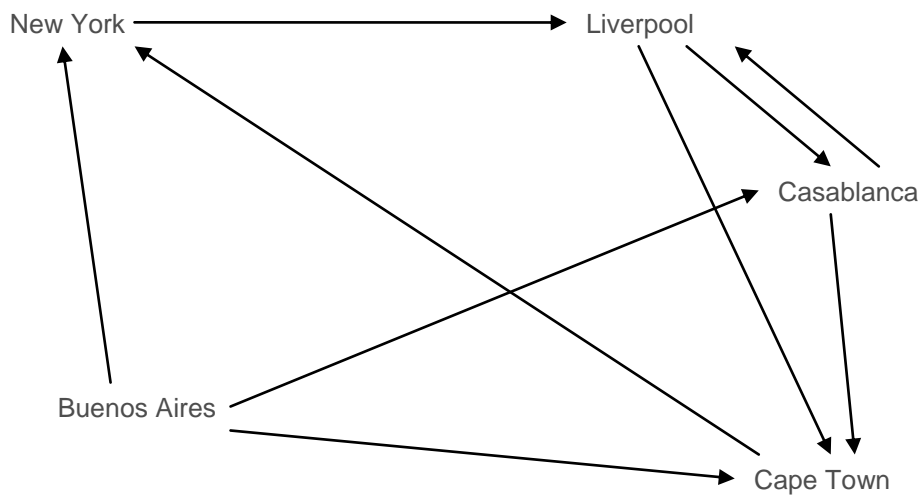


# 1 Scenario

A shipping operator has a network of routes to various ports around the Atlantic Ocean. This network of routes is represented in the following diagram:



Please note that the routes are one way (according to the direction of the arrow). The only journey with a direct return is the Liverpool – Casablanca route, as indicated by the two arrows. The journey times for the routes are as follows:

- Buenos Aires → New York = 6 days
- Buenos Aires → Casablanca = 5 days
- Buenos Aires → Cape Town = 4 days
- New York → Liverpool = 4 days
- Liverpool → Casablanca = 3 days
- Liverpool → Cape Town = 6 days
- Casablanca → Liverpool = 3 days
- Casablanca → Cape Town = 6 days
- Cape Town → New York = 8 days

The challenge is to produce a model (in code) that will answer the following questions:

- What is the total journey time for the following direct routes (your model should indicate if the journey is invalid):
  - ✚ Buenos Aires → New York → Liverpool
  - ✚ Buenos Aires → Casablanca → Liverpool
  - ✚ Buenos Aires → Capetown → New York → Liverpool → Casablanca
  - ✚ Buenos Aires → Capetown → Casablanca
- Find the shortest journey time for the following routes:
  - ✚ Buenos Aires → Liverpool
  - ✚ New York → New York
- Find the number of routes from Liverpool to Liverpool with a maximum number of 3 stops.
- Find the number of routes from Buenos Aires to Liverpool where exactly 4 stops are made.
- Find the number of routes from Liverpool to Liverpool where the journey time is less than or equal to 25 days.

## 2 Requirements

Please read the following carefully:

- Create a class library to model the scenario and solve the problems.
- Your model/solution should be able to accept other network configurations.
- Create a set of unit tests (in a separate class library) to prove that your model works.
- For the class library implementing your solution you may only use features of the C++ to solve the problem. Do not use any 3rd party libraries.
- For the class library implementing your unit tests you may use/reference any libraries you wish.
- Do not produce a graphical user interface (GUI) for your solution, please deliver only the two class libraries specified.
- The solution should demonstrate good industry practice.