Actividad 08 (QTableWidget)

Hernandez Nieto Fernando

Seminario de Algoritmia I

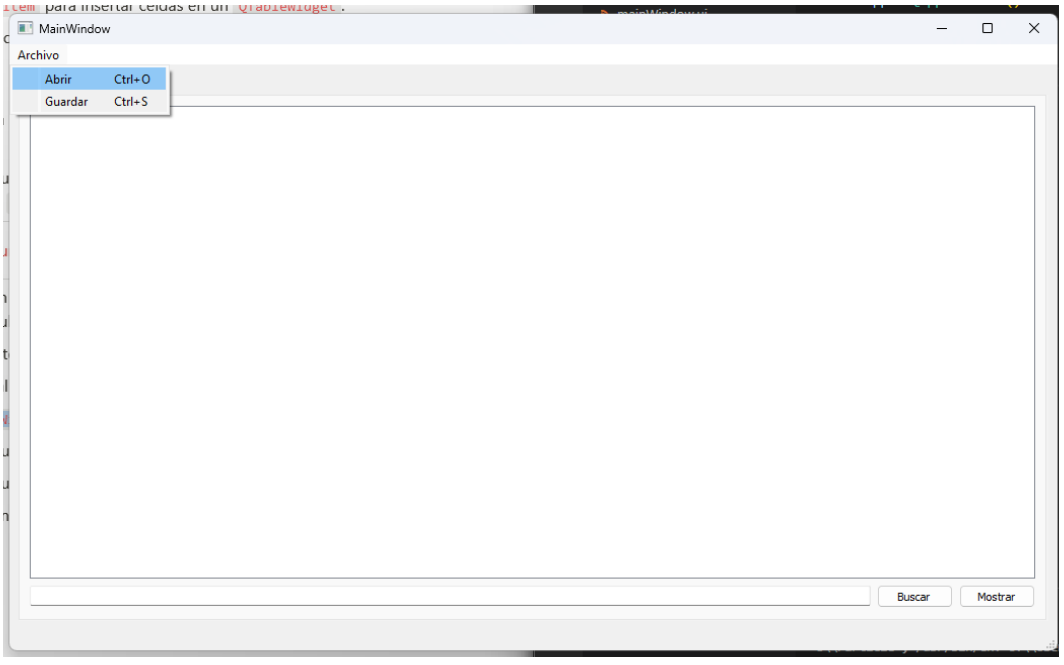
Lineamientos de evaluación

- ☑ ~~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 lo que se pide en el punto 2. sub punto a.~~
- ☑ ~~Se muestra captura de pantalla de lo que se pide en el punto 2. sub punto b.~~
- ☑ ~~Se muestra captura de pantalla de lo que se pide en el punto 2. sub punto c.~~
- ☑ ~~Se muestra captura de pantalla de lo que se pide en el punto 2. sub punto d.~~

