ONTOLOGIES AND THE SEMANTIC WEB
CSE488
COURSE PROJECT

PHARMACY MANAGEMENT SYSTEM

Abdelrahman Mohamed Shemies	18P9565
Ahmed Amr Behairy	18P5837
Daniel Tarek Lewis	18P1185
Mahmoud Mohasseb	20P2787

AGENDA

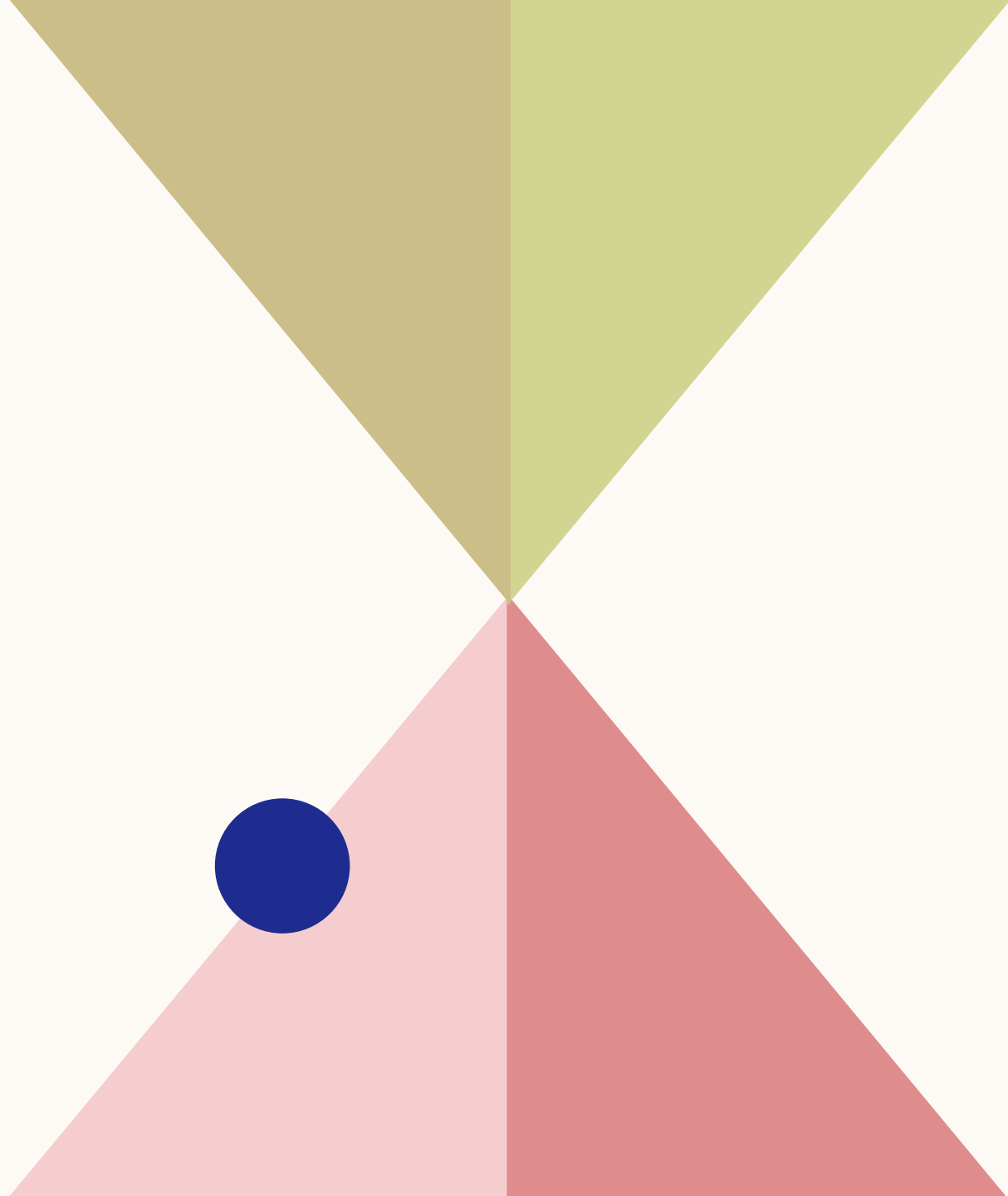
Ontology

RDF

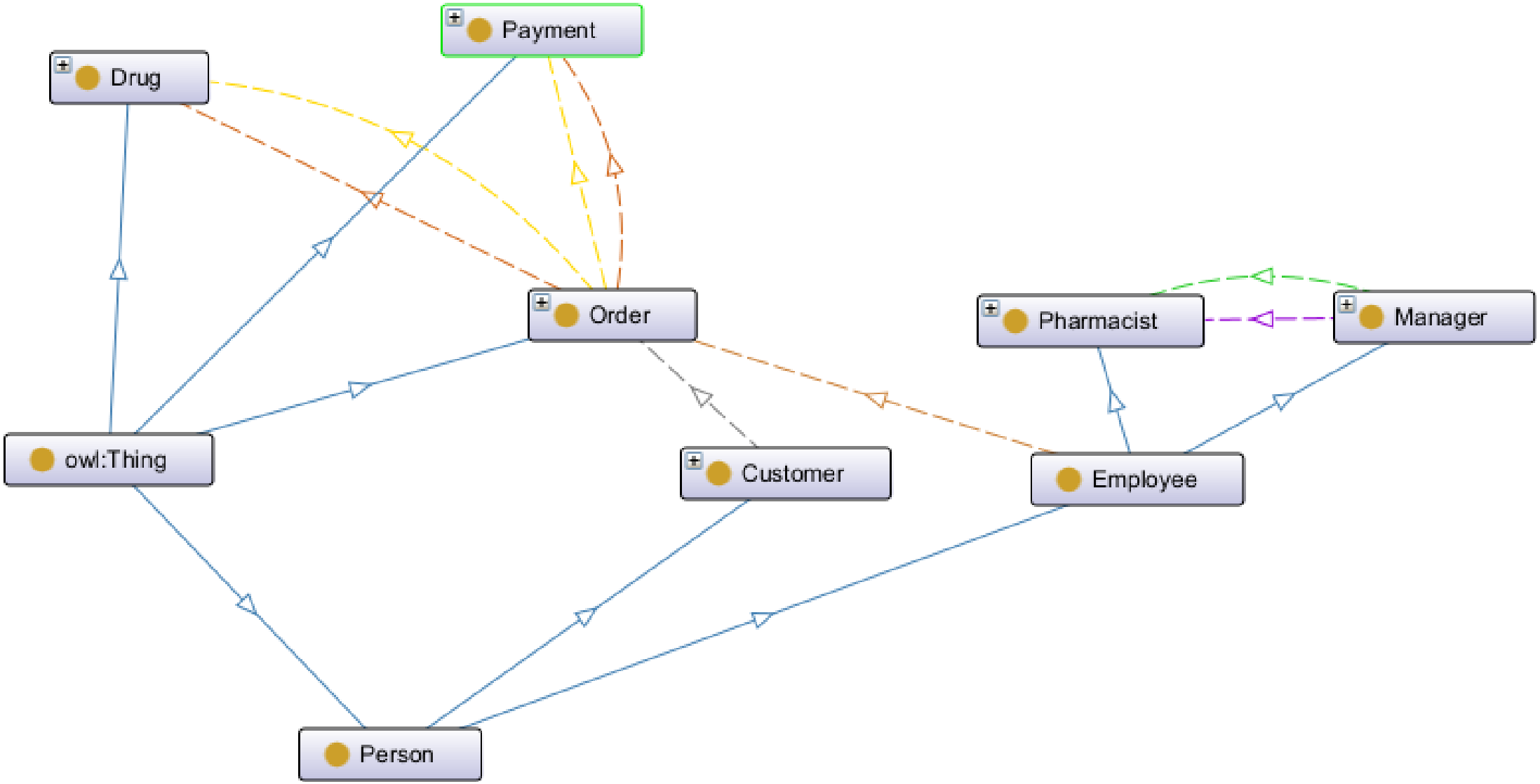
Instances

