

Actividad 11 (Fuerza Bruta).

Hernandez Nieto Fernando

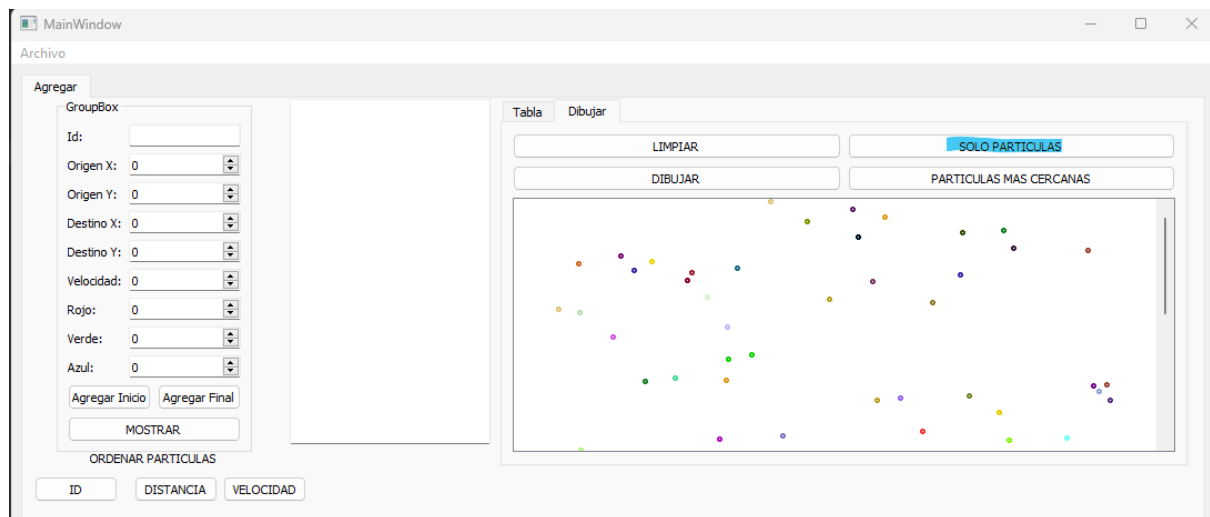
Seminario de Algoritmia I

Lineamientos de evaluación

- ☒ El reporte está en formato Google Docs o PDF.
- ☒ El reporte sigue las pautas del [Formato de Actividades](#).
- ☒ El reporte tiene desarrollada todas las pautas del [Formato de Actividades](#).
- ☒ Se muestra captura de pantalla de los puntos de las partículas en el **QScene**.
- ☒ Se muestra captura de pantalla del resultado del algoritmo de fuerza bruta en el **QScene**.

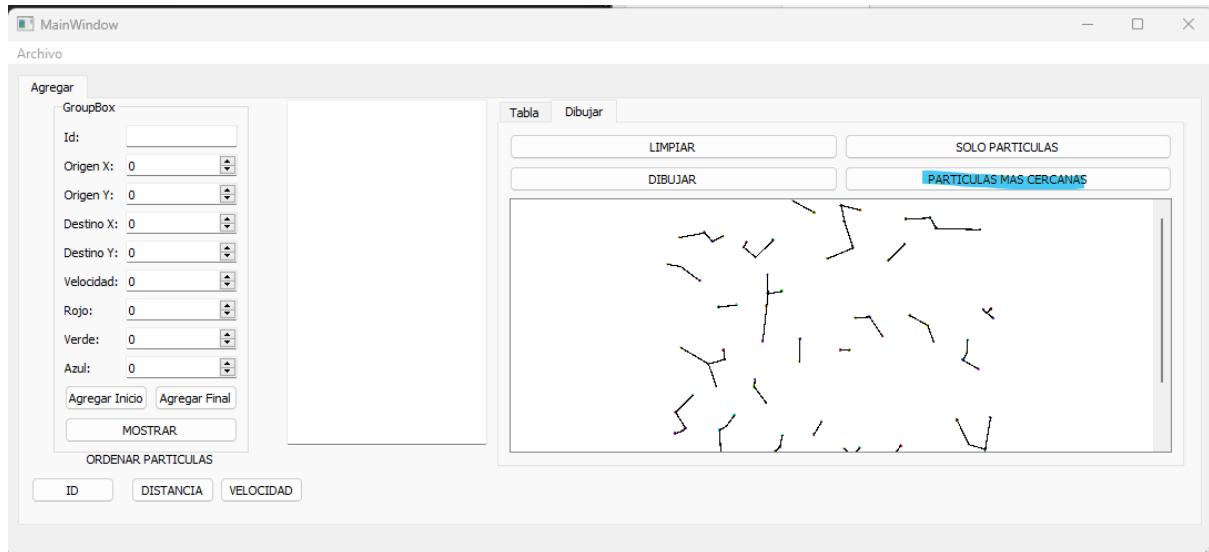
Desarrollo

Captura de pantalla de los puntos de las partículas.



En esa imagen se muestra el botón creado para mostrar solo los puntos de origen y final de las partículas creadas.

Captura de pantalla de los puntos más cercanos de las partículas.



En esa imagen se muestra el botón creado para mostrar los puntos de las partículas más cercanas a otras donde utilizamos el algoritmo de fuerza bruta..

Conclusiones

Lo más difícil era ver cómo crear el algoritmo a si que se obito por crear una clase pública donde tendríamos las coordenadas de x , y , se hizo con 2 while animados para simular los for anidados.

Referencias

Información entregada por el profesor:
JAIRO CAIN.