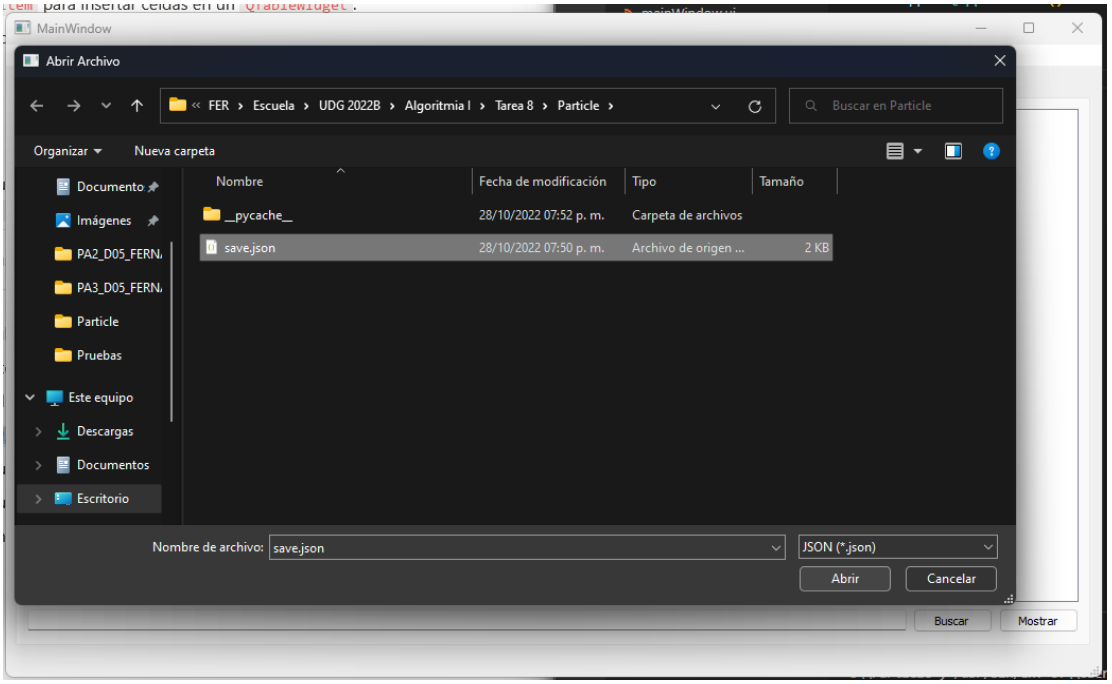
Desarrollo

2.a.- Agrega o recupera un respaldo de al menos 5 partículas.

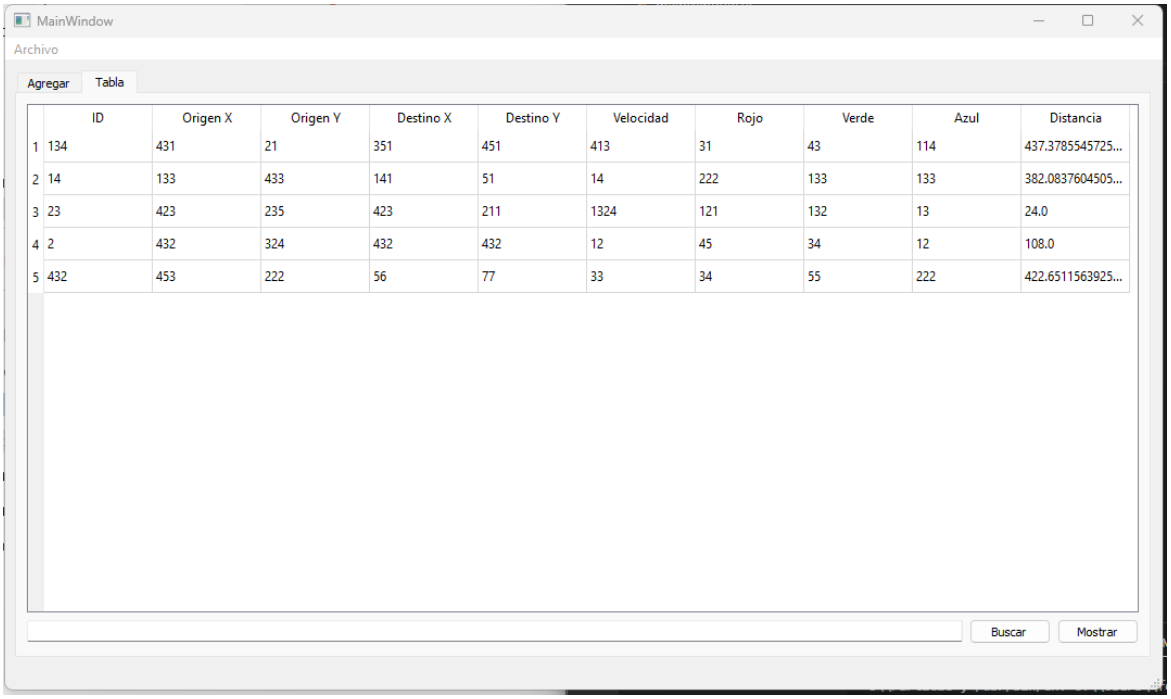
Para este caso se cargarán 5 registros existentes, por lo que en la opción de Archivo daremos click al apartado de Abrir ó bien el utilizaremos el acceso rápido *“control + O”.*



