University of Cyprus
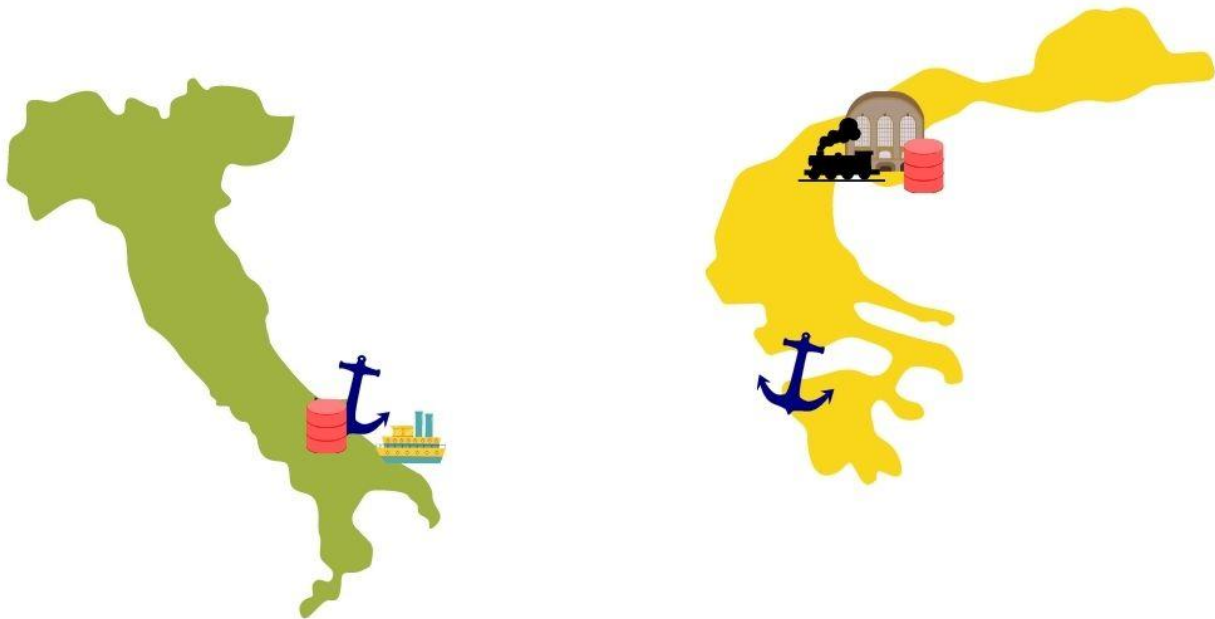**Department of Computer Science**

Ονοματεπώνυμο: Μιχαήλ-Παναγιώτης Μπόφος

Proof of concept: Για να είμαστε σίγουροι ότι όλα λειτουργούν σωστά δημιουργήσαμε ένα πολύ μικρό πρόβλημα για να μπορούμε να κάνουμε testing.

Παραδοχές: Κάθε λιμάνι έχει σταθμό, τα τρένα μπορούν να ενώσουν ΜΟΝΟ σταθμούς πόλεων και χωρών που γειτονεύουν με στεριά (έχει οριστεί σχέση στο domain). Η μεταφορά από το λιμάνι στο σταθμό του λιμανιού ΔΕΝ απαιτεί φορτηγό και γίνεται από μόνη της (πχ με κάποιο γερανό).

Στο πρόβλημα αυτό θέλουμε να χρησιμοποιήσουμε όλα τα μέσα μεταφοράς για να επιδείξουμε τη συμπεριφορά τους. Ξεκινάμε με δύο πακέτα και πέντε φορτηγά στη Ρώμη και θέλουμε και τα δύο πακέτα να μεταφερθούν στη Θεσσαλονίκη. Τα φορτηγά, τα βαγόνια και τα πακέτα παραλείπονται από το σχήμα καθώς θα δημιουργούσαν χάος, επίσης όπου έχουμε λιμάνι θεωρούμε ότι υπάρχει και σταθμός.

