



# Neo4j II - Relationships

HIGHER DIPLOMA IN DATA ANALYTICS

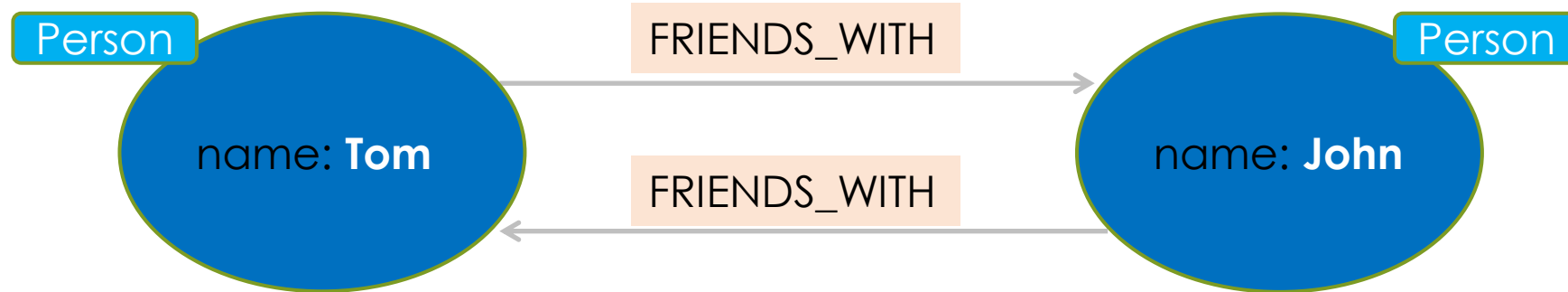


# Relationships

- ▶ A *relationship* is an entity that encodes a directed connection between exactly two nodes, the *source node* and the *target node*.
- ▶ An *outgoing* relationship is a directed relationship from the point of view of its source node.
- ▶ An *incoming* relationship is a directed relationship from the point of view of its target node.
- ▶ A relationship can have properties but is assigned exactly one relationship type.



# Relationships



# Relationships



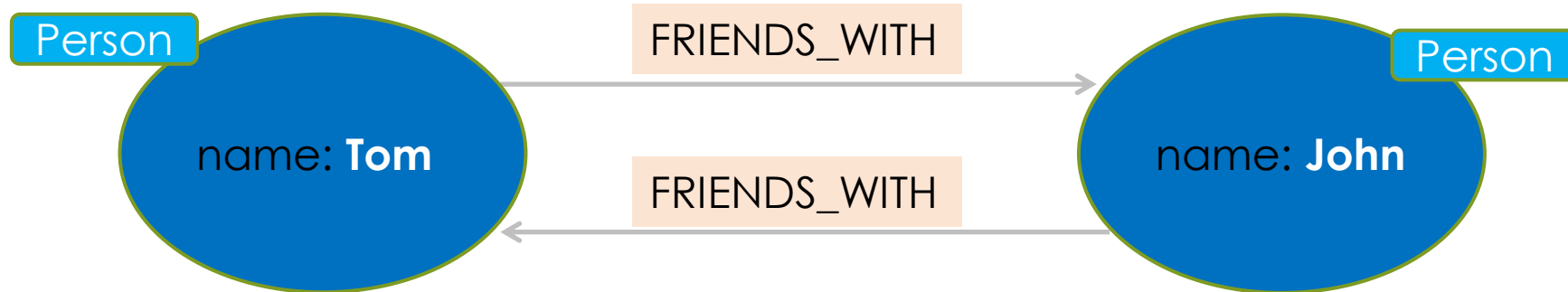
- ▶ `()`
- ▶ `(:Person)`
- ▶ `(:Person{name:"Tom"})`
  
- ▶ `-[:FRIENDS_WITH]->`
- ▶ `<-[:FRIENDS_WITH]-`



# Creating a Relationship



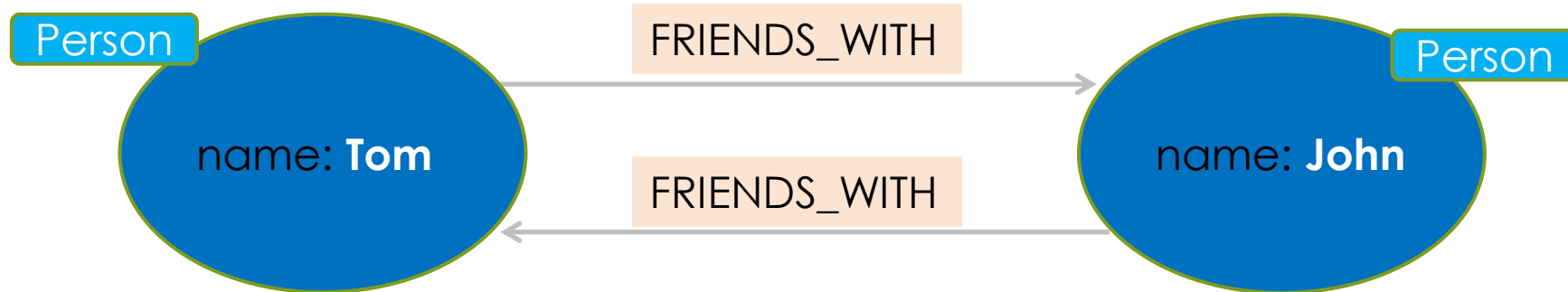
```
CREATE(p1:Person{name:"Tom"})-[r:FRIENDS_WITH]->(p2:Person{name:"John"})  
RETURN p1, r, p2
```



```
MATCH(p1:Person{name:"John"}),(p2:Person{name:"Tom"})  
CREATE(p1)-[r:FRIENDS_WITH]->(p2)  
RETURN p1, r, p2
```