Buscaremos el archivo donde está respaldada nuestra información, en este caso el archivo se llama “*save.json*”.

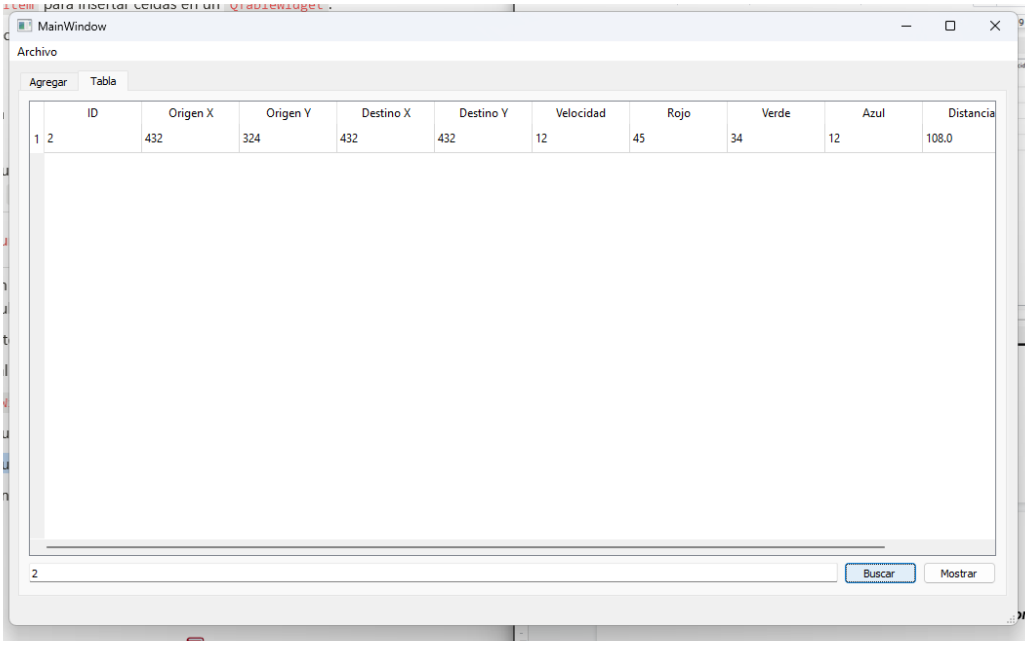


2.b.- Muestra las partículas en el QTableWidget.



