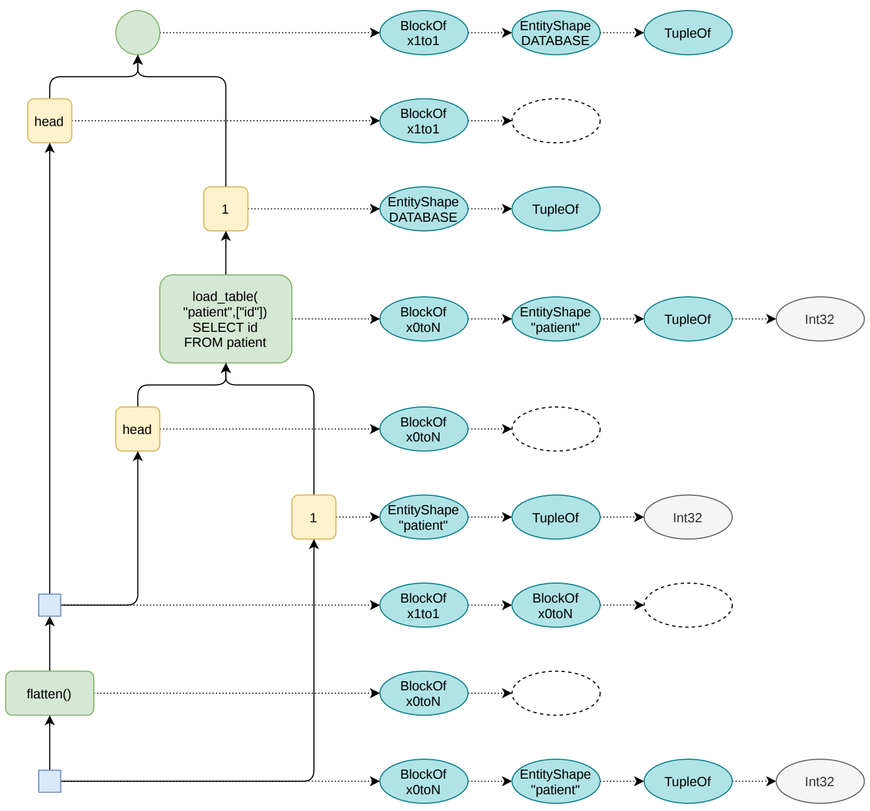
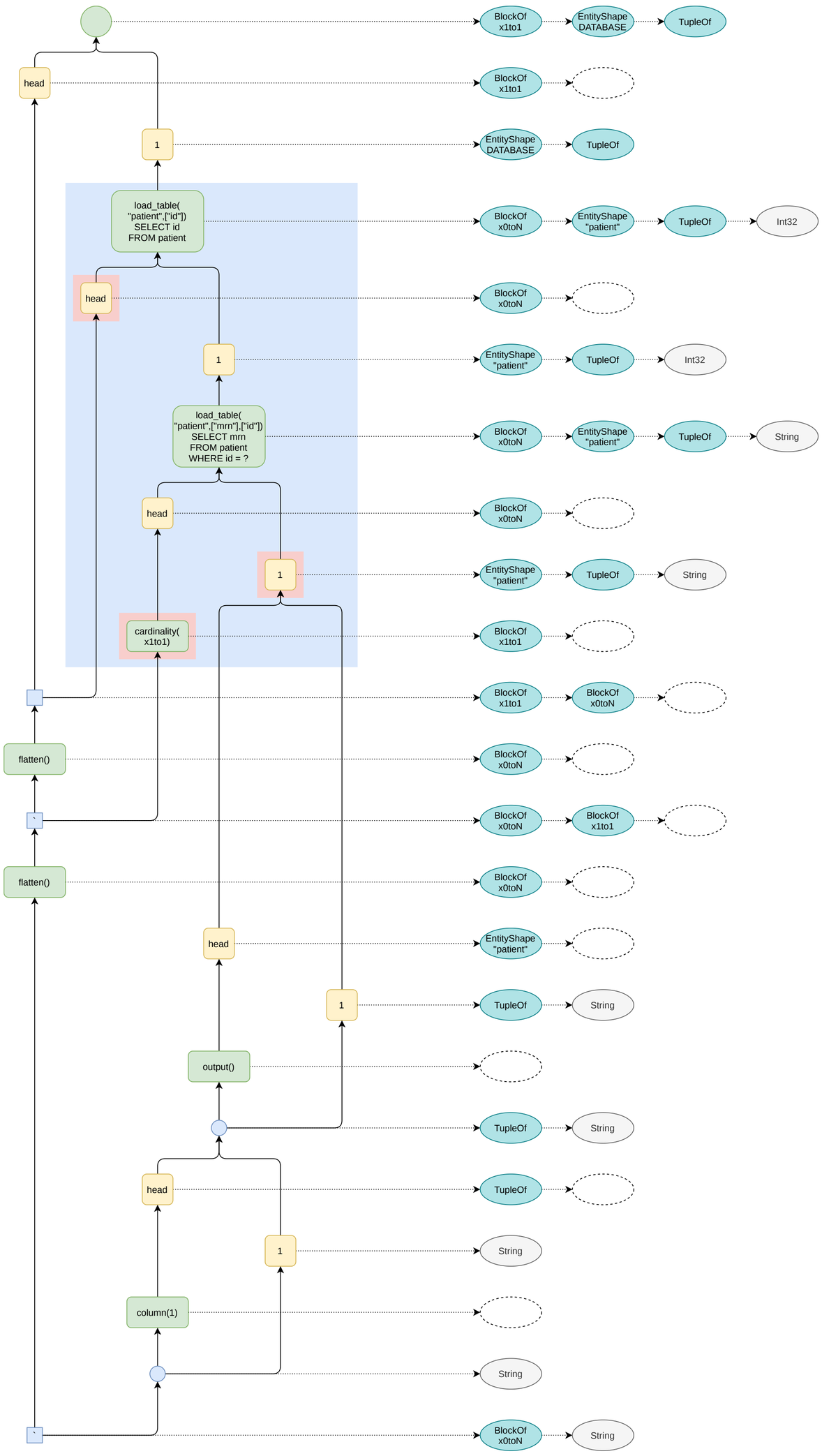
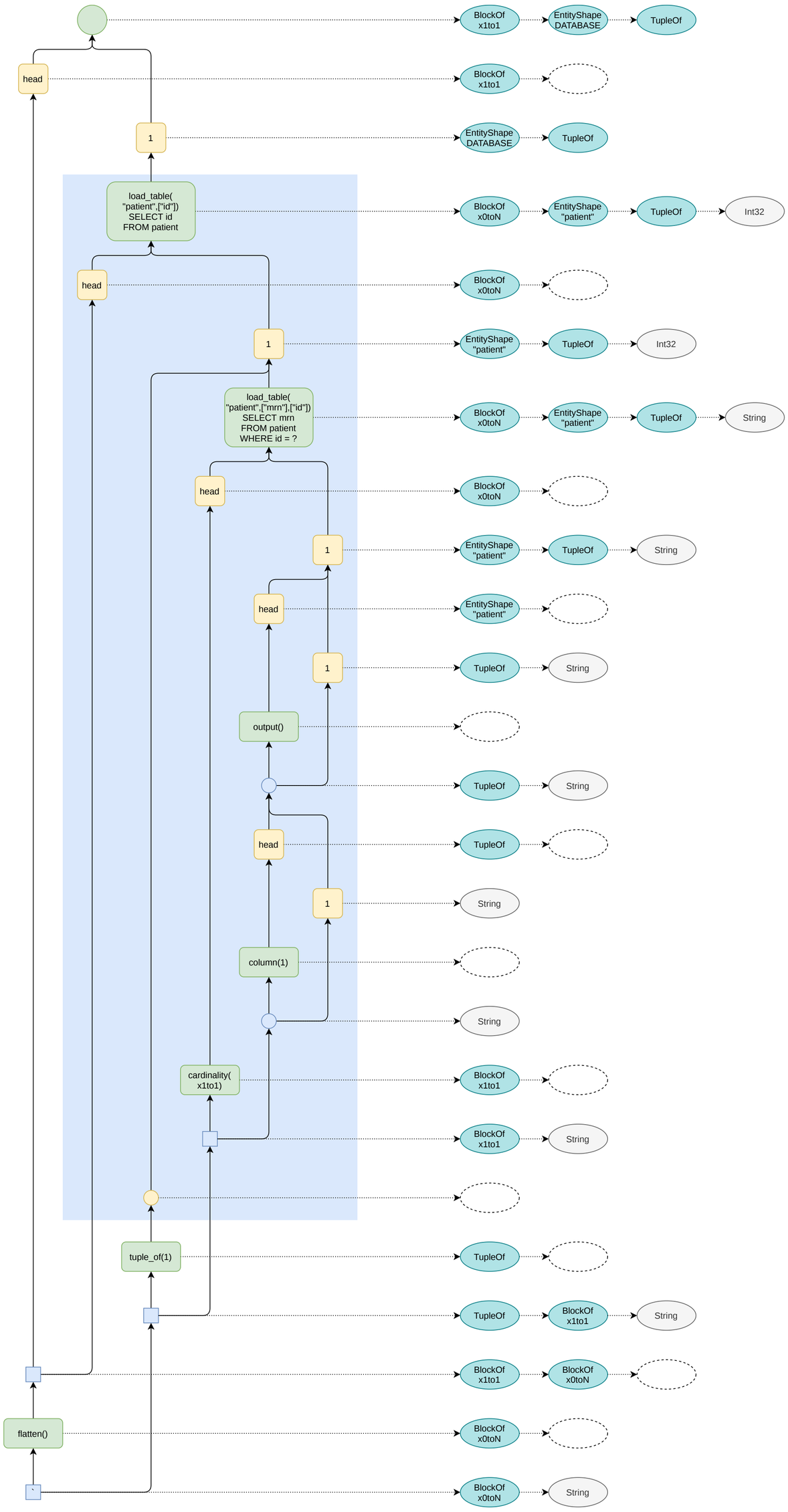