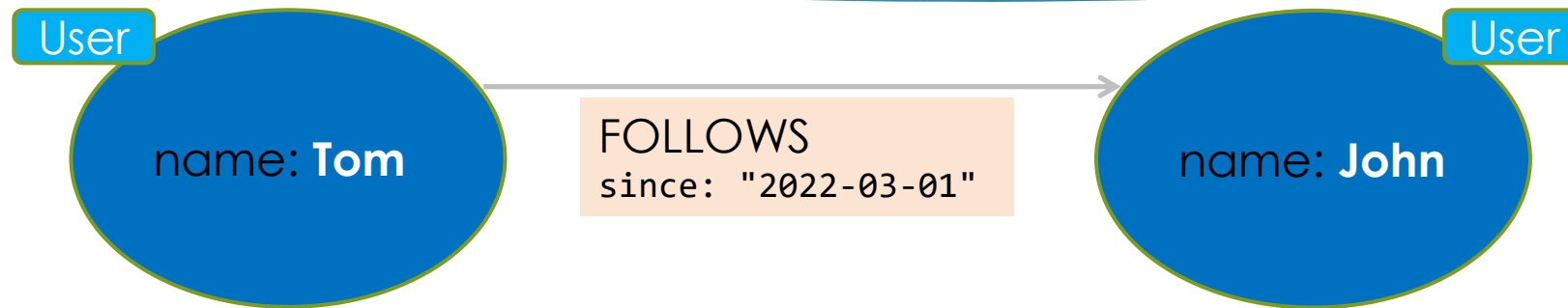
# Creating a Relationship



```
MATCH(p1:Person{name:"John"}),(p2:Person{name:"Tom"})  
MERGE(p1)-[r:FRIENDS_WITH]->(p2)  
RETURN p1,r,p2
```