Ορισμός Προβλήματος:

```
    (located pkg1 Storage_Roma)
    (located pkg2 Storage_Roma)


)

(:goal (and
    ;;;todo: put the goal condition here
    (located pkg1 Station_Thessaloniki)
    (located pkg2 Station_Thessaloniki)
));;
```

Traceroute:

(load_package_to_truck truck_roma_5 pkg2 roma storage_roma italy)

(load_package_to_truck truck_roma_1 pkg1 roma storage_roma italy)

(drive_truck_anywhere truck_roma_5 storage_roma roma harbour_roma roma italy)

(unload_package_from_truck truck_roma_5 pkg2 roma harbour_roma italy)

(load_ship_with_package mediterenian pkg2 roma harbour_roma italy)

(drive_truck_anywhere truck_roma_1 storage_roma roma harbour_roma roma italy)

(unload_package_from_truck truck_roma_1 pkg1 roma harbour_roma italy)

(load_ship_with_package mediterenian pkg1 roma harbour_roma italy)

(sail_to_port mediterenian harbour_roma roma harbour_patras patras italy greece)

(unload_ship_from_package mediterenian pkg2 patras harbour_patras greece)

(move_package_from_harbour_to_station pkg2 station_patras harbour_patras patras greece)

(unload_ship_from_package mediterenian pkg1 patras harbour_patras greece)

(move_package_from_harbour_to_station pkg1 station_patras harbour_patras patras greece)

(attach_wagon_to_train wagon3 engine_thessaloniki station_thessaloniki thessaloniki greece)

(railway_a_train engine_thessaloniki station_thessaloniki thessaloniki greece station_patras patras greece)

(dettach_wagon_from_train wagon3 engine_thessaloniki station_patras patras greece)

(load_a_wagon_with_package wagon3 pkg2 station_patras patras greece)

(attach_wagon_to_train wagon3 engine_thessaloniki station_patras patras greece)

(railway_a_train engine_thessaloniki station_patras patras greece station_thessaloniki thessaloniki greece)

(dettach_wagon_from_train wagon3 engine_thessaloniki station_thessaloniki thessaloniki greece)

(unload_package_from_wagon wagon3 pkg2 station_thessaloniki thessaloniki greece)

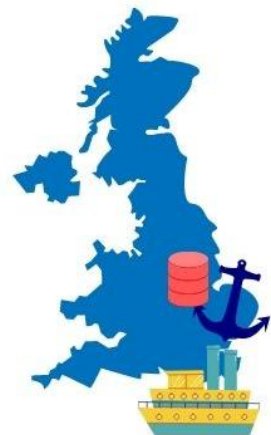(attach_wagon_to_train wagon3 engine_thessaloniki station_thessaloniki thessaloniki greece)

(railway_a_train engine_thessaloniki station_thessaloniki thessaloniki greece station_patras patras greece)

(dettach_wagon_from_train wagon3 engine_thessaloniki station_patras patras greece)

(load_a_wagon_with_package wagon3 pkg1 station_patras patras greece)

(attach_wagon_to_train wagon3 engine_thessaloniki station_patras patras greece)

(railway_a_train engine_thessaloniki station_patras patras greece station_thessaloniki thessaloniki greece)

(dettach_wagon_from_train wagon3 engine_thessaloniki station_thessaloniki thessaloniki greece)

(unload_package_from_wagon wagon3 pkg1 station_thessaloniki thessaloniki greece)

Βλέπουμε πως το πλοίο χρησιμοποιείται μόνο μια φορά και πως το τρένο από τη Θεσσαλονίκη κατεβαίνει στην Πάτρα για να φορτώσει.

Πρόβλημα 1

Αρχική Κατάσταση και Goal State

```
;; Wagons
(wagon Wagon1)
(wagon Wagon2)
(wagon Wagon3)
(located Wagon1 Boston_Station_Harbour)
(located Wagon2 Boston_Station_Harbour)
(located Wagon3 Boston_Station_Harbour)

(wagon Wagon4)
(wagon Wagon5)
(wagon Wagon6)
(located Wagon4 Chicago_Station)
(located Wagon5 Chicago_Station)
(located Wagon6 Chicago_Station)
```

```
    (located package1 London_Storage)
    (located package2 London_Storage)
    (located package3 London_Storage)
    (located package4 London_Storage)
    (located package5 Boston_Station_Harbour)
    (located package6 Boston_Station_Harbour)
    (located package7 Boston_Station_Harbour)
    (located package8 Chicago_Storage)
    (located package9 Chicago_Storage)
    (located package10 Chicago_Storage)
)

(:goal (and
    ;todo: put the goal condition here
    (located package1 Boston_Station_Harbour)
    (located package2 Boston_Station_Harbour)
    (located package3 Boston_Station_Harbour)
    (located package4 Chicago_Storage)
    (located package5 Chicago_Storage)
    (located package6 Chicago_Storage)
    (located package7 Chicago_Storage)
    (located package8 London_Storage)
    (located package9 London_Storage)
    (located package10 London_Storage)
))
```

Traceroute:

(load_package_to_truck boston_truck_1 package6 boston boston_station_harbour usa)

(load_package_to_truck boston_truck_2 package5 boston boston_station_harbour usa)