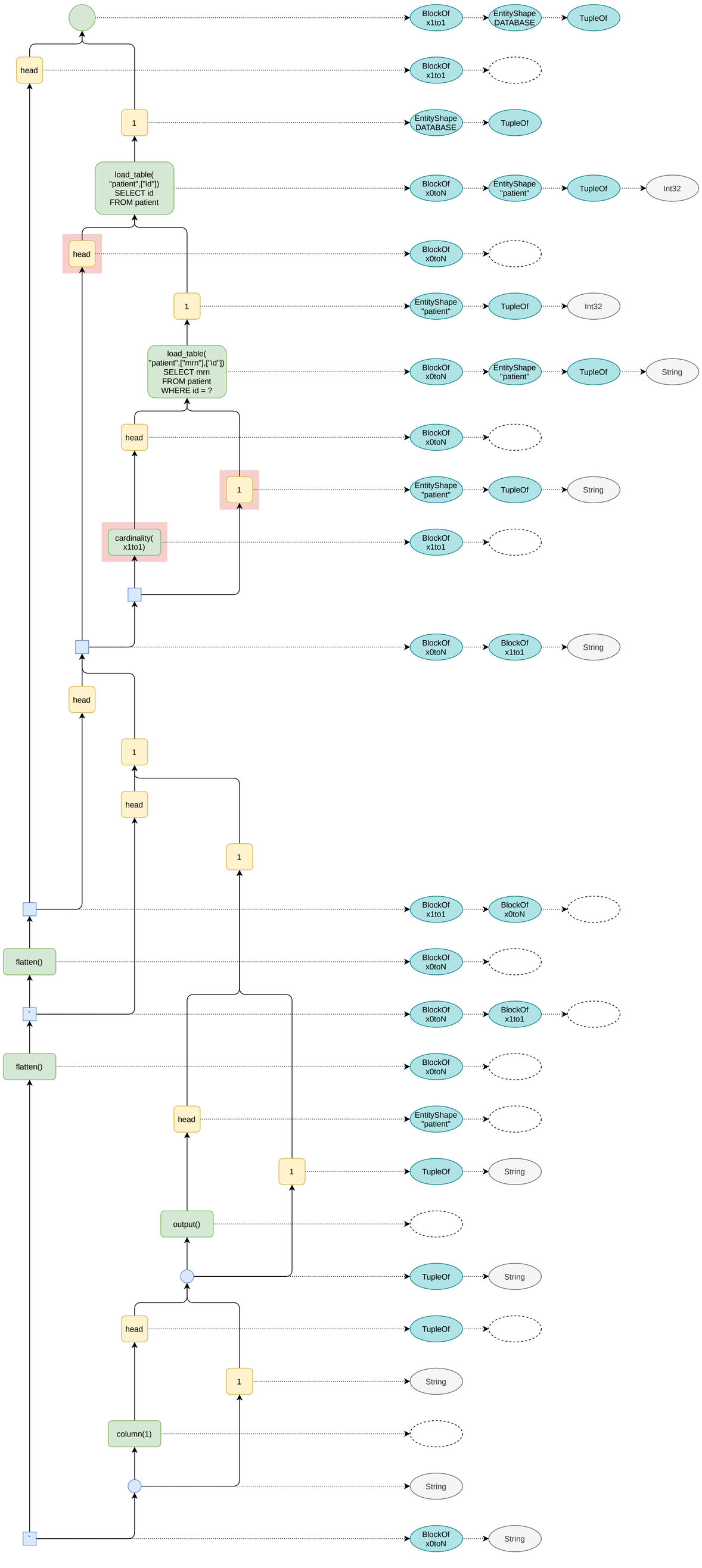
```
chain_of(
    with_elements(load_postgres_table(("public", "patient"), ["id"], [Int32])),
    flatten())
```