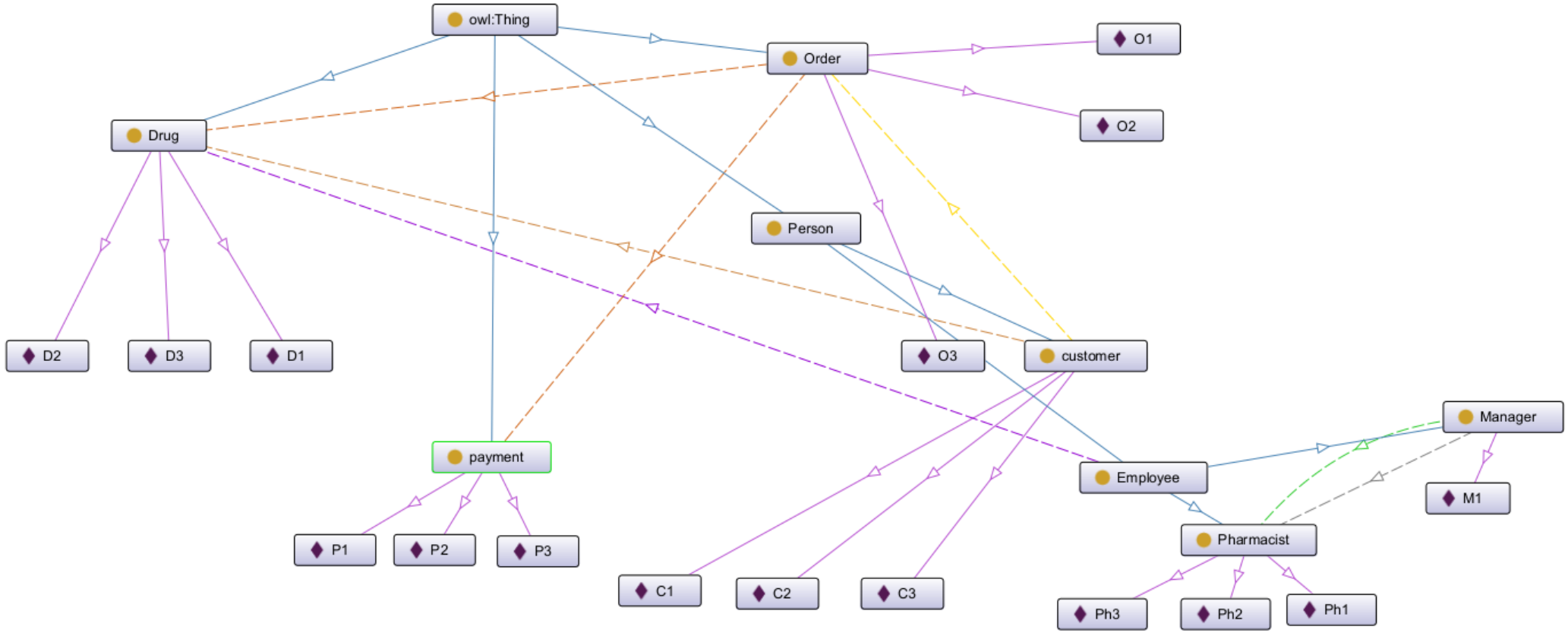
SparQL Queries

Front End



ONTOLOGY


Payment
Drug
Order
Pharmacist
Manager
owl:Thing
Customer
Employee
Person

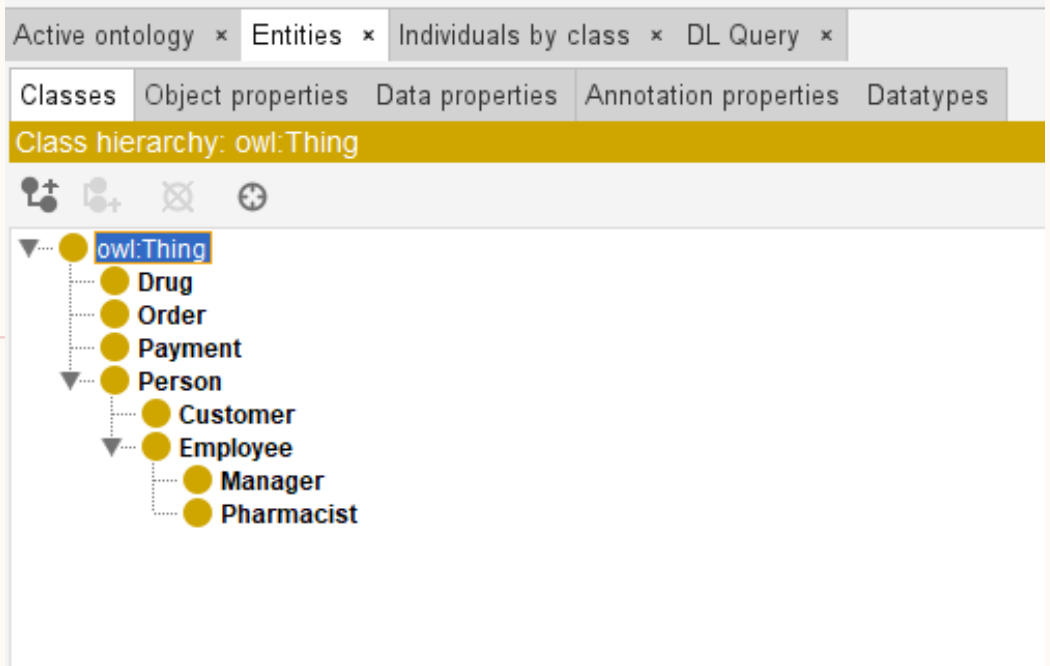

owl:Thing
Order
O1
O2
Drug
Person
D2
D3
D1
O3
customer
Manager
payment
Employee
M1
P1
P2
P3
Pharmacist
C1
C2
C3
Ph3
Ph2
Ph1