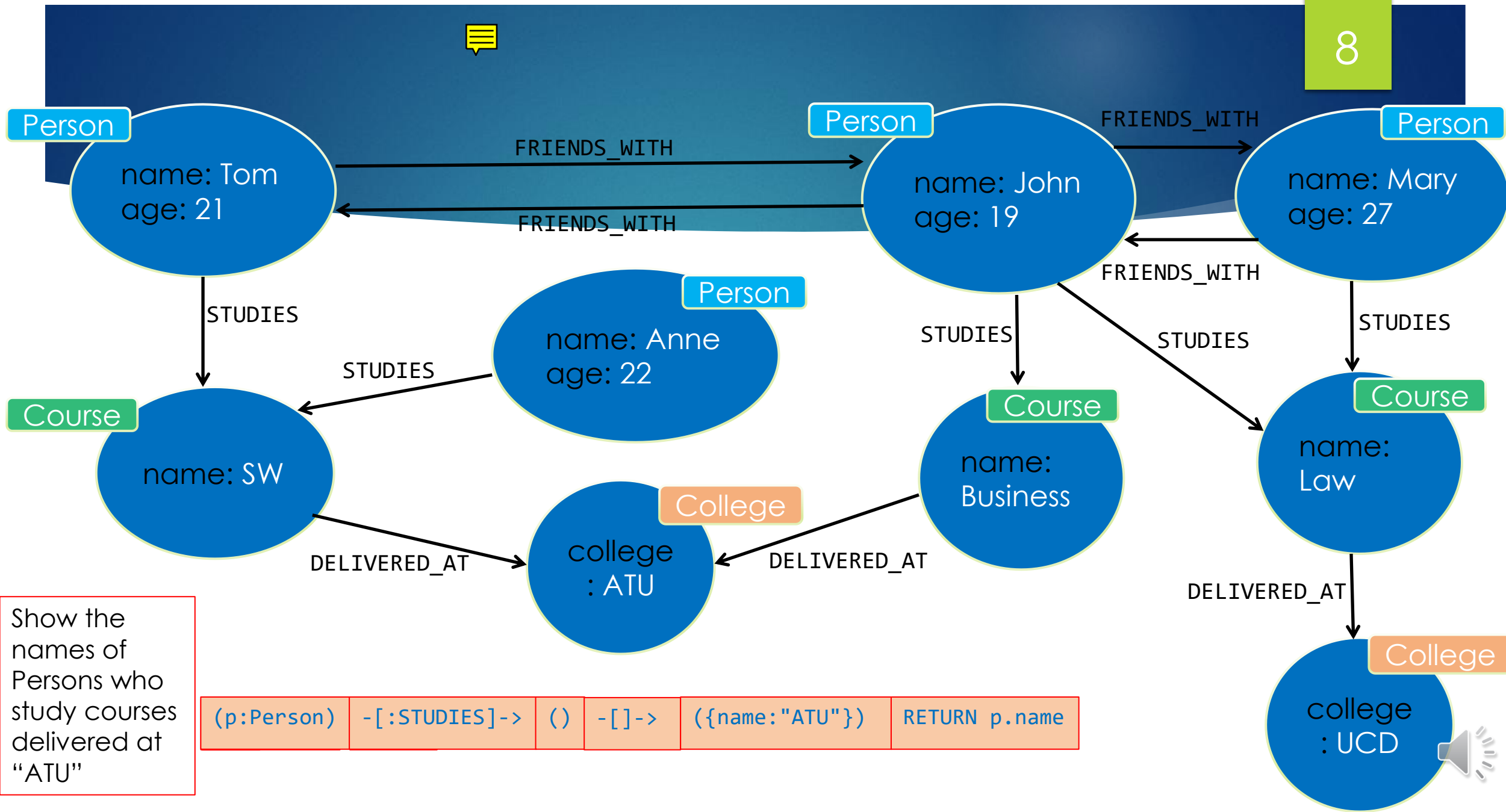
# Creating a Relationship



- ▶ Relationships can also have properties.
- ▶ Create a directional “FOLLOWS” Relationship between existing nodes “Tom” and “John”, with a property key = *since* and a value = “2022-03-01”.

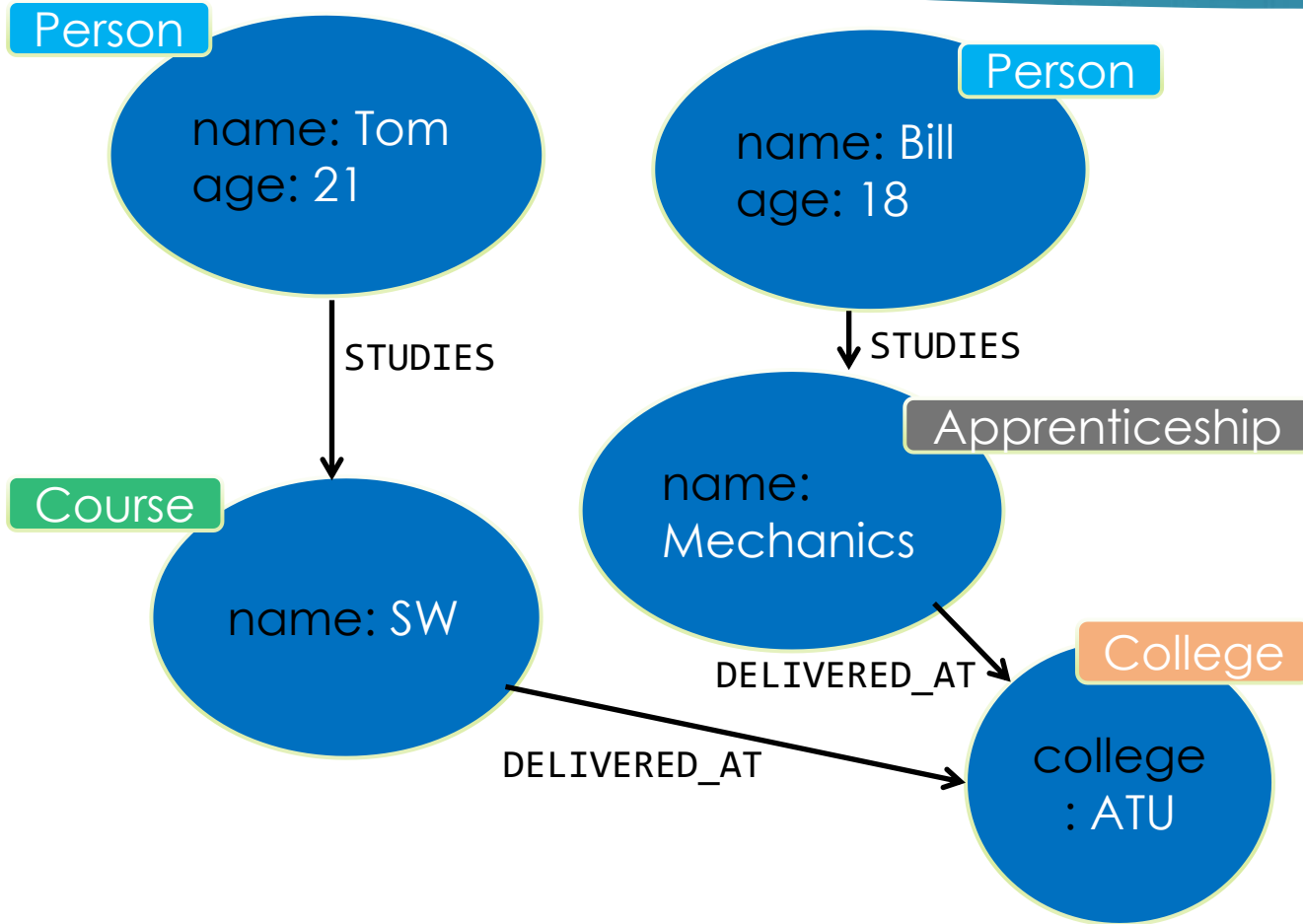
```
MATCH(p1:Person{name:"Tom"}),(p2:Person{name:"John"})  
MERGE(p1)-[r:FOLLOWS{since:"2022-03-01"}]->(p2)  
RETURN p1, r, p2
```