Código

app.py

```
from PySide2.QtWidgets import QApplication
from mainWindow import MainWindow
import sys

app = QApplication()
myWindow = MainWindow()
myWindow.show()

sys.exit(app.exec_())
```

algorithms.py

```
def euclidean_distance(x_1, y_1, x_2, y_2)->float:
    euclidean_Distance = math.sqrt(((x_2-x_1)**2) + ((y_2-y_1)**2))
    return euclidean_Distance
```

particle.py

```
from algorithms import euclidean_distance

class Point:
    def __init__(self, x=0, y=0):
        self.point_X = x
        self.point_Y = y

class Particle:
    def __init__(self, id="", origen_x=0, origen_y=0, destino_x=0,
destino_y=0, velocidad=0, red=0, green=0, blue=0):
        self.__id = id
        self.__origen_x = origen_x
        self.__origen_y = origen_y
        self.__destino_x = destino_x
        self.__destino_y = destino_y
        self.__velocidad = velocidad
        self.__red = red
        self.__green = green
        self.__blue = blue
        self.__distancia = euclidean_distance(origen_x, origen_y,
destino_x, destino_y)

    def __str__(self) -> str:
        return (
            '\nID: ' + str(self.__id) +
            '\nOrigen X: ' + str(self.__origen_x) +
            '\nOrigen Y: ' + str(self.__origen_y) +
            '\nDestino X: ' + str(self.__destino_x) +
            '\nDestino Y: ' + str(self.__destino_y) +
            '\nVelocidad: ' + str(self.__velocidad) +
            '\nRojo: ' + str(self.__red) +
```

```

        '\nVerde: ' + str(self.__green) +
        '\nAzul: ' + str(self.__blue) +
        '\nDistancia: ' + str(self.__distancia) +
        '\n'
    )

def __lt__(self, other):
    return self.id < other.id

def to_dict(self):
    return{

        "id": self.__id,
        "origen_x": self.__origen_x,
        "origen_y": self.__origen_y,
        "destino_x": self.__destino_x,
        "destino_y": self.__destino_y,
        "velocidad": self.__velocidad,
        "red": self.__red,
        "green": self.__green,
        "blue": self.__blue

    }

@property
def id(self):
    return self.__id

@property
def origen_x(self):
    return self.__origen_x

@property
def origen_y(self):
    return self.__origen_y

@property
def destino_x(self):
    return self.__destino_x

@property
def destino_y(self):
    return self.__destino_y

```

```

@property
def velocidad(self):
    return self.__velocidad

@property
def red(self):
    return self.__red

@property
def green(self):
    return self.__green

@property
def blue(self):
    return self.__blue

@property
def distancia(self):
    return self.__distancia

```

particle_list.py

```

import json
from particle import Particle
from algorithms import *

class Particle_List:
    def __init__(self):
        self.__Particles = []

    def __len__(self):
        return len(self.__Particles)

    def __str__(self):
        return "".join(
            str(particle) for particle in self.__Particles
        )

    def __iter__(self):
        self.cont = 0
        return self

```

```

def __next__(self):
    if(self.cont < len(self.__Particles)):
        Particle = self.__Particles[self.cont]
        self.cont += 1
        return Particle
    else:
        raise StopIteration

def addToEnd(self, part:Particle):
    self.__Particles.append(part)

def addFirst(self, part:Particle):
    self.__Particles.insert(0, part)

def showAll(self):
    for part in self.__Particles:
        print(part)

def guardar(self, ubicacion):
    try:
        with open(ubicacion, 'w') as archivo:
            lista = [particle.to_dict() for particle in
self.__Particles]
            json.dump(lista, archivo, indent=5)
        return 1
    except:
        return 0

def abrir(self, ubicacion):
    try:
        with open(ubicacion, 'r') as archivo:
            lista = json.load(archivo)
            self.__Particles =[Particle(**part) for part in lista]

        return 1
    except:
        return 0

def sort_byId(self):
    self.__Particles.sort(key=lambda Particle: float(Particle.id))

def sort_byDistance(self):

```

```

        self.__Particles.sort(key=lambda Particle : Particle.distancia,
reverse=True)

    def sort_bySpeed(self):
        self.__Particles.sort(key=lambda Particle : Particle.velocidad)

```

mainWindow.py

```

from PySide2.QtWidgets import QMainWindow, QFileDialog ,QMessageBox,
QTableWidgetItem, QGraphicsScene
from PySide2.QtGui import QPen, QColor
from ui_mainWindow import Ui_MainWindow
from PySide2.QtCore import Slot
from particle import Particle, Point
from particle_list import Particle_List
from algorithms import *

class MainWindow(QMainWindow):
    def __init__(self) -> None:
        super(MainWindow, self).__init__()
        self.myPoints = []
        self.particle_list = Particle_List()
        self.ui = Ui_MainWindow()
        self.ui.setupUi(self)

self.ui.addToStart_pushButton.clicked.connect(self.click_addStart)
        self.ui.addEnd_pushButton.clicked.connect(self.click_addEnd)

self.ui.showListParticle_pushButton.clicked.connect(self.click_show)
        self.ui.actionAbrir.triggered.connect(self.action_abrir)
        self.ui.actionGuardar.triggered.connect(self.action_guardar)

self.ui.search_pushButton.clicked.connect(self.search_tableParticle)

self.ui.show_pushButton.clicked.connect(self.show_tableParticle)
        self.ui.draw_pushButton.clicked.connect(self.draw_particle)
        self.ui.clearDraw_pushButton.clicked.connect(self.clear_draws)
        self.scene = QGraphicsScene()

```

```

        self.ui.graphicsView.setScene(self.scene)
        self.ui.idSort_pushButton.clicked.connect(self.sort_by_id)

self.ui.distanceSort_pushButton.clicked.connect(self.sort_by_distance)

self.ui.speedSort_pushButton.clicked.connect(self.sort_by_speed)

self.ui.close_particle_pushButton.clicked.connect(self.get_points_particles)

self.ui.only_particles_pushButton.clicked.connect(self.draw_points)


    def wheelEvent(self, event):
        if (event.delta() > 0):
            self.ui.graphicsView.scale(1.2,1.2)
        else:
            self.ui.graphicsView.scale(0.8, 0.8)

    @Slot()
    def search_tableParticle(self):
        id = self.ui.search_lineEdit.text()
        encontrado = False
        for particle in self.particle_list:
            print(id)
            print(particle.id)
            if(id == str(particle.id)):
                self.ui.particle_tableWidget.clear()
                headers = [ "ID", "Origen X","Origen Y","Destino X",
                            "Destino Y", "Velocidad","Rojo", "Verde", "Azul",
                            "Distancia"]

self.ui.particle_tableWidget.setHorizontalHeaderLabels(headers)
                self.ui.particle_tableWidget.setRowCount(1)

                id_widget = QTableWidgetItem(str(particle.id))
                origen_x_widget =
QTableWidgetItem(str(particle.origen_x))
                origen_y_widget =
QTableWidgetItem(str(particle.origen_y))
                destino_x_widget =
QTableWidgetItem(str(particle.destino_x))

