```
1 class System {
   STATE_MACHINE(Machine) {
3   INITIAL_STATE(S1,S1_entry,S1_exit,NULL){
    INITIAL(Initial1);
5    STATE(S11, S11_entry, S11_exit) {
     STATE(S111, S111_entry, S111_exit);
7    };
     CHOICE(c1);
9    EXIT_POINT(ex1);
    };
11   STATE(S2, S2_entry, S2_exit) {
     SHALLOW_HISTORY(h1);
13    STATE(S21, S21_entry, S21_exit);
     FINAL_STATE(S2_final);
15   };
    STATE(S3, S3_entry, S3_exit);
17  FINAL_STATE(FinalState1);
    //Event table definitions
19  //Transition table
    TRANSITION_TABLE {
21    TRANSITION(S111,c1,NULL,NULL,NULL);
     TRANSITION(c1,ex1,NULL,NULL,NULL);
23   TRANSITION(c1,S3,NULL,NULL,NULL);
    }
25 };
   void S1_entry() {
27  //Entry action for S1
   }
29 //...
   //class member declarations
31};
```
(a)

```
1 class System {
   STATE_MACHINE(Machine) {
   INITIAL_STATE(S1,S1_entry,S1_exit,NULL){
    INITIAL(Initial1);
5    STATE(S11, S11_entry, S11_exit) {
     STATE(S111, S111_entry, S111_exit);
7    };
     CHOICE(c1);
9   };
    STATE(S2, S2_entry, S2_exit) {
11   DEEP_HISTORY(dh1);
    STATE(S21, S21_entry, S21_exit) {
13    STATE(S211, S211_entry, S211_exit);
    };
15  };
   FINAL_STATE(FinalState1);
17  //Event table definitions
   //Transition table
19  TRANSITION_TABLE {
    TRANSITION(S111,c1,NULL,NULL,NULL);
21   TRANSITION(c1,dh1,NULL,NULL,NULL);
    TRANSITION(c1,FinalState1,NULL,NULL,NULL);
23  }
   };
25 void S1_entry() {
    //Entry action for S1
27 }
   //...
29 //class member declarations
   };
31
```
(b)