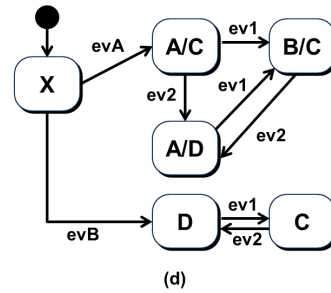
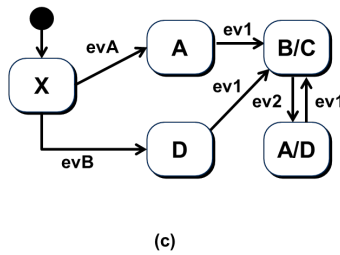
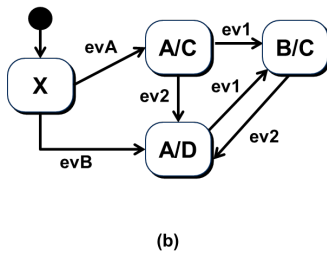
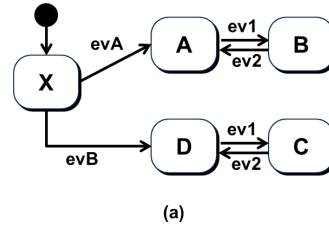
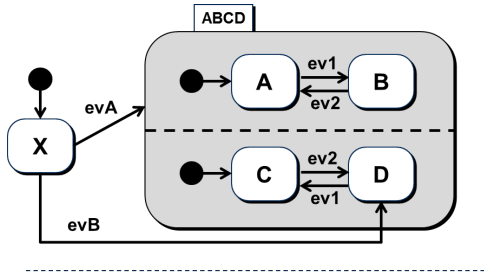
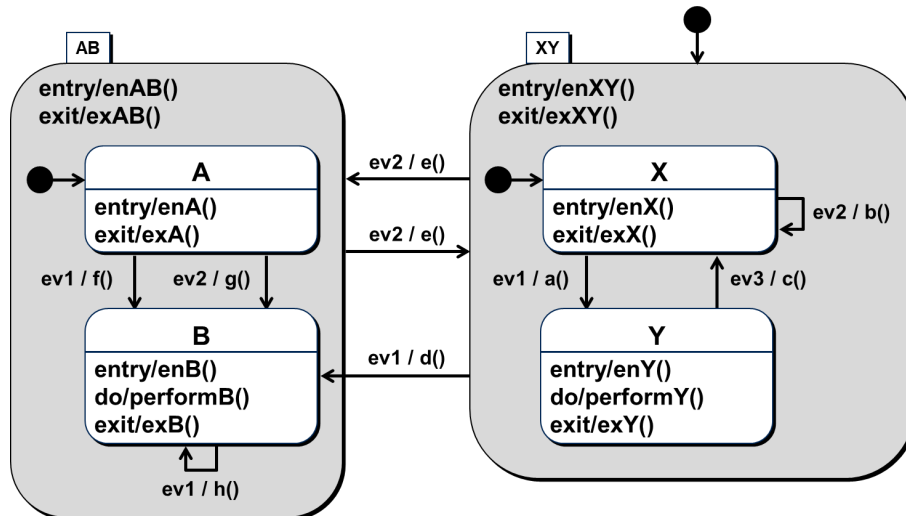


Multiple Choice Questions

1) (10 marks) Identify all of the flattened state machines that conform to the state machine in the top left corner.



2) (10 marks) Identify all of the following action sequences that do not conform to the state machine.

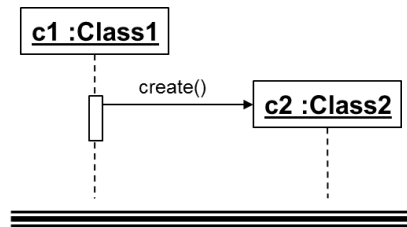


- a) exX() - a() - enY() - performY() - exY() - exXY() - e() - enAB() - enA()
- b) exA() - g() - enB() - performB() - exB() - h() - enB() - performB() - e()
- c) exX() - e() - enAB() - enA() - exA() - f() - enB() - performB() - exB()
- d) exXY() - d() - enB() - performB() - exB() - h() - enB() - performB() - exB()

3) **(10 marks)** Identify all of the following statements that are incorrect.