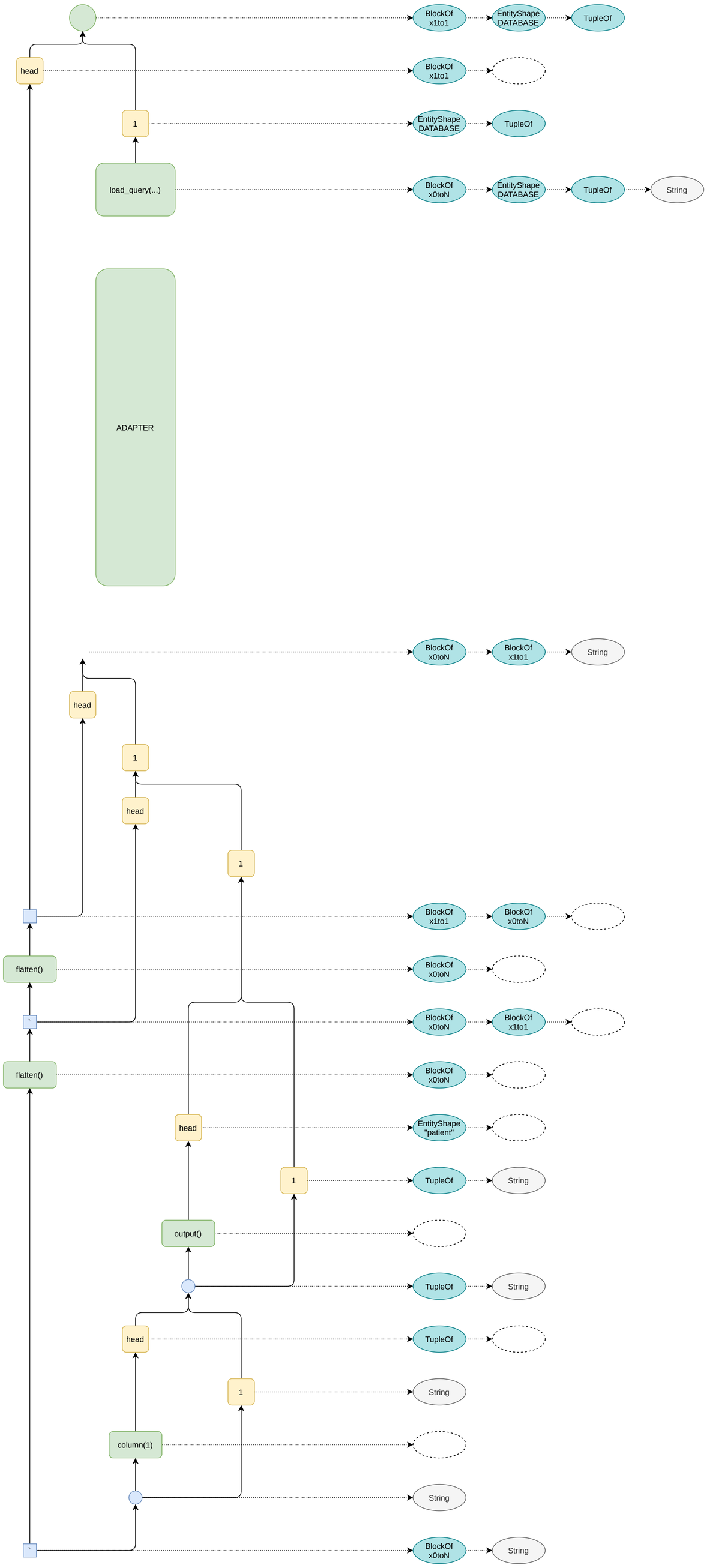


```
chain_of(with_elements(load_postgres_table(("public", "patient"), ["id"], [Int32])),
         flatten(),
         with_elements(
             chain_of(
                 load_postgres_table(("public", "patient"), ["mrn"], [String], ["id"]),
                 block_cardinality(x1to1))),
         flatten(),
         with_elements(
             chain_of(
                 output(),
                 column(1))))
```

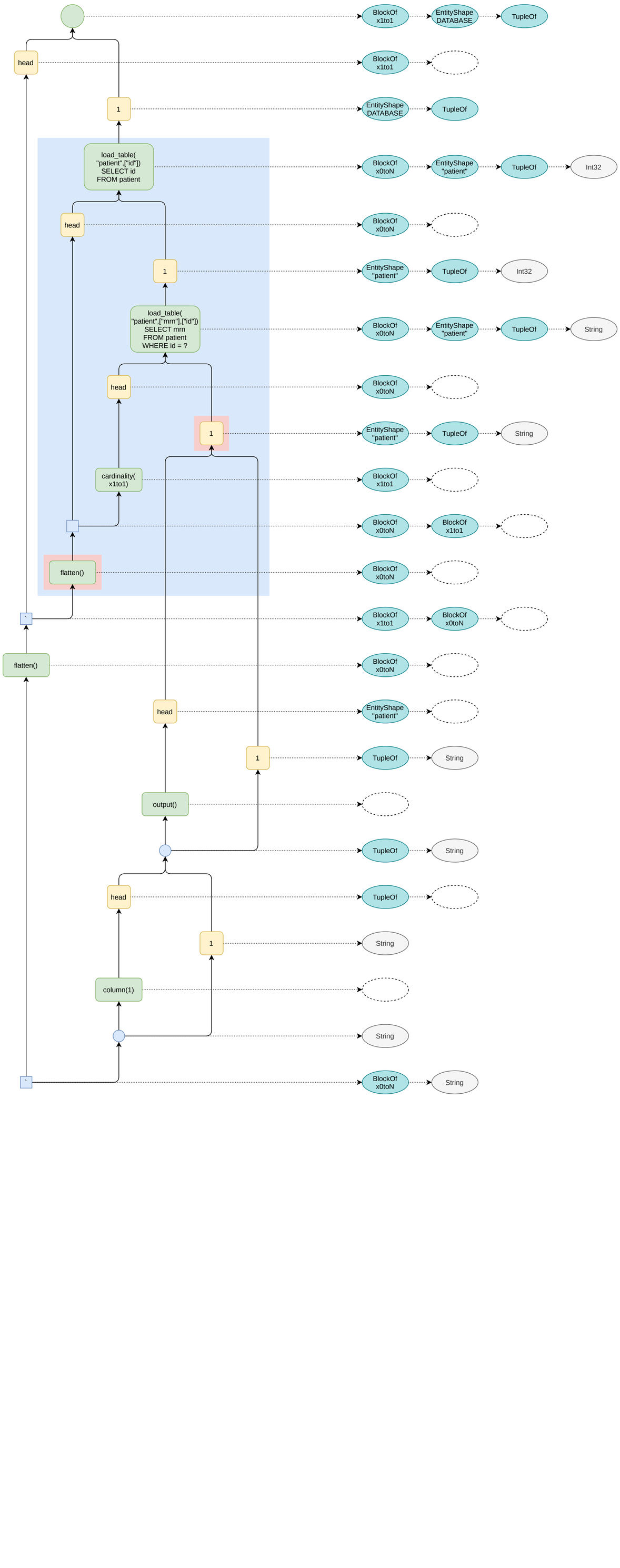


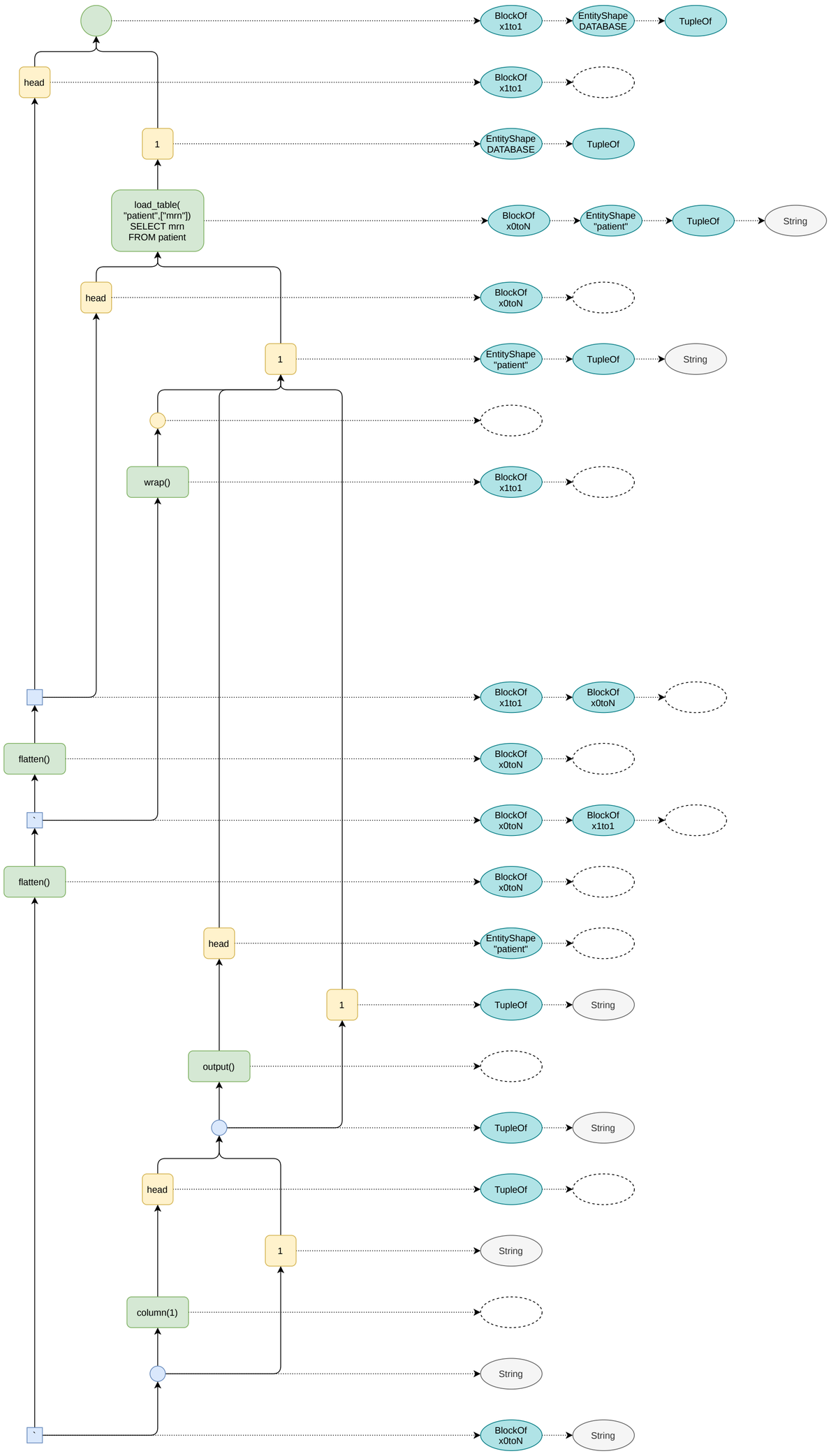

BlockOf x1to1
EntityShape DATABASE
TupleOf
head
BlockOf x1to1
1
EntityShape DATABASE
TupleOf
load_table("patient",["id"]) SELECT id FROM patient
BlockOf x0toN
EntityShape "patient"
TupleOf
Int32
head
BlockOf x0toN
1
EntityShape "patient"
TupleOf
Int32
load_table("patient",["mrn"],["id"]) SELECT mrn FROM patient WHERE id = ?
BlockOf x0toN
EntityShape "patient"
TupleOf
String
head
BlockOf x0toN
1
EntityShape "patient"
TupleOf
String
head
EntityShape "patient"
1
TupleOf
String
output()
TupleOf
String
head
TupleOf
1
String
column(1)
String
cardinality(x1to1)
BlockOf x1to1
BlockOf x1to1
String
tuple_of(1)
TupleOf
TupleOf
BlockOf x1to1
String
BlockOf x1to1
BlockOf x0toN
flatten()
BlockOf x0toN
`
BlockOf x0toN
String