(load_package_to_truck london_truck_1 package4 london london_storage uk)

(drive_truck_anywhere london_truck_1 london_storage london london_station_harbour london uk)

(drive_truck_anywhere boston_truck_2 boston_station_harbour boston chicago_storage chicago usa)

(drive_truck_anywhere boston_truck_1 boston_station_harbour boston chicago_storage chicago usa)

(drive_truck_anywhere chicago_truck_1 chicago_storage chicago boston_harbour boston usa)

(unload_package_from_truck boston_truck_2 package5 chicago chicago_storage usa)

(load_package_to_truck boston_truck_2 package9 chicago chicago_storage usa)

(unload_package_from_truck boston_truck_1 package6 chicago chicago_storage usa)

(drive_truck_anywhere boston_truck_1 chicago_storage chicago boston_station_harbour boston usa)

(load_package_to_truck boston_truck_1 package7 boston boston_station_harbour usa)

(drive_truck_anywhere boston_truck_2 chicago_storage chicago boston_harbour boston usa)

(unload_package_from_truck boston_truck_2 package9 boston boston_harbour usa)

(load_ship_with_package bluesea package9 boston boston_harbour usa)

(drive_truck_anywhere boston_truck_1 boston_station_harbour boston chicago_storage chicago usa)

(unload_package_from_truck boston_truck_1 package7 chicago chicago_storage usa)

(sail_to_port bluesea boston_harbour boston london_station_harbour london usa uk)

(unload_ship_from_package bluesea package9 london london_station_harbour uk)

(load_package_to_truck london_truck_2 package9 london london_station_harbour uk)

(load_package_to_truck boston_truck_1 package8 chicago chicago_storage usa)

(drive_truck_anywhere london_truck_2 london_station_harbour london london_storage london uk)

(unload_package_from_truck london_truck_2 package9 london london_storage uk)

(load_package_to_truck london_truck_2 package1 london london_storage uk)

(drive_truck_anywhere london_truck_2 london_storage london london_station_harbour london uk)

(drive_truck_anywhere boston_truck_1 chicago_storage chicago boston_harbour boston usa)

(unload_package_from_truck london_truck_2 package1 london london_station_harbour uk)

(unload_package_from_truck london_truck_1 package4 london london_station_harbour uk)

(load_ship_with_package bluesea package4 london london_station_harbour uk)

(load_ship_with_package bluesea package1 london london_station_harbour uk)

(drive_truck_anywhere london_truck_1 london_station_harbour london london_storage london uk)

(load_package_to_truck london_truck_1 package3 london london_storage uk)

(drive_truck_anywhere london_truck_1 london_storage london london_station_harbour london uk)

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(unload_package_from_truck london_truck_1 package3 london london_station_harbour uk)

(load_ship_with_package bluesea package3 london london_station_harbour uk)

(drive_truck_anywhere london_truck_1 london_station_harbour london london_storage london uk)

(load_package_to_truck london_truck_1 package2 london london_storage uk)

(drive_truck_anywhere london_truck_1 london_storage london london_station_harbour london uk)

(unload_package_from_truck london_truck_1 package2 london london_station_harbour uk)

(load_ship_with_package bluesea package2 london london_station_harbour uk)

(drive_truck_anywhere london_truck_1 london_station_harbour london london_storage london uk)

(sail_to_port bluesea london_station_harbour london boston_harbour boston uk usa)

(unload_ship_from_package bluesea package4 boston boston_harbour usa)

(drive_truck_anywhere boston_truck_2 boston_harbour boston chicago_storage chicago usa)

(load_package_to_truck boston_truck_2 package10 chicago chicago_storage usa)

(drive_truck_anywhere boston_truck_2 chicago_storage chicago boston_harbour boston usa)

(load_package_to_truck chicago_truck_1 package4 boston boston_harbour usa)

(unload_package_from_truck boston_truck_2 package10 boston boston_harbour usa)

(unload_package_from_truck boston_truck_1 package8 boston boston_harbour usa)

(load_ship_with_package bluesea package8 boston boston_harbour usa)

(load_ship_with_package bluesea package10 boston boston_harbour usa)

(drive_truck_anywhere chicago_truck_1 boston_harbour boston chicago_storage chicago usa)

(unload_package_from_truck chicago_truck_1 package4 chicago chicago_storage usa)

(unload_ship_from_package bluesea package3 boston boston_harbour usa)

(move_package_from_harbour_to_station package3 boston_station_harbour boston_harbour boston usa)

(unload_ship_from_package bluesea package1 boston boston_harbour usa)