# Relationships



Show the names of Persons who study courses delivered at "ATU"

```

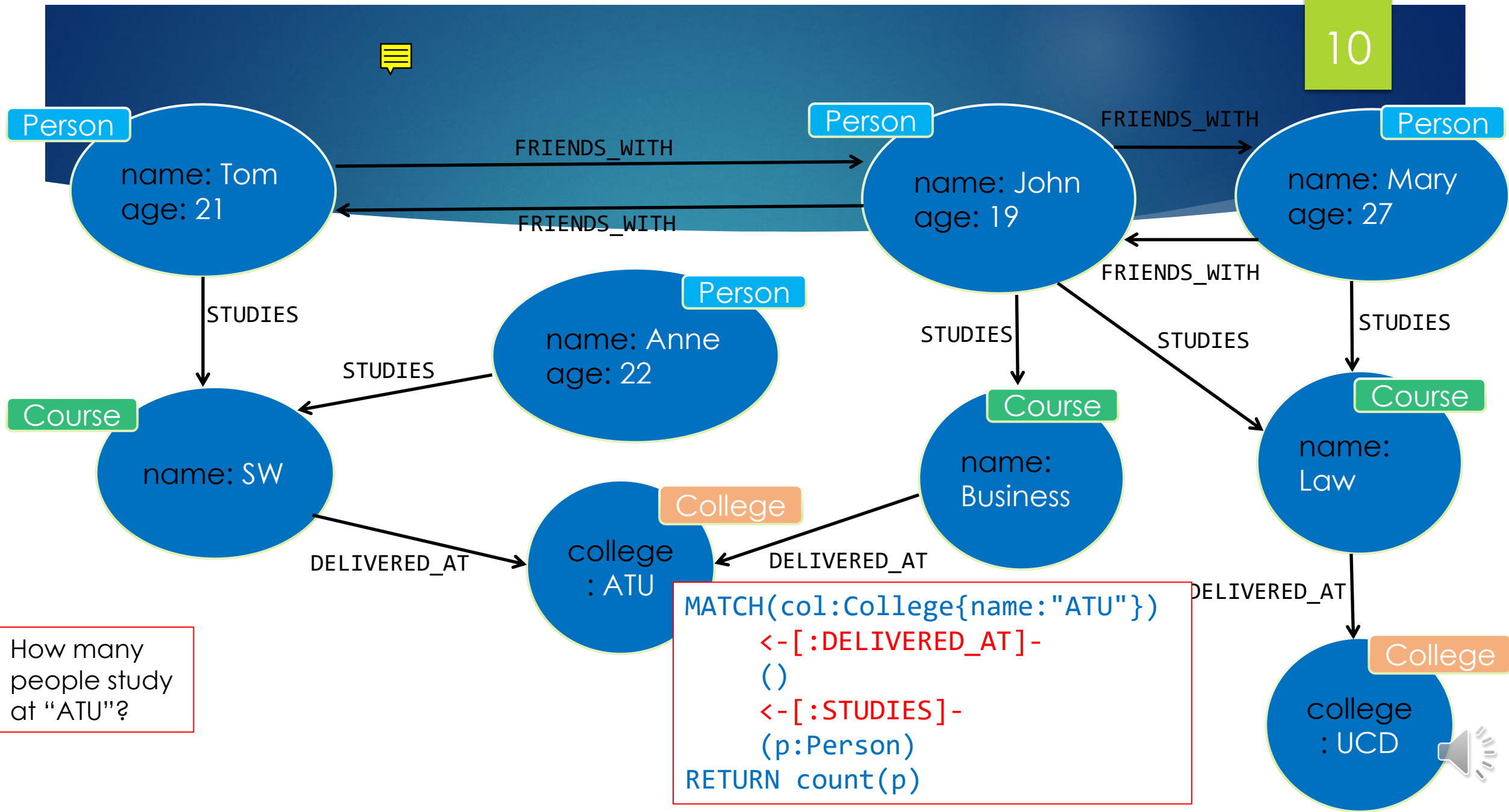
MATCH(p:Person)
  -[:STUDIES]->
    ( )
  -->
    ({name:"ATU"})
RETURN p.name
  
