```python
"""
Regroupement de différentes fonctions utiles aux deux programmes
"""
import random as rnd
import matplotlib.pyplot as plt
import numpy as np
import numpy.random as npr

def gen_points(nb_points):    #génère des points dans sur le plan
  points = []
  for i in range(nb_points):
    x = rnd.random() * 2 - 1
    y = rnd.random() * 2 - 1
    points.append((x, y))

  return points

def plot_points(points):    #affiche les points sur le plan
  x_list = []
  y_list = []

  for pt in points:
    x_list.append(pt[0])
    y_list.append(pt[1])
  plt.scatter(x_list, y_list)

def display_path(path, points):   #affiche le chemin sur le plan
    nb_points = len(points)

    x_list = []
    y_list = []

    for i in range(nb_points):
        pt = points[path[i]]
        x_list.append(pt[0])
        y_list.append(pt[1])
    pt = points[path[0]]
    x_list.append(pt[0])
    y_list.append(pt[1])

    plt.plot(x_list, y_list, 'o-')

def dist(pt1, pt2):   #calcule la distance entre deux points
  dx = pt2[0] - pt1[0]
  dy = pt2[1] - pt1[1]

  distance = np.sqrt(dx*dx + dy*dy)

  return distance

def create_distance_matrix(points):   #créé la matrice des distances entre tous les points
    nb_points = len(points)
    matrix = np.ones((nb_points, nb_points))

    for i in range(nb_points):
        for j in range(nb_points):
            matrix[i][j] = dist(points[i], points[j])

    return matrix
```