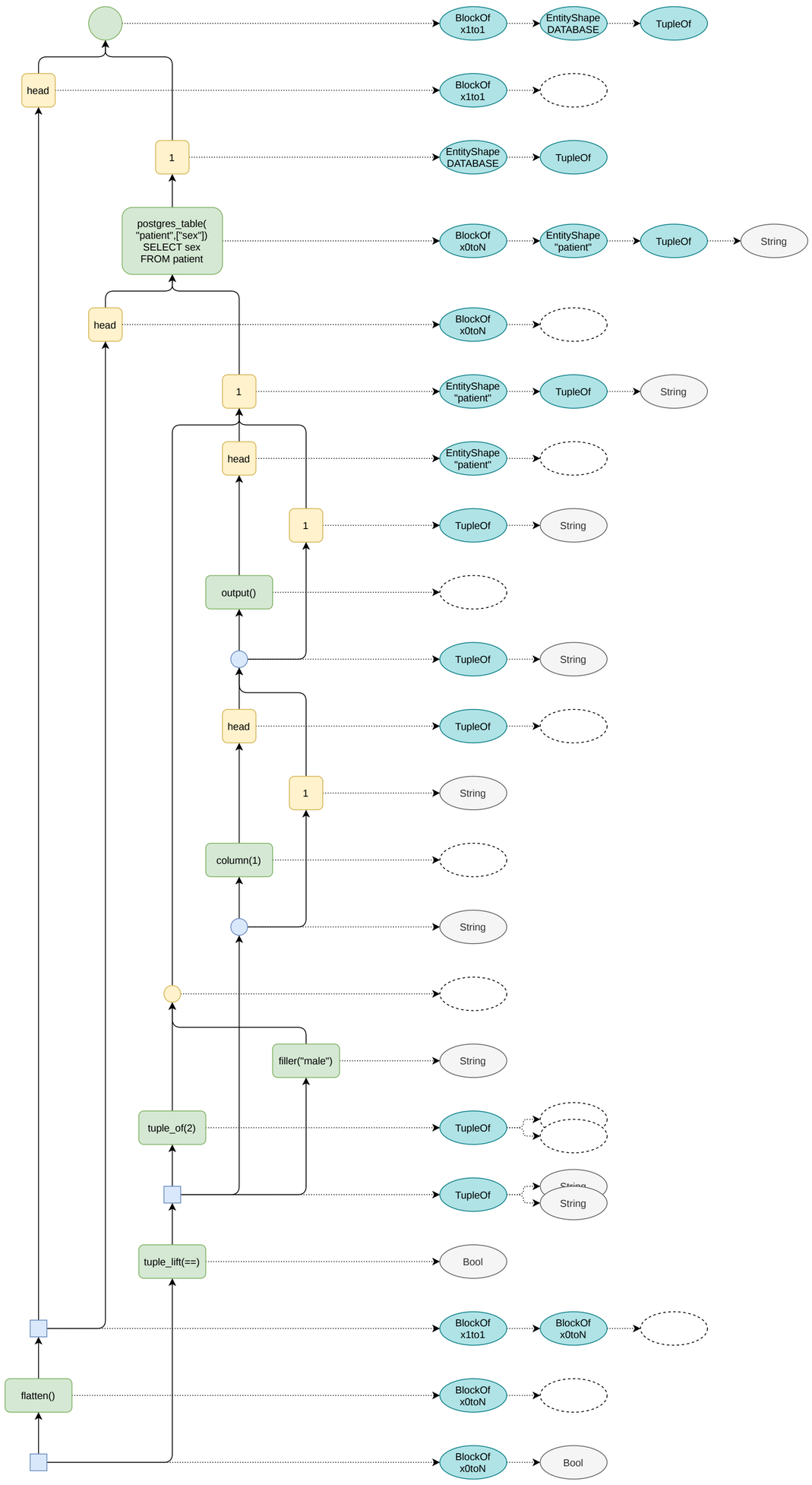

BlockOf x1to1
EntityShape DATABASE
TupleOf
head
BlockOf x1to1
1
EntityShape DATABASE
TupleOf
load_table("patient",["id"]) SELECT id FROM patient
BlockOf x0toN
EntityShape "patient"
TupleOf
Int32
head
BlockOf x0toN
1
EntityShape "patient"
TupleOf
Int32
load_table("patient",["mrn"],["id"]) SELECT mrn FROM patient WHERE id = ?
BlockOf x0toN
EntityShape "patient"
TupleOf
String
head
BlockOf x0toN
1
EntityShape "patient"
TupleOf
String
cardinality(x1to1)
BlockOf x1to1
BlockOf x0toN
BlockOf x1to1
String
head
1
head
1
BlockOf x1to1
BlockOf x0toN
flatten()
BlockOf x0toN
BlockOf x0toN
BlockOf x1to1
flatten()
BlockOf x0toN
head
EntityShape "patient"
1
TupleOf
String
output()
TupleOf
String
head
TupleOf
1
String
column(1)
String
BlockOf x0toN
String

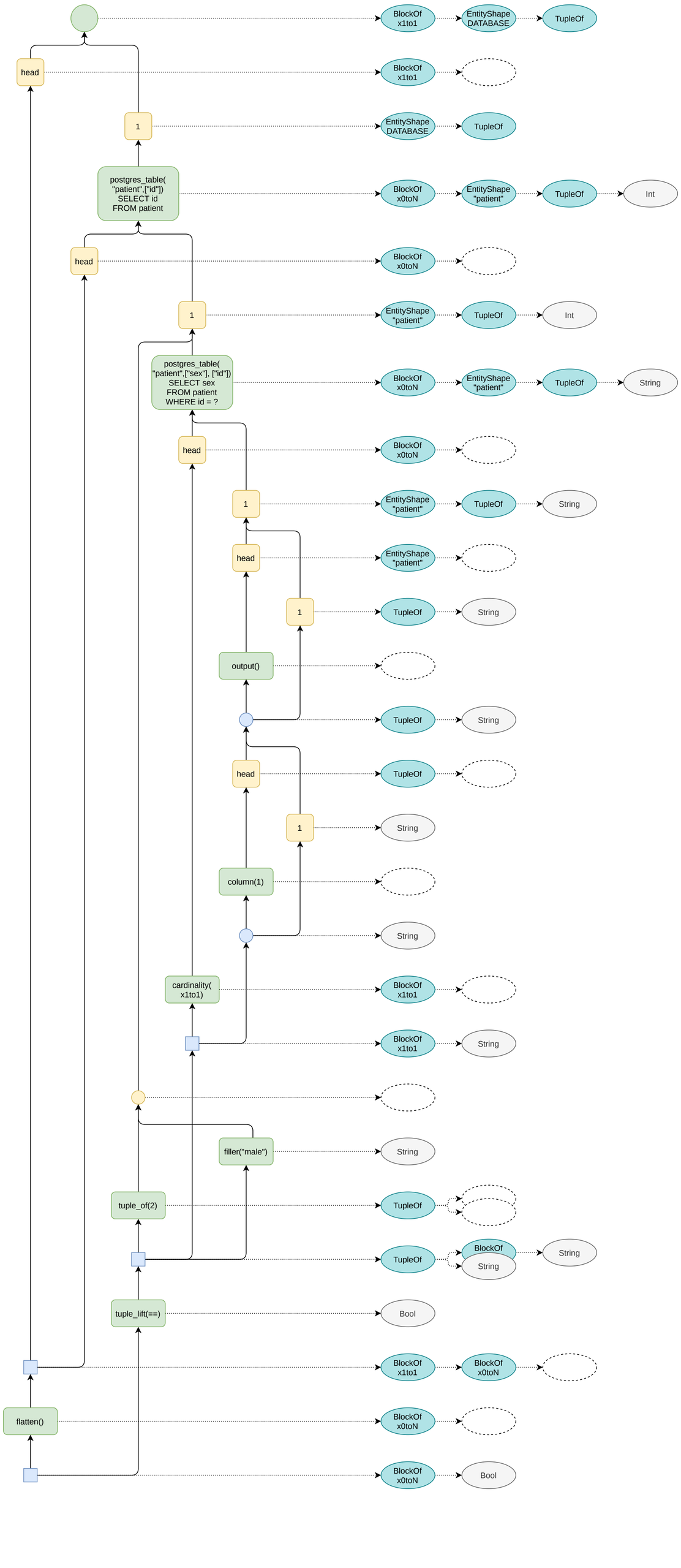

BlockOf x1to1
EntityShape DATABASE
TupleOf
head
BlockOf x1to1
1
EntityShape DATABASE
TupleOf
load_query(...)
BlockOf x0toN
EntityShape DATABASE
TupleOf
String
ADAPTER
BlockOf x0toN
BlockOf x1to1
String
head
1
head
1
BlockOf x1to1
BlockOf x0toN
flatten()
BlockOf x0toN
`
BlockOf x0toN
BlockOf x1to1
flatten()
BlockOf x0toN
head
EntityShape "patient"
1
TupleOf
String
output()
TupleOf
String
head
TupleOf
1
String
column(1)
String
`
BlockOf x0toN
String