```

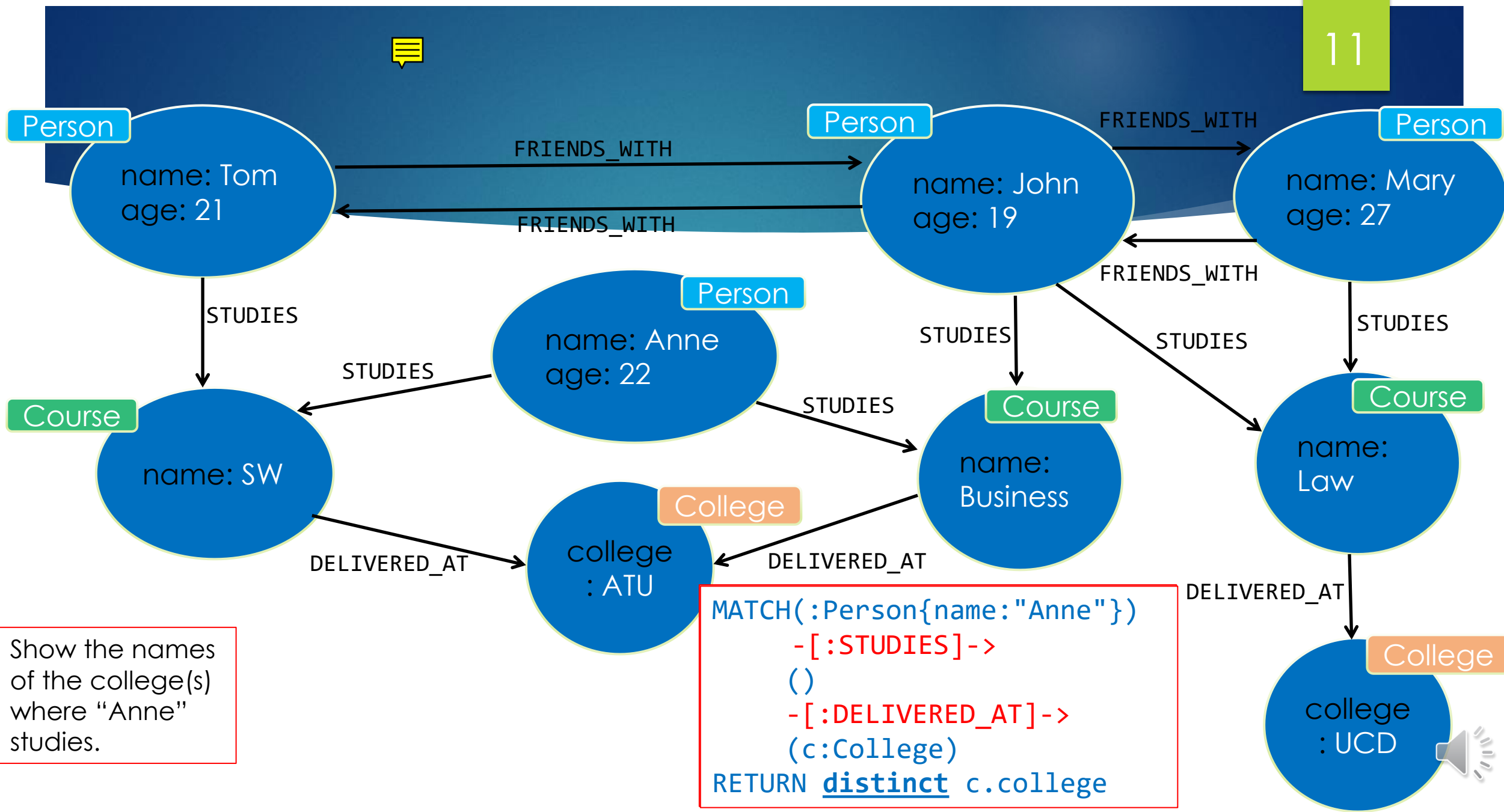
```

MATCH(p:Person)
  -[:STUDIES]->
    (c:Course)
  -[d:DELIVERED_AT]->
    (col:College{name:"ATU"})
RETURN p.name
  
```



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Show the Person's name and the name of the course(s) he/she studies.

```
MATCH(n:Person)
-[:STUDIES]->
(c:Course)
RETURN n.name as Name,
c.name as Courses
```

"Name"	"Courses"
"Tom"	"SW"
"John"	"Law"
"John"	"Business"
"Anne"	"SW"
"Mary"	"Law"

