In [16]:

```
from itertools import permutations

def bruteforce(cities, distances):
    mindistance = float('inf')
    bestroute = None
    n = len(cities)

    for route in permutations(range(n)):
        route = list(route) + [route[0]]
        distance = 0
        for i in range(len(route)-1):
            distance += distances[route[i]][route[i + 1]]

        if distance < mindistance:
            mindistance = distance
            bestroute = route

    #Conversion of indices to names
    bestroutecities = [cities[i] for i in bestroute] + [cities[bestroute[0]]]
    return bestroutecities, mindistance

# List of cities
cities = ['P', 'Q', 'R', 'S']

distances = [
    [0, 3, 6, 8],  # Distances from P
    [3, 0, 9, 4],  # Distances from Q
    [6, 9, 0, 2], # Distances from R
    [8, 4, 2, 0]   # Distances from S
]

#Find the best route and distance
route, distance = bruteforce(cities, distances)
print("Route using brute force:", route[:-1])
print("Total distance:", distance)
```

```
Route using brute force: ['P', 'Q', 'S', 'R', 'P']
Total distance: 15
```

In [ ]: