Revisión del avance 1

Equipo 2:

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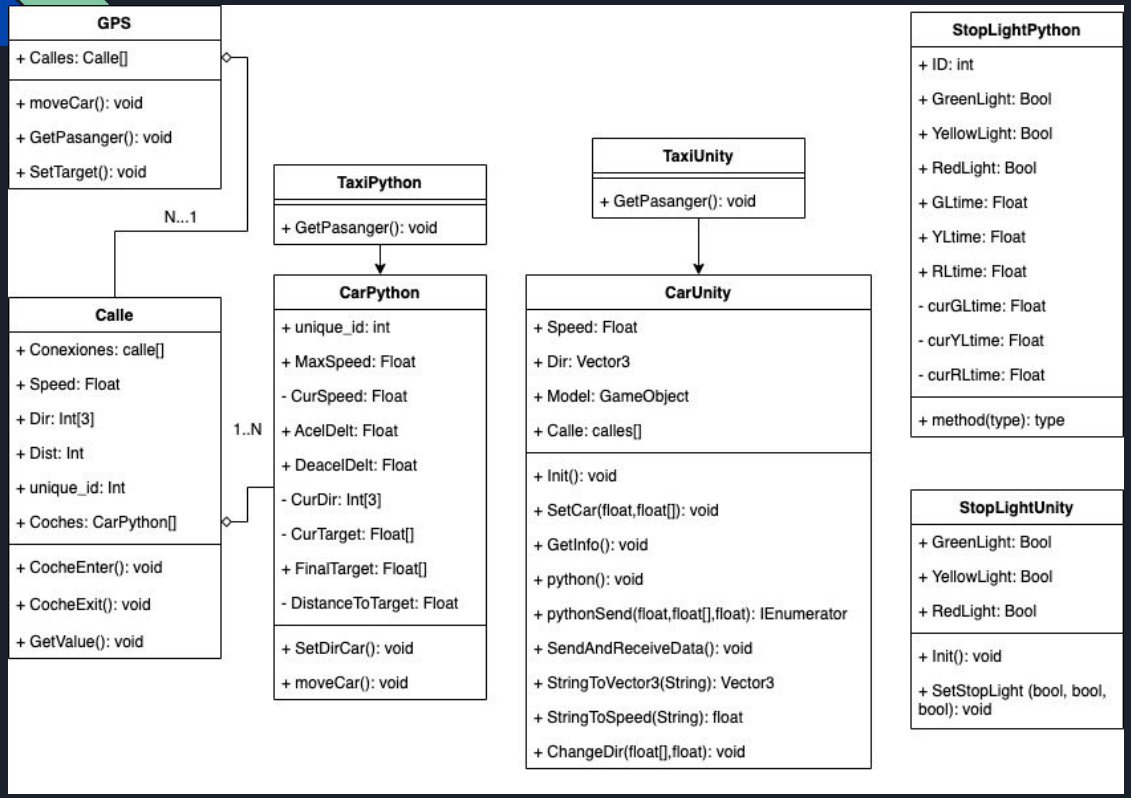
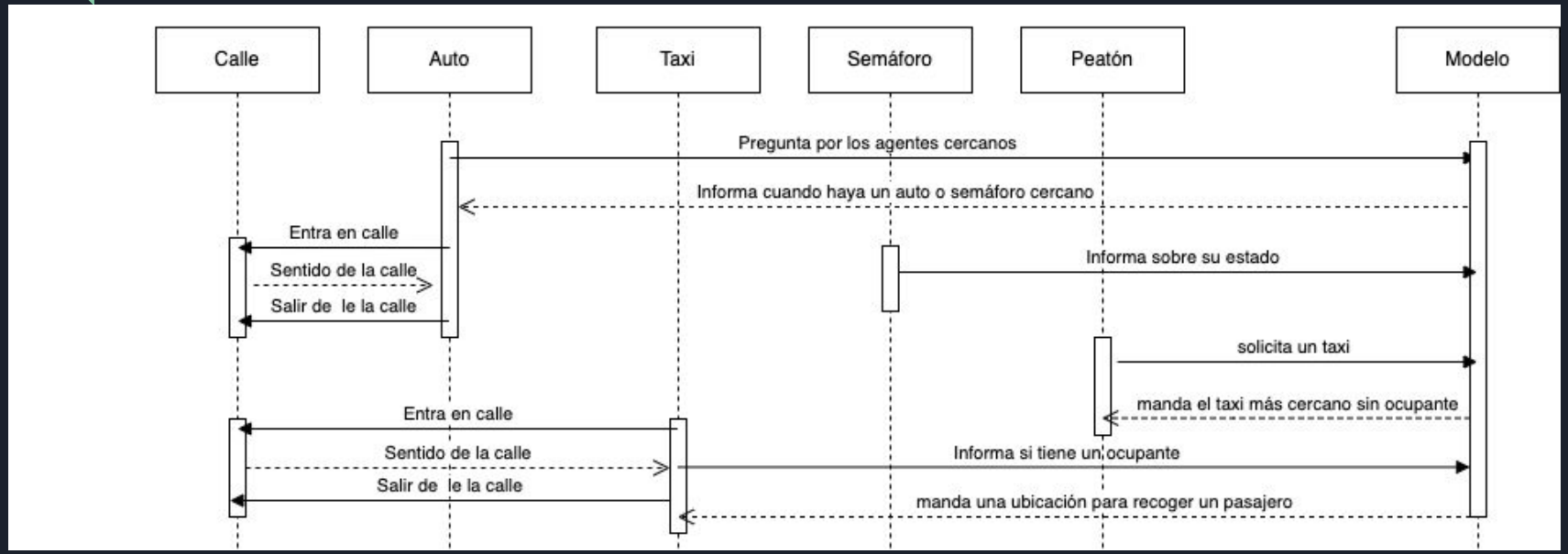
Actualización del diagrama de clases



- Se modificaron los atributos y los métodos de las clases implementadas:
  - Calle
  - CarPython
  - CarUnity

Diagrama de interacción actualizado



Código Agentes

https://replit.com/@A01653185/Semaforos#main.py

main.py

```python
from mesa import Agent, Model
#import random
import time
import socket

host, port = "127.0.0.1", 25001  # poner host y puerto
sock = socket.socket(socket.AF_INET, socket.SOCK_STREAM)
sock.connect((host,port))

class Grafo():
  def __init__(self):
    self.Calles = []

  def SetCalles(self,c):
    self.Calles.append(c)

class Calle(Agent):
  def __init__(self, unique_id,Speed,Dir):
    #super().__init__(unique_id, model)
    self.Speed = Speed
    self.Dir = Dir
    self.Conexiones = []
    self.Dist = 30
    self.unique_id = unique_id

  def SetConexion(self,c):
    self.Conexiones = c

  def  __ne__(self,other):
    return self.unique_id != other.unique_id
```

```python
class CarPython(Agent):
  def __init__(self, unique_id,CurDir,CurTarget,FinalTarget):
    #super().__init__(unique_id,model)
    self.MaxSpeed = 10
    self.CurSpeed = 0
    self.AcelDelt = 0.25
    self.DeacelDelt = -0.25
    self.CurDir = CurDir
    self.CurTarget = CurTarget
    self.FinalTarget = FinalTarget

  def SetDirCar(self,CurTarget):
    print("Calle:" + str(CurTarget.unique_id))
    self.CurDir = CurTarget.Dir
    self.DistanceToTarget = 30
    self.CurTarget = CurTarget
    self.CurSpeed = self.CurSpeed /2

  def MoveCar(self):
    print(self.DistanceToTarget)
    self.CurSpeed += self.AcelDelt
    if(self.CurSpeed > self.MaxSpeed):
      self.CurSpeed = self.MaxSpeed
```

```python
        self.DistanceToTarget -= self.CurSpeed
        tmp = []
        tmp = self.CurDir
        tmp.append(self.CurSpeed)
        print(tmp)
        SpeedString = ','.join(map(str,tmp))
        tmp.pop()
        sock.sendall(SpeedString.encode("UTF-8"))

class CarModel(Model):
    """A model with some number of agents."""
    def __init__(self, N):
        self.num_agents = N
        a = CarPython(N,self)
        # Create agents
        #for i in range(self.num_agents):
            #a = MoneyAgent(i, self)

class StopLight(Agent):
  def __init__(self,model,unique_id):
    super().__init__(unique_id)
    self.GL = False
    self.YL = True
    self.RL = False
    self.GLT = 3
    self.YLT = 1
    self.RLT = 4
```

```python
def main():
  GPS = Grafo()
  #Semaforo1 = StopLight(1)
  calle1 = Calle(1,20,[0,0,1])
  GPS.SetCalles(calle1)

  #Semaforo2 = StopLight(2)
  calle2 = Calle(2,20,[1,0,0])
  GPS.SetCalles(calle2)

  #Semaforo3 = StopLight(3)
  calle3 = Calle(3,20,[0,0,-1])
  GPS.SetCalles(calle3)

  #Semaforo4 = StopLight(4)
  calle4 = Calle(4,20,[-1,0,0])
  GPS.SetCalles(calle4)

  #Semaforo5 = StopLight(5)
  calle5 = Calle(5, 20,[0,0,1])
  GPS.SetCalles(calle5)

  #Semaforo6 = StopLight(6)
  calle6 = Calle(6, 20,[1,0,0])
  GPS.SetCalles(calle6)
```

```python
timeout = time.time() + 60
McQueen = CarPython(1,calle1.Dir,calle1, calle9)
McQueen.SetDirCar(calle1)

i = 0

while (McQueen.CurTarget != McQueen.FinalTarget):
    if(i == 0):
        if(McQueen.DistanceToTarget < 0):
            i+= 1
            McQueen.SetDirCar(calle2)
        else:
            McQueen.MoveCar()
    elif(i == 1):
        if(McQueen.DistanceToTarget < 0):
            i+= 1
            McQueen.SetDirCar(calle8)
        else:
            McQueen.MoveCar()
    elif(i == 2):
        if(McQueen.DistanceToTarget < 0):
            i+= 1
            McQueen.SetDirCar(calle9)
        else:
            McQueen.MoveCar()

    time.sleep(1)
```