RDF

RDF

Entities

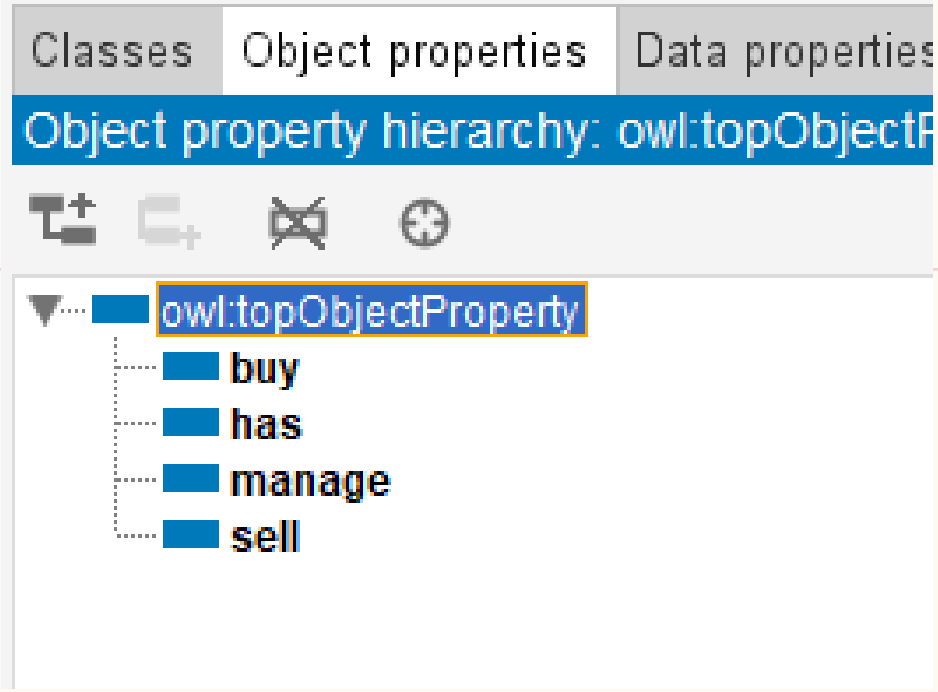
- Person subclass of thing
- Drug a subclass of thing
- Payment subclass of thing
- Order subclass of thing
- Employee a subclass of person
- Customer a subclass of person
- Pharmacist subclass of person a subclass of employee
- Manager a subclass of employee



RDF

Object Properties

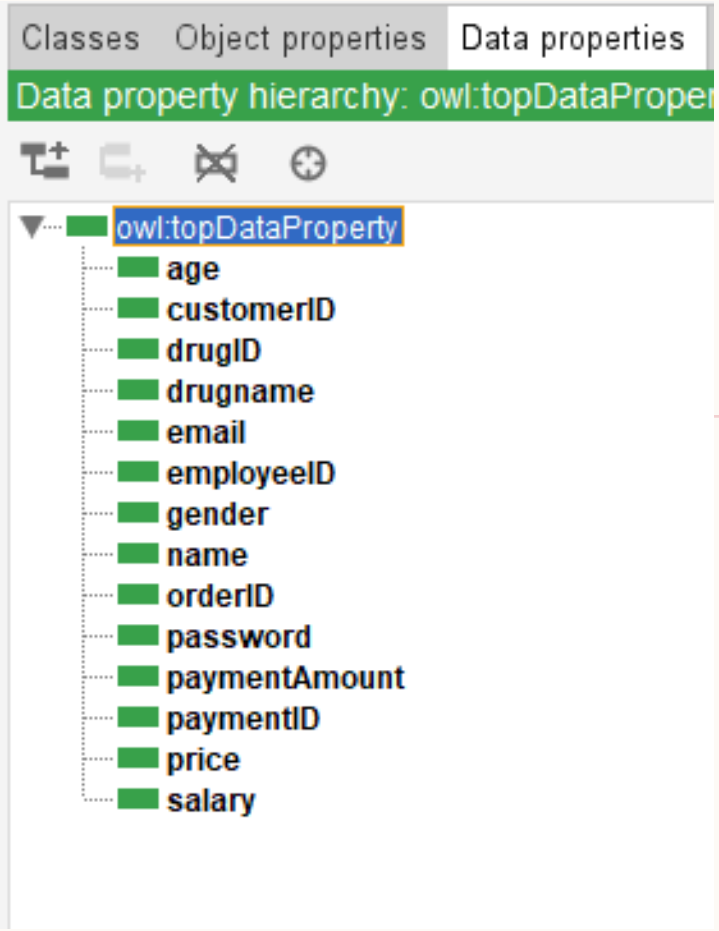
- Buy (Customer buy Order)
- Has (Order has Drug & Order has Payment)
- Manage (Manger manage Pharmacist)
- Sell (Pharmacist sell order)



RDF

Data Properties

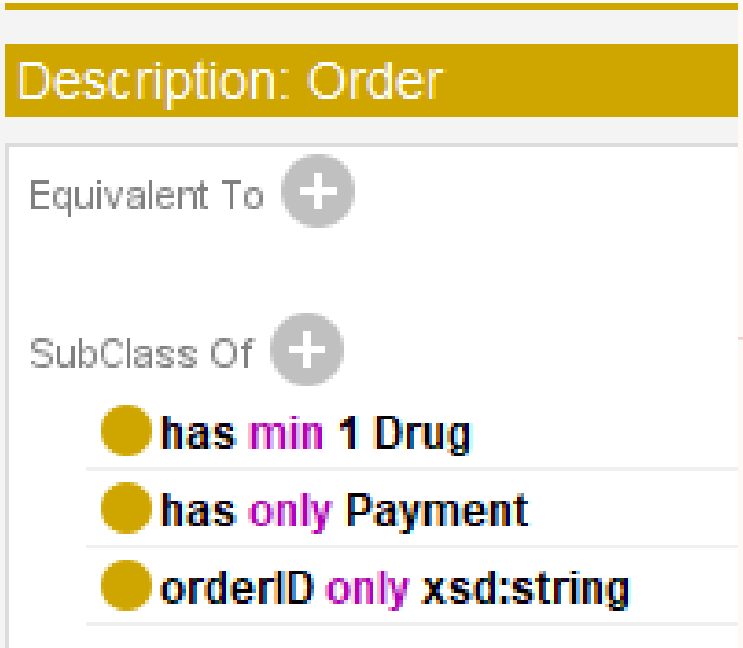
- Age
- customerID
- drugID
- drugname
- email
- employeeID
- gender
- name
- orderID
- password
- paymentAmount
- paymentID
- price
- salary