(move_package_from_harbour_to_station package1 boston_station_harbour boston_harbour boston usa)

(unload_ship_from_package bluesea package2 boston boston_harbour usa)

(move_package_from_harbour_to_station package2 boston_station_harbour boston_harbour boston usa)

(sail_to_port bluesea boston_harbour boston london_station_harbour london usa uk)

(unload_ship_from_package bluesea package8 london london_station_harbour uk)

(unload_ship_from_package bluesea package10 london london_station_harbour uk)

(load_package_to_truck london_truck_2 package10 london london_station_harbour uk)

(drive_truck_anywhere london_truck_2 london_station_harbour london london_storage london uk)

(unload_package_from_truck london_truck_2 package10 london london_storage uk)

(drive_truck_anywhere london_truck_1 london_storage london london_station_harbour london uk)

(load_package_to_truck london_truck_1 package8 london london_station_harbour uk)

(drive_truck_anywhere london_truck_1 london_station_harbour london london_storage london uk)

(unload_package_from_truck london_truck_1 package8 london london_storage uk)

Πρόβλημα 2

Τα αντικείμενα που χρησιμοποιήσαμε διπλασιάστηκαν, όπως φαίνεται στην εικόνα δίπλα

```
(:objects
    ;; Countries
    USA Mexico UK Brazil
    ;; Cities
    Boston Chicago LosAngeles MexicoCity SaoPaolo Brasilia London
    ;; Harbours
    Boston_Harbour London_Harbour SaoPaolo_Harbour LosAngeles_Harbour
    ;; Harbour Stations
    Boston_Station_Harbour London_Station_Harbour SaoPaolo_Station_Harbour LosAngeles_Station_Harbour
    ;; Stations
    MexicoCity_Station Chicago_Station
    ;; Storages
    Brasilia_Storage London_Storage LosAngeles_Storage Chicago_Storage Boston_Storage
    ;; Trucks
    Chicago_Truck_1 Chicago_Truck_2
    Boston_Truck_1 Boston_Truck_2
    LosAngeles_Truck_1 LosAngeles_Truck_2
    London_Truck_1 London_Truck_2
    MexicoCity_Truck_1 MexicoCity_Truck_2
    SaoPaolo_Truck_1 SaoPaolo_Truck_2
    Brasilia_Truck_1 Brasilia_Truck_2
    ;; Ships
    Evergiven    BlueSea     Pacific     IntraCont
    ;; Engines
    London_Engine Boston_Engine SaoPaolo_Engine LosAngeles_Engine
    ;; Wagons
    wagon1    wagon2    wagon3
    wagon4    wagon5    wagon6
    wagon7    wagon8    wagon9
    wagon10   wagon11   wagon12
```

Αρχική Κατάσταση και Goal State

```
;; Wagons
(wagon Wagon1)
(wagon Wagon2)
(wagon Wagon3)
(located Wagon1 Boston_Station_Harbour)
(located Wagon2 Boston_Station_Harbour)
(located Wagon3 Boston_Station_Harbour)

(wagon Wagon4)
(wagon Wagon5)
(wagon Wagon6)
(located Wagon4 Chicago_Station)
(located Wagon5 Chicago_Station)
(located Wagon6 Chicago_Station)

(wagon Wagon7)
(wagon Wagon8)
(wagon Wagon9)
(located Wagon7 MexicoCity_Station)
(located Wagon8 MexicoCity_Station)
(located Wagon9 MexicoCity_Station)

(wagon Wagon10)
(wagon Wagon11)
(wagon Wagon12)
(located Wagon10 SaoPaolo_Station_Harbour)
(located Wagon11 SaoPaolo_Station_Harbour)
(located Wagon12 SaoPaolo_Station_Harbour)
```

```
(located package1 London_Storage)
(located package2 London_Storage)
(located package3 London_Storage)
(located package4 London_Storage)
(located package5 London_Storage)
(located package6 Chicago_Station)
(located package7 Chicago_Station)
(located package8 Chicago_Station)
(located package9 Chicago_Station)
(located package10 LosAngeles_Storage)
(located package11 LosAngeles_Storage)
(located package12 LosAngeles_Storage)
(located package13 LosAngeles_Storage)
(located package14 LosAngeles_Storage)
(located package15 SaoPaolo_Station_Harbour)
(located package16 SaoPaolo_Station_Harbour)
(located package17 SaoPaolo_Station_Harbour)
(located package18 SaoPaolo_Station_Harbour)
(located package19 SaoPaolo_Station_Harbour)
(located package20 SaoPaolo_Station_Harbour)
```

```
(:goal (and
    ;todo: put the goal condition here

    (located package1 Brasilia_Storage)
    (located package2 Brasilia_Storage)
    (located package3 Brasilia_Storage)
    (located package4 Brasilia_Storage)
    (located package5 Brasilia_Storage)
    (located package6 Brasilia_Storage)
    (located package7 Brasilia_Storage)
    (located package8 Brasilia_Storage)
    (located package9 Brasilia_Storage)
    (located package10 London_Storage)
    (located package11 London_Storage)
    (located package12 London_Storage)
    (located package13 London_Storage)
    (located package14 London_Storage)
    (located package15 Boston_Storage)
    (located package16 Boston_Storage)
    (located package17 Boston_Storage)
    (located package18 Boston_Storage)
    (located package19 Boston_Storage)
    (located package20 Boston_Storage)
))
```

