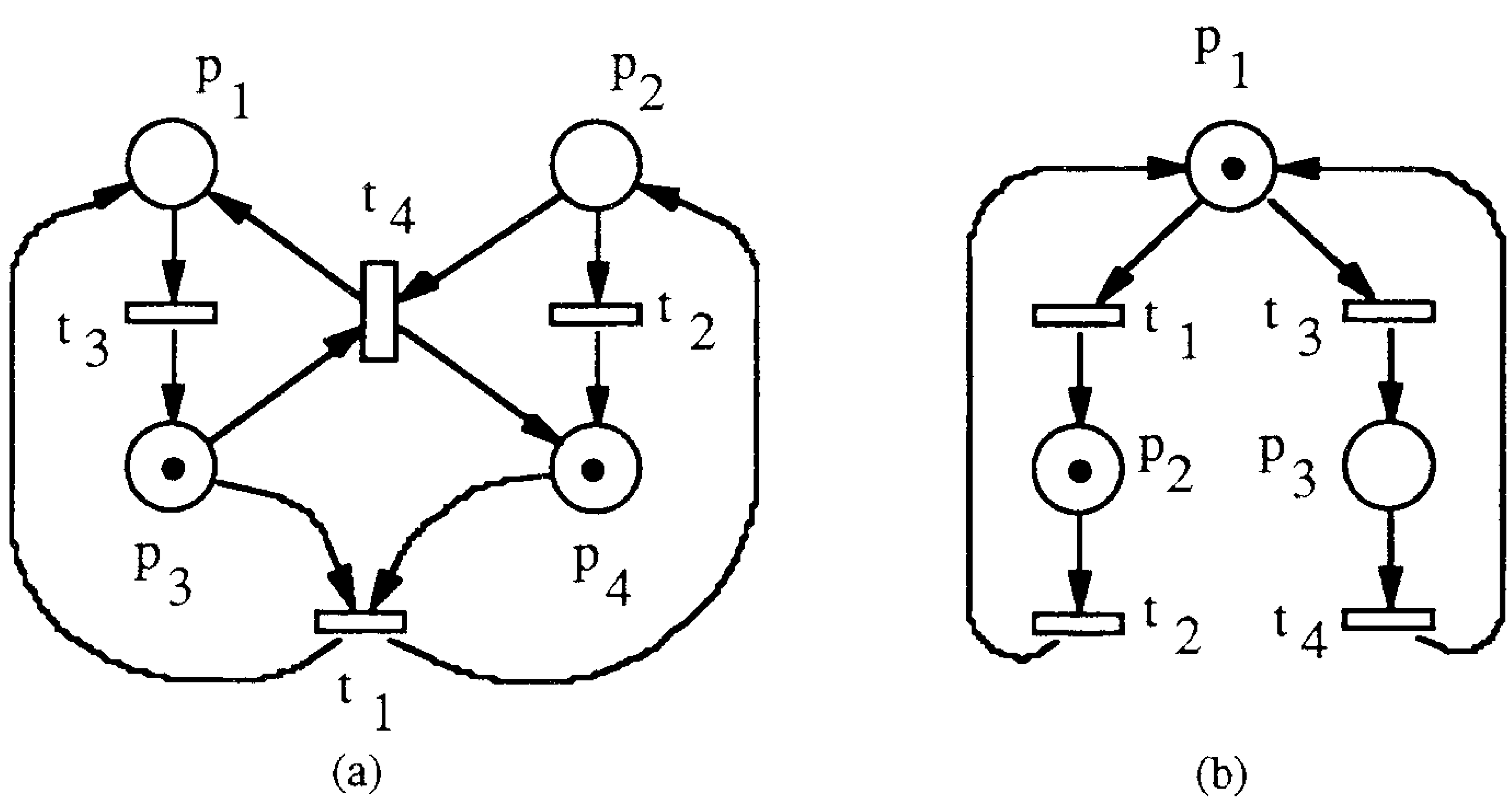

Fig. 3.6 (a) The firing sequence $<t_1, t_2, t_3>^\infty$ is strongly fair, but it is not unconditionally fair; and