```



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        destino_y_widget =
QTableWidgetItem(str(particle.destino_y))
        velocidad_widget =
QTableWidgetItem(str(particle.velocidad))
        red_widget = QTableWidgetItem(str(particle.red))
        green_widget = QTableWidgetItem(str(particle.green))
        blue_widget = QTableWidgetItem(str(particle.blue))
        distance_widget =
QTableWidgetItem(str(particle.distancia))

        self.ui.particle_tableWidget.setItem(0, 0, id_widget)
        self.ui.particle_tableWidget.setItem(0, 1,
origen_x_widget)
        self.ui.particle_tableWidget.setItem(0, 2,
origen_y_widget)
        self.ui.particle_tableWidget.setItem(0, 3,
destino_x_widget)
        self.ui.particle_tableWidget.setItem(0, 4,
destino_y_widget)
        self.ui.particle_tableWidget.setItem(0, 5,
velocidad_widget)
        self.ui.particle_tableWidget.setItem(0, 6, red_widget)
        self.ui.particle_tableWidget.setItem(0, 7,
green_widget)
        self.ui.particle_tableWidget.setItem(0, 8, blue_widget)
        self.ui.particle_tableWidget.setItem(0, 9,
distance_widget)

        encontrado = True
        return

    if not encontrado:
        QMessageBox.warning(
            self, "Atencion",
            'La partícula con el id ' + id + ' no fue
encontrado...'
        )

    @Slot()
    def sort_by_id(self):
        self.particle_list.sort_byId()
        self.click_show()
        self.show_tableParticle()

    @Slot()

```

```

def sort_by_distance(self):
    self.particle_list.sort_byDistance()
    self.click_show()
    self.show_tableParticle()

@Slot()
def sort_by_speed(self):
    self.particle_list.sort_bySpeed()
    self.click_show()
    self.show_tableParticle()

@Slot()
def show_tableParticle(self):
    self.ui.particle_tableWidget.setColumnCount(10)
    headers = [ "ID", "Origen X", "Origen Y", "Destino X",
                "Destino Y", "Velocidad", "Rojo", "Verde", "Azul",
                "Distancia"]
    self.ui.particle_tableWidget.setHorizontalHeaderLabels(headers)

self.ui.particle_tableWidget.setRowCount(len(self.particle_list))

row = 0
for particle in self.particle_list:
    id_widget = QTableWidgetItem(str(particle.id))
    origen_x_widget = QTableWidgetItem(str(particle.origen_x))
    origen_y_widget = QTableWidgetItem(str(particle.origen_y))
    destino_x_widget =
QTableWidgetItem(str(particle.destino_x))
    destino_y_widget =
QTableWidgetItem(str(particle.destino_y))
    velocidad_widget =
QTableWidgetItem(str(particle.velocidad))
    red_widget = QTableWidgetItem(str(particle.red))
    green_widget = QTableWidgetItem(str(particle.green))
    blue_widget = QTableWidgetItem(str(particle.blue))
    distance_widget = QTableWidgetItem(str(particle.distancia))

    self.ui.particle_tableWidget.setItem(row, 0, id_widget)
    self.ui.particle_tableWidget.setItem(row, 1,
origen_x_widget)
    self.ui.particle_tableWidget.setItem(row, 2,
origen_y_widget)

```

```

        self.ui.particle_tableWidget.setItem(row, 3,
destino_x_widget)
        self.ui.particle_tableWidget.setItem(row, 4,
destino_y_widget)
        self.ui.particle_tableWidget.setItem(row, 5,
velocidad_widget)
        self.ui.particle_tableWidget.setItem(row, 6, red_widget)
        self.ui.particle_tableWidget.setItem(row, 7, green_widget)
        self.ui.particle_tableWidget.setItem(row, 8, blue_widget)
        self.ui.particle_tableWidget.setItem(row, 9,
distance_widget)

        row += 1

@Slot()
def action_abrir(self):
    ubicacion = QFileDialog.getOpenFileName(
        self,
        'Abrir Archivo',
        '.',
        'JSON (*.json)'
    ) [0]
    if(self.particle_list.abrir(ubicacion)):
        QMessageBox.information(
            self,
            "Exito",
            "Se pudo abrir el archivo" + ubicacion
        )
    else:
        QMessageBox.critical(
            self,
            "Error",
            "No se pudo abrir el archivo" + ubicacion
        )

@Slot()
def action_guardar(self):

    ubicacion = QFileDialog.getSaveFileName(
        self,
        'Guardar Archivo',
        '.',
        'JSON (*.json)'
    ) [0]
    if(self.particle_list.guardar(ubicacion)):

```

```

        QMessageBox.information(
            self,
            "Exit",
            "Se pudo crear el archivo" + ubicacion
        )
    else:
        QMessageBox.critical(
            self,
            "Error",
            "No se pudo crear el archivo" + ubicacion
        )

@Slot()
def click_addStart(self):
    self.particle_list.addFirst(self.make_particle())
    self.reset_spinBoxes()

@Slot()
def click_addEnd(self):
    self.particle_list.addToEnd(self.make_particle())
    self.reset_spinBoxes()

