UNIVERSIDAD POLITÉCNICA SALESIANA ECUADOR

FORMATO DE INFORME DE PRÁCTICA DE LABORATORIO / TALLERES / CENTROS DE SIMULACIÓN – PARA ESTUDIANTES

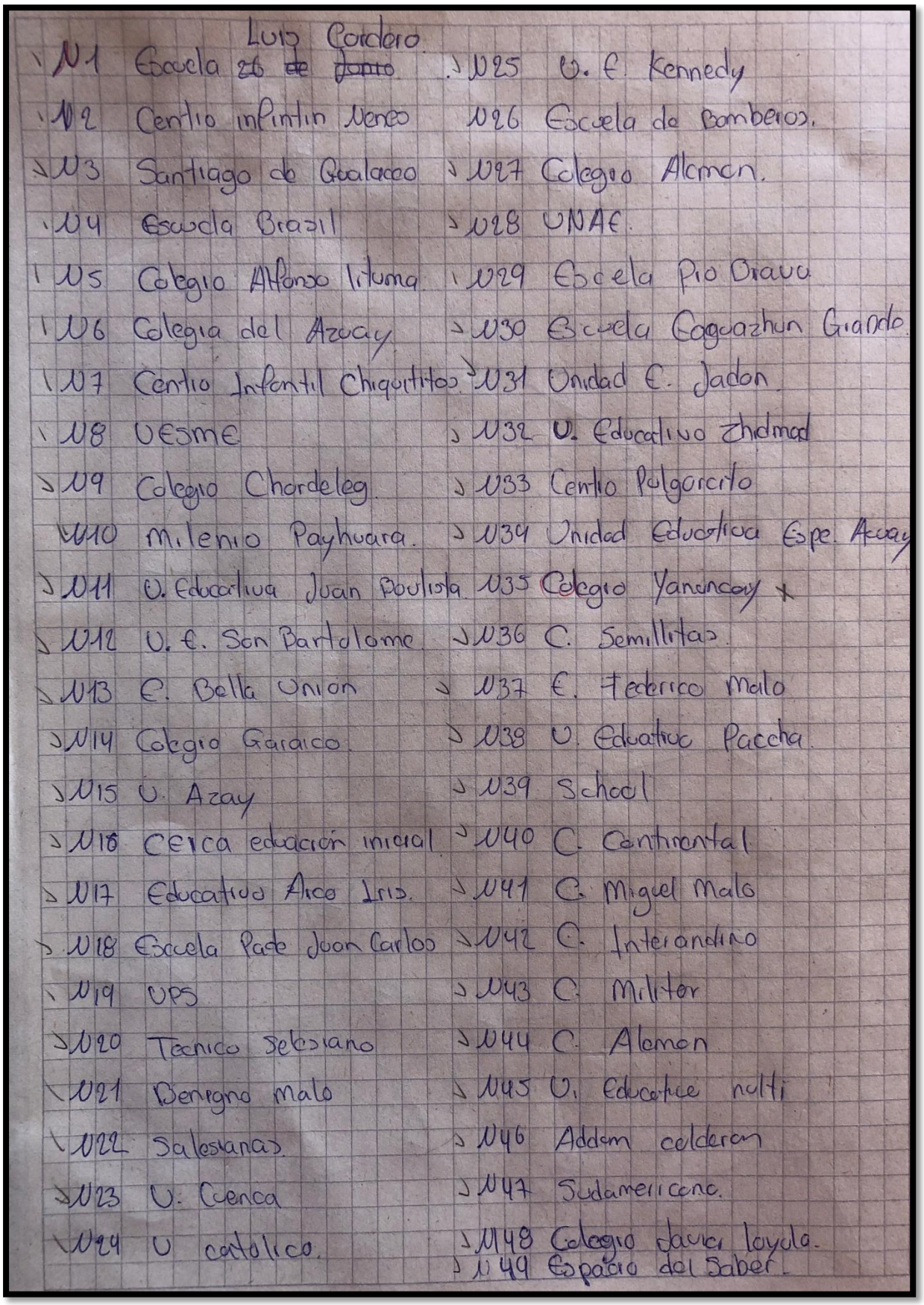
CARRERA: Ing. Sistemas		**ASIGNATURA**: IA
NRO. PRÁCTICA:	00	**TÍTULO PRÁCTICA**: Prueba 02

OBJETIVO ALCANZADO:

- **Generar un árbol de nodos**
- **Grafica en neo4j**
- **Resultados en neo4j**

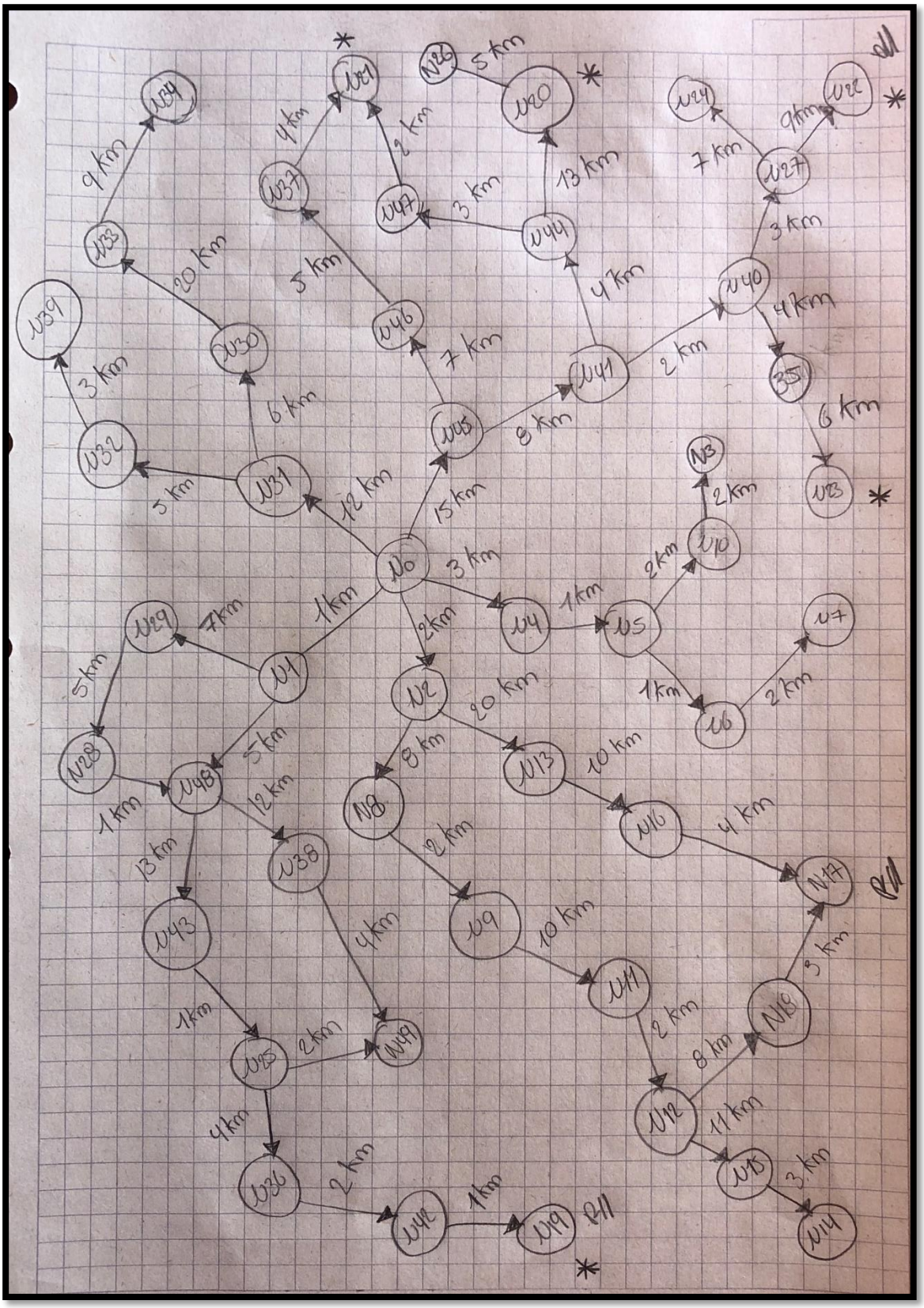
ACTIVIDADES DESARROLLADAS

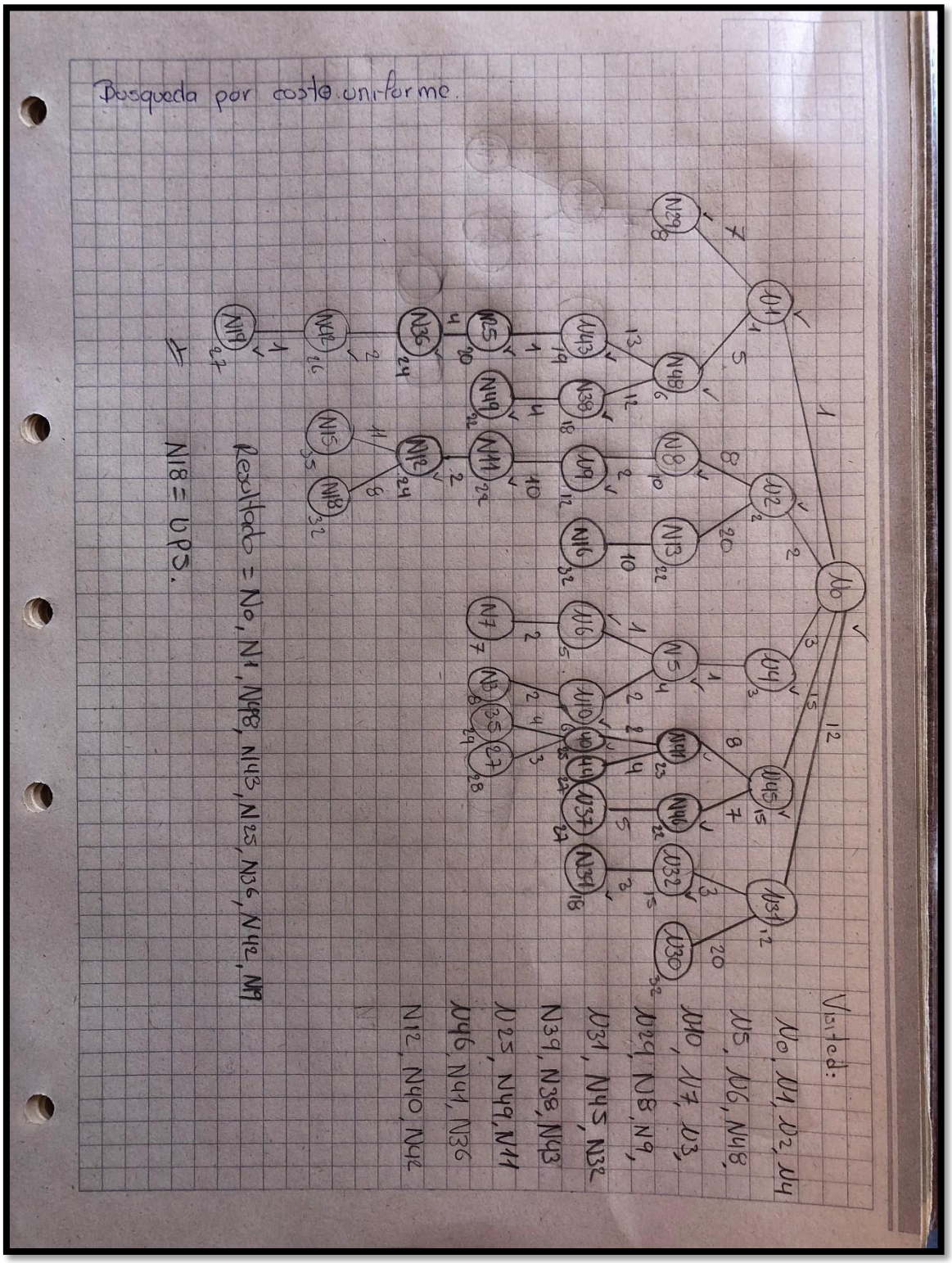
1. **Ejercicio manual**

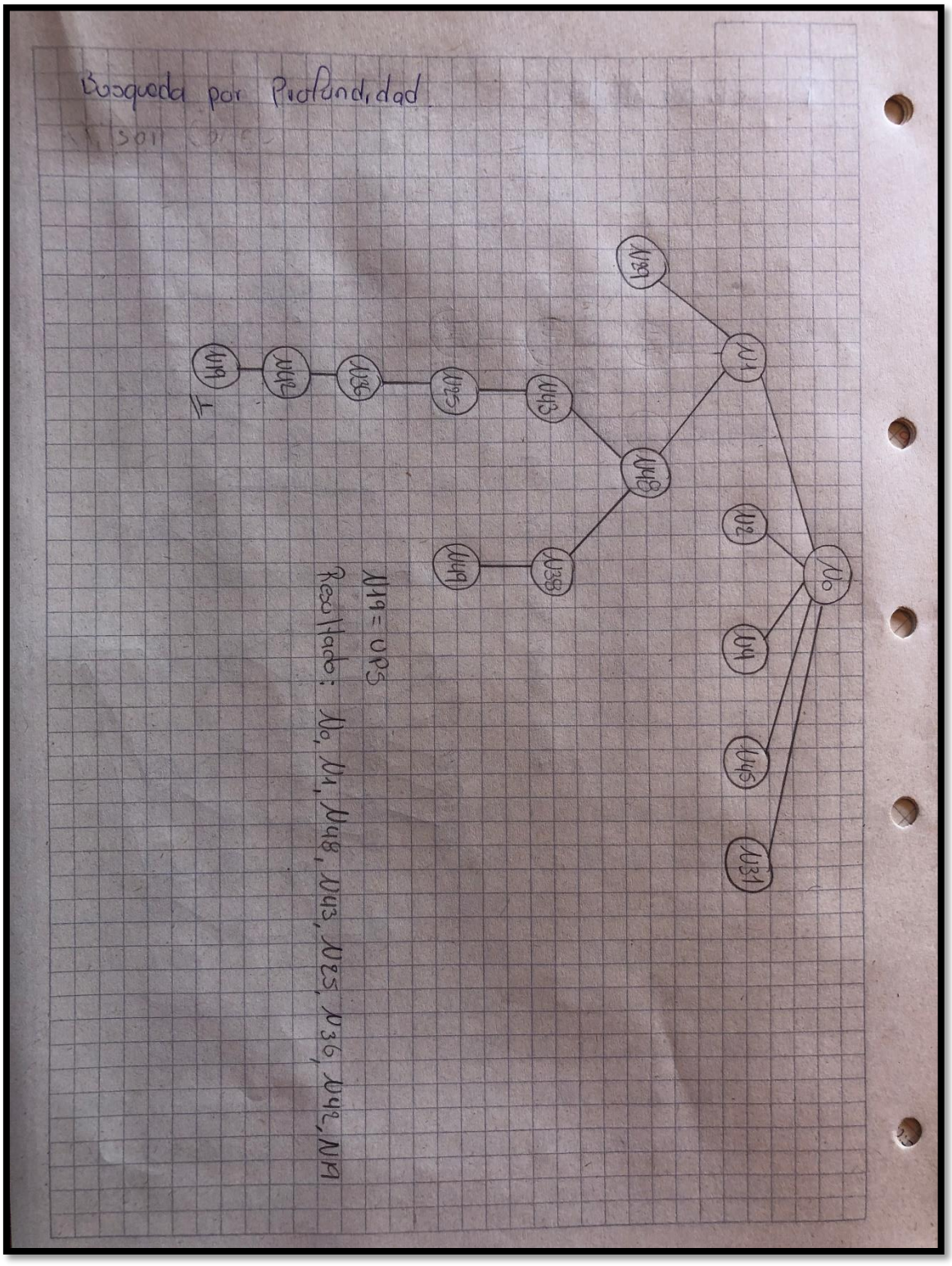


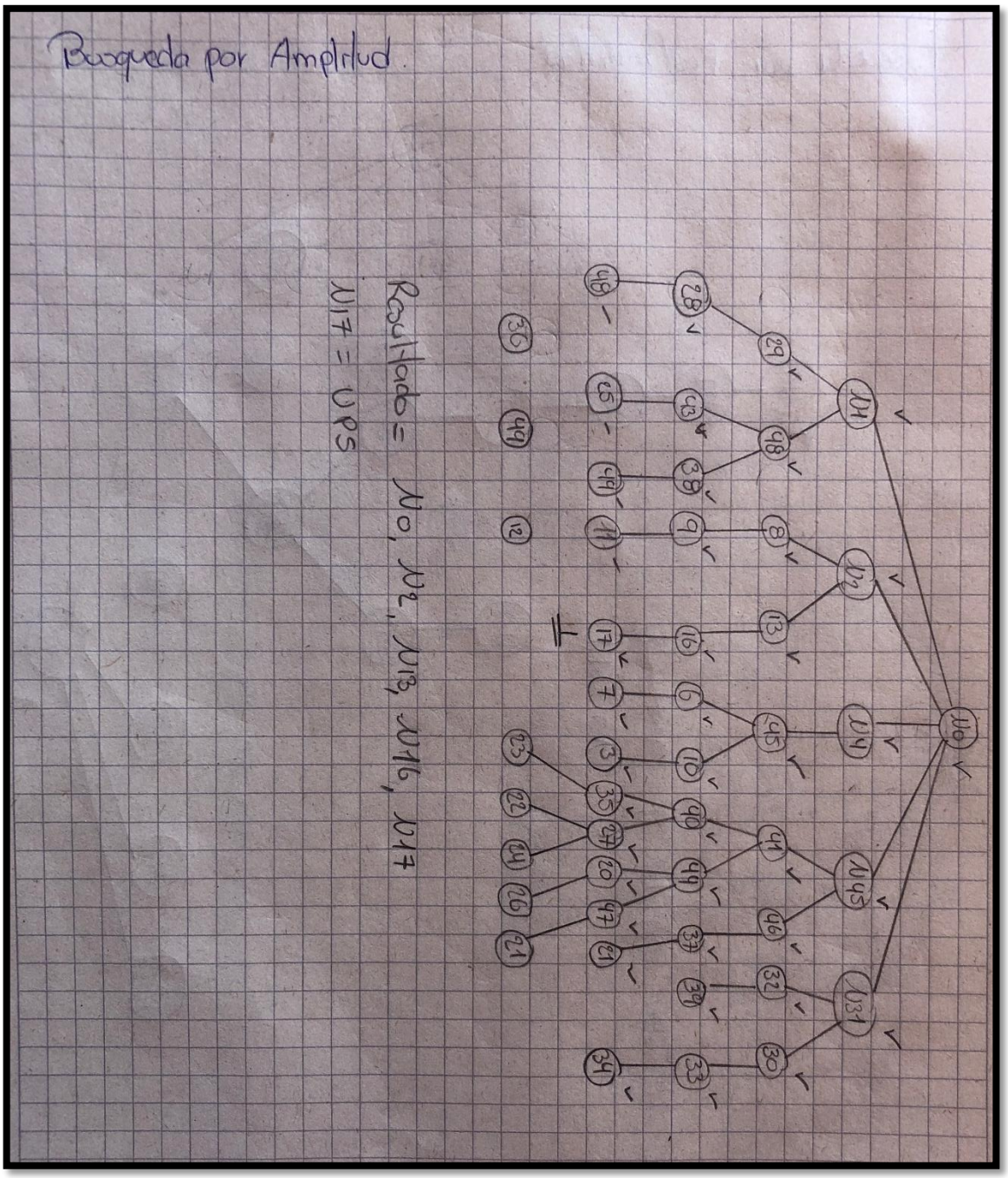
Luis Cordero

U1 Escuela 26 ~~de Junio~~
U2 Centro infantil Nenco
U3 Santiago de Guaiacco
U4 Escuela Brazil
U5 Colegio AlfonsoItuma
U6 Colegio del Azuay
U7 Centro Infantil Chiquititos
U8 UESME
U9 Colegio Chordeleg
U10 Milenio Payhuara.
U11 U. Educativa Juan Bautista
U12 U. E. San Bartolome
U13 E. Bella Union
U14 Colegio Gaiaico
U15 U. Azay
U16 Cerca educación inicial
U17 Educativo Arco Iris.
U18 Escuela Padre Juan Carlos
U19 UPS
U20 Tecnico Salesiano
U21 Benigno Malo
U22 Salesianas
U23 U. Cuenca
U24 U catolico.
U25 U. E. Kennedy
U26 Escuela de Bomberos.
U27 Colegio Aleman.
U28 UNAE.
U29 Escuela Pio Onavo
U30 Escuela Cagüazhun Grande
U31 Unidad E. Jadan.
U32 U. Educativo Zhidmad
U33 Centro Polgarcito
U34 Unidad Educativa Espe. Azoay
U35 Colegio Yanuncay x
U36 C. Semillitas.
U37 E. Federico Malo
U38 U. Educativo Paccha.
U39 School
U40 C. Continental
U41 C. Miguel Malo
U42 C. Interandino
U43 C. Militar
U44 C. Aleman
U45 U. Educative multi
U46 Addam calderon
U47 Sudamericano.
U48 Colegio Javier Loyola.
U49 Espacio del Saber.


U34
U21
N26
5 km
U20
U24
U22
9 km
4 km
2 km
7 km
9 km
U33
U47
U44
U27
3 km
13 km
3 km
U40
U39
U46
4 km
4 km
U33
20 km
5 km
U30
7 km
U41
2 km
U35
3 km
6 km
U32
U45
8 km
6 km
N3
U31
2 km
U3
3 km
12 km
15 km
U10
U6
3 km
2 km
U29
1 km
U4
1 km
U5
U7
1 km
7 km
5 km
U1
2 km
U2
20 km
1 km
U6
2 km
N28
U48
5 km
8 km
U13
10 km
1 km
12 km
U8
U16
4 km
13 km
U38
2 km
N17
U43
U9
10 km
4 km
U11
1 km
3 km
U18
U25
2 km
U49
2 km
8 km
4 km
U12
11 km
U15
3 km
U26
2 km
U42
1 km
U19
U14


Busqueda por costo uniforme.
Visited:
U0, U1, U2, U4
U5, U6, N18,
U10, N7, U3,
U29, N8, N9,
U31, N45, N32
N39, N38, N43
U25, N49, N11
U46, N41, N36
N12, N40, N42
Resultado = No, N1, N48, N43, N25, N36, N42, N9
N18 = UPS.