Código de la parte gráfica

```
using System.Collections;
using System.Collections.Generic;
using System.Net;
using System.Net.Sockets;
using System.Text;
using UnityEngine;
using System.Threading;


[System.Serializable]
public struct Calle
{
    public Calle[] c;
    public Vector2 dir;
    public float speed;
}

public class CarUnity : MonoBehaviour
{
    Thread mThread;
    public string connectionIP = "127.0.0.1";
    public int connectionPort = 25001;
    IPAddress localAdd;
    TcpListener listener;
    TcpClient client;
    Vector3 receivedPos = Vector3.zero;

    public Vector3 dir;
    public GameObject CarModel;
    public float speed;

    public Calle[] calles;
    public int i;


    bool running;

    private void Start()
    {
        ThreadStart ts = new ThreadStart(GetInfo);
        mThread = new Thread(ts);
        mThread.Start();
    }
```

```
    void Update()
    {
        //dir.z = 1 + (dir. * dir.y) * (1 / 2);

        dir = dir.normalized;
        transform.Translate(dir * Time.deltaTime * speed);
        //transform.position = dir;

        Quaternion newRotation = Quaternion.LookRotation(new Vector3(dir.x, 0, dir.z));
        CarModel.transform.rotation = newRotation;
    }

    public void ChangeDir(float[] vector, float s)
    {
        dir.x = vector[0];
        dir.z = vector[1];

        speed = s;

        dir = dir.normalized;
    }


    //MOCK python

    public void python()
    {
        Calle c = calles[i];
        Vector2 vtmp = c.dir;
        float[] tmp = { vtmp.x, vtmp.y };
        float t = 3.25f;
        float s = c.speed;
        i++;

        StartCoroutine(pythonSend(t, tmp,s));
    }
```

```
    IEnumerator pythonSend(float wait, float[] vector, float ss)
    {
        ChangeDir(vector, ss);
        yield return new WaitForSeconds(wait);
        if (i >= calles.Length)
        {
            i = 0;
        }
        python();
    }

    void GetInfo()
    {
        localAdd = IPAddress.Parse(connectionIP);
        listener = new TcpListener(IPAddress.Any, connectionPort);
        listener.Start();

        client = listener.AcceptTcpClient();

        running = true;
        while (running)
        {
            SendAndReceiveData();

        }
            speed = 0;

        listener.Stop();
    }