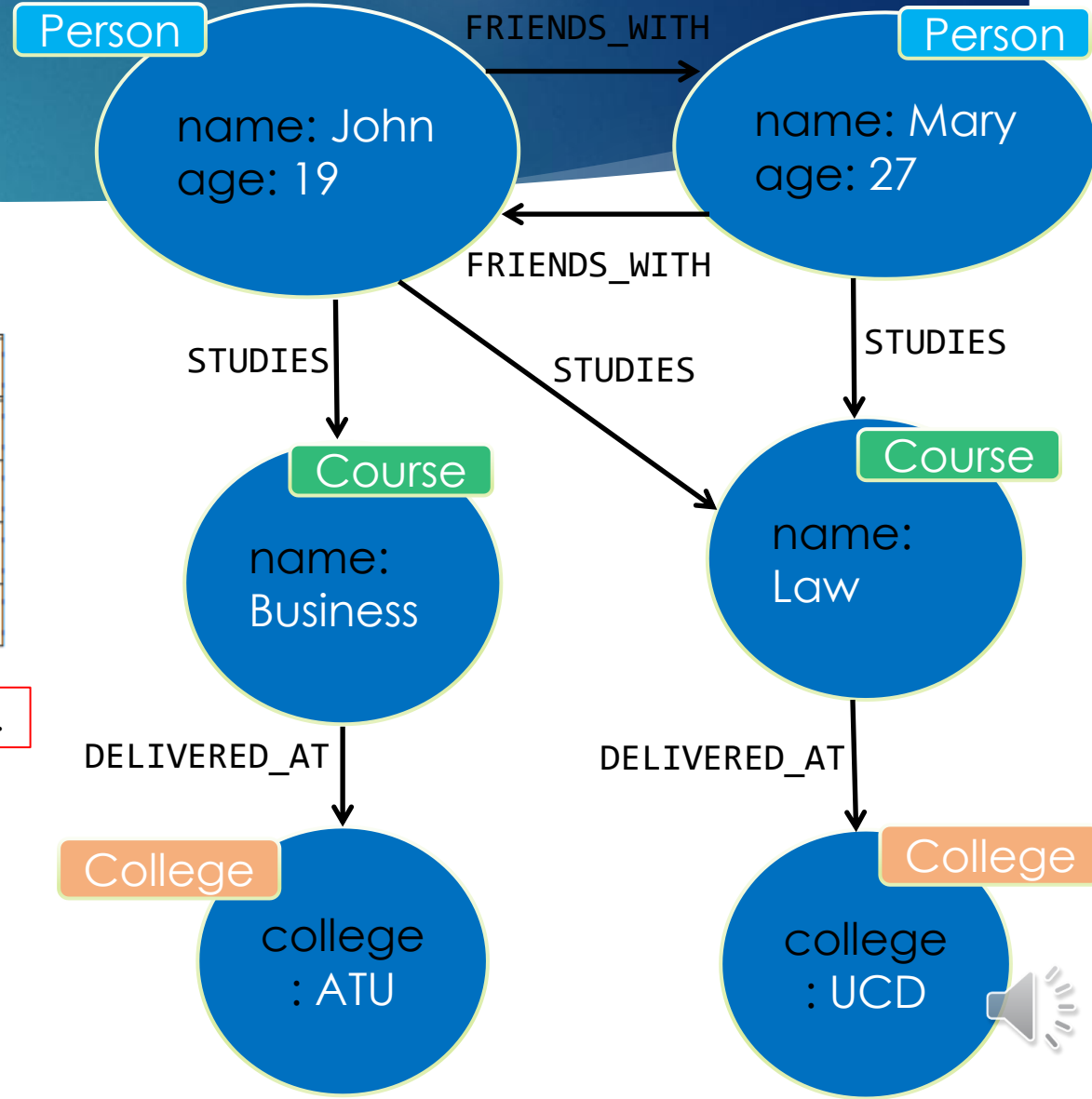
```
MATCH(n:Person)
-[:STUDIES]->
(c:Course)
RETURN n.name as Name,
collect(c.name) as Courses
```

"Name"	"Courses"
"Tom"	["SW"]
"John"	["Law", "Business"]
"Anne"	["SW"]
"Mary"	["Law"]

Show the Person's name and the number of the course(s) he/she studies.

```
MATCH(n:Person)
-[:STUDIES]->
(c:Course)
RETURN n.name as Name,
size(collect(c.name)) as Courses
```

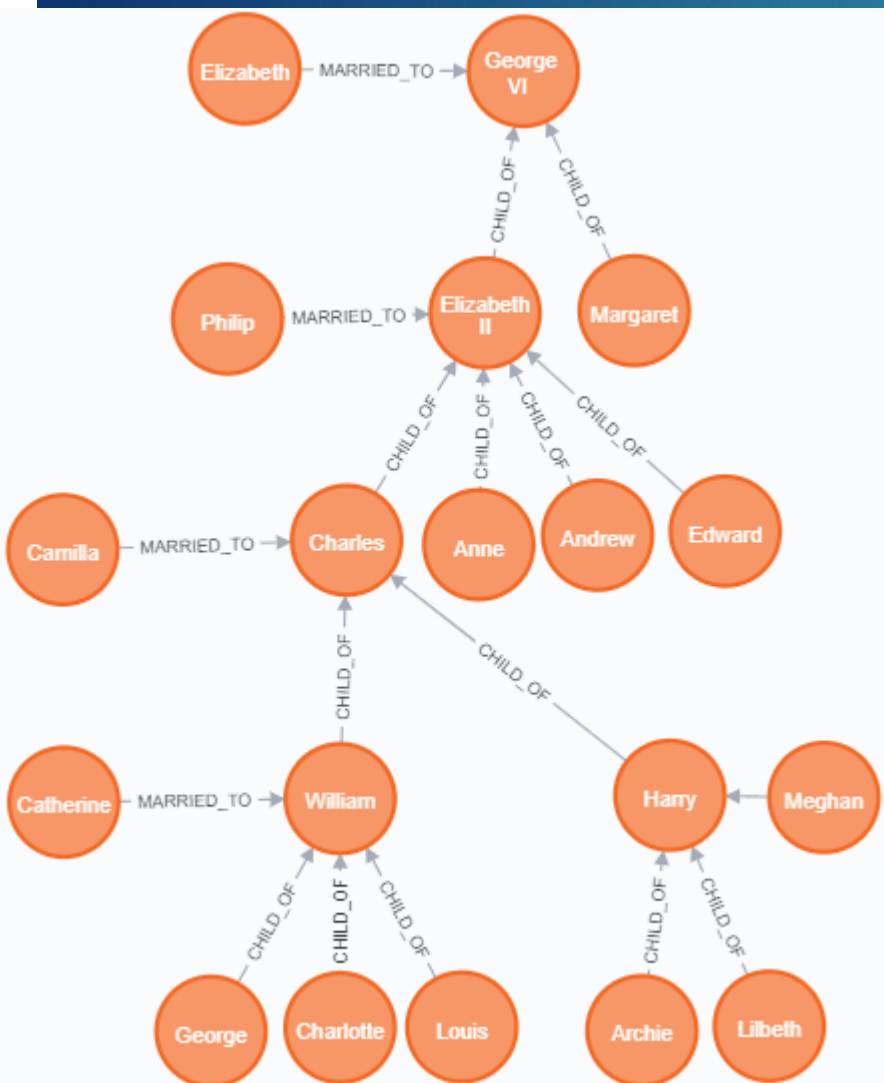
"Name"	"Courses"
"Tom"	1
"John"	2
"Anne"	1
"Mary"	1