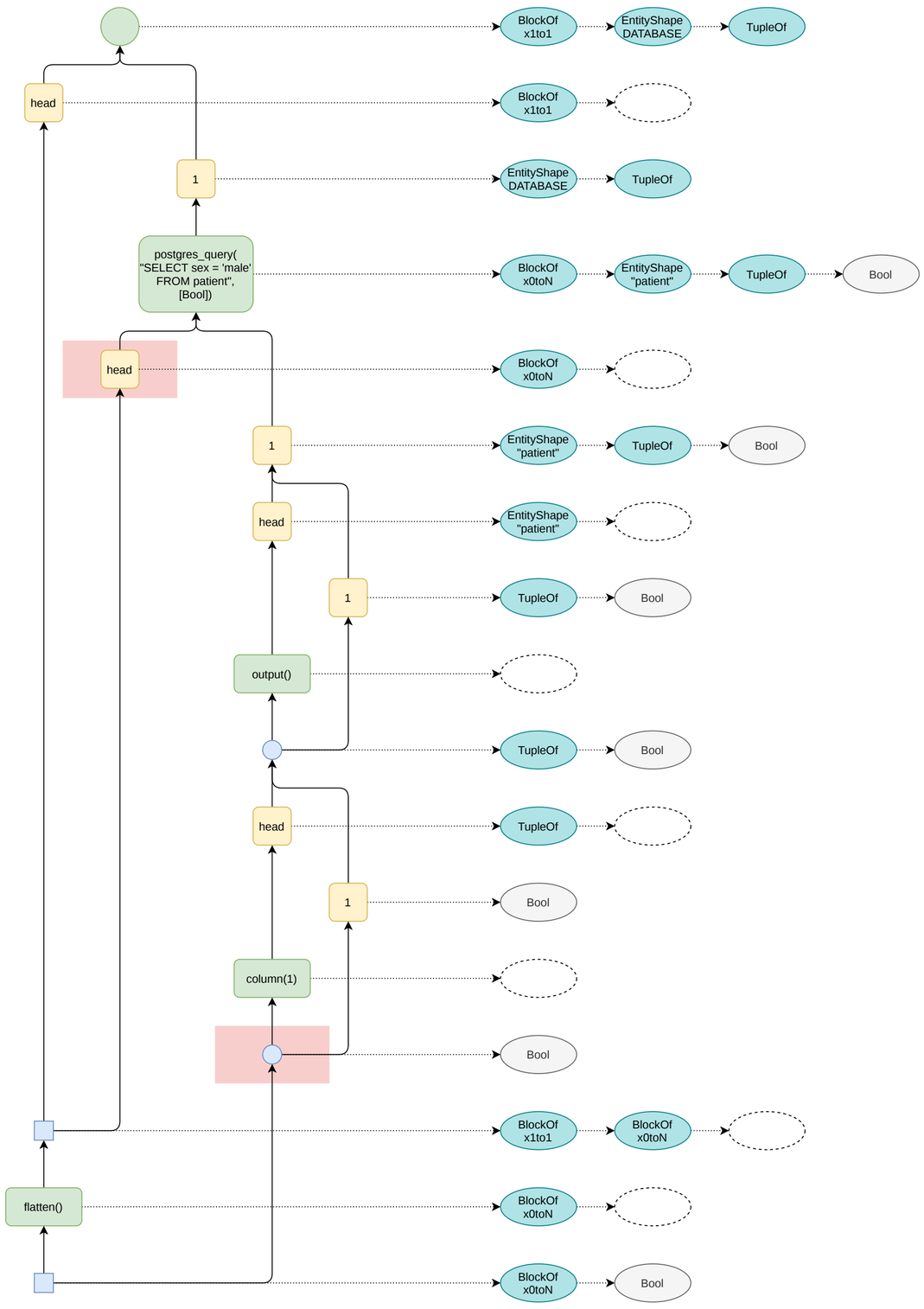
```
chain_of(with_elements(load_postgres_table(("public", "patient"), ["id"], [Int32])),
        flatten(),
        with_elements(
            chain_of(
                load_postgres_table(("public", "patient"), ["mrn"], [String], ["id"]),
                block_cardinality(x1to1))),
        flatten(),
        with_elements(
            chain_of(
                output(),
                column(1))))
```

