BEHAVIORAL SUBCLASSES OF C/E SYSTEMS

Conflict, Concurrency, Confusion=> behavioral subclasses of C/E systems

Definition 1: $N=(B, E, F, C_{in})$ is C/E system
i> N is sequential if and only if

$$\forall_{E \in E_N} \; |E| = 1$$

ii> N is deterministic if and only if

$$\forall_{C \in C_N} \; \forall_{e_1, e_2 \in E} \; [C[e_1> \; \& \; C[e_2> \rightarrow C[\{e_1, e_2\}>]$$

iii> N is confusion-free if and only if there is no confusion in N.

Examples:

1>

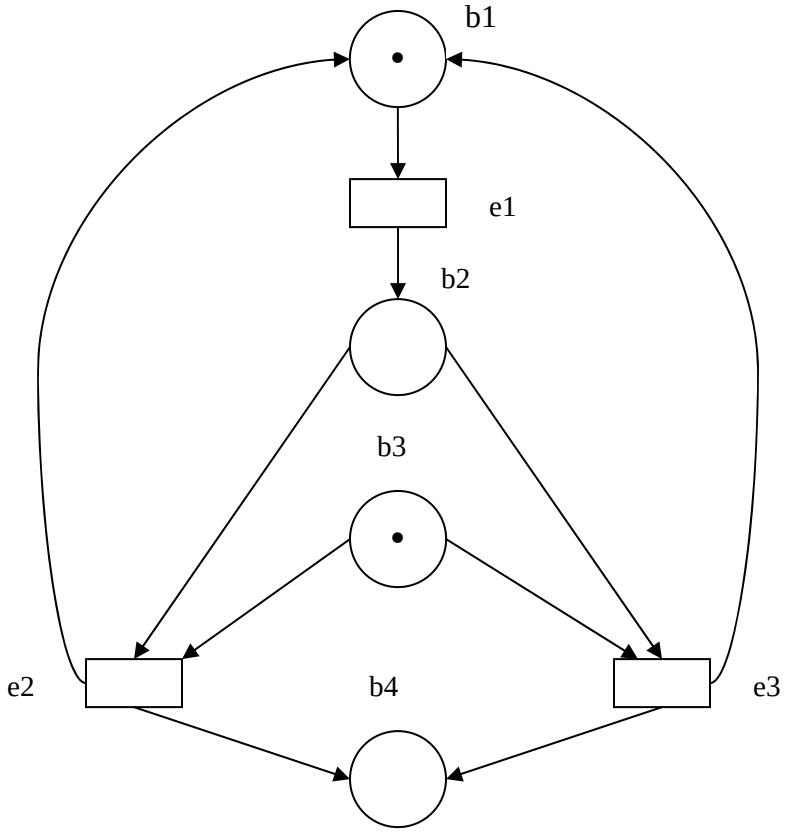

Figure 1. Illustration of sequential C/E system.

Reachability graph of C/E system from Figure 1.

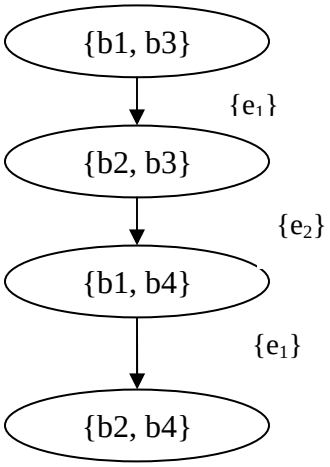

Figure 2. Reachability graph

This system is sequential because |E| = 1 and it is also trivially deterministic because left part of implication is not true, and 0 => 1