# Variable Length Pattern Matching

- ▶ Rather than describing a long path using a sequence of many node and relationship descriptions in a pattern, many relationships (and the intermediate nodes) can be described by specifying a length in the relationship description of a pattern.





Show "George"s grandparent.

```
MATCH(g{name:"George"})
-[:CHILD_OF]->
()
-[:CHILD_OF]->
(gp)
RETURN gp.name
```

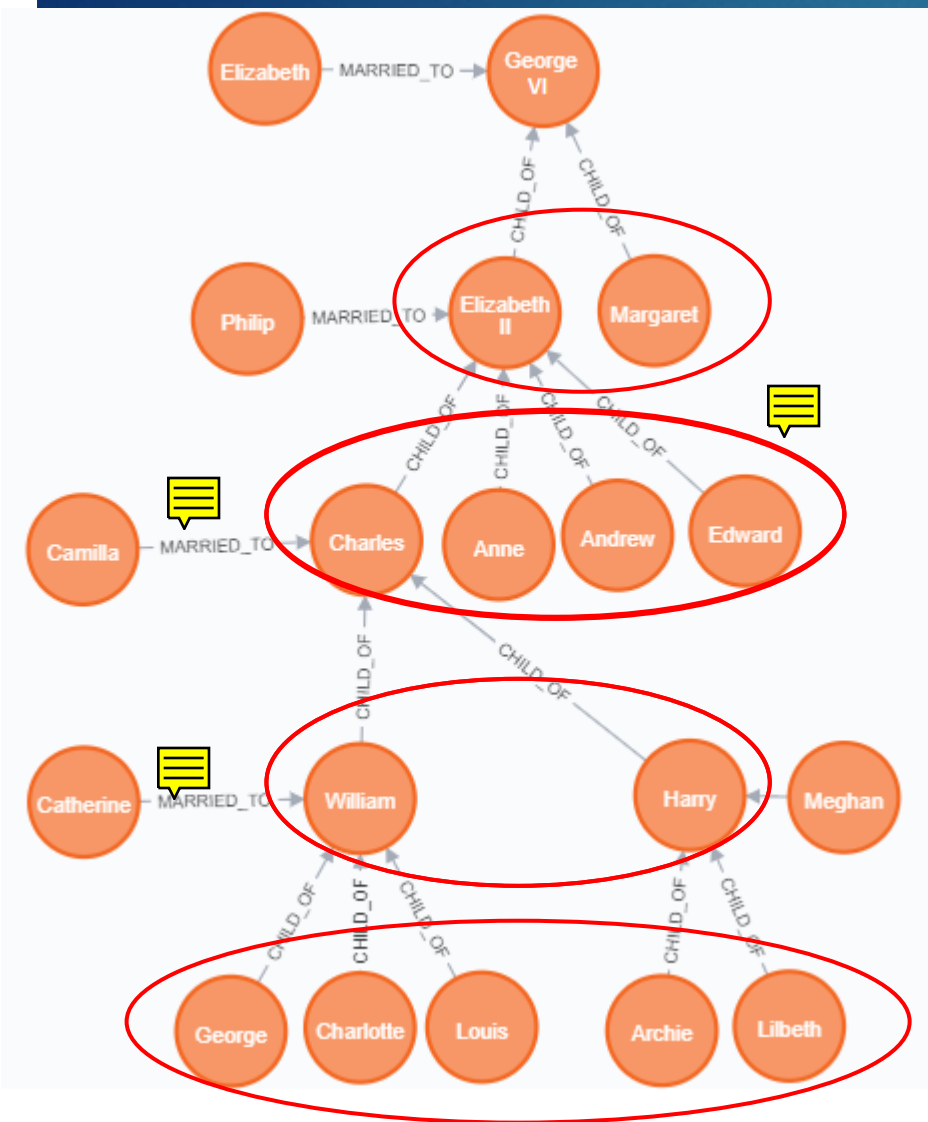
```
MATCH(g{name:"George"})
-[:CHILD_OF*2]->
(gp)
RETURN gp.name
```

