

State Machine Misconceptions

What not to do when writing a state machine program.

Don't Call SDK Actions Directly

```
class Forward75(StateNode):  
    def start(self, event=None):  
        self.robot.drive_straight(distance_mm(75))  
        self.post_completion()
```

This is bad code. It bypasses all the FSM machinery for keeping track of running actions and generating completion events.

Read the implementation of Forward in nodes.py to see how the Forward node actually works.

Do Use Subclass To Modify An Action's Behavior

```
class Forward75(Forward):  
    def __init__(self, **kwargs):  
        super().__init__(**kwargs)  
        self.distance = distance_mm(75)
```

Don't Try to Call Node Constructors in the Body of a start() Method

```
class TriangleLeg(StateNode):  
    def start(self, event=None):  
        Forward(50)  
        Turn(120).now()  
        self.parent.post_completion()
```

Do Use the State Machine Language

```
class TriangleLeg(StateNode):  
    $setup {  
        Forward(50) =C=> Turn(120) =C=>  
        ParentCompletes()  
    }
```

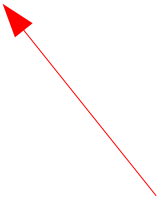
Constructors Are Only Called Once

Node constructors are only called once, when the state machine is being set up, not when the state machine is executing.

```
$setup {
```

```
    Turn(robot.pose.rotation.angle_z.degrees/2)
```

```
}
```



This is not the robot's pose at the time the node is started; it's the pose at the time the node was created. See next slide for how to do it right.

Do Put Dynamic Logic in start()

```
class TurnMore(Turn):  
    def start(self, event=None):  
        heading = self.robot.pose.rotation.angle_z.degrees  
        self.angle = degrees(heading/2)  
        super().start(event)
```

Bad Style: Spaghetti Code

```
$setup {  
  rock: Say("rock")  
  turn: Turn(180)  
  and_roll: Say("and roll")  
  
  rock =C=> turn =C=> and_roll  
  turn =Tap=> and_roll  
}
```


Proper Style: Group Each Node's Creation and Outgoing Transitions Together

```
$setup {  
  rock: Say("rock") =C=> turn  
  
  turn: Turn(180)  
  turn =C=> and_roll  
  turn =Tap=> and_roll  
  
  and_roll: Say("and roll")  
}
```

Follow Naming Conventions

- 1) Class names must begin with a capital letter.
- 2) Node labels in state machines should be lowercase.
- 3) The name of the StateMachineProgram class must match the name of the fsm file.