Remark: However not every sequential system is deterministic

2>

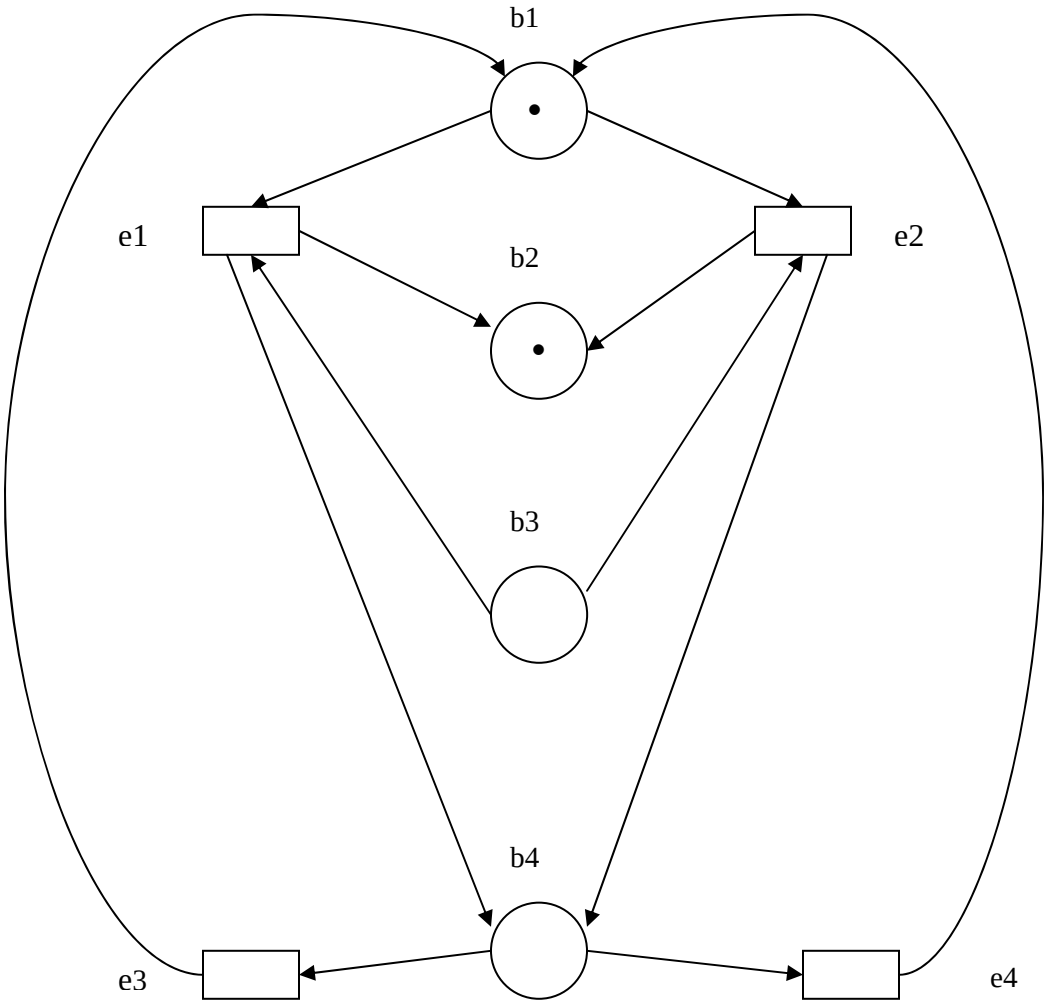

Figure 3. Illustration of C/E system with nondeterminism.