Traceroute:

(sail_to_port bluesea boston_harbour boston london_harbour london usa uk)

(railway_a_train saopaolo_engine saopaolo_station_harbour saopaolo brazil chicago_station chicago usa)

(drive_truck_anywhere brasilia_truck_2 brasilia_storage brasilia saopaolo_station_harbour saopaolo brazil)

(load_package_to_truck losangeles_truck_2 package11 losangeles losangeles_storage usa)

(drive_truck_anywhere losangeles_truck_2 losangeles_storage losangeles losangeles_harbour losangeles usa)

(move_package_from_station_to_harbour package18 saopaolo_station_harbour saopaolo_harbour saopaolo brazil)

(move_package_from_station_to_harbour package16 saopaolo_station_harbour saopaolo_harbour saopaolo brazil)

(load_ship_with_package intracont package18 saopaolo saopaolo_harbour brazil)

(move_package_from_station_to_harbour package17 saopaolo_station_harbour saopaolo_harbour saopaolo brazil)

(load_ship_with_package intracont package16 saopaolo saopaolo_harbour brazil)

(move_package_from_station_to_harbour package15 saopaolo_station_harbour saopaolo_harbour saopaolo brazil)

(load_ship_with_package intracont package15 saopaolo saopaolo_harbour brazil)

(load_ship_with_package intracont package17 saopaolo saopaolo_harbour brazil)

(move_package_from_station_to_harbour package20 saopaolo_station_harbour saopaolo_harbour saopaolo brazil)

(load_ship_with_package intracont package20 saopaolo saopaolo_harbour brazil)

(load_package_to_truck london_truck_1 package5 london london_storage uk)

(drive_truck_anywhere london_truck_1 london_storage london london_harbour london uk)

(load_package_to_truck losangeles_truck_1 package13 losangeles losangeles_storage usa)

(drive_truck_anywhere losangeles_truck_1 losangeles_storage losangeles losangeles_harbour losangeles usa)

(unload_package_from_truck losangeles_truck_1 package13 losangeles losangeles_harbour usa)

(drive_truck_anywhere losangeles_truck_1 losangeles_harbour losangeles boston_storage boston usa)

(load_ship_with_package pacific package13 losangeles losangeles_harbour usa)

(unload_package_from_truck losangeles_truck_2 package11 losangeles losangeles_harbour usa)

(load_ship_with_package pacific package11 losangeles losangeles_harbour usa)

(load_package_to_truck saopaolo_truck_2 package19 saopaolo saopaolo_station_harbour brazil)

(drive_truck_anywhere saopaolo_truck_2 saopaolo_station_harbour saopaolo saopaolo_harbour saopaolo brazil)

(sail_to_port pacific losangeles_harbour losangeles london_harbour london usa uk)

(unload_ship_from_package pacific package11 london london_harbour uk)

(drive_truck_anywhere london_truck_2 london_storage london london_harbour london uk)

(load_package_to_truck london_truck_2 package11 london london_harbour uk)

(unload_package_from_truck london_truck_1 package5 london london_harbour uk)

(load_ship_with_package bluesea package5 london london_harbour uk)

(drive_truck_anywhere london_truck_2 london_harbour london london_storage london uk)

(unload_package_from_truck london_truck_2 package11 london london_storage uk)

(load_package_to_truck london_truck_2 package1 london london_storage uk)

(drive_truck_anywhere london_truck_2 london_storage london london_harbour london uk)

(unload_ship_from_package pacific package13 london london_harbour uk)

(load_package_to_truck london_truck_1 package13 london london_harbour uk)

(unload_package_from_truck london_truck_2 package1 london london_harbour uk)

(load_ship_with_package bluesea package1 london london_harbour uk)

(drive_truck_anywhere london_truck_1 london_harbour london london_storage london uk)