Búsqueda por Profundidad
U19
U42
U36
U25
U43
U48
U49
U38
U39
U1
U2
U0
U4
U46
U31
U19 = U25
Resultado: U0, U1, U48, U43, U25, U36, U42, NA



2. Captura de resultados en neo4j

- **Búsqueda por Amplitud**

Nodo destino “UPS”

```
MATCH (n0:Nodo{name:'inicio'}), (n19:Nodo{name:'UPS'})
WITH id(n0) AS startNode, [id(n19)] AS targetNodes
CALL gds.alpha.bfs.stream('myGraph', {startNode: startNode, targetNodes: targetNodes})
YIELD path
UNWIND [ n in nodes(path) | n.name ] AS names
RETURN names
```

"names"
"inicio"
"E. Luis Cordero"
"Centro I. Nenes"
"E. Brasil"
"E. Jadan"
"U. E. Nulti"
"E. Pio Bravo"
"C. Javier Loyola"
"UESME"
"E. Bella Union"
"C. Alfonso Lituma"
"E. Caguazhun Grande"
"U. Zhidmad"
"C. Miguel Malo"
"Addom Calderon"

Nodo destino “Técnico Salesiano”

```
MATCH (n0:Nodo{name:'inicio'}), (n20:Nodo{name:'Tecnico Salesiano'})
WITH id(n0) AS startNode, [id(n20)] AS targetNodes
CALL gds.alpha.bfs.stream('myGraph', {startNode: startNode, targetNodes: targetNodes})
YIELD path
UNWIND [ n in nodes(path) | n.name ] AS names
RETURN names
```

	names
32	"C. Chiquititos"
33	"S. de Gualaceo"
34	"U. E. Esperaza del Azuay"
35	"Colegio Aleman"
36	"Colegio Yanuncay"
37	"Tecnico Salesiano"

Nodo destino “Benigno Malo”

```
MATCH (n0:Nodo{name:'inicio'}), (n21:Nodo{name:'Benigno malo'})
WITH id(n0) AS startNode, [id(n21)] AS targetNodes
CALL gds.alpha.bfs.stream('myGraph', {startNode: startNode, targetNodes: targetNodes})
YIELD path
UNWIND [ n in nodes(path) | n.name ] AS names
RETURN names
```

	names
34	"U. E. Esperaza del Azuay"
35	"Colegio Aleman"
36	"Colegio Yanuncay"
37	"Tecnico Salesiano"
38	"Sudamericano"
39	"Benigno malo"

Nodo destino “Salesianas”

```
MATCH (n0:Nodo{name:'inicio'}), (n22:Nodo{name:'Salesianas'})
WITH id(n0) AS startNode, [id(n22)] AS targetNodes
CALL gds.alpha.bfs.stream('myGraph', {startNode: startNode, targetNodes: targetNodes})
YIELD path
UNWIND [ n in nodes(path) | n.name ] AS names
RETURN names
```

	names
37	"Tecnico Salesiano"
38	"Sudamericano"
39	"Benigno malo"
40	"C. Semillitas"
41	"U.E. San Bartolome"
42	"Salesianas"

Nodo destino "U Cuenca"

```
MATCH (n0:Nodo{name:'inicio'}), (n23:Nodo{name:'U Cuenca'})
WITH id(n0) AS startNode, [id(n23)] AS targetNodes
CALL gds.alpha.bfs.stream('myGraph', {startNode: startNode, targetNodes: targetNodes})
YIELD path
UNWIND [ n in nodes(path) | n.name ] AS names
RETURN names
```

	names
39	"Benigno malo"
40	"C. Semillitas"
41	"U.E. San Bartolome"
42	"Salesianas"
43	"U Catolica"
44	"U Cuenca"

- **Búsqueda por Profundidad**

Nodo destino "UPS"

```
MATCH (n0:Nodo{name:'inicio'}), (n19:Nodo{name:'UPS'})
WITH id(n0) AS startNode, [id(n19)] AS targetNodes
CALL gds.alpha.dfs.stream('myGraph', {startNode: startNode, targetNodes: targetNodes})
YIELD path
UNWIND [ n in nodes(path) | n.name ] AS names
RETURN names
```

	names
42	"C. Militar"
43	"U. E Kennedy"
44	"Espacio del Saber"
45	"C. Semillitas"
46	"C. Interandino"
47	"UPS"

Nodo destino “Técnico Salesiano”

```
MATCH (n0:Nodo{name:'inicio'}), (n20:Nodo{name:'Tecnico Salesiano'})
WITH id(n0) AS startNode, [id(n20)] AS targetNodes
CALL gds.alpha.dfs.stream('myGraph', {startNode: startNode, targetNodes: targetNodes})
YIELD path
UNWIND [ n in nodes(path) | n.name ] AS names
RETURN names
```

	names
4	"E. Federico Malo"
5	"Benigno malo"
6	"C. Miguel Malo"
7	"C. Aleman"
8	"Sudamericano"
9	"Tecnico Salesiano"