Reachability graph

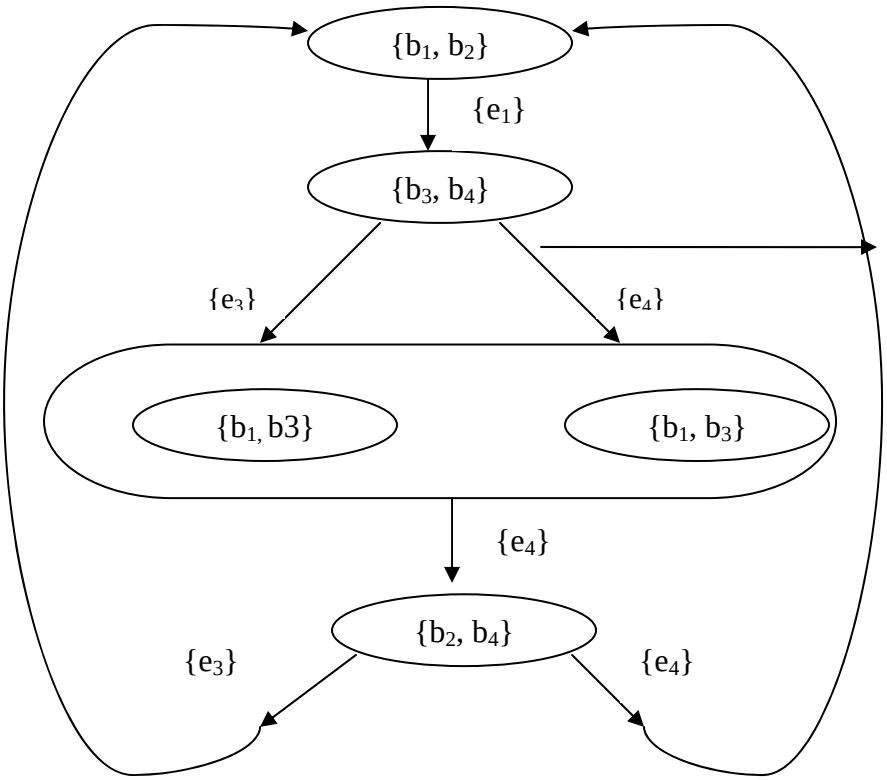

Figure 4. Reachability graph of C/E system from Figure 3.

System which is sequential but non deterministic.

