



Fig.3.4. (continued) (g) BLR'. (h) BLR.

Example 3.3. Note that the above three properties: boundedness, liveness, and reversibility are independent of each other. For example, a reversible net can be live or not live and bounded or not bounded. Fig. 3.4 shows examples of eight Petri nets for all possible combinations of these three properties, where B' , L' and R' denote the negations of boundedness (B), liveness (L) and reversibility (R).

3.5 Coverability

A marking M in a Petri net (N, M_0) is said to be *coverable* if there exists a marking M_1 in $R(M_0)$ such that $M_1(p) \geq M(p)$ for each p in the net. Coverability is closely related to L1-liveness (potential firability). Let M_{\min} be the minimum marking needed to enable a transition t in (N, M_0) . Then, t is dead (not L1-live) if and only if M_{\min} is not coverable. That is, t is L1-live in (N, M_0) if and only if M_{\min} is coverable.

Example 3.4: In the net (N, M_0) shown in Fig.3.1, the marking $M_1 = (0 \ 0 \ 0 \ 0 \ 0 \ 1)$ is coverable and is the minimum marking needed to enable t_5 , and t_5 is L1-live. In the net