(unload_package_from_truck london_truck_1 package13 london london_storage uk)

(load_package_to_truck london_truck_1 package4 london london_storage uk)

(drive_truck_anywhere london_truck_1 london_storage london london_harbour london uk)

(sail_to_port bluesea london_harbour london saopaolo_harbour saopaolo uk brazil)

(sail_to_port intracont saopaolo_harbour saopaolo losangeles_harbour losangeles brazil usa)

(load_a_wagon_with_package wagon4 package8 chicago_station chicago usa)

(attach_wagon_to_train wagon4 saopaolo_engine chicago_station chicago usa)

(railway_a_train saopaolo_engine chicago_station chicago usa saopaolo_station_harbour saopaolo brazil)

(dettach_wagon_from_train wagon4 saopaolo_engine saopaolo_station_harbour saopaolo brazil)

(unload_package_from_wagon wagon4 package8 saopaolo_station_harbour saopaolo brazil)

(unload_ship_from_package intracont package17 losangeles losangeles_harbour usa)

(unload_ship_from_package bluesea package5 saopaolo saopaolo_harbour brazil)

(railway_a_train saopaolo_engine saopaolo_station_harbour saopaolo brazil chicago_station chicago usa)

(unload_ship_from_package intracont package20 losangeles losangeles_harbour usa)

(unload_ship_from_package intracont package16 losangeles losangeles_harbour usa)

(unload_ship_from_package bluesea package1 saopaolo saopaolo_harbour brazil)

(unload_ship_from_package intracont package15 losangeles losangeles_harbour usa)

(unload_ship_from_package intracont package18 losangeles losangeles_harbour usa)

(load_package_to_truck losangeles_truck_2 package16 losangeles losangeles_harbour usa)

(drive_truck_anywhere losangeles_truck_2 losangeles_harbour losangeles boston_storage boston usa)

(load_package_to_truck brasilia_truck_2 package8 saopaolo saopaolo_station_harbour brazil)

(drive_truck_anywhere brasilia_truck_2 saopaolo_station_harbour saopaolo brasilia_storage brasilia brazil)

(unload_package_from_truck saopaolo_truck_2 package19 saopaolo saopaolo_harbour brazil)

(load_package_to_truck saopaolo_truck_2 package1 saopaolo saopaolo_harbour brazil)

(drive_truck_anywhere saopaolo_truck_2 saopaolo_harbour saopaolo brasilia_storage brasilia brazil)

(load_ship_with_package bluesea package19 saopaolo saopaolo_harbour brazil)

(sail_to_port bluesea saopaolo_harbour saopaolo boston_harbour boston brazil usa)

(unload_ship_from_package bluesea package19 boston boston_harbour usa)

(unload_package_from_truck saopaolo_truck_2 package1 brasilia brasilia_storage brazil)

(drive_truck_anywhere brasilia_truck_1 brasilia_storage brasilia saopaolo_station_harbour saopaolo brazil)

(unload_package_from_truck brasilia_truck_2 package8 brasilia brasilia_storage brazil)

(drive_truck_anywhere brasilia_truck_2 brasilia_storage brasilia saopaolo_harbour saopaolo brazil)

(load_package_to_truck brasilia_truck_2 package5 saopaolo saopaolo_harbour brazil)

(drive_truck_anywhere brasilia_truck_2 saopaolo_harbour saopaolo brasilia_storage brasilia brazil)

(unload_package_from_truck brasilia_truck_2 package5 brasilia brasilia_storage brazil)

(load_a_wagon_with_package wagon5 package9 chicago_station chicago usa)

(attach_wagon_to_train wagon5 saopaolo_engine chicago_station chicago usa)

(railway_a_train saopaolo_engine chicago_station chicago usa saopaolo_station_harbour saopaolo brazil)

(unload_package_from_truck losangeles_truck_2 package16 boston boston_storage usa)

(drive_truck_anywhere boston_truck_2 boston_storage boston boston_harbour boston usa)

(drive_truck_anywhere losangeles_truck_1 boston_storage boston losangeles_harbour losangeles usa)

(load_package_to_truck boston_truck_2 package19 boston boston_harbour usa)

(drive_truck_anywhere boston_truck_2 boston_harbour boston boston_storage boston usa)

(unload_package_from_truck boston_truck_2 package19 boston boston_storage usa)

(dettach_wagon_from_train wagon5 saopaolo_engine saopaolo_station_harbour saopaolo brazil)

(unload_package_from_wagon wagon5 package9 saopaolo_station_harbour saopaolo brazil)

(load_package_to_truck saopaolo_truck_1 package9 saopaolo saopaolo_station_harbour brazil)