RDF

Constraints

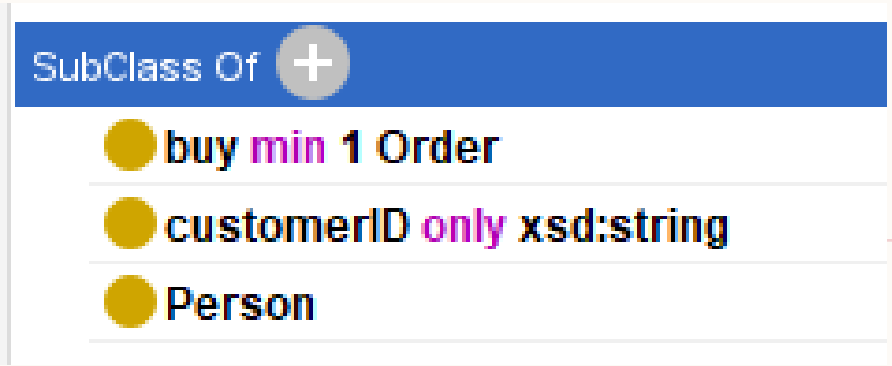
- Order has min 1 drug
- Order has only one Payment



RDF

Constraints

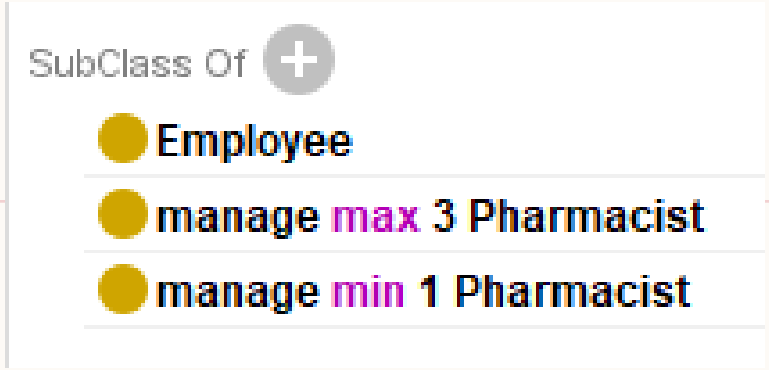
- Customer buy min 1 order



RDF

Constraints

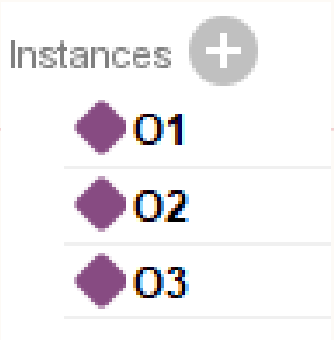
- Manager manage min 1 Pharmacist
- Manager manage max 5 Pharmacist



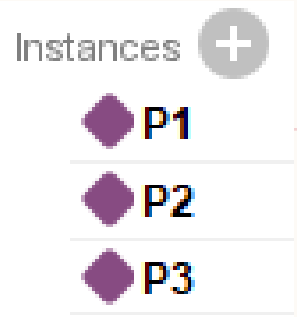
INSTANCES

DRUG

ORDER



PAYMENT



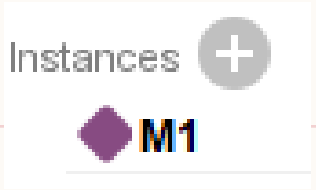
INSTANCES

PERSON

CUSTOMER

PHARMACIST

MANAGER



SPARQL QUERIES

List all Pharmacists Listing their name , ID, Salary, and Gender

/pharm/sparql | JSON | Turtle

```
prefix ex:<http://www.semanticweb.org/user/ontologies/2023/4/Pharmacy-managment-system#>
SELECT ?pharmacistname ?pharmacistID ?salary ?gender
WHERE {
  ?pharmacist a ex:Pharmacist.
  ?pharmacist ex:name ?pharmacistname.
  ?pharmacist ex:employeeID ?pharmacistID.
  ?pharmacist ex:salary ?salary.
  ?pharmacist ex:gender ?gender.

}
```

Table | Response | 3 results in 0.014 seconds

Simple view Ellipse Filter query results Page size: 1000

pharmacistname	pharmacistID	salary	gender
Ragab	e002	7000	Male
Mona	e003	15000	Female
Michael	e004	9500	Male

Showing 1 to 3 of 3 entries

< 1 >

SPARQL QUERIES

List all persons listing their name , age and email (Optional)

SPARQL Endpoint: /pharm/sparql

Content Type (SELECT): JSON

Content Type (GRAPH): Turtle

```
prefix ex:<http://www.semanticweb.org/user/ontologies/2023/4/Pharmacy-managment-system#>
SELECT ?name ?age ?email
WHERE {
  ?person ex:name ?name;
          ex:age ?age .
  OPTIONAL { ?person ex:email ?email
  }

}

```

Table | Response | 7 results in 0.02 seconds

Simple view Ellipse Filter query results Page size: 1000

name	age	email
Ahmed	25	ahmed@gmail.com
Manal	45	
Sayed	65	sayed@gmail.com
Mohamed	50	Mohamed@gmail.com
Ragab	28	ragab@gmail.com
Mona	48	Mona@gmail.com
Michael	39	Michael@gmail.com

Showing 1 to 7 of 7 entries

< 1 >

SPARQL QUERIES

List all customers and arranging them ascendingly by age

/pharm/sparql | JSON | Turtle

```
prefix ex:<http://www.semanticweb.org/user/ontologies/2023/4/Pharmacy-managment-system#>
SELECT ?name ?age
WHERE {
  ?emp a ex:Customer.
  ?emp ex:name ?name.
  ?emp ex:age ?age.

}
ORDER BY ASC  (?age)
```