3>

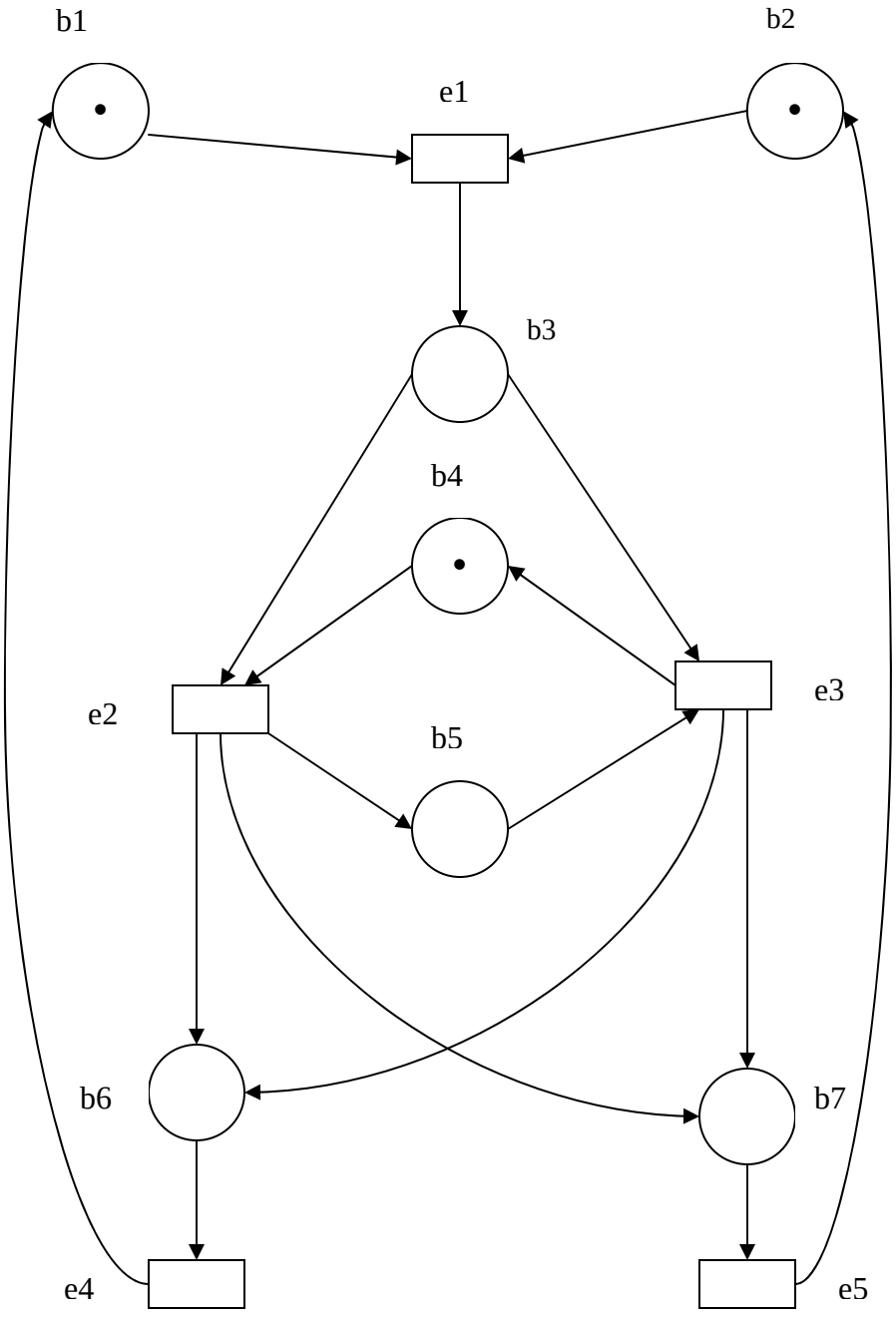

Figure 5. C/E system that is non-sequential but deterministic.

