



Actividad 10 (sort)

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Seminario de Algoritmia I

Lineamientos de evaluación.

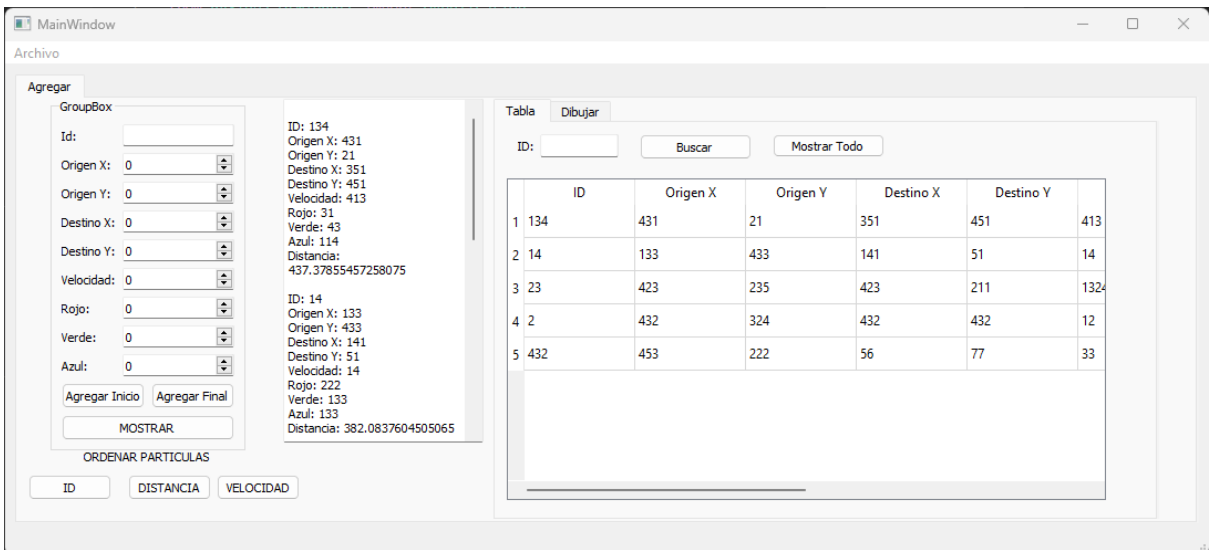
- ☒ El reporte está en formato Google Docs o PDF.
- ☒ El reporte sigue las pautas del  [Formato de Actividades](#).
- ☒ El reporte tiene desarrollada todas las pautas del  [Formato de Actividades](#).
- ☒ Se muestra captura de pantalla de las partículas del antes y después de ser ordenadas por id de manera ascendente tanto en el `QPlainTextEdit` como en el `QTableWidget`.
- ☒ Se muestra captura de pantalla de las partículas del antes y después de ser ordenadas por distancia de manera descendente tanto en el `QPlainTextEdit` como en el `QTableWidget`.
- ☒ Se muestra captura de pantalla de las partículas del antes y después de ser ordenadas por velocidad de manera ascendente tanto en el `QPlainTextEdit` como en el `QTableWidget`.

Desarrollo.

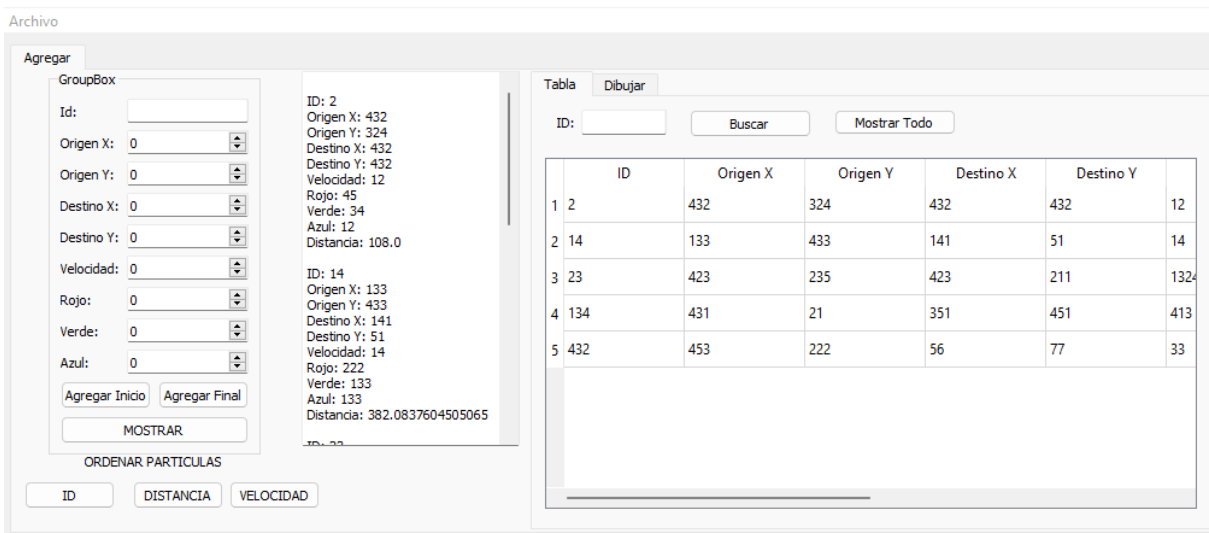
Para la evidencia de esta actividad se utilizará el archivo **.JSON** que se está usando de antemano con la función que ya implementamos de antemano en las actividades anteriores.