@Slot()
def click_show(self):
    self.ui.particle_PlainText.clear()

self.ui.particle_PlainText.insertPlainText(str(self.particle_list))

def make_particle(self)->Particle:
    id = self.ui.id_lineEdit.text()
    x1 = self.ui.originX_spinBox.value()
    y1 = self.ui.originY_spinBox.value()
    x2 = self.ui.destX_spinBox.value()
    y2 = self.ui.destY_spinBox.value()
    speed = self.ui.speed_spinBox.value()
    red = self.ui.red_spinBox.value()
    green = self.ui.green_spinBox.value()
    blue = self.ui.blue_spinBox.value()
    myParticle = Particle(id, x1, y1, x2, y2, speed, red, green,
blue)

    return myParticle

def reset_spinBoxes(self):
    id = self.ui.id_lineEdit.setText("")
    self.ui.originX_spinBox.setValue(0)
    self.ui.originY_spinBox.setValue(0)

```

```

        self.ui.destX_spinBox.setValue(0)
        self.ui.destY_spinBox.setValue(0)
        self.ui.speed_spinBox.setValue(0)
        self.ui.red_spinBox.setValue(0)
        self.ui.green_spinBox.setValue(0)
        self.ui.blue_spinBox.setValue(0)

    @Slot()
    def draw_particle(self):
        self.scene.clear()
        for part in self.particle_list:
            pen = QPen()
            pen.setWidth(2)
            color = QColor(part.red, part.green, part.blue)
            pen.setColor(color)
            self.scene.addEllipse(part.origen_x, part.origen_y, 3, 3,
pen)

            self.scene.addEllipse(part.destino_x, part.destino_y, 3, 3,
pen)

            self.scene.addLine(part.origen_x +2, part.origen_y+2,
part.destino_x+2, part.destino_y+2, pen)

    @Slot()
    def clear_draws(self):
        self.scene.clear()

    @Slot()
    def draw_points(self):
        self.scene.clear()
        for part in self.particle_list:
            pen = QPen()
            pen.setWidth(2)
            color = QColor(part.red, part.green, part.blue)
            pen.setColor(color)
            self.scene.addEllipse(part.origen_x, part.origen_y, 3, 3,
pen)

            self.scene.addEllipse(part.destino_x, part.destino_y, 3, 3,
pen)

    @Slot()
    def get_points_particles(self):
        self.myPoints.clear()
        for particle in self.particle_list:

```

```

        myP = Point(particle.origen_x, particle.origen_y)
        self.myPoints.append(myP)
        myPe = Point(particle.destino_x, particle.destino_y)
        self.myPoints.append(myPe)
        self.get_points()

    def get_points(self):
        count = 0
        close = 0
        less_distance = 999999999999999
        while(len(self.myPoints) > count):
            iter = 0
            while(len(self.myPoints) > iter):
                if(count != iter):
                    actual =
euclidean_distance(self.myPoints[count].point_X,
self.myPoints[count].point_Y,
                    self.myPoints[iter].point_X,
self.myPoints[iter].point_Y)
                    #print("Obtenida: " + actual + "\n")
                    #print("Menor actual: " + less_distance + "\n")
                    if(actual < less_distance):
                        less_distance = actual
                        close = iter
                iter+=1

            pen = QPen()
            pen.setWidth(2)
            self.scene.addLine(self.myPoints[count].point_X +2,
self.myPoints[count].point_Y+2,
                                self.myPoints[close].point_X +2,
self.myPoints[close].point_Y+2, pen)
            less_distance = 999999999999999
            count += 1

```

mainWindow.ui

```

<?xml version="1.0" encoding="UTF-8"?>
<ui version="4.0">

```

```
<class>MainWindow</class>
<widget class="QMainWindow" name="MainWindow">
  <property name="geometry">
    <rect>
      <x>0</x>
      <y>0</y>
      <width>1087</width>
      <height>465</height>
    </rect>
  </property>
  <property name="windowTitle">
    <string>MainWindow</string>
  </property>
  <widget class="QWidget" name="centralwidget">
    <layout class="QGridLayout" name="gridLayout">
      <item row="0" column="0">
        <widget class="QTabWidget" name="tabWidget_2">
          <property name="currentIndex">
            <number>0</number>
          </property>
          <widget class="QWidget" name="tab_7">
            <attribute name="title">
              <string>Agregar</string>
            </attribute>
            <widget class="QGroupBox" name="groupBox_3">
              <property name="geometry">
                <rect>
                  <x>30</x>
                  <y>0</y>
                  <width>176</width>
                  <height>319</height>
                </rect>
              </property>
              <property name="title">
                <string>GroupBox</string>
              </property>
              <layout class="QGridLayout" name="gridLayout_5">
                <item row="2" column="1" colspan="2">
                  <widget class="QSpinBox" name="originY_spinBox">
                    <property name="maximum">
                      <number>500</number>
                    </property>
                  </widget>
                </item>
              </layout>
            </widget>
          </widget>
        </widget>
      </item>
    </layout>
  </widget>
</widget>
```

```
</item>
<item row="6" column="0">
  <widget class="QLabel" name="label_15">
    <property name="text">
      <string>Rojo:</string>
    </property>
  </widget>
</item>
<item row="4" column="0">
  <widget class="QLabel" name="label_16">
    <property name="text">
      <string>Destino Y:</string>
    </property>
  </widget>
</item>
<item row="6" column="1" colspan="2">
  <widget class="QSpinBox" name="red_spinBox">
    <property name="maximum">
      <number>255</number>
    </property>
  </widget>
</item>
<item row="7" column="0">
  <widget class="QLabel" name="label_17">
    <property name="text">
      <string>Verde:</string>
    </property>
  </widget>
</item>
<item row="3" column="1" colspan="2">
  <widget class="QSpinBox" name="destX_spinBox">
    <property name="maximum">
      <number>500</number>
    </property>
  </widget>
</item>
<item row="1" column="1" colspan="2">
  <widget class="QSpinBox" name="originX_spinBox">
    <property name="maximum">
      <number>500</number>
    </property>
  </widget>
</item>
```