Nodo destino “Benigno Malo”

```
MATCH (n0:Nodo{name:'inicio'}), (n21:Nodo{name:'Benigno malo'})
WITH id(n0) AS startNode, [id(n21)] AS targetNodes
CALL gds.alpha.dfs.stream('myGraph', {startNode: startNode, targetNodes: targetNodes})
YIELD path
UNWIND [ n in nodes(path) | n.name ] AS names
RETURN names
```

	names
1	"inicio"
2	"U. E. Nulti"
3	"Addom Calderon"
4	"E. Federico Malo"
5	"Benigno malo"

Nodo destino “Salesianas”

```
MATCH (n0:Nodo{name:'inicio'}), (n22:Nodo{name:'Salesianas'})
WITH id(n0) AS startNode, [id(n22)] AS targetNodes
CALL gds.alpha.dfs.stream('myGraph', {startNode: startNode, targetNodes: targetNodes})
YIELD path
UNWIND [ n in nodes(path) | n.name ] AS names
RETURN names
```

names
"Benigno malo"
"C. Miguel Malo"
"C. Aleman"
"Sudamericano"
"Tecnico Salesiano"
"E. Bomberos"
"C. Continental"
"Colegio Yanuncay"
"U Cuenca"
"Colegio Aleman"
"U Catolica"
"Salesianas"

Nodo destino “U Cuenca”

```
MATCH (n0:Nodo{name:'inicio'}), (n23:Nodo{name:'U Cuenca'})
WITH id(n0) AS startNode, [id(n23)] AS targetNodes
CALL gds.alpha.dfs.stream('myGraph', {startNode: startNode, targetNodes: targetNodes})
YIELD path
UNWIND [ n in nodes(path) | n.name ] AS names
RETURN names
```

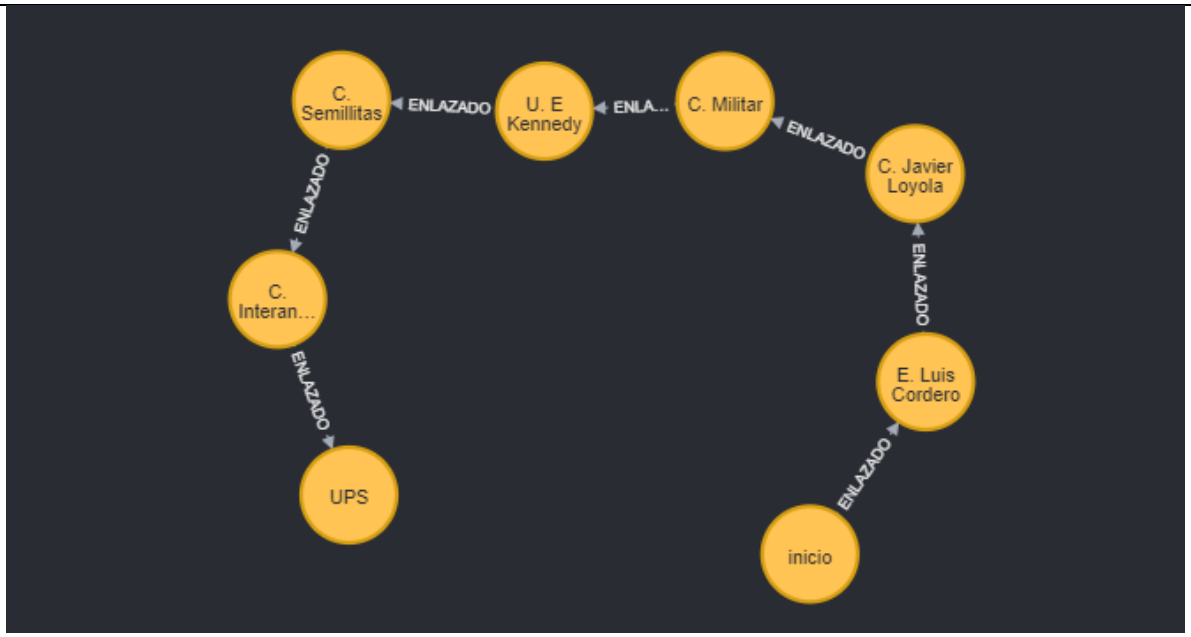
names
"U. E. Nulti"
"Addom Calderon"
"E. Federico Malo"
"Benigno malo"
"C. Miguel Malo"
"C. Aleman"
"Sudamericano"
"Tecnico Salesiano"
"E. Bomberos"
"C. Continental"
"Colegio Yanuncay"
"U Cuenca"

- **Búsqueda por costo uniforme**

Nodo destino "UPS"

```
MATCH (source:Nodo {name: 'inicio'}), (target:Nodo {name: 'UPS'})
CALL gds.shortestPath.dijkstra.stream('myGraph', {
    sourceNode: source,
    targetNode: target,
    relationshipWeightProperty: 'cost'
})
YIELD index, sourceNode, targetNode, totalCost, nodeIds, costs, path
RETURN
    index,
    gds.util.asNode(sourceNode).name AS sourceNodeName,
    gds.util.asNode(targetNode).name AS targetNodeName,
    totalCost,
```