Reachability graph

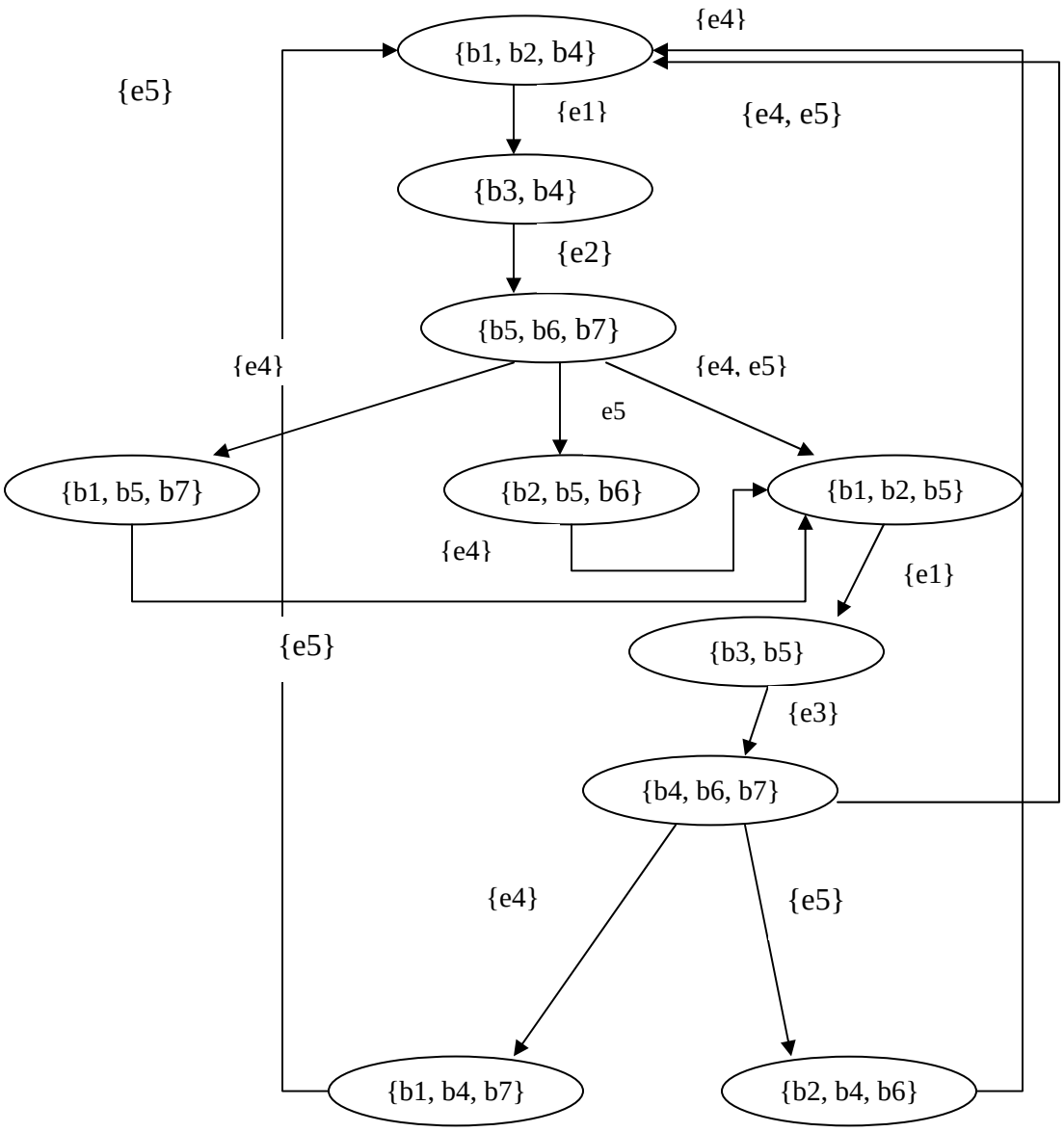

Figure 6. Reachability graph of C/E system from Figure 5.

Non-sequential but deterministic system.

4>

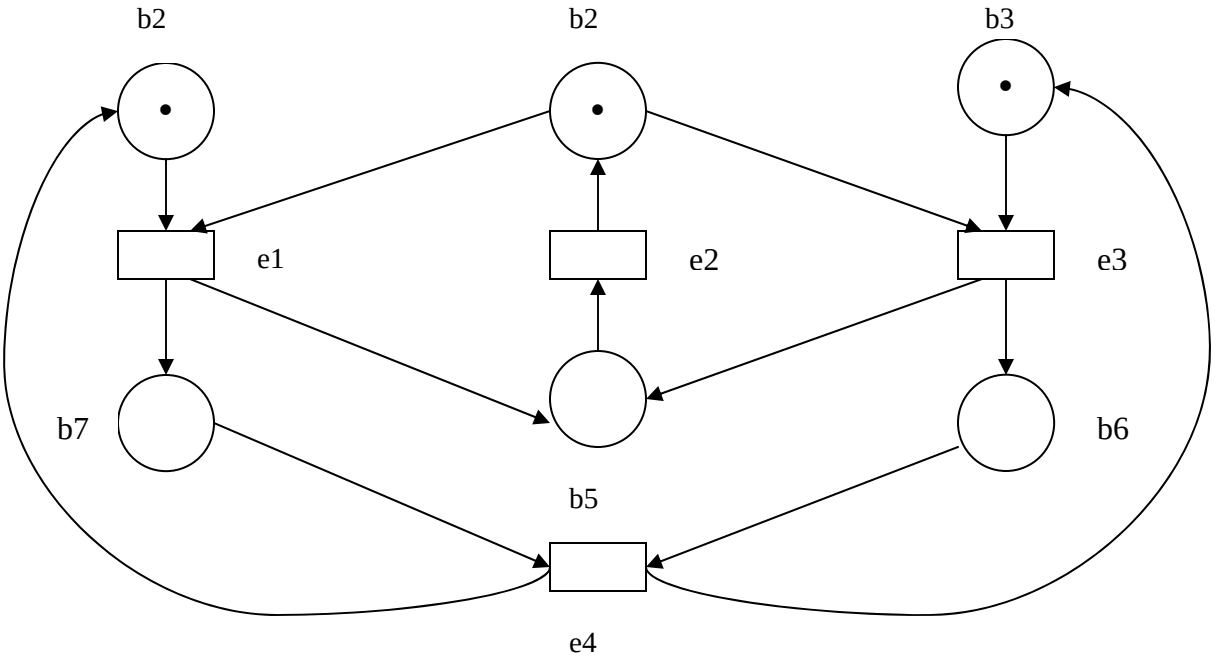

Figure 7. Illustration of C/E system that is non-sequential, nondeterministic, and confusion-free.