```
<item row="8" column="1" colspan="2">
  <widget class="QSpinBox" name="blue_spinBox">
    <property name="maximum">
      <number>255</number>
    </property>
  </widget>
</item>
<item row="5" column="0">
  <widget class="QLabel" name="label_18">
    <property name="text">
      <string>Velocidad:</string>
    </property>
  </widget>
</item>
<item row="0" column="1" colspan="2">
  <widget class="QLineEdit" name="id_lineEdit"/>
</item>
<item row="7" column="1" colspan="2">
  <widget class="QSpinBox" name="green_spinBox">
    <property name="maximum">
      <number>255</number>
    </property>
  </widget>
</item>
<item row="9" column="2">
  <widget class="QPushButton" name="addEnd_pushButton">
    <property name="text">
      <string>Agregar Final</string>
    </property>
  </widget>
</item>
<item row="8" column="0">
  <widget class="QLabel" name="label_19">
    <property name="text">
      <string>Azul:</string>
    </property>
  </widget>
</item>
<item row="0" column="0">
  <widget class="QLabel" name="originX_label_5">
    <property name="text">
      <string>Id:</string>
    </property>
```

```

        </widget>
    </item>
    <item row="4" column="1" colspan="2">
        <widget class="QSpinBox" name="destY_spinBox">
            <property name="maximum">
                <number>500</number>
            </property>
        </widget>
    </item>
    <item row="1" column="0">
        <widget class="QLabel" name="originX_label_6">
            <property name="text">
                <string>Origen X:</string>
            </property>
        </widget>
    </item>
    <item row="10" column="0" colspan="3">
        <widget class="QPushButton"
name="showListParticle_pushButton">
            <property name="text">
                <string>MOSTRAR</string>
            </property>
        </widget>
    </item>
    <item row="3" column="0">
        <widget class="QLabel" name="label_20">
            <property name="text">
                <string>Destino X:</string>
            </property>
        </widget>
    </item>
    <item row="2" column="0">
        <widget class="QLabel" name="originY_label_3">
            <property name="text">
                <string>Origen Y:</string>
            </property>
        </widget>
    </item>
    <item row="9" column="0" colspan="2">
        <widget class="QPushButton" name="addToStart_pushButton">
            <property name="text">
                <string>Agregar Inicio</string>
            </property>

```

```
</widget>
</item>
<item row="5" column="1" colspan="2">
  <widget class="QSpinBox" name="speed_spinBox">
    <property name="maximum">
      <number>99999</number>
    </property>
  </widget>
</item>
</layout>
</widget>
<widget class="QPlainTextEdit" name="particle_PlainText">
  <property name="geometry">
    <rect>
      <x>240</x>
      <y>0</y>
      <width>181</width>
      <height>311</height>
    </rect>
  </property>
</widget>
<widget class="QPushButton" name="idSort_pushButton">
  <property name="geometry">
    <rect>
      <x>10</x>
      <y>340</y>
      <width>75</width>
      <height>23</height>
    </rect>
  </property>
  <property name="text">
    <string>ID</string>
  </property>
</widget>
<widget class="QPushButton" name="distanceSort_pushButton">
  <property name="geometry">
    <rect>
      <x>100</x>
      <y>340</y>
      <width>75</width>
      <height>23</height>
    </rect>
  </property>
```

```
<property name="text">
  <string>DISTANCIA</string>
</property>
</widget>
<widget class="QPushButton" name="speedSort_pushButton">
  <property name="geometry">
    <rect>
      <x>180</x>
      <y>340</y>
      <width>75</width>
      <height>23</height>
    </rect>
  </property>
  <property name="text">
    <string>VELOCIDAD</string>
  </property>
</widget>
<widget class="QLabel" name="label_21">
  <property name="geometry">
    <rect>
      <x>60</x>
      <y>313</y>
      <width>121</width>
      <height>20</height>
    </rect>
  </property>
  <property name="text">
    <string>ORDENAR PARTICULAS</string>
  </property>
</widget>
<widget class="QTabWidget" name="tabWidget">
  <property name="geometry">
    <rect>
      <x>430</x>
      <y>0</y>
      <width>621</width>
      <height>331</height>
    </rect>
  </property>
  <property name="currentIndex">
    <number>1</number>
  </property>
  <widget class="QWidget" name="Table">
```

```
<attribute name="title">
  <string>Tabla</string>
</attribute>
<widget class="QTableWidget" name="particle_tableWidget">
  <property name="geometry">
    <rect>
      <x>10</x>
      <y>50</y>
      <width>541</width>
      <height>291</height>
    </rect>
  </property>
</widget>
<widget class="QLineEdit" name="search_lineEdit">
  <property name="geometry">
    <rect>
      <x>40</x>
      <y>10</y>
      <width>71</width>
      <height>21</height>
    </rect>
  </property>
</widget>
<widget class="QPushButton" name="search_pushButton">
  <property name="geometry">
    <rect>
      <x>130</x>
      <y>10</y>
      <width>101</width>
      <height>23</height>
    </rect>
  </property>
  <property name="text">
    <string>Buscar</string>
  </property>
</widget>
<widget class="QPushButton" name="show_pushButton">
  <property name="geometry">
    <rect>
      <x>250</x>
      <y>10</y>
      <width>101</width>
      <height>21</height>
```

```

        </rect>
    </property>
    <property name="text">
        <string>Mostrar Todo</string>
    </property>
</widget>
<widget class="QLabel" name="originX_label_7">
    <property name="geometry">
        <rect>
            <x>20</x>
            <y>10</y>
            <width>21</width>
            <height>20</height>
        </rect>
    </property>
    <property name="text">
        <string>ID:</string>
    </property>
</widget>
</widget>
<widget class="QWidget" name="tab_2">
    <attribute name="title">
        <string>Dibujar</string>
    </attribute>
    <layout class="QGridLayout" name="gridLayout_2">
        <item row="0" column="0">
            <widget class="QPushButton" name="clearDraw_pushButton">
                <property name="text">
                    <string>LIMPIAR</string>
                </property>
            </widget>
        </item>
        <item row="0" column="1">
            <widget class="QPushButton"
name="only_particles_pushButton">
                <property name="text">
                    <string>SOLO PARTICULAS</string>
                </property>
            </widget>
        </item>
        <item row="1" column="0">
            <widget class="QPushButton" name="draw_pushButton">
                <property name="text">

```