Show "George"s great-grandparent.

```
MATCH(g{name:"George"})
-[:CHILD_OF]->
()
-[:CHILD_OF]->
()
-[:CHILD_OF]->
(ggp)
RETURN ggp.name
```

```
MATCH(g{name:"George"})
-[:CHILD_OF*3]->
(gp)
RETURN gp.name
```





Show "George VI"s grandchildren and great-grandchildren.

```

MATCH(g{name:"George VI"})
  <-[:CHILD_OF*2..3]-
  (gc)
RETURN gc.name

```

*\*min.. max*

Show all "George VI"s descendants except his children.

```

MATCH(g{name:"George VI"})
  <-[:CHILD_OF*2..]-
  (gc)
RETURN gc.name

```

*\*min.. (no max)*

Show all "George VI"s children and grandchildren.

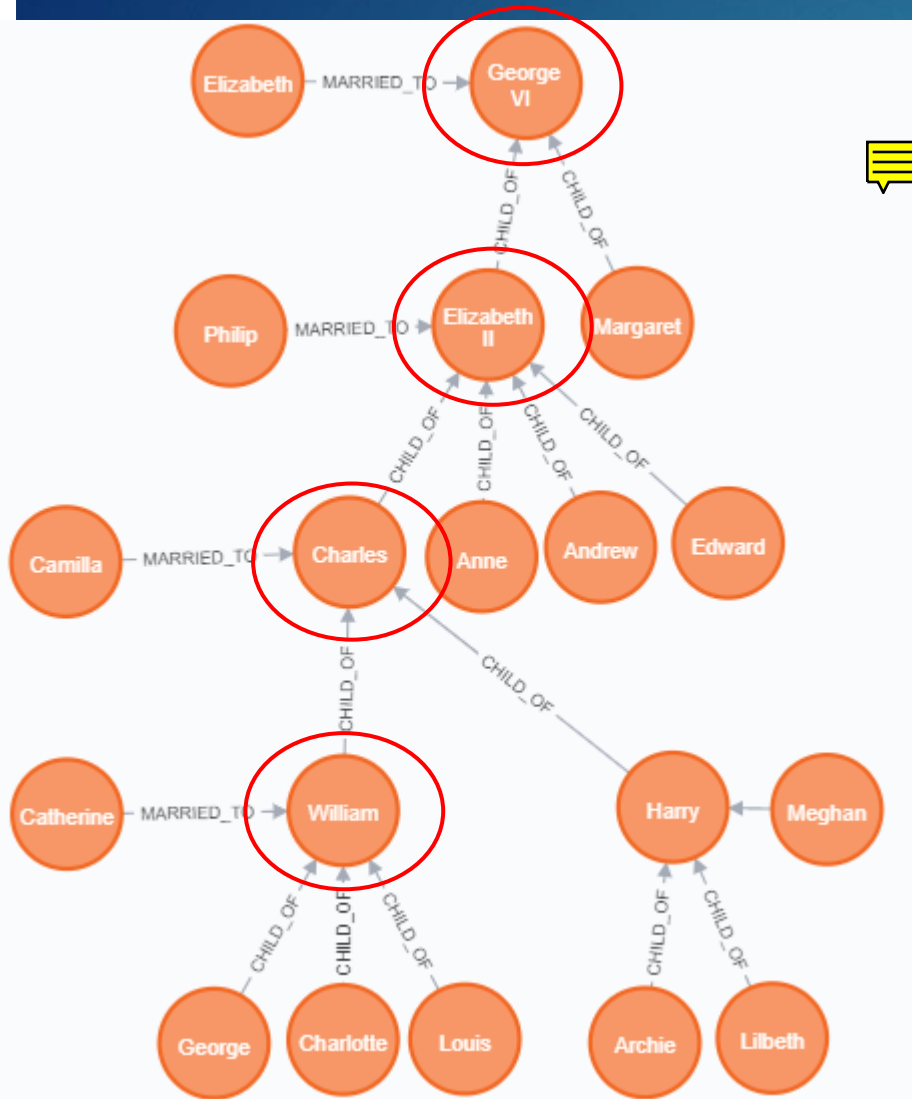
```

MATCH(g{name:"George VI"})
  <-[:CHILD_OF*..2]-
  (gc)
RETURN gc.name

```

*\*(no min).. max*





Show all "George"s direct ancestors.

```

MATCH(g{name:"George"})
-[:CHILD_OF*]->
(a)
RETURN a.name
  
```

*\* (no min) (no max)*





# Variable Length Pattern Matching



[\*2]

*\*exactly 2*

[\*2..3]

*\*min 2    max 3*

[\*2..]

*\*min 2    no max*

[\*..2]

*\*no min    max 2*

[\*]

*\*no min    no max*