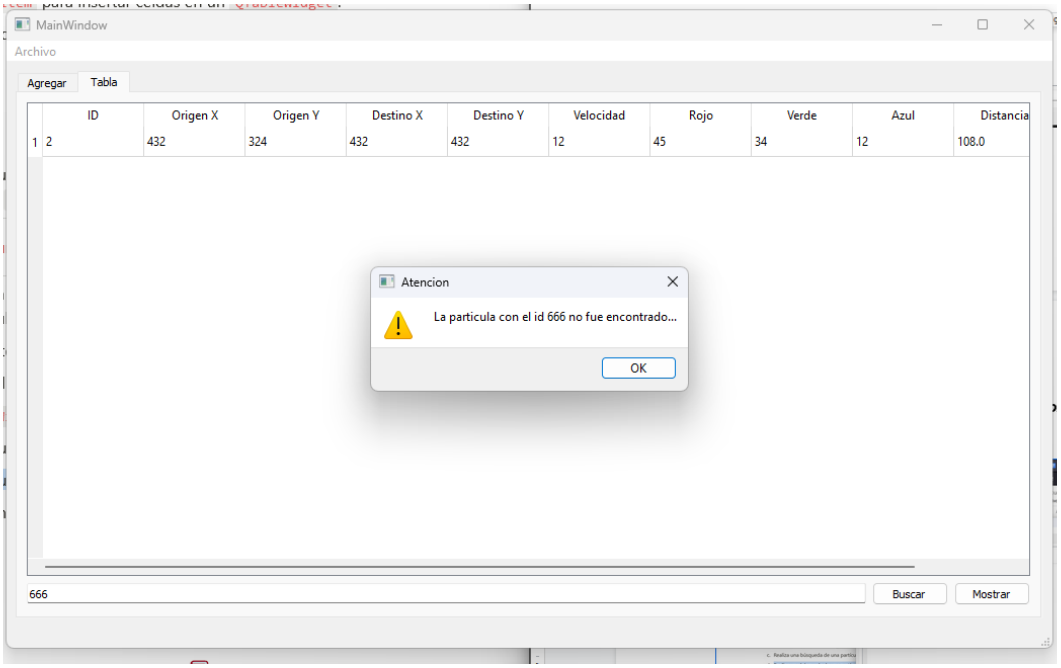
2.c.- Realiza una búsqueda de una partícula con un id existente.

Al buscar la partícula “2” podemos ver que nos muestra toda su información sin problemas.



2.d.- Realiza una búsqueda de una partícula con un id no existente.

En este caso buscaremos la partícula “666” y como podemos ver no se encuentra en nuestra lista por lo que nos mostrar un mensaje de advertencia y podremos continuar con la búsqueda después de pulsar “OK”.



Conclusiones

En esta sección escribirás los problemas con los que te enfrentaste, que aprendiste, que no entendiste desde el inicio y como hiciste para entenderlo (o sigues sin entender), puntos de vista con otras cosas que conoces o visto de otros programadores, etc.

Referencias

PySide2 - QTableWidget (Qt for Python)(V). Michel Dávalos
https://youtu.be/1yEpAHaiMxs

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

```
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
```

mainWindow.py

```
from PySide2.QtWidgets import QMainWindow, QFileDialog ,QMessageBox,
QTableWidgetItem
from ui_mainWindow import Ui_MainWindow
from particle import Particle
from particle_list import  Particle_List

class MainWindow(QMainWindow):
```

```
    def __init__(self) -> None:
        super(MainWindow, self).__init__()
        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)

    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))
                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 particula con el id ' + id + ' no fue
encontrado...'
            )

    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

    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
            )

    def action_guardar(self):

        ubicacion = QFileDialog.getSaveFileName(
            self,
            'Guardar Archivo',
            '.',
            'JSON (*.json)'
        ) [0]
        if(self.particle_list.guardar(ubicacion)):
            QMessageBox.information(
                self,
                "Éxito",
                "Se pudo crear el archivo" + ubicacion
            )
        else:
            QMessageBox.critical(
                self,
                "Error",
                "No se pudo crear el archivo" + ubicacion
            )

    def click_addStart(self):
        self.particle_list.addFirst(self.make_particle())
        self.reset_spinBoxs()

    def click_addEnd(self):
        self.particle_list.addToEnd(self.make_particle())
        self.reset_spinBoxs()

    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_spinBoxs(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)
```

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>1033</width>
  <height>600</height>
 </rect>
</property>
<property name="windowTitle">
 <string>MainWindow</string>
</property>
<widget class="QWidget" name="centralwidget">
 <layout class="QGridLayout" name="gridLayout_3">
  <item row="0" column="0">
   <widget class="QTabWidget" name="tabWidget">
    <property name="currentIndex">
     <number>0</number>
    </property>
    <widget class="QWidget" name="tab">
     <attribute name="title">
      <string>Agregar</string>
     </attribute>
     <widget class="QGroupBox" name="groupBox">
      <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_2">
       <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="1" colspan="2">
```