Reachability graph

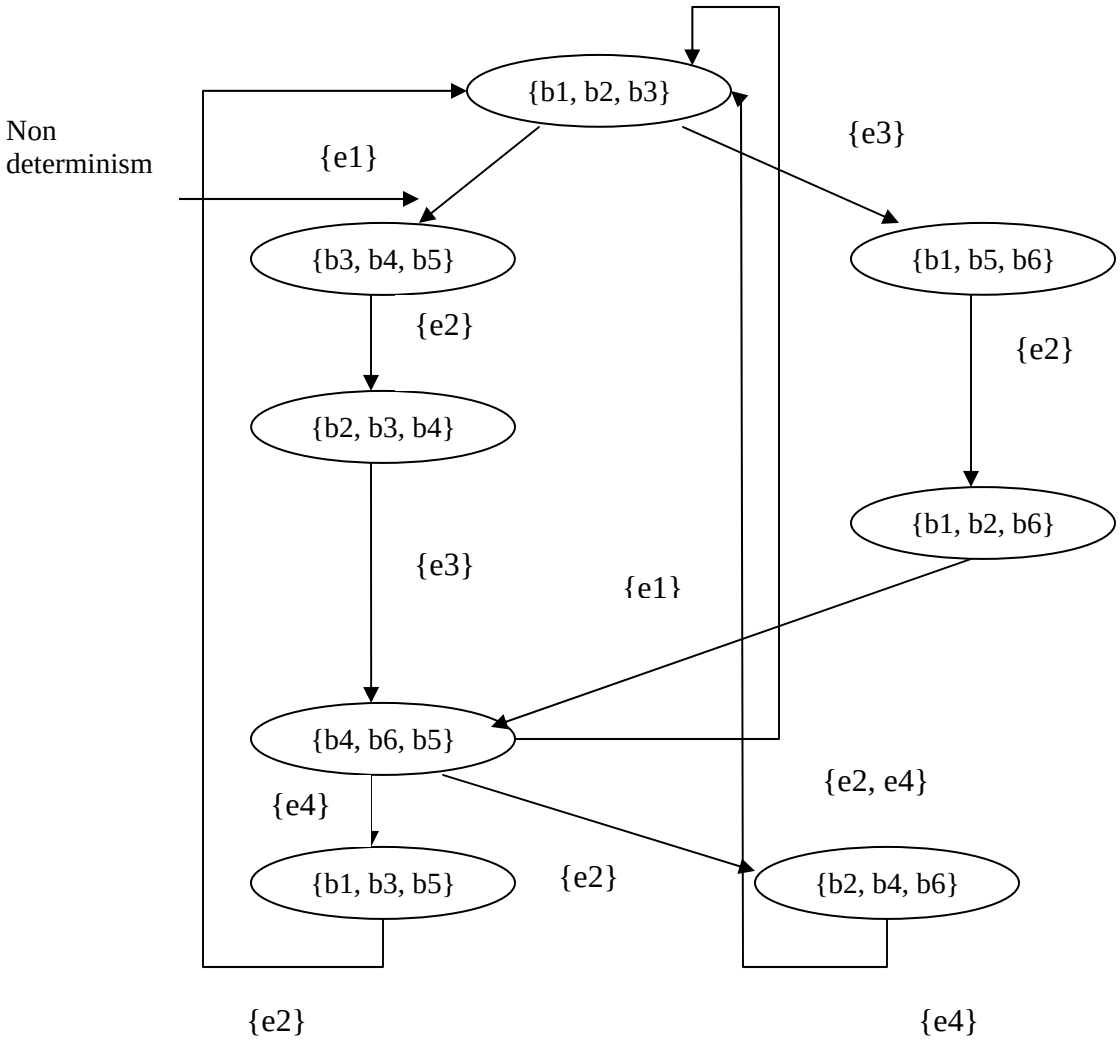

Figure 8. Reachability graph of C/E system from Figure 7.