```

        <string>DIBUJAR</string>
    </property>
</widget>
</item>
<item row="1" column="1">
    <widget class="QPushButton"
name="close_particle_pushButton">
        <property name="text">
            <string>PARTICULAS MAS CERCANAS</string>
        </property>
    </widget>
</item>
<item row="2" column="0" colspan="2">
    <widget class="QGraphicsView" name="graphicsView"/>
</item>
</layout>
</widget>
</widget>
</widget>
</widget>
</item>
</layout>
</widget>
<widget class="QMenuBar" name="menubar">
    <property name="geometry">
        <rect>
            <x>0</x>
            <y>0</y>
            <width>1087</width>
            <height>21</height>
        </rect>
    </property>
    <widget class="QMenu" name="menuAbrir">
        <property name="title">
            <string>Archivo</string>
        </property>
        <addaction name="actionAbrir"/>
        <addaction name="actionGuardar"/>
    </widget>
    <addaction name="menuAbrir"/>
</widget>
<widget class="QStatusBar" name="statusbar"/>
<action name="actionAbrir">

```

```

    <property name="text">
        <string>Abrir</string>
    </property>
    <property name="shortcut">
        <string>Ctrl+O</string>
    </property>
</action>
<action name="actionGuardar">
    <property name="text">
        <string>Guardar</string>
    </property>
    <property name="shortcut">
        <string>Ctrl+S</string>
    </property>
</action>
</widget>
<resources/>
<connections/>
</ui>

```

ui_mainWindow.py

```

# -*- coding: utf-8 -*-

#####
#####
## Form generated from reading UI file 'mainWindow.ui'
##
## Created by: Qt User Interface Compiler version 5.15.2
##
## WARNING! All changes made in this file will be lost when recompiling
UI file!

```



```
#####

#####

from PySide2.QtCore import *
from PySide2.QtGui import *
from PySide2.QtWidgets import *

class Ui_MainWindow(object):
    def setupUi(self, MainWindow):
        if not MainWindow.setObjectName():
            MainWindow.setObjectName(u"MainWindow")
        MainWindow.resize(1087, 465)
        self.actionAbrir = QAction(MainWindow)
        self.actionAbrir.setObjectName(u"actionAbrir")
        self.actionGuardar = QAction(MainWindow)
        self.actionGuardar.setObjectName(u"actionGuardar")
        self.centralwidget = QWidget(MainWindow)
        self.centralwidget.setObjectName(u"centralwidget")
        self.gridLayout = QGridLayout(self.centralwidget)
        self.gridLayout.setObjectName(u"gridLayout")
        self.tabWidget_2 = QTabWidget(self.centralwidget)
        self.tabWidget_2.setObjectName(u"tabWidget_2")
        self.tab_7 = QWidget()
        self.tab_7.setObjectName(u"tab_7")
        self.groupBox_3 = QGroupBox(self.tab_7)
        self.groupBox_3.setObjectName(u"groupBox_3")
        self.groupBox_3.setGeometry(QRect(30, 0, 176, 319))
        self.gridLayout_5 = QGridLayout(self.groupBox_3)
        self.gridLayout_5.setObjectName(u"gridLayout_5")
        self.originY_spinBox = QSpinBox(self.groupBox_3)
        self.originY_spinBox.setObjectName(u"originY_spinBox")
        self.originY_spinBox.setMaximum(500)

        self.gridLayout_5.addWidget(self.originY_spinBox, 2, 1, 1, 2)

        self.label_15 = QLabel(self.groupBox_3)
        self.label_15.setObjectName(u"label_15")

        self.gridLayout_5.addWidget(self.label_15, 6, 0, 1, 1)

        self.label_16 = QLabel(self.groupBox_3)
        self.label_16.setObjectName(u"label_16")
```

```
self.gridLayout_5.addWidget(self.label_16, 4, 0, 1, 1)

self.red_spinBox = QSpinBox(self.groupBox_3)
self.red_spinBox.setObjectName(u"red_spinBox")
self.red_spinBox.setMaximum(255)

self.gridLayout_5.addWidget(self.red_spinBox, 6, 1, 1, 2)

self.label_17 = QLabel(self.groupBox_3)
self.label_17.setObjectName(u"label_17")

self.gridLayout_5.addWidget(self.label_17, 7, 0, 1, 1)

self.destX_spinBox = QSpinBox(self.groupBox_3)
self.destX_spinBox.setObjectName(u"destX_spinBox")
self.destX_spinBox.setMaximum(500)

self.gridLayout_5.addWidget(self.destX_spinBox, 3, 1, 1, 2)

self.originX_spinBox = QSpinBox(self.groupBox_3)
self.originX_spinBox.setObjectName(u"originX_spinBox")
self.originX_spinBox.setMaximum(500)

self.gridLayout_5.addWidget(self.originX_spinBox, 1, 1, 1, 2)

self.blue_spinBox = QSpinBox(self.groupBox_3)
self.blue_spinBox.setObjectName(u"blue_spinBox")
self.blue_spinBox.setMaximum(255)

self.gridLayout_5.addWidget(self.blue_spinBox, 8, 1, 1, 2)

self.label_18 = QLabel(self.groupBox_3)
self.label_18.setObjectName(u"label_18")

self.gridLayout_5.addWidget(self.label_18, 5, 0, 1, 1)

self.id_lineEdit = QLineEdit(self.groupBox_3)
self.id_lineEdit.setObjectName(u"id_lineEdit")