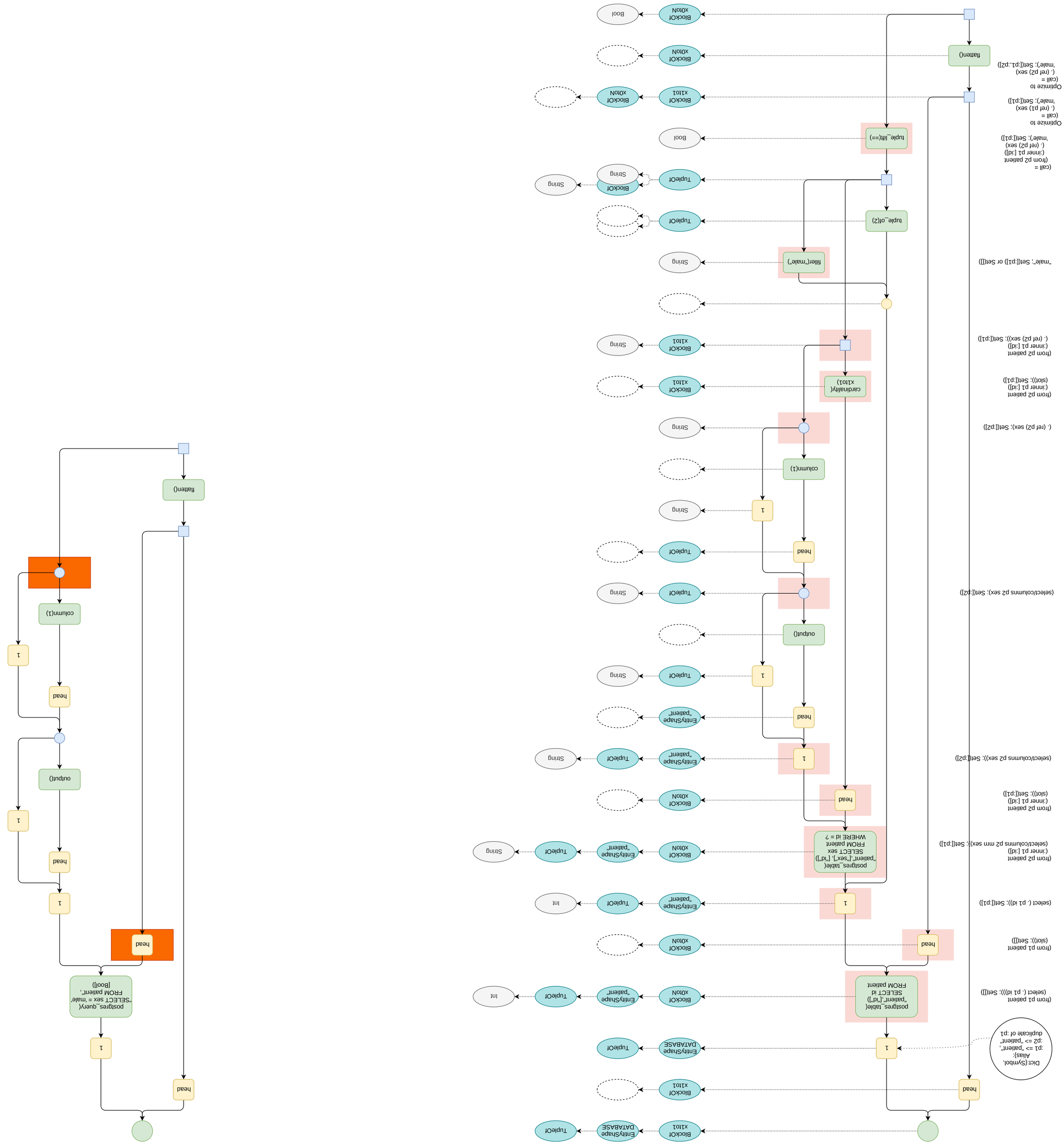


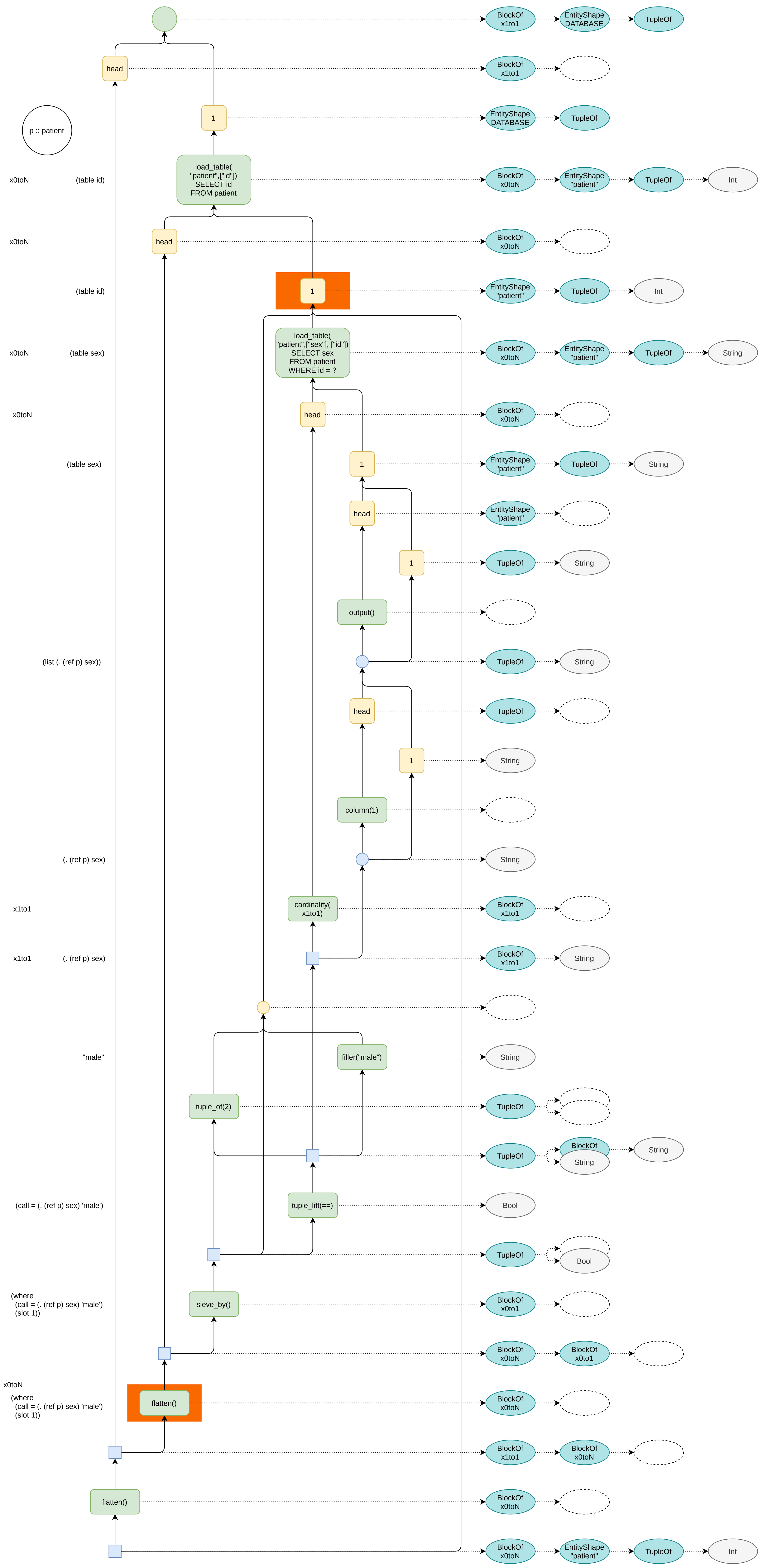

BlockOf x1to1
EntityShape DATABASE
TupleOf
head
BlockOf x1to1
1
EntityShape DATABASE
TupleOf
load_table("patient",["mrn"]) SELECT mrn FROM patient
BlockOf x0toN
EntityShape "patient"
TupleOf
String
head
BlockOf x0toN
1
EntityShape "patient"
TupleOf
String
wrap()
BlockOf x1to1
BlockOf x1to1
BlockOf x0toN
flatten()
BlockOf x0toN
`
BlockOf x0toN
BlockOf x1to1
flatten()
BlockOf x0toN
head
EntityShape "patient"
1
TupleOf
String
output()
TupleOf
String
head
TupleOf
1
String
column(1)
String
`
BlockOf x0toN
String