```
          <widget class="QSpinBox" name="blue_spinBox">
           <property name="maximum">
            <number>255</number>
           </property>
          </widget>
         </item>
         <item row="3" column="0">
          <widget class="QLabel" name="label">
           <property name="text">
            <string>Destino X:</string>
           </property>
          </widget>
         </item>
         <item row="2" column="1" colspan="2">
          <widget class="QSpinBox" name="originY_spinBox">
           <property name="maximum">
            <number>500</number>
           </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="1" column="0">
          <widget class="QLabel" name="originX_label">
           <property name="text">
            <string>Origen X:</string>
           </property>
          </widget>
         </item>
         <item row="8" column="0">
          <widget class="QLabel" name="label_6">
           <property name="text">
            <string>Azul:</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="4" column="1" colspan="2">
          <widget class="QSpinBox" name="destY_spinBox">
           <property name="maximum">
            <number>500</number>
           </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="7" column="1" colspan="2">
          <widget class="QSpinBox" name="green_spinBox">
           <property name="maximum">
            <number>255</number>
           </property>
          </widget>
         </item>
         <item row="0" column="0">
          <widget class="QLabel" name="originX_label_2">
           <property name="text">
            <string>Id:</string>
           </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="9" column="0" colspan="2">
          <widget class="QPushButton" name="addToStart_pushButton">
```

```
      <property name="text">
       <string>Agregar Inicio</string>
      </property>
     </widget>
    </item>
    <item row="6" column="0">
     <widget class="QLabel" name="label_4">
      <property name="text">
       <string>Rojo:</string>
      </property>
     </widget>
    </item>
    <item row="4" column="0">
     <widget class="QLabel" name="label_2">
      <property name="text">
       <string>Destino Y:</string>
      </property>
     </widget>
    </item>
    <item row="5" column="0">
     <widget class="QLabel" name="label_3">
      <property name="text">
       <string>Velocidad:</string>
      </property>
     </widget>
    </item>
    <item row="2" column="0">
     <widget class="QLabel" name="originY_label">
      <property name="text">
       <string>Origen Y:</string>
      </property>
     </widget>
    </item>
    <item row="7" column="0">
     <widget class="QLabel" name="label_5">
      <property name="text">
       <string>Verde:</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>
         <item row="0" column="1" colspan="2">
          <widget class="QLineEdit" name="id_lineEdit"/>
         </item>
        </layout>
       </widget>
       <widget class="QPlainTextEdit" name="particle_PlainText">
        <property name="geometry">
         <rect>
          <x>280</x>
          <y>0</y>
          <width>271</width>
          <height>361</height>
         </rect>
        </property>
       </widget>
      </widget>
      <widget class="QWidget" name="Table">
       <attribute name="title">
        <string>Tabla</string>
       </attribute>
       <layout class="QGridLayout" name="gridLayout">
        <item row="0" column="0" colspan="3">
         <widget class="QTableWidget" name="particle_tableWidget"/>
        </item>
        <item row="1" column="0">
         <widget class="QLineEdit" name="search_lineEdit"/>
        </item>
        <item row="1" column="1">
         <widget class="QPushButton" name="search_pushButton">
          <property name="text">
           <string>Buscar</string>
          </property>
         </widget>
        </item>
        <item row="1" column="2">
         <widget class="QPushButton" name="show_pushButton">
          <property name="text">
           <string>Mostrar</string>
          </property>
```

