Module 10 Self Check

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1 Permissible Actions

Evaluation Strategy: Identify preconditions, match each variable to item in corresponding state, verify preconditions met, return permissible or not based on that.

Step 1: What does: (fly ?plane, ?from, ?to)
precondition: (plane ?plane), (airport ?to), (airport ?from) (at ?plane ?from) mean?

Means that for fly to be permissible we need a valid plane, a from and to as airports, and the plane must be at the from airport.

Step 2: Current state: Plane = 1973, airport from = SFO, airport to = JFK, airport at = SFO. so (fly 1973 SFO JFK) is the state.

Finally: As all preconditions are met we know this is permissable.

2 A Multiplicity of Permissibility

Step 1: List all possible values for each condition:
planes: 1973, 2749, 97, 1211
airport to: SFO, JFK, ORD
airport from: SFO, JFK, ORD
Step 2: Determine where plans can go based on where theyre starting
1973 starts at SFO, so only combos of (fly 1973 SFO X) will work
2749 starts at JFK, so only combos of (fly 2749 JFK X) will work
97 starts at ORD, so only combos of (fly 97 ORD X) will work
1211 starts at SFO, so only combos of (fly 1211 SFO X) will work
Step 3: Finish possible combos
1973: (fly 1973 SFO JFK),(fly 1973 SFO ORD)
2749: (fly 2749 JFK SFO), (fly 2749 JFK ORD)
97: (fly 97 ORD JFK), (fly 97 ORD SFO)
1211: (fly 1211 SFO JFK), (fly 1211 SFO ORD)
Evaluation Changes:

Loop through each plane and its current location. From that evaluate each potential destination. For each valid set confirm all preconditions are met and return permissible or not.

3 Forward Planning

Step 1: Goal State is to have 1973 at ORD, 1211 at JFK, and 2749 at SFO.
Step 2: Update our preconditions
(fly ?plane ?from ?to)
precondition: (plane ?plane), (airport ?to), (airport ?from), (at ?plane ?from), (fueled ?plane)
Step 3: Plan for each plane
Current State of 1973: (at 1973 SFO), (fueled 1973)

As we are already fueled and not at ORD we would just need to (fly 1973 SFO ORD).

Current State of 1211: (at 1211 SFO), (fueled 1211)

Already fueled so we can just (fly 1211 SFO JFK)
Current state of 2749: (at 2749 JFK), (unfueled 2749)
Not fueled so we would need to do (fuel 2749) then we can do (fly 2749 JFK SFO).
Step 4: Create Full Plan now
(fly 1973 SFO ORD)
(fly 1211 SFO JFK)
(fuel 2749)
(fly 2749 JFK SFO)

4 Digging Deeper

1. We could define capacity into this problem much like fuel (capacity ?plane ?capacity). We could either consider capacity as something like high, medium, or low or as raw numbers giving exact capcity depending on what is needed. This would then become a precondition that checks to ensure we have the correct capacity, most likely we would want a second category having to do with luggage or person amount and check capacity against that.

2. I think a good problem that would benefit from combining a forward planner and A* search path would be finding paths withing a City with Traffic Constraints for a Delivery service. The Forward Planner would determine which packages should go where when to ensure maximum efficiency in package delivery while the A* search path would determine the best path for the delivery driver to take to deliver each package. Both of them together would be much more efficient than either of them could be alone.