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1a)

The environment involved in autonomous golf carts is partially observable. One reason might include the limitation of sensors of the agent. For example, visual sensors in the golf cart might have blind spots, like a person standing behind a tree.

Another possible reason that the environment is partially observable is due to unknown environmental factors, such as the intention of pedestrians to cross the road.

1b)

The environment is a collaborative multi-agent environment. This is because there are likely other drivers or golf carts that are working together to prevent accidents.

1c)

The environment is stochastic. For example, since the intention of pedestrians are not known, when the golf cart detects a pedestrian at the side of the road, there is a chance that they will wait for a safe time to cross, or they might jay walk. This is a seemingly probabilistic situation and cannot be determined just based on prior actions the agent takes.

1d)

The environment is sequential. This is because the decisions of the golf cart will affect what it should do in the future. For example, the decision of the golf cart to speed up at a green light might mean it passes the traffic light before it turns red, and it does not have to stop. However, if the cart slows down, it might have to stop at the light.

2a)

Fly(P1, JFK, JFK)

Fly(P1, JFK, SFO)

Fly(P2, SFO, JFK)

Fly(P2, JFK, SFO)

2b)

At(C1, SFO) ^ In(C2, JFK) ^ At(P1, SFO) ^ At(P2, JFK) ^ Cargo(C1) ^ Cargo(C2) ^ Plane(P1) ^ Plane(P2) ^ Airport(JFK) ^ Airport(SFO)

3a)

At(Monkey, A) ^ At(Bananas, B) ^ At(Box, C) ^ Height(Monkey, Low) ^ Height(Bananas, High) ^ Height(Box, Low) ^ isMonkey(Monkey) ^ Climbable(Box)

3b)

Go(m, start, end):

Precond: isMonkey(m) ^ At(m, start) ^ Height(m, Low)

Effect: ~At(m, start) ^ At(m, end)

Push(m, o, start, end):

Precond: isMonkey(m) ^ At(m, start) ^ At(o, start) ^ Height(m, Low) ^ Height(o, Low)

Effect: ~At(m, start) ^ ~At(o, start) ^ At(m, end) ^ At(o, end)

ClimbUp(m, o, x):

Precond: isMonkey(m) ^ At(m, x) ^ At(o, x) ^ Height(m, Low) ^ Height(o, Low) ^ Climbable(o)

Effect: ~Height(m, Low) ^ Height(m, High)

ClimbDown(m, o, x):

Precond: isMonkey(m) ^ At(m, x) ^ At(o, x) ^ Height(m, High) ^ Height(o, Low) ^ Climbable(o)

Effect: ~Height(m, High) ^ Height(m, Low)

Grasp(m, o, x, h):

Precond: isMonkey(m) ^ At(m, x) ^ At(o, x) ^ Height(m, h) ^ Height(o, h)

Effect: ~At(o, x) ^ ~Height(o, h) ^ Hold(m, o)

Ungrasp(m, o, x, h):

Precond: isMonkey(m) ^ At(m, x) ^ Hold(m, o) ^ Height(m, h)

Effect: ~Hold(m, o) ^ At(o, x) ^ Height(o, h)