Table | Response | 3 results in 0.015 seconds | Simple view | Ellipse | Filter query results | Page size: 1000

name	age
Ahmed	25
Manal	45
Sayed	65

Showing 1 to 3 of 3 entries

< 1 >

SPARQL QUERIES

List all persons who starts with letter m (regex and filter) and their gender

SPARQL Endpoint: /pharm/sparql | Content Type (SELECT): JSON | Content Type (GRAPH): Turtle

```
prefix ex:<http://www.semanticweb.org/user/ontologies/2023/4/Pharmacy-managment-system#>
SELECT ?name ?gender
WHERE {
  ?p a ex:Person.
  ?p ex:name ?name.
  ?p ex:gender ?gender.

  FILTER(REGEX(?name, "^m", "i"))


}
```

Table | Response | 4 results in 0.014 seconds | Simple view | Ellipse | Filter query results | Page size: 50

name	gender
Manal	Female
Mohamed	male
Mona	Female
Michael	Male

Showing 1 to 4 of 4 entries

< 1 >

SPARQL QUERIES

List all persons who have emails that include letter a (regex and filter) and their names

/pharm/sparql | JSON | Turtle

```
prefix ex:<http://www.semanticweb.org/user/ontologies/2023/4/Pharmacy-managment-system#>
SELECT ?name ?email
WHERE {
  ?p a ex:Person.
  ?p ex:name ?name.
  ?p ex:email ?email.

  FILTER(REGEX(?email, "a+", "i"))


}
```

Table | Response | 6 results in 0.019 seconds | Simple view | Ellipse | Filter query results | Page size: 50

name	email
Ahmed	ahmed@gmail.com
Sayed	sayed@gmail.com
Mohamed	Mohamed@gmail.com
Ragab	ragab@gmail.com
Mona	Mona@gmail.com
Michael	Michael@gmail.com

Showing 1 to 6 of 6 entries

< 1 >

SPARQL QUERIES

List all persons who have emails that include letter a (regex and filter) and their names

/pharm/sparql | JSON | Turtle

```
prefix ex:<http://www.semanticweb.org/user/ontologies/2023/4/Pharmacy-managment-system#>
SELECT ?name ?email
WHERE {
  ?p a ex:Person.
  ?p ex:name ?name.
  ?p ex:email ?email.

  FILTER(REGEX(?email, "a+", "i"))


}
```

Table | Response | 6 results in 0.019 seconds | Simple view | Ellipse | Filter query results | Page size: 50

name	email
Ahmed	ahmed@gmail.com
Sayed	sayed@gmail.com
Mohamed	Mohamed@gmail.com
Ragab	ragab@gmail.com
Mona	Mona@gmail.com
Michael	Michael@gmail.com

Showing 1 to 6 of 6 entries

< 1 >

SPARQL QUERIES

- List all the Payments that have their amounts >450 UNION <300

/pharm/sparql | JSON

```
1  prefix ex:<http://www.semanticweb.org/user/ontologies/2023/4/Pharmacy-managment-system#>
2  SELECT ?paymentID ?paymentamount
3  WHERE {
4    {
5      ?payment a ex:Payment.
6      ?payment ex:paymentID ?paymentID.
7      ?payment ex:paymentAmount ?paymentamount.
8      FILTER( ?paymentamount > 450)
9    }
10   UNION
11   {
12     ?payment a ex:Payment.
13     ?payment ex:paymentID ?paymentID.
14     ?payment ex:paymentAmount ?paymentamount.
15     FILTER( ?paymentamount < 300)
```

Table | Response | 2 results in 0.013 seconds

paymentID	paym
p003	455.0
p002	120.0

Showing 1 to 2 of 2 entries

SPARQL QUERIES

ASK if there is a manager who manage pharmacist

/pharm/sparql

JSON

```
prefix ex:<http://www.semanticweb.org/user/ontologies/2023/4/Pharmacy-managment-system#>
ASK WHERE {
  ?manger a ex:Manager.
  ?pharma a ex:Pharmacist.
  ?manger ex:manage ?pharma
}
```

Table Response Response in 0.018 seconds

✓ True

SPARQL QUERIES

List all description of all orders that contain customer with customerID “c003”

/pharm/sparql | JSON | Turtle

```
prefix ex:<http://www.semanticweb.org/user/ontologies/2023/4/Pharmacy-managment-system#>
DESCRIBE ?customer WHERE{
  ?customer a ex:Customer ;
            ex:customerID "c003" .
}
```

Table | Response | 8 results in 0.019 seconds

Simple view Ellipse Filter query results Page size: 50

subject	predicate	object
http://www.semanticweb.org/user/ontologies/2023/4/Pharmacy-managment-system#...	http://www.semanticweb.org/user/ontologies/2023/4/Pharmacy-managment-system#name	Sayed
http://www.semanticweb.org/user/ontologies/2023/4/Pharmacy-managment-system#...	http://www.semanticweb.org/user/ontologies/2023/4/Pharmacy-managment-system#gender	Male
http://www.semanticweb.org/user/ontologies/2023/4/Pharmacy-managment-system#...	http://www.semanticweb.org/user/ontologies/2023/4/Pharmacy-managment-system#email	sayed@gmail.com
http://www.semanticweb.org/user/ontologies/2023/4/Pharmacy-managment-system#...	http://www.semanticweb.org/user/ontologies/2023/4/Pharmacy-managment-system#customer...	c003
http://www.semanticweb.org/user/ontologies/2023/4/Pharmacy-managment-system#...	http://www.semanticweb.org/user/ontologies/2023/4/Pharmacy-managment-system#age	65
http://www.semanticweb.org/user/ontologies/2023/4/Pharmacy-managment-system#...	http://www.semanticweb.org/user/ontologies/2023/4/Pharmacy-managment-system#buy	http://www.semanticweb.org/user/ontologies/2023/4/Pharmacy-managment-system#O2
http://www.semanticweb.org/user/ontologies/2023/4/Pharmacy-managment-system#...	http://www.w3.org/1999/02/22-rdf-syntax-ns#type	http://www.w3.org/2002/07/owl#NamedIndividual
http://www.semanticweb.org/user/ontologies/2023/4/Pharmacy-managment-system#...	http://www.w3.org/1999/02/22-rdf-syntax-ns#type	http://www.semanticweb.org/user/ontologies/2023/4/Pharmacy-managment-system#Custo...

Showing 1 to 8 of 8 entries

< 1 >

SPARQL QUERIES

Construct a result set containing all orders and the drugs they contain.