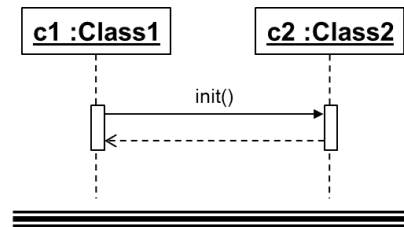
- a) A shallow history state remembers more or the same as a deep history state.
- b) A shallow history state remembers the last active sub-state of a composite state before the most recent exit from the composite state.
- c) A deep history state may be used more than once whereas a shallow history state may only be used once.
- d) A deep history state remembers all states that have been visited since the initial state of the state machine.

4) **(10 marks)** Identify all of the following pairs where the implementation matches the sequence diagram.



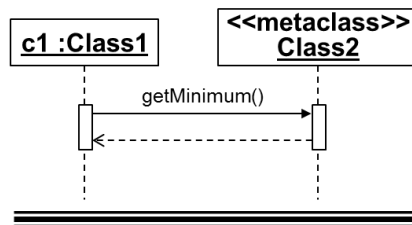
c2.create()

(a)



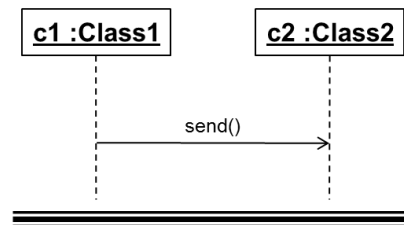
c2.init()

(b)



c2.getMinimum()

(c)



c1.send()

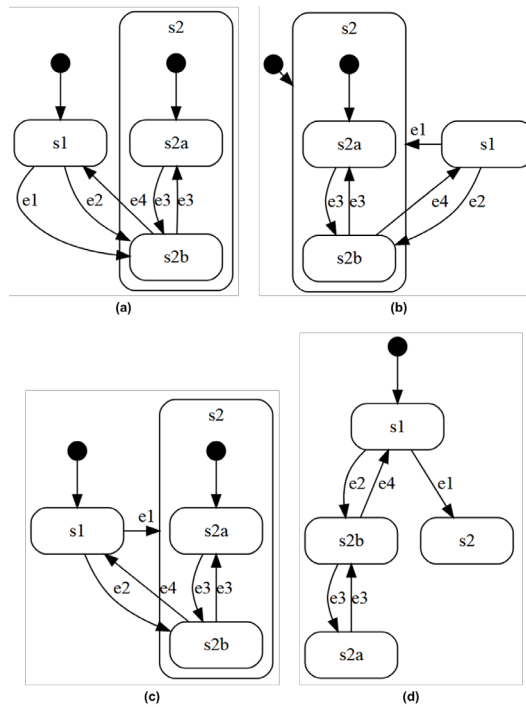
(d)

5) **(10 marks)** Which one of the following statements is the most accurate?

- a) The Model-View-Controller Pattern ensures that the persistence layer never has to be changed.
- b) The Model-View-Controller Pattern separates the Controller from the View.
- c) The Model-View-Controller Pattern separates the Model from the View.
- d) The Model-View-Controller Pattern separates the Controller from the Model.

6) (10 marks) Identify all of the following state machine diagrams that correspond to the Uml specification.

```
class A {
    sm {
        s1 {
            e1 -> s2;
            e2 -> s2b;
        }
        s2 {
            s2a {
                e3 -> s2b;
            }
            s2b {
                e3 -> s2a;
                e4 -> s1;
            }
        }
    }
}
```



7) (10 marks) How often does the generated code for the state machine on the right not correspond to the Uml specification on the left? Assume that the enumeration, fields, and other methods not shown on the right are correct.