Non-sequential √ (≡ concurrent)
Non-deterministic √
Confusion-free

5>

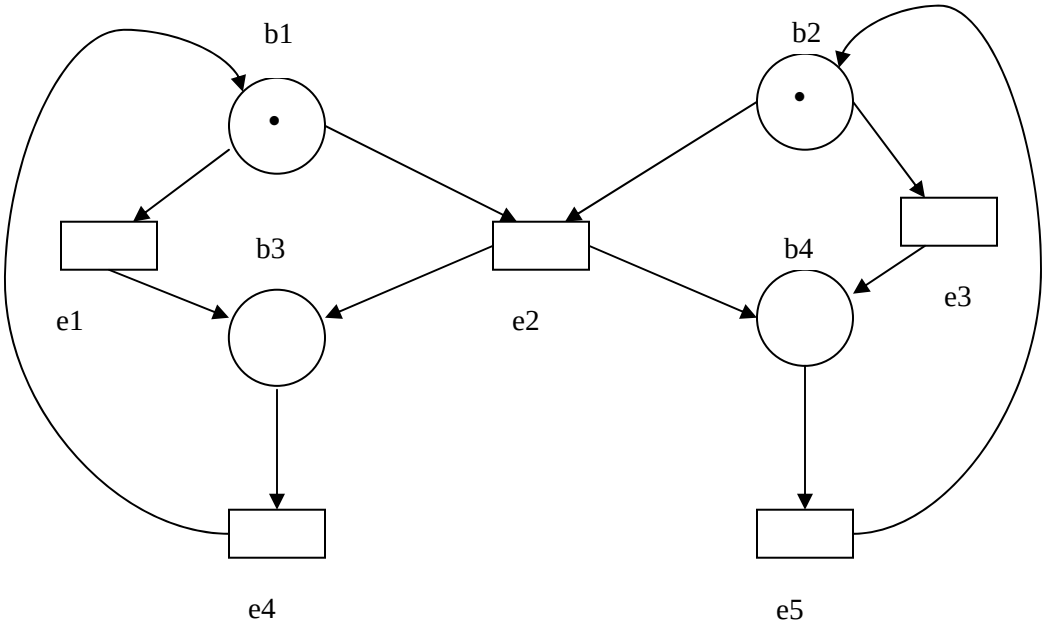

Figure 9. Illustration of C/E system with nondeterminism, non-sequential and with confusion.

Reachability graph

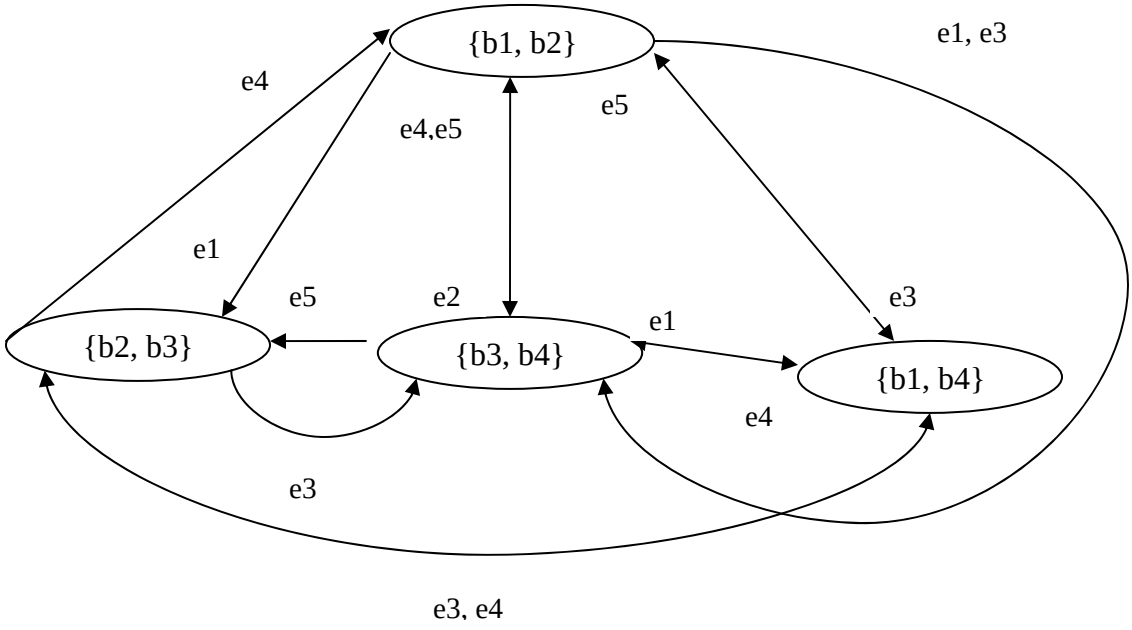

Figure 10. Reachability graph of C/E system from Figure 9.

Non-sequential √,
Non –deterministic √,
Confusion (asymmetric, and symmetric)