/pharm/sparql | JSON | Turtle

```
prefix ex:<http://www.semanticweb.org/user/ontologies/2023/4/Pharmacy-managment-system#>
CONSTRUCT {
  ?order a ex:Order ;
           ex:orderID ?orderID ;
           ex:has ?drug .
  ?drug a ex:Drug ;
          ex:drugID ?drugID .
}
WHERE {
  ?order a ex:Order ;
           ex:has ?drug .
  ?drug a ex:Drug ;
          ex:drugID ?drugID .
}
```

Table | Response | 15 results in 0.013 seconds | Simple view | Ellipse | Filter query results | Page size: 1000

subject	predicate	object
http://www.semanticweb.org/user/ontologies/2023/4/Pharmacy-managment-system#O1	http://www.semanticweb.org/user/ontologies/2023/4/Pharmacy-managment-system#has	http://www.semanticweb.org/user/ontologies/2023/4/Pharmacy-managment-system#D2
http://www.semanticweb.org/user/ontologies/2023/4/Pharmacy-managment-system#O1	http://www.semanticweb.org/user/ontologies/2023/4/Pharmacy-managment-system#has	http://www.semanticweb.org/user/ontologies/2023/4/Pharmacy-managment-system#D1
http://www.semanticweb.org/user/ontologies/2023/4/Pharmacy-managment-system#O1	http://www.w3.org/1999/02/22-rdf-syntax-ns#type	http://www.semanticweb.org/user/ontologies/2023/4/Pharmacy-managment-system#Order
http://www.semanticweb.org/user/ontologies/2023/4/Pharmacy-managment-system#D2	http://www.semanticweb.org/user/ontologies/2023/4/Pharmacy-managment-system#drugID	d002
http://www.semanticweb.org/user/ontologies/2023/4/Pharmacy-managment-system#D2	http://www.w3.org/1999/02/22-rdf-syntax-ns#type	http://www.semanticweb.org/user/ontologies/2023/4/Pharmacy-managment-system#Drug
http://www.semanticweb.org/user/ontologies/2023/4/Pharmacy-managment-system#O2	http://www.semanticweb.org/user/ontologies/2023/4/Pharmacy-managment-system#has	http://www.semanticweb.org/user/ontologies/2023/4/Pharmacy-managment-system#D1
http://www.semanticweb.org/user/ontologies/2023/4/Pharmacy-managment-system#O2	http://www.w3.org/1999/02/22-rdf-syntax-ns#type	http://www.semanticweb.org/user/ontologies/2023/4/Pharmacy-managment-system#Order
http://www.semanticweb.org/user/ontologies/2023/4/Pharmacy-managment-system#D3	http://www.semanticweb.org/user/ontologies/2023/4/Pharmacy-managment-system#drugID	d003
http://www.semanticweb.org/user/ontologies/2023/4/Pharmacy-managment-system#D3	http://www.w3.org/1999/02/22-rdf-syntax-ns#type	http://www.semanticweb.org/user/ontologies/2023/4/Pharmacy-managment-system#Drug
http://www.semanticweb.org/user/ontologies/2023/4/Pharmacy-managment-system#D1	http://www.semanticweb.org/user/ontologies/2023/4/Pharmacy-managment-system#drugID	d001
http://www.semanticweb.org/user/ontologies/2023/4/Pharmacy-managment-system#D1	http://www.w3.org/1999/02/22-rdf-syntax-ns#type	http://www.semanticweb.org/user/ontologies/2023/4/Pharmacy-managment-system#Drug
http://www.semanticweb.org/user/ontologies/2023/4/Pharmacy-managment-system#O3	http://www.semanticweb.org/user/ontologies/2023/4/Pharmacy-managment-system#has	http://www.semanticweb.org/user/ontologies/2023/4/Pharmacy-managment-system#D3
http://www.semanticweb.org/user/ontologies/2023/4/Pharmacy-managment-system#O3	http://www.semanticweb.org/user/ontologies/2023/4/Pharmacy-managment-system#has	http://www.semanticweb.org/user/ontologies/2023/4/Pharmacy-managment-system#D2

SPARQL QUERIES

Obtain a description of all orders that contain a drug with drug ID "d003".

SPARQL Endpoint: /pharm/sparql

Content Type (SELECT): JSON

Content Type (GRAPH): Turtle

```
prefix ex:<http://www.semanticweb.org/user/ontologies/2023/4/Pharmacy-managment-system#>
DESCRIBE ?order WHERE {
  ?order a ex:Order ;
           ex:has ?drug .
  ?drug a ex:Drug ;
          ex:drugID "d003" .
}
```

Table | Response | 12 results in 0.012 seconds

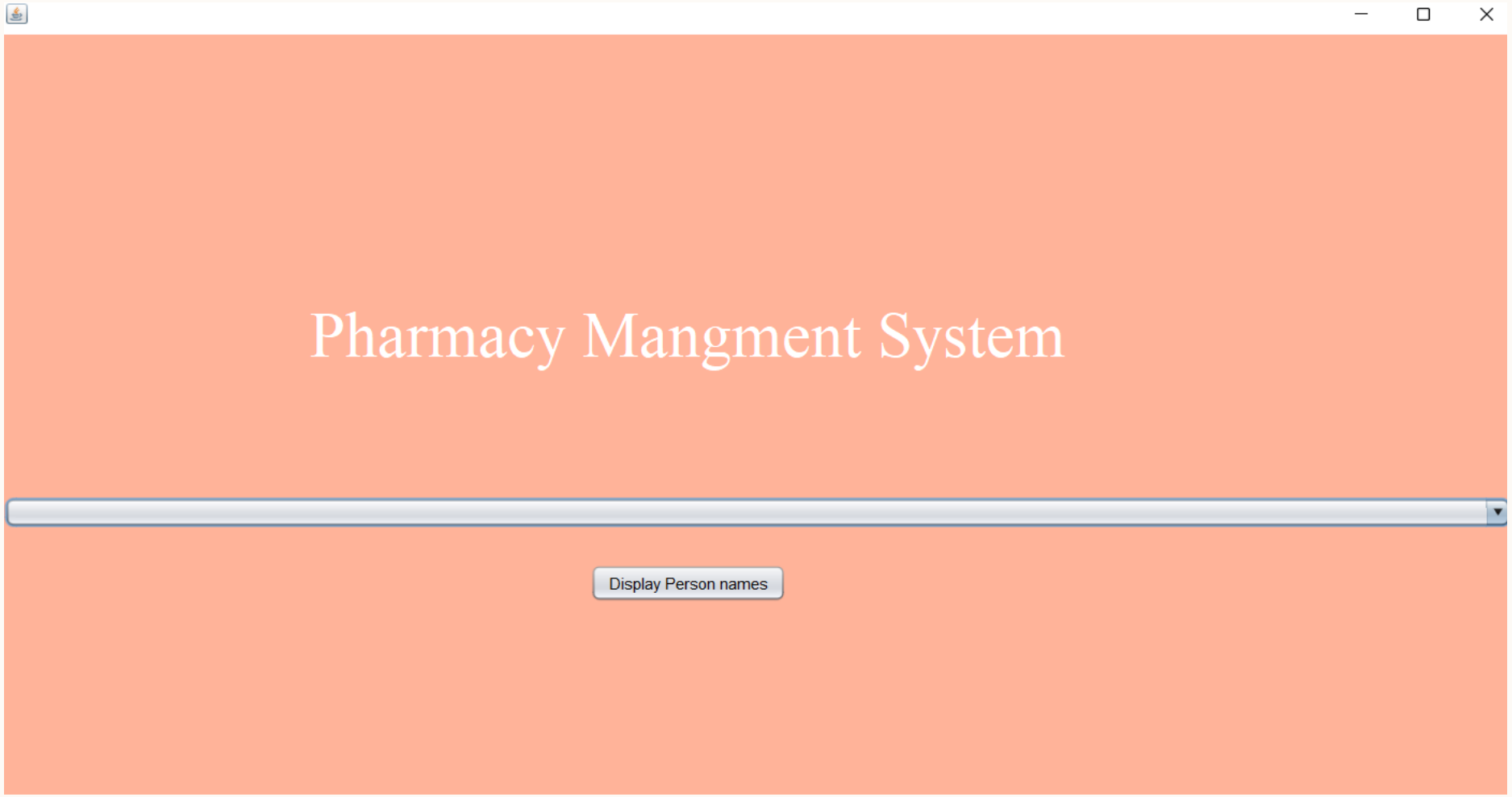
Simple view ☑ Ellipse ☑ Filter query results Page size: 1000