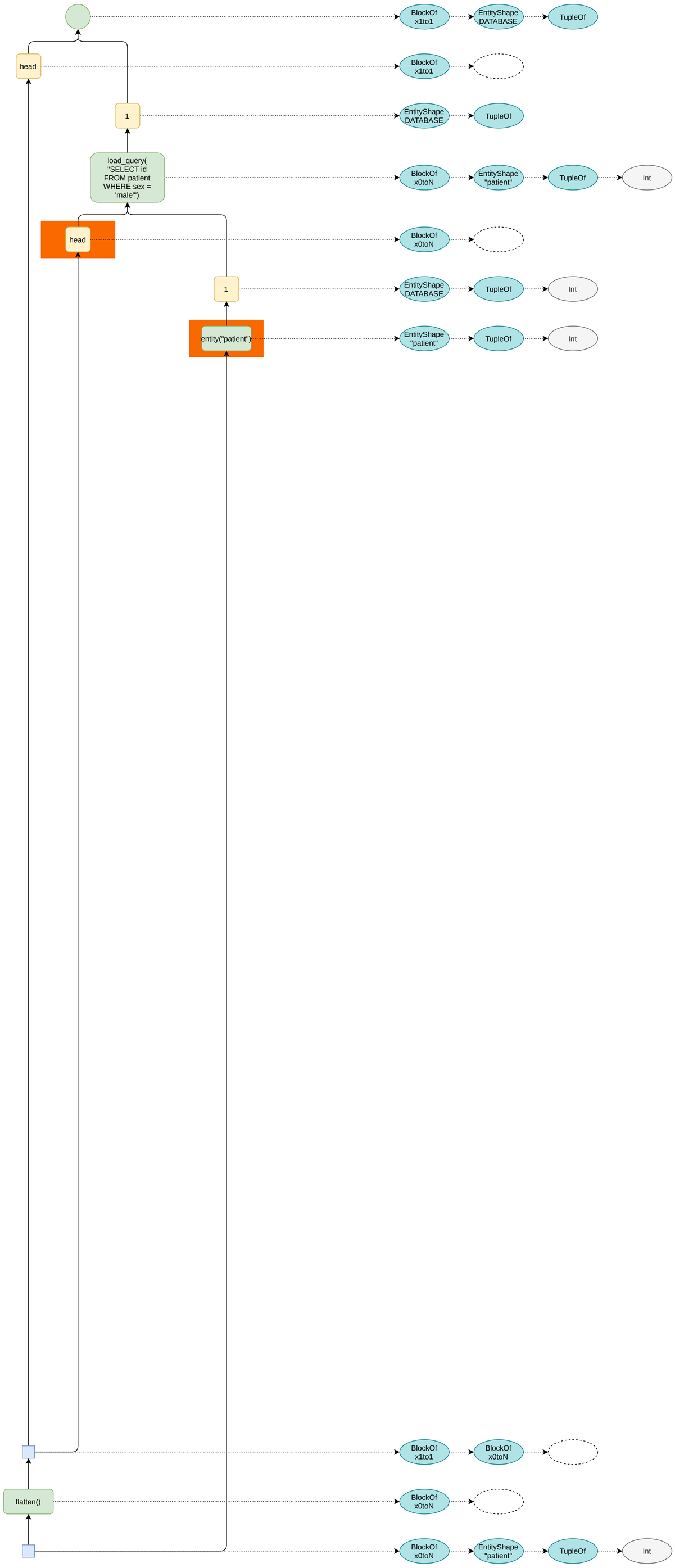

BlockOf x1to1
EntityShape DATABASE
TupleOf
head
BlockOf x1to1
1
EntityShape DATABASE
TupleOf
postgres_table("patient",["sex"]) SELECT sex FROM patient
BlockOf x0toN
EntityShape "patient"
TupleOf
String
head
BlockOf x0toN
1
EntityShape "patient"
TupleOf
String
head
EntityShape "patient"
1
TupleOf
String
output()
TupleOf
String
head
TupleOf
1
String
column(1)
String
filler("male")
String
tuple_of(2)
TupleOf
TupleOf
String
tuple_lift(==)
Bool
BlockOf x1to1
BlockOf x0toN
flatten()
BlockOf x0toN
BlockOf x0toN
Bool


BlockOf x1to1
EntityShape DATABASE
TupleOf
head
BlockOf x1to1
1
EntityShape DATABASE
TupleOf
postgres_table("patient",["id"]) SELECT id FROM patient
BlockOf x0toN
EntityShape "patient"
TupleOf
Int
head
BlockOf x0toN
1
EntityShape "patient"
TupleOf
Int
postgres_table("patient",["sex"], {"id"}) SELECT sex FROM patient WHERE id = ?
BlockOf x0toN
EntityShape "patient"
TupleOf
String
head
BlockOf x0toN
1
EntityShape "patient"
TupleOf
String
head
EntityShape "patient"
1
TupleOf
String
output()
TupleOf
String
head
TupleOf
1
String
column(1)
String
cardinality(x1to1)
BlockOf x1to1
BlockOf x1to1
String
filler("male")
String
tuple_of(2)
TupleOf
TupleOf
BlockOf
String
String
tuple_lift(==)
Bool
BlockOf x1to1
BlockOf x0toN
flatten()
BlockOf x0toN
BlockOf x0toN
Bool


BlockOf x1to1
EntityShape DATABASE
TupleOf
head
BlockOf x1to1
1
EntityShape DATABASE
TupleOf
postgres_query("SELECT sex = 'male' FROM patient", [Bool])
BlockOf x0toN
EntityShape "patient"
TupleOf
Bool
head
BlockOf x0toN
1
EntityShape "patient"
TupleOf
Bool
head
EntityShape "patient"
1
TupleOf
Bool
output()
TupleOf
Bool
head
TupleOf
1
Bool
column(1)
Bool
BlockOf x1to1
BlockOf x0toN
flatten()
BlockOf x0toN
BlockOf x0toN
Bool


Dict{:Symbol, Alias}:
:p1 => "patient",
:p2 => "patient"
duplicate of :p1
(from p1 patient
(select (. p1 id))); Set([])
(from p1 patient
(slot)); Set([])
(select/columns p2 sex); Set([:p2])
(from p2 patient
(slot)); Set([:p1])
(from p2 patient
(:inner p1 [:id])
(select/columns p2 mm sex)); Set([:p1])
(from p2 patient
(:inner p1 [:id])
(slot)); Set([:p1])
"male"; Set([:p1]) or Set([])
(call =
(from p2 patient
(:inner p1 [:id])
(. (ref p2) sex)
'male'); Set([:p1])
Optimize to
(call =
(. (ref p1) sex)
'male'); Set([:p1])
Optimize to
(call =
(. (ref p2) sex)
'male'); Set([:p1,:p2])
(. (ref p2) sex); Set([:p2])
(select/columns p2 sex); Set([:p2])
postgres_table(
"patient",["sex"], ["id"])
SELECT sex
FROM patient
WHERE id = ?
BlockOf
x01oN
EntityShape
"patient"
TupleOf
String
1
BlockOf
x1101
EntityShape
DATABASE
TupleOf
Int
head
BlockOf
x01oN
EntityShape
"patient"
TupleOf
String
1
BlockOf
x1101
EntityShape
DATABASE
TupleOf
Int
output()
BlockOf
x01oN
EntityShape
"patient"
TupleOf
String
1
BlockOf
x1101
EntityShape
DATABASE
TupleOf
Int
head
BlockOf
x01oN
EntityShape
"patient"
TupleOf
String
1
BlockOf
x1101
EntityShape
DATABASE
TupleOf
String
column(1)
BlockOf
x01oN
String
1
String
head
BlockOf
x01oN
TupleOf
String
output()
BlockOf
x01oN
TupleOf
String
1
BlockOf
x01oN
TupleOf
String
head
BlockOf
x01oN
TupleOf
String
tuple_of(2)
BlockOf
x01oN
TupleOf
String
filler("male")
String
BlockOf
x01oN
TupleOf
String
tuple_lift(==)
Bool
BlockOf
x1101
BlockOf
x01oN
String
BlockOf
x01oN
Bool
flatten()
BlockOf
x01oN
Bool
flatten()
column(1)
1
head
output()
1
head
1
head
postgres_query(
"SELECT sex = 'male'
FROM patient",
[Bool])
1
head


p :: patient
BlockOf x1to1
EntityShape DATABASE
TupleOf
head
1
load_table("patient",["id"]) SELECT id FROM patient
x0toN
(table id)
BlockOf x0toN
EntityShape "patient"
Int
1
load_table("patient",["sex"], ["id"]) SELECT sex FROM patient WHERE id = ?
(table sex)
String
output()
(list (. (ref p) sex))
column(1)
(. (ref p) sex)
cardinality(x1to1)
x1to1
"male"
filler("male")
tuple_of(2)
tuple_lift(==)
(call = (. (ref p) sex) 'male')
Bool
sieve_by()
(where (call = (. (ref p) sex) 'male') (slot 1))
BlockOf x0to1
flatten()


BlockOf x1to1
EntityShape DATABASE
TupleOf
head
BlockOf x1to1
1
EntityShape DATABASE
TupleOf
load_query("SELECT id FROM patient WHERE sex = 'male'")
BlockOf x0toN
EntityShape "patient"
TupleOf
Int
head
BlockOf x0toN
1
EntityShape DATABASE
TupleOf
Int
entity("patient")
EntityShape "patient"
TupleOf
Int
BlockOf x1to1
BlockOf x0toN
flatten()
BlockOf x0toN
BlockOf x0toN
EntityShape "patient"
TupleOf
Int