```
        </widget>
       </item>
      </layout>
     </widget>
    </widget>
   </item>
  </layout>
 </widget>
 <widget class="QMenuBar" name="menubar">
  <property name="geometry">
   <rect>
    <x>0</x>
    <y>0</y>
    <width>1033</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.objectName():
            MainWindow.setObjectName(u"MainWindow")
        MainWindow.resize(1033, 600)
        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_3 = QGridLayout(self.centralwidget)
        self.gridLayout_3.setObjectName(u"gridLayout_3")
        self.tabWidget = QTabWidget(self.centralwidget)
        self.tabWidget.setObjectName(u"tabWidget")
        self.tab = QWidget()
```

```
        self.tab.setObjectName(u"tab")
        self.groupBox = QGroupBox(self.tab)
        self.groupBox.setObjectName(u"groupBox")
        self.groupBox.setGeometry(QRect(30, 0, 176, 319))
        self.gridLayout_2 = QGridLayout(self.groupBox)
        self.gridLayout_2.setObjectName(u"gridLayout_2")
        self.addEnd_pushButton = QPushButton(self.groupBox)
        self.addEnd_pushButton.setObjectName(u"addEnd_pushButton")

        self.gridLayout_2.addWidget(self.addEnd_pushButton, 9, 2, 1, 1)

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

        self.gridLayout_2.addWidget(self.blue_spinBox, 8, 1, 1, 2)

        self.label = QLabel(self.groupBox)
        self.label.setObjectName(u"label")

        self.gridLayout_2.addWidget(self.label, 3, 0, 1, 1)

        self.originY_spinBox = QSpinBox(self.groupBox)
        self.originY_spinBox.setObjectName(u"originY_spinBox")
        self.originY_spinBox.setMaximum(500)

        self.gridLayout_2.addWidget(self.originY_spinBox, 2, 1, 1, 2)

        self.showListParticle_pushButton = QPushButton(self.groupBox)

self.showListParticle_pushButton.setObjectName(u"showListParticle_pushB
utton")

        self.gridLayout_2.addWidget(self.showListParticle_pushButton,
10, 0, 1, 3)

        self.originX_label = QLabel(self.groupBox)
        self.originX_label.setObjectName(u"originX_label")

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

        self.label_6 = QLabel(self.groupBox)
        self.label_6.setObjectName(u"label_6")
```

```
        self.gridLayout_2.addWidget(self.label_6, 8, 0, 1, 1)

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

        self.gridLayout_2.addWidget(self.red_spinBox, 6, 1, 1, 2)

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

        self.gridLayout_2.addWidget(self.destY_spinBox, 4, 1, 1, 2)

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

        self.gridLayout_2.addWidget(self.destX_spinBox, 3, 1, 1, 2)

        self.green_spinBox = QSpinBox(self.groupBox)
        self.green_spinBox.setObjectName(u"green_spinBox")
        self.green_spinBox.setMaximum(255)

        self.gridLayout_2.addWidget(self.green_spinBox, 7, 1, 1, 2)

        self.originX_label_2 = QLabel(self.groupBox)
        self.originX_label_2.setObjectName(u"originX_label_2")

        self.gridLayout_2.addWidget(self.originX_label_2, 0, 0, 1, 1)

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

        self.gridLayout_2.addWidget(self.originX_spinBox, 1, 1, 1, 2)

        self.addToStart_pushButton = QPushButton(self.groupBox)

self.addToStart_pushButton.setObjectName(u"addToStart_pushButton")
```

```
        self.gridLayout_2.addWidget(self.addToStart_pushButton, 9, 0,
1, 2)

        self.label_4 = QLabel(self.groupBox)
        self.label_4.setObjectName(u"label_4")

        self.gridLayout_2.addWidget(self.label_4, 6, 0, 1, 1)

        self.label_2 = QLabel(self.groupBox)
        self.label_2.setObjectName(u"label_2")

        self.gridLayout_2.addWidget(self.label_2, 4, 0, 1, 1)

        self.label_3 = QLabel(self.groupBox)
        self.label_3.setObjectName(u"label_3")

        self.gridLayout_2.addWidget(self.label_3, 5, 0, 1, 1)

        self.originY_label = QLabel(self.groupBox)
        self.originY_label.setObjectName(u"originY_label")