subject	predicate	object
http://www.semanticweb.org/user/ontologies/2023/4/Pharmacy-managment-system#O3	http://www.semanticweb.org/user/ontologies/2023/4/Pharmacy-managment-system#drugID	d003
http://www.semanticweb.org/user/ontologies/2023/4/Pharmacy-managment-system#O3	http://www.semanticweb.org/user/ontologies/2023/4/Pharmacy-managment-system#drugID	d002
http://www.semanticweb.org/user/ontologies/2023/4/Pharmacy-managment-system#O3	http://www.semanticweb.org/user/ontologies/2023/4/Pharmacy-managment-system#has	http://www.semanticweb.org/user/ontologies/2023/4/Pharmacy-managment-system#P3
http://www.semanticweb.org/user/ontologies/2023/4/Pharmacy-managment-system#O3	http://www.semanticweb.org/user/ontologies/2023/4/Pharmacy-managment-system#customerID	c002
http://www.semanticweb.org/user/ontologies/2023/4/Pharmacy-managment-system#O3	http://www.semanticweb.org/user/ontologies/2023/4/Pharmacy-managment-system#has	http://www.semanticweb.org/user/ontologies/2023/4/Pharmacy-managment-system#D1
http://www.semanticweb.org/user/ontologies/2023/4/Pharmacy-managment-system#O3	http://www.semanticweb.org/user/ontologies/2023/4/Pharmacy-managment-system#paymentID	p003
http://www.semanticweb.org/user/ontologies/2023/4/Pharmacy-managment-system#O3	http://www.w3.org/1999/02/22-rdf-syntax-ns#type	http://www.w3.org/2002/07/owl#NamedIndividual
http://www.semanticweb.org/user/ontologies/2023/4/Pharmacy-managment-system#O3	http://www.semanticweb.org/user/ontologies/2023/4/Pharmacy-managment-system#has	http://www.semanticweb.org/user/ontologies/2023/4/Pharmacy-managment-system#D3
http://www.semanticweb.org/user/ontologies/2023/4/Pharmacy-managment-system#O3	http://www.semanticweb.org/user/ontologies/2023/4/Pharmacy-managment-system#drugID	d001
http://www.semanticweb.org/user/ontologies/2023/4/Pharmacy-managment-system#O3	http://www.w3.org/1999/02/22-rdf-syntax-ns#type	http://www.semanticweb.org/user/ontologies/2023/4/Pharmacy-managment-system#Order
http://www.semanticweb.org/user/ontologies/2023/4/Pharmacy-managment-system#O3	http://www.semanticweb.org/user/ontologies/2023/4/Pharmacy-managment-system#has	http://www.semanticweb.org/user/ontologies/2023/4/Pharmacy-managment-system#D2
http://www.semanticweb.org/user/ontologies/2023/4/Pharmacy-managment-system#O3	http://www.semanticweb.org/user/ontologies/2023/4/Pharmacy-managment-system#orderID	o003