```

```
    void SendAndReceiveData()
    {
        NetworkStream nwStream = client.GetStream();
        byte[] buffer = new byte[client.ReceiveBufferSize];

        //---receiving Data from the Host----
        int bytesRead = nwStream.Read(buffer, 0, client.ReceiveBufferSize); //Getting data in Bytes from Python
        string dataReceived = Encoding.UTF8.GetString(buffer, 0, bytesRead); //Converting byte data to string

        if (dataReceived != null)
        {
            //---Using received data---
            receivedPos = StringToVector3(dataReceived); //<-- assigning receivedPos value from Python
            speed = StringToSpeed(dataReceived);
            print("received pos data, and moved the Cube!");
            dir = receivedPos.normalized;


            //---Sending Data to Host----
            byte[] myWriteBuffer = Encoding.ASCII.GetBytes("Hey I got your message Python! Do You see this massage?");
            nwStream.Write(myWriteBuffer, 0, myWriteBuffer.Length); //Sending the data in Bytes to Python
        }
        else
        {
    }
            speed = 0;
        }
    public static Vector3 StringToVector3(string sVector)
    {
        // Remove the parentheses
        if (sVector.StartsWith("(") && sVector.EndsWith(")"))
        {
            sVector = sVector.Substring(1, sVector.Length - 2);
        }

        // split the items
        string[] sArray = sVector.Split(',');
```

```
145         public static Vector3 StringToVector3(string sVector)
146         {
147             // Remove the parentheses
148             if (sVector.StartsWith("(") && sVector.EndsWith(")"))
149             {
150                 sVector = sVector.Substring(1, sVector.Length - 2);
151             }
152 
153             // split the items
154             string[] sArray = sVector.Split(',');
155 
156             // store as a Vector3
157             Vector3 result = new Vector3(
158                 float.Parse(sArray[0]),
159                 float.Parse(sArray[1]),
160                 float.Parse(sArray[2]));
161 
162             return result;
163         }
164 
165         public static float StringToSpeed(string sVector)
166         {
167             // Remove the parentheses
168             if (sVector.StartsWith("(") && sVector.EndsWith(")"))
169             {
170                 sVector = sVector.Substring(1, sVector.Length - 2);
171             }
172 
173             // split the items
174             string[] sArray = sVector.Split(',');
175 
176             // store as a Vector3
177             float result =
178                 float.Parse(sArray[3]);
179 
180             return result;
181         }
182 
183 
184     }
```

Plan de trabajo actualizado

Lo que se realizó esta semana

Tercera semana (15 al 21 de noviembre)

- Elaborar el diseño gráfico del entorno en Unity
  - Tiempo empleado aproximado: 5 horas
  - Responsable: Rodolfo
- Código de implementación de los agentes en Python
  - Tiempo empleado aproximado: 6 horas
  - Responsable: Victoria
- Código de la implementación gráfica
  - Tiempo empleado aproximado: 4 horas
  - Responsable: Diógenes

Siguiente semana:

Cuarta semana (22 al 28 de noviembre)

- **Diseñar el algoritmo Dijkstra en python para que los agentes encuentren la ruta más corta**
  - Responsables: Victoria, Diógenes y Rodolfo
  - Esfuerzo estimado: 7 horas
- **Introducir nuestro proyecto a IBM Cloud**
  - Responsables: Victoria, Diógenes y Rodolfo
  - Esfuerzo estimado: 3 horas
- **Conectar Unity con nuestro servidor**
  - Responsables: Rodolfo
  - Esfuerzo estimado: 4 horas
- **Terminar las clases para los agentes en Python**
  - Responsables: Victoria
  - Esfuerzo estimado: 5 horas
- **Terminar el código de la parte gráfica en Unity**
  - Responsables: Diógenes
  - Esfuerzo estimado: 7 horas

Quinta semana (29 de novembre al 3 de diciembre)

- Mostrar los datos gráficamente de python en Unity
- Prueba de errores