Id.

Antes de ser ordenada la tabla.



Al dar click sobre el botón **ID** el cual se encuentra en la parte inferior izquierda nos ordenará la tabla de manera ascendente tanto en el **QPlainTextEdit** como en el **QTableWidget**.



Distancia.

Antes de ser ordenada la tabla.

Agregar

GroupBox

Id:

Origen X:

0

Origen Y:

0

Destino X:

0

Destino Y:

0

Velocidad:

0

Rojo:

0

Verde:

0

Azul:

0

Agregar Inicio

Agregar Final

MOSTRAR

ORDENAR PARTICULAS

ID

DISTANCIA

VELOCIDAD

ID: 2

Origen X: 432

Origen Y: 324

Destino X: 432

Destino Y: 432

Velocidad: 12

Rojo: 45

Verde: 34

Azul: 12

Distancia: 108.0

ID: 14

Origen X: 133

Origen Y: 433

Destino X: 141

Destino Y: 51

Velocidad: 14

Rojo: 222

Verde: 133

Azul: 133

Distancia: 382.0837604505065

Tabla

Dibujar

ID:

Buscar

Mostrar Todo

	Velocidad	Rojo	Verde	Azul	Distancia
1	12	45	34	12	108.0
2	14	222	133	133	382.0837604505...
3	1324	121	132	13	24.0
4	413	31	43	114	437.3785545725...
5	33	34	55	222	422.6511563925...

Al dar click sobre el botón ***DISTANCIA*** el cual se encuentra en la parte inferior izquierda nos ordenará la tabla de forma descendente tanto en el ***QPlainTextEdit*** como en el ***QTableWidget***.

Agregar

GroupBox

Id:

Origen X:

0

Origen Y:

0

Destino X:

0

Destino Y:

0

Velocidad:

0

Rojo:

0

Verde:

0

Azul:

0

Agregar Inicio

Agregar Final

MOSTRAR

ORDENAR PARTICULAS

ID

DISTANCIA

VELOCIDAD

ID: 134

Origen X: 431

Origen Y: 21

Destino X: 351

Destino Y: 451

Velocidad: 413

Rojo: 31

Verde: 43

Azul: 114

Distancia: 437.37855457258075

ID: 432

Origen X: 453

Origen Y: 222

Destino X: 56

Destino Y: 77

Velocidad: 33

Rojo: 34

Verde: 55

Azul: 222

Distancia: 422.6511563925976

Tabla

Dibujar

ID:

Buscar

Mostrar Todo

	Velocidad	Rojo	Verde	Azul	Distancia
1	413	31	43	114	437.3785545725...
2	33	34	55	222	422.6511563925...
3	14	222	133	133	382.0837604505...
4	12	45	34	12	108.0
5	1324	121	132	13	24.0

Velocidad.

Antes de ser ordenada la tabla.

The interface is divided into two main sections. On the left, under the 'Agregar' tab, there is a 'GroupBox' with input fields for 'Id', 'Origen X', 'Origen Y', 'Destino X', 'Destino Y', 'Velocidad', 'Rojo', 'Verde', and 'Azul'. Below these are buttons for 'Agregar Inicio', 'Agregar Final', and 'MOSTRAR'. At the bottom of this section are buttons for 'ORDENAR PARTICULAS' with options 'ID', 'DISTANCIA', and 'VELOCIDAD'. On the right, under the 'Tabla' tab, there is a search bar with 'ID:', 'Buscar', and 'Mostrar Todo' buttons. Below is a table with 6 columns: 'Velocidad', 'Rojo', 'Verde', 'Azul', and 'Distancia'. The table contains 5 rows of data.