(load_package_to_truck losangeles_truck_1 package15 losangeles losangeles_harbour usa)

(drive_truck_anywhere losangeles_truck_1 losangeles_harbour losangeles boston_storage boston usa)

(unload_package_from_truck losangeles_truck_1 package15 boston boston_storage usa)

(railway_a_train saopaolo_engine saopaolo_station_harbour saopaolo brazil chicago_station chicago usa)

(drive_truck_anywhere saopaolo_truck_1 saopaolo_station_harbour saopaolo brasilia_storage brasilia brazil)

(unload_package_from_truck saopaolo_truck_1 package9 brasilia brasilia_storage brazil)

(sail_to_port bluesea boston_harbour boston london_harbour london usa uk)

(sail_to_port intracont losangeles_harbour losangeles london_harbour london usa uk)

(drive_truck_anywhere boston_truck_2 boston_storage boston losangeles_harbour losangeles usa)

(load_package_to_truck boston_truck_2 package20 losangeles losangeles_harbour usa)

(drive_truck_anywhere boston_truck_2 losangeles_harbour losangeles boston_storage boston usa)

(unload_package_from_truck boston_truck_2 package20 boston boston_storage usa)

(drive_truck_anywhere boston_truck_2 boston_storage boston losangeles_harbour losangeles usa)

(load_package_to_truck boston_truck_2 package18 losangeles losangeles_harbour usa)

(drive_truck_anywhere boston_truck_2 losangeles_harbour losangeles boston_storage boston usa)

(unload_package_from_truck boston_truck_2 package18 boston boston_storage usa)

(drive_truck_anywhere boston_truck_2 boston_storage boston losangeles_harbour losangeles usa)

(load_package_to_truck boston_truck_2 package17 losangeles losangeles_harbour usa)

(drive_truck_anywhere boston_truck_2 losangeles_harbour losangeles boston_storage boston usa)

(unload_package_from_truck boston_truck_2 package17 boston boston_storage usa)

(drive_truck_anywhere boston_truck_2 boston_storage boston losangeles_storage losangeles usa)

(load_a_wagon_with_package wagon6 package7 chicago_station chicago usa)

(attach_wagon_to_train wagon6 saopaolo_engine chicago_station chicago usa)

(railway_a_train saopaolo_engine chicago_station chicago usa saopaolo_station_harbour saopaolo brazil)

(sail_to_port intracont london_harbour london losangeles_harbour losangeles uk usa)

(load_package_to_truck boston_truck_2 package14 losangeles losangeles_storage usa)

(drive_truck_anywhere boston_truck_2 losangeles_storage losangeles losangeles_harbour losangeles usa)

(unload_package_from_truck boston_truck_2 package14 losangeles losangeles_harbour usa)

(drive_truck_anywhere boston_truck_2 losangeles_harbour losangeles losangeles_storage losangeles usa)

(load_ship_with_package intracont package14 losangeles losangeles_harbour usa)

(load_package_to_truck boston_truck_2 package12 losangeles losangeles_storage usa)

(drive_truck_anywhere boston_truck_2 losangeles_storage losangeles losangeles_harbour losangeles usa)

(unload_package_from_truck boston_truck_2 package12 losangeles losangeles_harbour usa)

(drive_truck_anywhere boston_truck_2 losangeles_harbour losangeles losangeles_storage losangeles usa)

(load_package_to_truck boston_truck_2 package10 losangeles losangeles_storage usa)

(drive_truck_anywhere boston_truck_2 losangeles_storage losangeles losangeles_harbour losangeles usa)

(unload_package_from_truck boston_truck_2 package10 losangeles losangeles_harbour usa)

(load_ship_with_package intracont package10 losangeles losangeles_harbour usa)

(load_ship_with_package intracont package12 losangeles losangeles_harbour usa)

(sail_to_port intracont losangeles_harbour losangeles london_harbour london usa uk)

(unload_ship_from_package intracont package10 london london_harbour uk)

(unload_ship_from_package intracont package12 london london_harbour uk)

(unload_ship_from_package intracont package14 london london_harbour uk)

(load_package_to_truck london_truck_2 package12 london london_harbour uk)

(drive_truck_anywhere london_truck_2 london_harbour london london_storage london uk)

(unload_package_from_truck london_truck_2 package12 london london_storage uk)

(drive_truck_anywhere london_truck_2 london_storage london london_harbour london uk)

(load_package_to_truck london_truck_2 package14 london london_harbour uk)

(unload_package_from_truck london_truck_1 package4 london london_harbour uk)

(load_ship_with_package bluesea package4 london london_harbour uk)