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

        self.label_5 = QLabel(self.groupBox)
        self.label_5.setObjectName(u"label_5")

        self.gridLayout_2.addWidget(self.label_5, 7, 0, 1, 1)

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

        self.gridLayout_2.addWidget(self.speed_spinBox, 5, 1, 1, 2)

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

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

        self.particle_PlainText = QPlainTextEdit(self.tab)
        self.particle_PlainText.setObjectName(u"particle_PlainText")
        self.particle_PlainText.setGeometry(QRect(280, 0, 271, 361))
        self.tabWidget.addTab(self.tab, "")
```

```
        self.Table = QWidget()
        self.Table.setObjectName(u"Table")
        self.gridLayout = QGridLayout(self.Table)
        self.gridLayout.setObjectName(u"gridLayout")
        self.particle_tableWidget = QTableWidget(self.Table)

self.particle_tableWidget.setObjectName(u"particle_tableWidget")

        self.gridLayout.addWidget(self.particle_tableWidget, 0, 0, 1,
3)

        self.search_lineEdit = QLineEdit(self.Table)
        self.search_lineEdit.setObjectName(u"search_lineEdit")

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

        self.search_pushButton = QPushButton(self.Table)
        self.search_pushButton.setObjectName(u"search_pushButton")

        self.gridLayout.addWidget(self.search_pushButton, 1, 1, 1, 1)

        self.show_pushButton = QPushButton(self.Table)
        self.show_pushButton.setObjectName(u"show_pushButton")

        self.gridLayout.addWidget(self.show_pushButton, 1, 2, 1, 1)

        self.tabWidget.addTab(self.Table, "")

        self.gridLayout_3.addWidget(self.tabWidget, 0, 0, 1, 1)

        MainWindow.setCentralWidget(self.centralwidget)
        self.menubar = QMenuBar(MainWindow)
        self.menubar.setObjectName(u"menubar")
        self.menubar.setGeometry(QRect(0, 0, 1033, 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.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.setTitle(QCoreApplication.translate("MainWindow",
u"GroupBox", None))

self.addEnd_pushButton.setText(QCoreApplication.translate("MainWindow",
u"Agregar Final", None))
        self.label.setText(QCoreApplication.translate("MainWindow",
u"Destino X:", None))

self.showListParticle_pushButton.setText(QCoreApplication.translate("Ma
inWindow", u"MOSTRAR", None))

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

```
        self.label_6.setText(QCoreApplication.translate("MainWindow",
u"Azul:", None))

self.originX_label_2.setText(QCoreApplication.translate("MainWindow",
u"Id:", None))

self.addToStart_pushButton.setText(QCoreApplication.translate("MainWind
ow", u"Agregar Inicio", None))
        self.label_4.setText(QCoreApplication.translate("MainWindow",
u"Rojo:", None))
        self.label_2.setText(QCoreApplication.translate("MainWindow",
u"Destino Y:", None))
        self.label_3.setText(QCoreApplication.translate("MainWindow",
u"Velocidad:", None))

self.originY_label.setText(QCoreApplication.translate("MainWindow",
u"Origen Y:", None))
        self.label_5.setText(QCoreApplication.translate("MainWindow",
u"Verde:", None))
        self.tabWidget.setTabText(self.tabWidget.indexOf(self.tab),
QCoreApplication.translate("MainWindow", u"Agregar", None))

self.search_pushButton.setText(QCoreApplication.translate("MainWindow",
u"Buscar", None))

self.show_pushButton.setText(QCoreApplication.translate("MainWindow",
u"Mostrar", None))
        self.tabWidget.setTabText(self.tabWidget.indexOf(self.Table),
QCoreApplication.translate("MainWindow", u"Tabla", None))

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

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
```

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 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
```

```python
    @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
```