- a) Never
- b) Once
- c) Twice
- d) Three times

```
class A {
    sm {
        s1 {
            e1 -> s2;
            e2 [isActive()] -> s1;
        }
        s2 {
            e2 / {activate();} -> s2;
            e3 -> s1;
        }
    }
}

private boolean isActive() {
    // TODO
}

private void activate() {
    // TODO
}
```

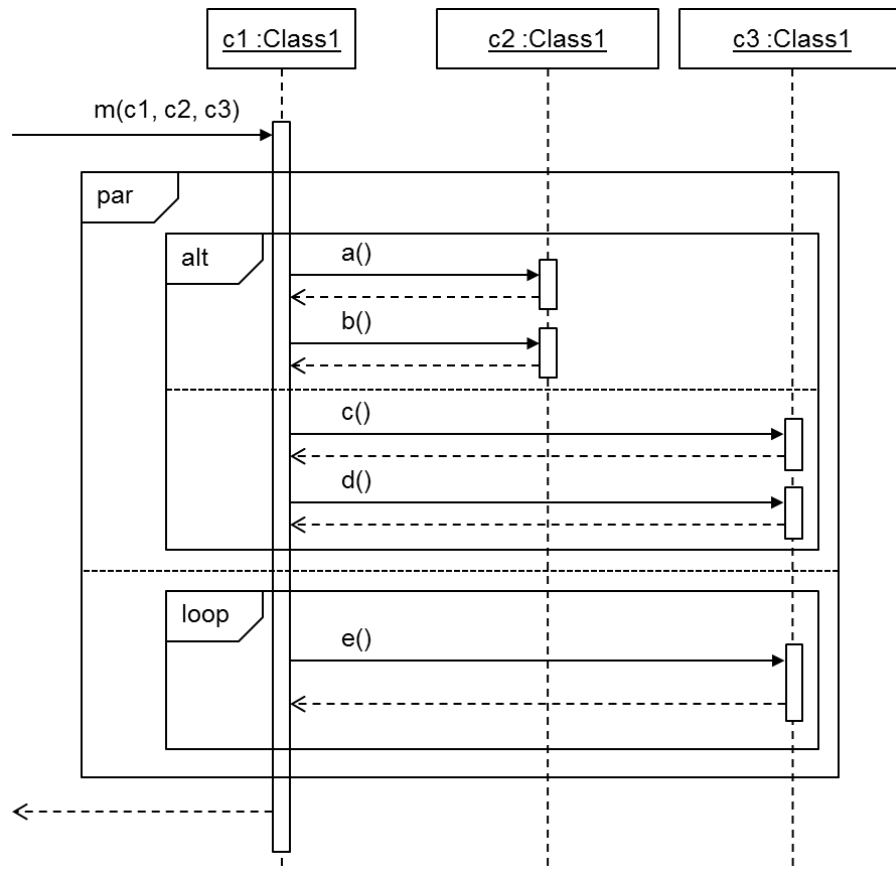
```
public A()
{
}

public boolean e2()
{
    boolean wasEventProcessed = false;
    Sm aSm = sm;
    if (isActive())
    {
        switch (aSm)
        {
            case s1:
                setSm(Sm.s1);
                wasEventProcessed = true;
                break;
            case s2:
                activate();
                setSm(Sm.s2);
                wasEventProcessed = true;
                break;
            default:
                // Other states do respond to this event
        }
    }
    return wasEventProcessed;
}
```

8) **(10 marks)** Identify all of the following statements that are correct.

- a) A deferred event occurs in one state but may be acted upon in another state.
- b) A deferred event is a special case of a completion transition.
- c) Regions in a state machine may not interact with each other.
- d) Regions in a state machine may react to the same event in parallel.

9) **(10 marks)** Identify all of the following message sequences that conform to the sequence diagram. Assume that all preceding and following messages are correct.



- a) <preceded by other messages> - a() - b() - c()- d()- e() - <followed by other messages>
- b) <preceded by other messages> - e() - a() - e()- e()- b() - <followed by other messages>
- c) <preceded by other messages> - a() - e() - e()- e()- e() - <followed by other messages>
- d) <preceded by other messages> - e() - d() - e()- e()- d() - <followed by other messages>

10) **(10 marks)** Which one of the following statements is the most accurate?

- a) There exists a Mealy automaton that cannot be expressed as a Moore automaton.
- b) There exists a Moore automaton that cannot be expressed as a Mealy automaton.
- c) A Moore automaton is more concise than a Mealy automaton.
- d) Any Moore automaton can be expressed as a Mealy automaton and vice versa.