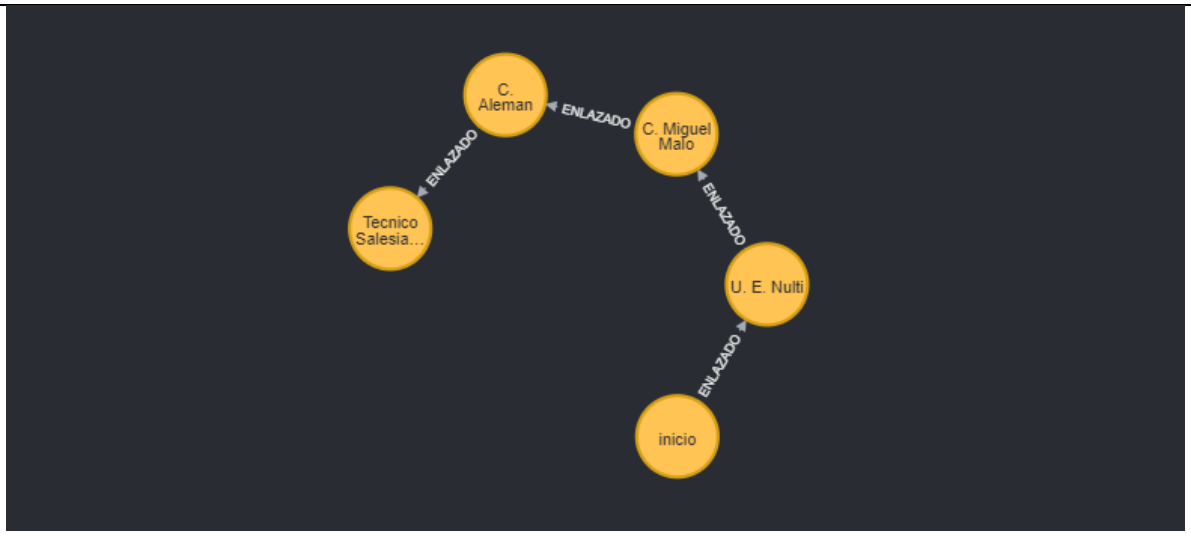
	index	sourceNodeName	targetNodeName	totalCost	nodeNames	costs
1	0	"inicio"	"UPS"	27.0	["inicio", "E. Luis Cordero", "C. Javier Loyola", "C. Militar", "U. E Kennedy", "C. Semillitas", "C. Interandino", "UPS"]	[0.0, 1.0, 6.0, 19.0, 20.0, 24.0, 26.0, 27.0]



Nodo destino “Técnico Salesiano”

```
MATCH (source:Nodo {name: 'inicio'}), (target:Nodo {name: 'Tecnico Salesiano'})
CALL gds.shortestPath.dijkstra.stream('myGraph', {
    sourceNode: source,
    targetNode: target,
    relationshipWeightProperty: 'cost'
})
YIELD index, sourceNode, targetNode, totalCost, nodeIds, costs, path
RETURN
    index,
    gds.util.asNode(sourceNode).name AS sourceNodeName,
    gds.util.asNode(targetNode).name AS targetNodeName,
    totalCost,
```

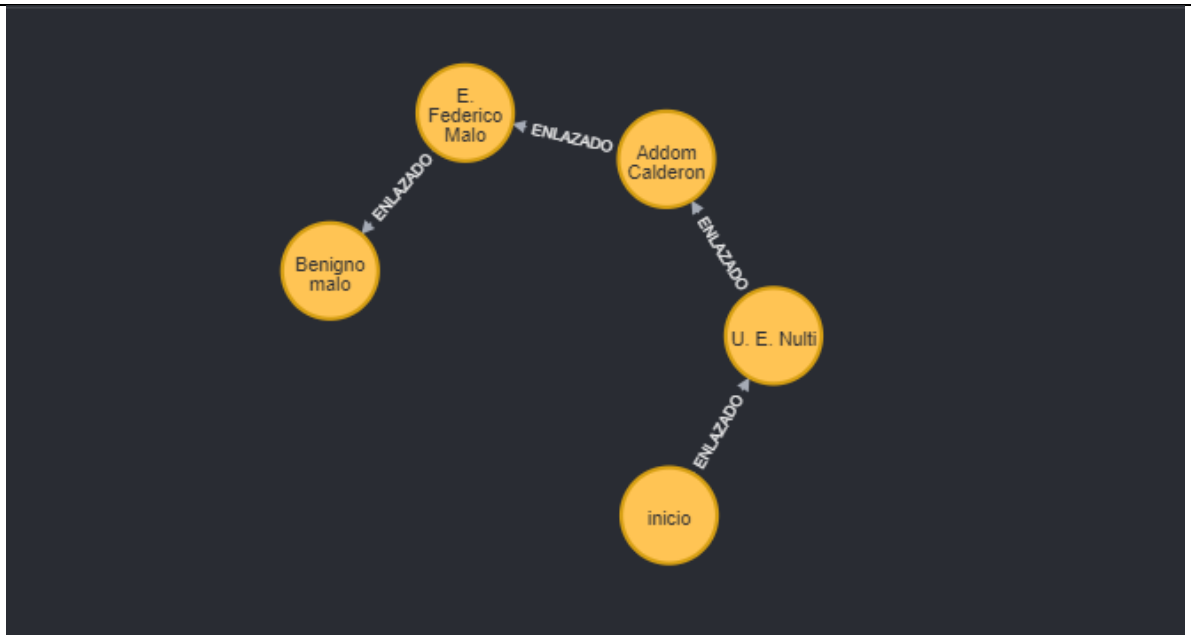
	index	sourceNodeName	targetNodeName	totalCost	nodeNames	costs
1	0	"inicio"	"Tecnico Salesiano"	39.0	["inicio", "U. E. Nulti", "C. Miguel Malo", "C. Aleman", "Tecnico Salesiano"]	[0.0, 14.0, 22.0, 26.0, 39.0]



