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FYMCA-B 03
BATCH 1
ASSIGNEMT 4

CODE:

```
from math import sqrt

def distance(city1, city2):
  """
  Calculates the Euclidean distance between two cities.
  """
  x1, y1 = city1
  x2, y2 = city2
  return sqrt((x1 - x2) ** 2 + (y1 - y2) ** 2)

def nearest_neighbor(cities):
  """
  Solves the TSP using a nearest neighbor heuristic.
  """
  visited = set()
  tour = []
  current_city = cities[0]
  visited.add(current_city)
  tour.append(current_city)

  for _ in range(len(cities) - 1):
    min_distance = float('inf')
    nearest_city = None
    for city in cities:
      if city not in visited and distance(current_city, city) < min_distance:
        min_distance = distance(current_city, city)
        nearest_city = city
    visited.add(nearest_city)
    tour.append(nearest_city)
    current_city = nearest_city

  # Return to the starting city to complete the tour
  tour.append(tour[0])

  total_distance = 0
  for i in range(len(tour) - 1):
    total_distance += distance(tour[i], tour[i + 1])

  return tour, total_distance

# Example city coordinates (replace with your actual data)
cities = [(1, 2), (4, 5), (7, 1), (2, 8)]

tour, total_distance = nearest_neighbor(cities.copy())

print("Tour:", tour)
print("Total distance:", total_distance)
```

OUTPUT:

```
Tour: [(1, 2), (2, 8), (7, 1), (4, 5), (1, 2)]
Total distance: 15.656854248910719
```