	Velocidad	Rojo	Verde	Azul	Distancia
1	413	31	43	114	437.3785545725...
2	33	34	55	222	422.6511563925...
3	14	222	133	133	382.0837604505...
4	12	45	34	12	108.0
5	1324	121	132	13	24.0

Al dar click sobre el botón ***DISTANCIA*** el cual se encuentra en la parte inferior izquierda nos ordenará la tabla de forma ascendente tanto en el ***QPlainTextEdit*** como en el ***QTableWidget***.

The interface is identical to the previous one, but the table data is now sorted by distance in ascending order. The 'DISTANCIA' button in the 'ORDENAR PARTICULAS' section is highlighted.

	Velocidad	Rojo	Verde	Azul	Distancia
1	12	45	34	12	108.0
2	14	222	133	133	382.0837604505...
3	33	34	55	222	422.6511563925...
4	413	31	43	114	437.3785545725...
5	1324	121	132	13	24.0

Las funciones lambda fueron implementadas donde se encuentra nuestra lista de partículas de la siguiente manera.

```
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)
```

Conclusiones

Para esta actividad no se tuvieron problemas considerables ya que la explicación del algoritmo fue muy fácil de digerir, el mayor problema fue volver a reestructurar la interfaz gráfica para que pudiera mostrar ambas tablas al mismo tiempo, pero se logró de manera rápida ya que solo era cuestión de modificar la distribución de los elementos.

Al momento de ordenar los elementos por el atributo *id*, se tuvieron problemas pero se soluciono al castear a float los elementos de la misma para lograr ordenarlos.

Referencias

Michel Dávalos.

Python - sort().

<https://youtu.be/0NZajLly5qQ>

Código

app.py

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

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

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

particle.py

```
from algorithms import euclidean_distance

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

```

algorithms.py

```

import math

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_list.py

```
import json
from particle import Particle

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)

```

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, 601, 381))
        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.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.graphicsView = QGraphicsView(self.tab_2)
self.graphicsView.setObjectName(u"graphicsView")

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

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(0)

        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("Ma
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.draw_pushButton.setText(QCoreApplication.translate("MainWindow",
u"DIBUJAR", 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

```

mainWindow.py

```

<?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>
              <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>601</width>
      <height>381</height>
    </rect>
  </property>
  <property name="currentIndex">
    <number>0</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="1" column="0">
            <widget class="QPushButton" name="draw_pushButton">
                <property name="text">
                    <string>DIBUJAR</string>
                </property>
            </widget>
        </item>
        <item row="2" column="0">
            <widget class="QGraphicsView" name="graphicsView"/>
        </item>
    </layout>
</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>

```

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>
<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>601</width>
      <height>381</height>
    </rect>
  </property>
  <property name="currentIndex">
    <number>0</number>
  </property>
```



```
<widget class="QWidget" name="Table">
  <attribute name="title">
    <string>Tabla</string>
  </attribute>
</widget>
<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="1" column="0">
            <widget class="QPushButton" name="draw_pushButton">
                <property name="text">
                    <string>DIBUJAR</string>
                </property>
            </widget>
        </item>
        <item row="2" column="0">
            <widget class="QGraphicsView" name="graphicsView"/>
        </item>
    </layout>
</widget>
```

```
        </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>
```

save.json

```
[
  {
    "id": "134",
    "origen_x": 431,
    "origen_y": 21,
    "destino_x": 351,
    "destino_y": 451,
    "velocidad": 413,
    "red": 31,
    "green": 43,
    "blue": 114
  },
  {
    "id": "14",
    "origen_x": 133,
    "origen_y": 433,
    "destino_x": 141,
    "destino_y": 51,
    "velocidad": 14,
    "red": 222,
    "green": 133,
    "blue": 133
  },
  {
    "id": "23",
    "origen_x": 423,
    "origen_y": 235,
    "destino_x": 423,
    "destino_y": 211,
    "velocidad": 1324,
    "red": 121,
    "green": 132,
    "blue": 13
  },
]
```

```
{
  "id": "2",
  "origen_x": 432,
  "origen_y": 324,
  "destino_x": 432,
  "destino_y": 432,
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  "red": 45,
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  "id": "432",
  "origen_x": 453,
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