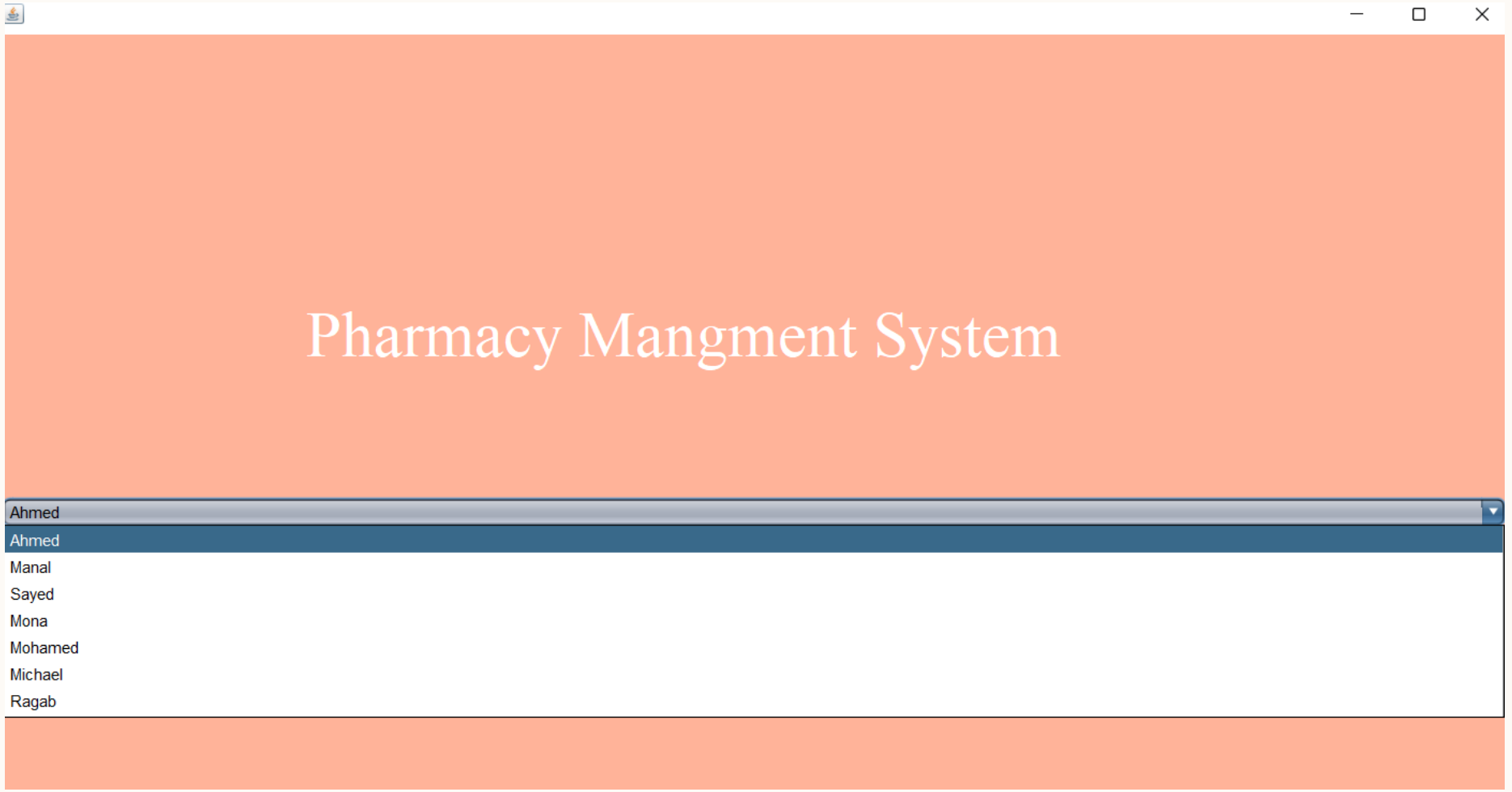
Showing 1 to 12 of 12 entries

< 1 >

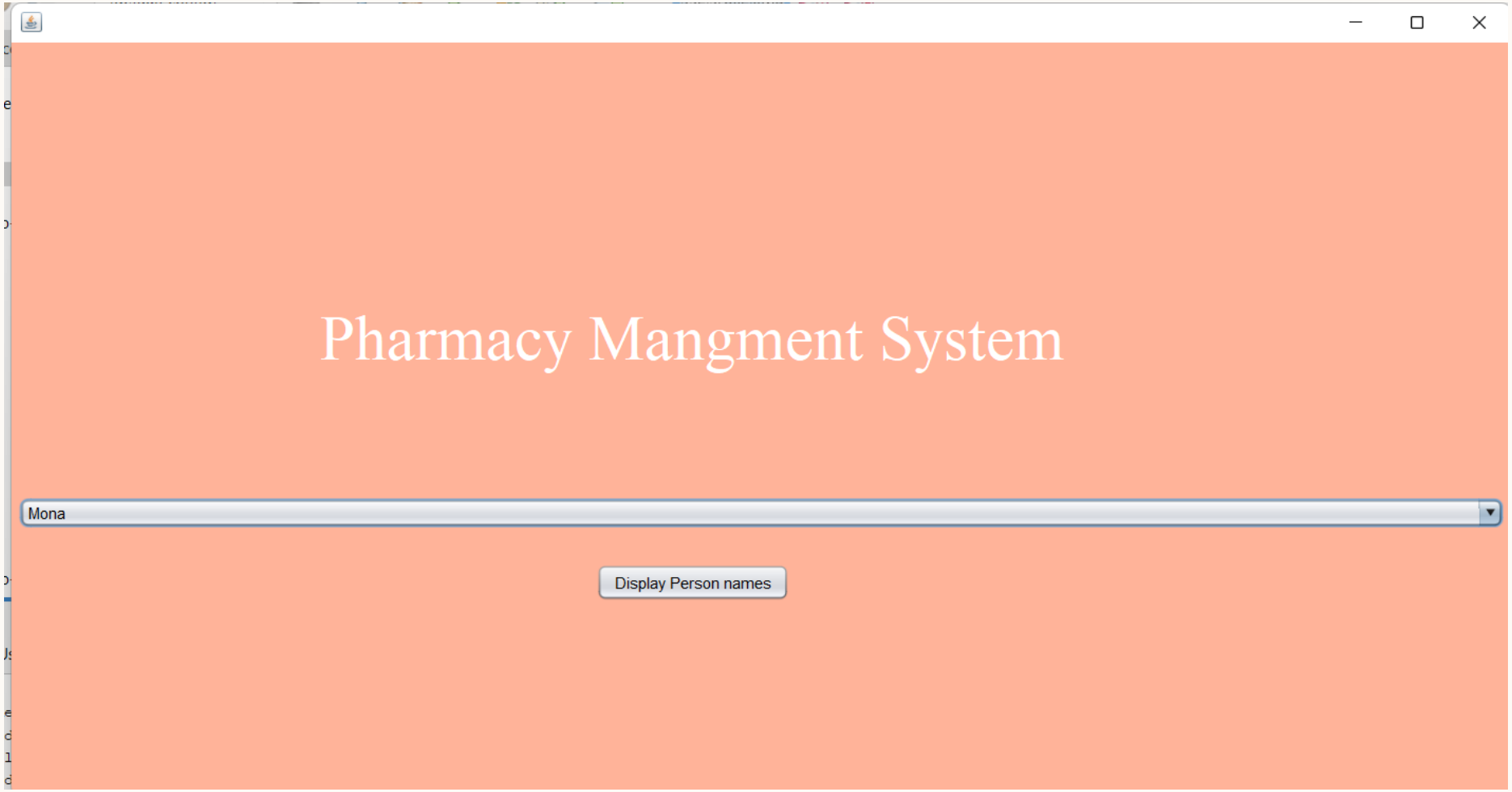
FRONTEND



FRONTEND


Pharmacy Mangment System
Ahmed
Ahmed
Manal
Sayed
Mona
Mohamed
Michael
Ragab

FRONTEND



THANK YOU

Abdelrahman Mohamed Shemies	18P9565
Ahmed Amr Behairy	18P5837
Daniel Tarek Lewis	18P1185
Mahmoud Mohasseb	20P2787