(load_package_to_truck london_truck_1 package10 london london_harbour uk)

(drive_truck_anywhere london_truck_1 london_harbour london london_storage london uk)

(unload_package_from_truck london_truck_1 package10 london london_storage uk)

(drive_truck_anywhere london_truck_2 london_harbour london london_storage london uk)

(unload_package_from_truck london_truck_2 package14 london london_storage uk)

(load_package_to_truck london_truck_2 package3 london london_storage uk)

(load_package_to_truck london_truck_1 package2 london london_storage uk)

(drive_truck_anywhere london_truck_1 london_storage london london_harbour london uk)

(unload_package_from_truck london_truck_1 package2 london london_harbour uk)

(load_ship_with_package bluesea package2 london london_harbour uk)

(drive_truck_anywhere london_truck_2 london_storage london london_harbour london uk)

(unload_package_from_truck london_truck_2 package3 london london_harbour uk)

(load_ship_with_package bluesea package3 london london_harbour uk)

(sail_to_port bluesea london_harbour london saopaolo_harbour saopaolo uk brazil)

(drive_truck_anywhere saopaolo_truck_1 brasilia_storage brasilia saopaolo_harbour saopaolo brazil)

(unload_ship_from_package bluesea package4 saopaolo saopaolo_harbour brazil)

(load_package_to_truck saopaolo_truck_1 package4 saopaolo saopaolo_harbour brazil)

(drive_truck_anywhere saopaolo_truck_1 saopaolo_harbour saopaolo brasilia_storage brasilia brazil)

(unload_ship_from_package bluesea package2 saopaolo saopaolo_harbour brazil)

(unload_ship_from_package bluesea package3 saopaolo saopaolo_harbour brazil)

(unload_package_from_truck saopaolo_truck_1 package4 brasilia brasilia_storage brazil)

(drive_truck_anywhere saopaolo_truck_1 brasilia_storage brasilia saopaolo_harbour saopaolo brazil)

(load_package_to_truck saopaolo_truck_1 package3 saopaolo saopaolo_harbour brazil)

(drive_truck_anywhere saopaolo_truck_1 saopaolo_harbour saopaolo brasilia_storage brasilia brazil)

(unload_package_from_truck saopaolo_truck_1 package3 brasilia brasilia_storage brazil)

(drive_truck_anywhere saopaolo_truck_1 brasilia_storage brasilia saopaolo_harbour saopaolo brazil)

(load_package_to_truck saopaolo_truck_1 package2 saopaolo saopaolo_harbour brazil)

(drive_truck_anywhere saopaolo_truck_1 saopaolo_harbour saopaolo brasilia_storage brasilia brazil)

(unload_package_from_truck saopaolo_truck_1 package2 brasilia brasilia_storage brazil)

(dettach_wagon_from_train wagon6 saopaolo_engine saopaolo_station_harbour saopaolo brazil)

(unload_package_from_wagon wagon6 package7 saopaolo_station_harbour saopaolo brazil)

(attach_wagon_to_train wagon4 saopaolo_engine saopaolo_station_harbour saopaolo brazil)

(railway_a_train saopaolo_engine saopaolo_station_harbour saopaolo brazil chicago_station chicago usa)

(dettach_wagon_from_train wagon4 saopaolo_engine chicago_station chicago usa)

(load_a_wagon_with_package wagon4 package6 chicago_station chicago usa)

(attach_wagon_to_train wagon4 saopaolo_engine chicago_station chicago usa)

(railway_a_train saopaolo_engine chicago_station chicago usa saopaolo_station_harbour saopaolo brazil)

(dettach_wagon_from_train wagon4 saopaolo_engine saopaolo_station_harbour saopaolo brazil)

(unload_package_from_wagon wagon4 package6 saopaolo_station_harbour saopaolo brazil)

(load_package_to_truck brasilia_truck_1 package6 saopaolo saopaolo_station_harbour brazil)

(drive_truck_anywhere brasilia_truck_1 saopaolo_station_harbour saopaolo brasilia_storage brasilia brazil)

(unload_package_from_truck brasilia_truck_1 package6 brasilia brasilia_storage brazil)

(drive_truck_anywhere saopaolo_truck_1 brasilia_storage brasilia saopaolo_station_harbour saopaolo brazil)

(load_package_to_truck saopaolo_truck_1 package7 saopaolo saopaolo_station_harbour brazil)

(drive_truck_anywhere saopaolo_truck_1 saopaolo_station_harbour saopaolo brasilia_storage brasilia brazil)

(unload_package_from_truck saopaolo_truck_1 package7 brasilia brasilia_storage brazil)