self.gridLayout_5.addWidget(self.id_lineEdit, 0, 1, 1, 2)

self.green_spinBox = QSpinBox(self.groupBox_3)
```

```
self.green_spinBox.setObjectName(u"green_spinBox")
self.green_spinBox.setMaximum(255)

self.gridLayout_5.addWidget(self.green_spinBox, 7, 1, 1, 2)

self.addEnd_pushButton = QPushButton(self.groupBox_3)
self.addEnd_pushButton.setObjectName(u"addEnd_pushButton")

self.gridLayout_5.addWidget(self.addEnd_pushButton, 9, 2, 1, 1)

self.label_19 = QLabel(self.groupBox_3)
self.label_19.setObjectName(u"label_19")

self.gridLayout_5.addWidget(self.label_19, 8, 0, 1, 1)

self.originX_label_5 = QLabel(self.groupBox_3)
self.originX_label_5.setObjectName(u"originX_label_5")

self.gridLayout_5.addWidget(self.originX_label_5, 0, 0, 1, 1)

self.destY_spinBox = QSpinBox(self.groupBox_3)
self.destY_spinBox.setObjectName(u"destY_spinBox")
self.destY_spinBox.setMaximum(500)

self.gridLayout_5.addWidget(self.destY_spinBox, 4, 1, 1, 2)

self.originX_label_6 = QLabel(self.groupBox_3)
self.originX_label_6.setObjectName(u"originX_label_6")

self.gridLayout_5.addWidget(self.originX_label_6, 1, 0, 1, 1)

self.showListParticle_pushButton = QPushButton(self.groupBox_3)
self.showListParticle_pushButton.setObjectName(u"showListParticle_pushButton")

self.gridLayout_5.addWidget(self.showListParticle_pushButton,
10, 0, 1, 3)

self.label_20 = QLabel(self.groupBox_3)
self.label_20.setObjectName(u"label_20")

self.gridLayout_5.addWidget(self.label_20, 3, 0, 1, 1)
```

```

self.originY_label_3 = QLabel(self.groupBox_3)
self.originY_label_3.setObjectName(u"originY_label_3")

self.gridLayout_5.addWidget(self.originY_label_3, 2, 0, 1, 1)

self.addToStart_pushButton = QPushButton(self.groupBox_3)

self.addToStart_pushButton.setObjectName(u"addToStart_pushButton")

self.gridLayout_5.addWidget(self.addToStart_pushButton, 9, 0,
1, 2)

self.speed_spinBox = QSpinBox(self.groupBox_3)
self.speed_spinBox.setObjectName(u"speed_spinBox")
self.speed_spinBox.setMaximum(99999)

self.gridLayout_5.addWidget(self.speed_spinBox, 5, 1, 1, 2)

self.particle_PlainText = QPlainTextEdit(self.tab_7)
self.particle_PlainText.setObjectName(u"particle_PlainText")
self.particle_PlainText.setGeometry(QRect(240, 0, 181, 311))
self.idSort_pushButton = QPushButton(self.tab_7)
self.idSort_pushButton.setObjectName(u"idSort_pushButton")
self.idSort_pushButton.setGeometry(QRect(10, 340, 75, 23))
self.distanceSort_pushButton = QPushButton(self.tab_7)

self.distanceSort_pushButton.setObjectName(u"distanceSort_pushButton")
self.distanceSort_pushButton.setGeometry(QRect(100, 340, 75,
23))

self.speedSort_pushButton = QPushButton(self.tab_7)

self.speedSort_pushButton.setObjectName(u"speedSort_pushButton")
self.speedSort_pushButton.setGeometry(QRect(180, 340, 75, 23))
self.label_21 = QLabel(self.tab_7)
self.label_21.setObjectName(u"label_21")
self.label_21.setGeometry(QRect(60, 313, 121, 20))
self.tabWidget = QTabWidget(self.tab_7)
self.tabWidget.setObjectName(u"tabWidget")
self.tabWidget.setGeometry(QRect(430, 0, 621, 331))
self.Table = QWidget()
self.Table.setObjectName(u"Table")
self.particle_tableWidget = QTableWidget(self.Table)

```

```

self.particle_tableWidget.setObjectName(u"particle_tableWidget")
    self.particle_tableWidget.setGeometry(QRect(10, 50, 541, 291))
    self.search_lineEdit = QLineEdit(self.Table)
    self.search_lineEdit.setObjectName(u"search_lineEdit")
    self.search_lineEdit.setGeometry(QRect(40, 10, 71, 21))
    self.search_pushButton = QPushButton(self.Table)
    self.search_pushButton.setObjectName(u"search_pushButton")
    self.search_pushButton.setGeometry(QRect(130, 10, 101, 23))
    self.show_pushButton = QPushButton(self.Table)
    self.show_pushButton.setObjectName(u"show_pushButton")
    self.show_pushButton.setGeometry(QRect(250, 10, 101, 21))
    self.originX_label_7 = QLabel(self.Table)
    self.originX_label_7.setObjectName(u"originX_label_7")
    self.originX_label_7.setGeometry(QRect(20, 10, 21, 20))
    self.tabWidget.addTab(self.Table, "")
    self.tab_2 = QWidget()
    self.tab_2.setObjectName(u"tab_2")
    self.gridLayout_2 = QGridLayout(self.tab_2)
    self.gridLayout_2.setObjectName(u"gridLayout_2")
    self.clearDraw_pushButton = QPushButton(self.tab_2)

self.clearDraw_pushButton.setObjectName(u"clearDraw_pushButton")

    self.gridLayout_2.addWidget(self.clearDraw_pushButton, 0, 0, 1,
1)

    self.only_particles_pushButton = QPushButton(self.tab_2)

self.only_particles_pushButton.setObjectName(u"only_particles_pushButto
n")

    self.gridLayout_2.addWidget(self.only_particles_pushButton, 0,
1, 1, 1)

    self.draw_pushButton = QPushButton(self.tab_2)
    self.draw_pushButton.setObjectName(u"draw_pushButton")

    self.gridLayout_2.addWidget(self.draw_pushButton, 1, 0, 1, 1)

    self.close_particle_pushButton = QPushButton(self.tab_2)

```

```

self.close_particle_pushButton.setObjectName(u"close_particle_pushButto
n")

        self.gridLayout_2.addWidget(self.close_particle_pushButton, 1,
1, 1, 1)

        self.graphicsView = QGraphicsView(self.tab_2)
        self.graphicsView.setObjectName(u"graphicsView")

        self.gridLayout_2.addWidget(self.graphicsView, 2, 0, 1, 2)

        self.tabWidget.addTab(self.tab_2, "")
        self.tabWidget_2.addTab(self.tab_7, "")

        self.gridLayout.addWidget(self.tabWidget_2, 0, 0, 1, 1)