Nodo destino “Benigno malo”

```
MATCH (source:Nodo {name: 'inicio'}), (target:Nodo {name: 'Benigno malo'})
CALL gds.shortestPath.dijkstra.stream('myGraph', {
    sourceNode: source,
    targetNode: target,
    relationshipWeightProperty: 'cost'
})
YIELD index, sourceNode, targetNode, totalCost, nodeIds, costs, path
RETURN
    index,
    gds.util.asNode(sourceNode).name AS sourceNodeName,
    gds.util.asNode(targetNode).name AS targetNodeName,
    totalCost,
```

	index	sourceNodeName	targetNodeName	totalCost	nodeNames	costs
1	0	"inicio"	"Benigno malo"	30.0	["inicio", "U. E. Nulti", "Addom Calderon", "E. Federico Malo", "Benigno malo"]	[0.0, 14.0, 21.0, 26.0, 30.0]



Nodo destino “Salesianas”

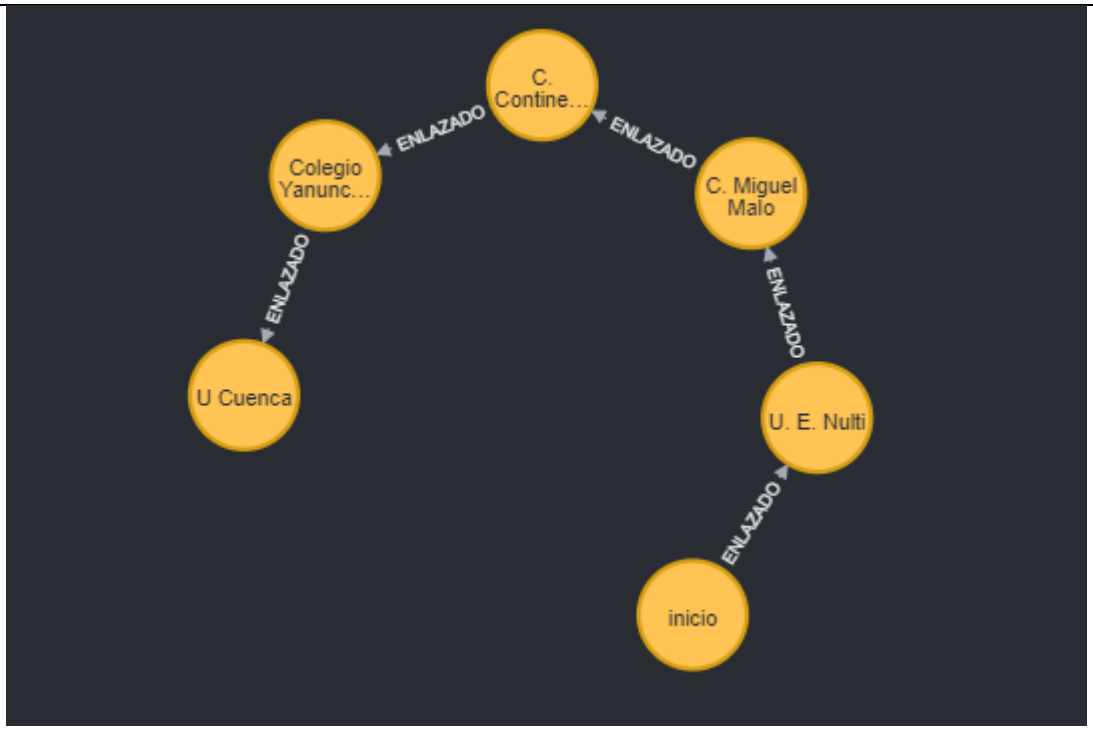
```
MATCH (source:Nodo {name: 'inicio'}), (target:Nodo {name: 'Salesianas'})
CALL gds.shortestPath.dijkstra.stream('myGraph', {
    sourceNode: source,
    targetNode: target,
    relationshipWeightProperty: 'cost'
})
YIELD index, sourceNode, targetNode, totalCost, nodeIds, costs, path
RETURN
    index,
    gds.util.asNode(sourceNode).name AS sourceNodeName,
    gds.util.asNode(targetNode).name AS targetNodeName,
    totalCost,
```

	index	sourceNodeName	targetNodeName	totalCost	nodeNames	costs
1	0	"inicio"	"Salesianas"	36.0	["inicio", "U. E. Nulti", "C. Miguel Malo", "C. Continental", "Colegio Aleman", "Salesianas"]	[0.0, 14.0, 22.0, 24.0, 27.0, 36.0]

Nodo destino “U Cuenca”

```
MATCH (source:Nodo {name: 'inicio'}), (target:Nodo {name: 'U Cuenca'})
CALL gds.shortestPath.dijkstra.stream('myGraph', {
    sourceNode: source,
    targetNode: target,
    relationshipWeightProperty: 'cost'
})
YIELD index, sourceNode, targetNode, totalCost, nodeIds, costs, path
RETURN
    index,
    gds.util.asNode(sourceNode).name AS sourceNodeName,
    gds.util.asNode(targetNode).name AS targetNodeName,
    totalCost,
```

	index	sourceNodeName	targetNodeName	totalCost	nodeNames	costs
1	0	"inicio"	"U Cuenca"	34.0	["inicio", "U. E. Nulti", "C. Miguel Malo", "C. Continental", "Colegio Yanuncay", "U Cuenca"]	[0.0, 14.0, 22.0, 24.0, 28.0, 34.0]



CONCLUSIONES:

- Es una herramienta muy útil ya que se puede implementar en diferentes tipos de sistema, ya sea comercial o para aprendizaje.

RECOMENDACIONES:

- Tomar en cuenta las documentaciones que existe dentro de la página oficial de neo4j, para así tener un conocimiento más profundo de los diferentes algoritmos

***Nombre de estudiante*:** Wilson Conce

***Firma de estudiante*:**