        MainWindow.setCentralWidget(self.centralwidget)
        self.menubar = QMenuBar(MainWindow)
        self.menubar.setObjectName(u"menubar")
        self.menubar.setGeometry(QRect(0, 0, 1087, 21))
        self.menuAbrir = QMenu(self.menubar)
        self.menuAbrir.setObjectName(u"menuAbrir")
        MainWindow.setMenuBar(self.menubar)
        self.statusbar = QStatusBar(MainWindow)
        self.statusbar.setObjectName(u"statusbar")
        MainWindow.setStatusBar(self.statusbar)

        self.menubar.addAction(self.menuAbrir.menuAction())
        self.menuAbrir.addAction(self.actionAbrir)
        self.menuAbrir.addAction(self.actionGuardar)

        self.retranslateUi(MainWindow)

        self.tabWidget_2.setCurrentIndex(0)
        self.tabWidget.setCurrentIndex(1)

        QMetaObject.connectSlotsByName(MainWindow)
    # setupUi

    def retranslateUi(self, MainWindow):

```

```
MainWindow.setWindowTitle(QCoreApplication.translate("MainWindow",
u"MainWindow", None))

self.actionAbrir.setText(QCoreApplication.translate("MainWindow",
u"Abrir", None))
#if QT_CONFIG(shortcut)

self.actionAbrir.setShortcut(QCoreApplication.translate("MainWindow",
u"Ctrl+O", None))
#endif // QT_CONFIG(shortcut)

self.actionGuardar.setText(QCoreApplication.translate("MainWindow",
u"Guardar", None))
#if QT_CONFIG(shortcut)

self.actionGuardar.setShortcut(QCoreApplication.translate("MainWindow",
u"Ctrl+S", None))
#endif // QT_CONFIG(shortcut)

self.groupBox_3.setTitle(QCoreApplication.translate("MainWindow",
u"GroupBox", None))
    self.label_15.setText(QCoreApplication.translate("MainWindow",
u"Rojo:", None))
    self.label_16.setText(QCoreApplication.translate("MainWindow",
u"Destino Y:", None))
    self.label_17.setText(QCoreApplication.translate("MainWindow",
u"Verde:", None))
    self.label_18.setText(QCoreApplication.translate("MainWindow",
u"Velocidad:", None))

self.addEnd_pushButton.setText(QCoreApplication.translate("MainWindow",
u"Agregar Final", None))
    self.label_19.setText(QCoreApplication.translate("MainWindow",
u"Azul:", None))

self.originX_label_5.setText(QCoreApplication.translate("MainWindow",
u"Id:", None))

self.originX_label_6.setText(QCoreApplication.translate("MainWindow",
u"Origen X:", None))
```

```
self.showListParticle_pushButton.setText(QCoreApplication.translate("Main  
inWindow", u"MOSTRAR", None))  
        self.label_20.setText(QCoreApplication.translate("MainWindow",  
u"Destino X:", None))  
  
self.originY_label_3.setText(QCoreApplication.translate("MainWindow",  
u"Origen Y:", None))  
  
self.addToStart_pushButton.setText(QCoreApplication.translate("MainWind  
ow", u"Agregar Inicio", None))  
  
self.idSort_pushButton.setText(QCoreApplication.translate("MainWindow",  
u"ID", None))  
  
self.distanceSort_pushButton.setText(QCoreApplication.translate("MainWi  
ndow", u"DISTANCIA", None))  
  
self.speedSort_pushButton.setText(QCoreApplication.translate("MainWindo  
w", u"VELOCIDAD", None))  
        self.label_21.setText(QCoreApplication.translate("MainWindow",  
u"ORDENAR PARTICULAS", None))  
  
self.search_pushButton.setText(QCoreApplication.translate("MainWindow",  
u"Buscar", None))  
  
self.show_pushButton.setText(QCoreApplication.translate("MainWindow",  
u"Mostrar Todo", None))  
  
self.originX_label_7.setText(QCoreApplication.translate("MainWindow",  
u"ID:", None))  
        self.tabWidget.setTabText(self.tabWidget.indexOf(self.Table),  
QCoreApplication.translate("MainWindow", u"Tabla", None))  
  
self.clearDraw_pushButton.setText(QCoreApplication.translate("MainWindo  
w", u"LIMPIAR", None))  
  
self.only_particles_pushButton.setText(QCoreApplication.translate("Main  
Window", u"SOLO PARTICULAS", None))  
  
self.draw_pushButton.setText(QCoreApplication.translate("MainWindow",  
u"DIBUJAR", None))
```



```
self.close_particle_pushButton.setText(QCoreApplication.translate("Main
Window", u"PARTICULAS MAS CERCANAS", None))
    self.tabWidget.setTabText(self.tabWidget.indexOf(self.tab_2),
QCoreApplication.translate("MainWindow", u"Dibujar", None))

self.tabWidget_2.setTabText(self.tabWidget_2.indexOf(self.tab_7),
QCoreApplication.translate("MainWindow", u"Agregar", None))

self.menuAbrir.setTitle(QCoreApplication.translate("MainWindow",
u"Archivo", None))
    # retranslateUi
```