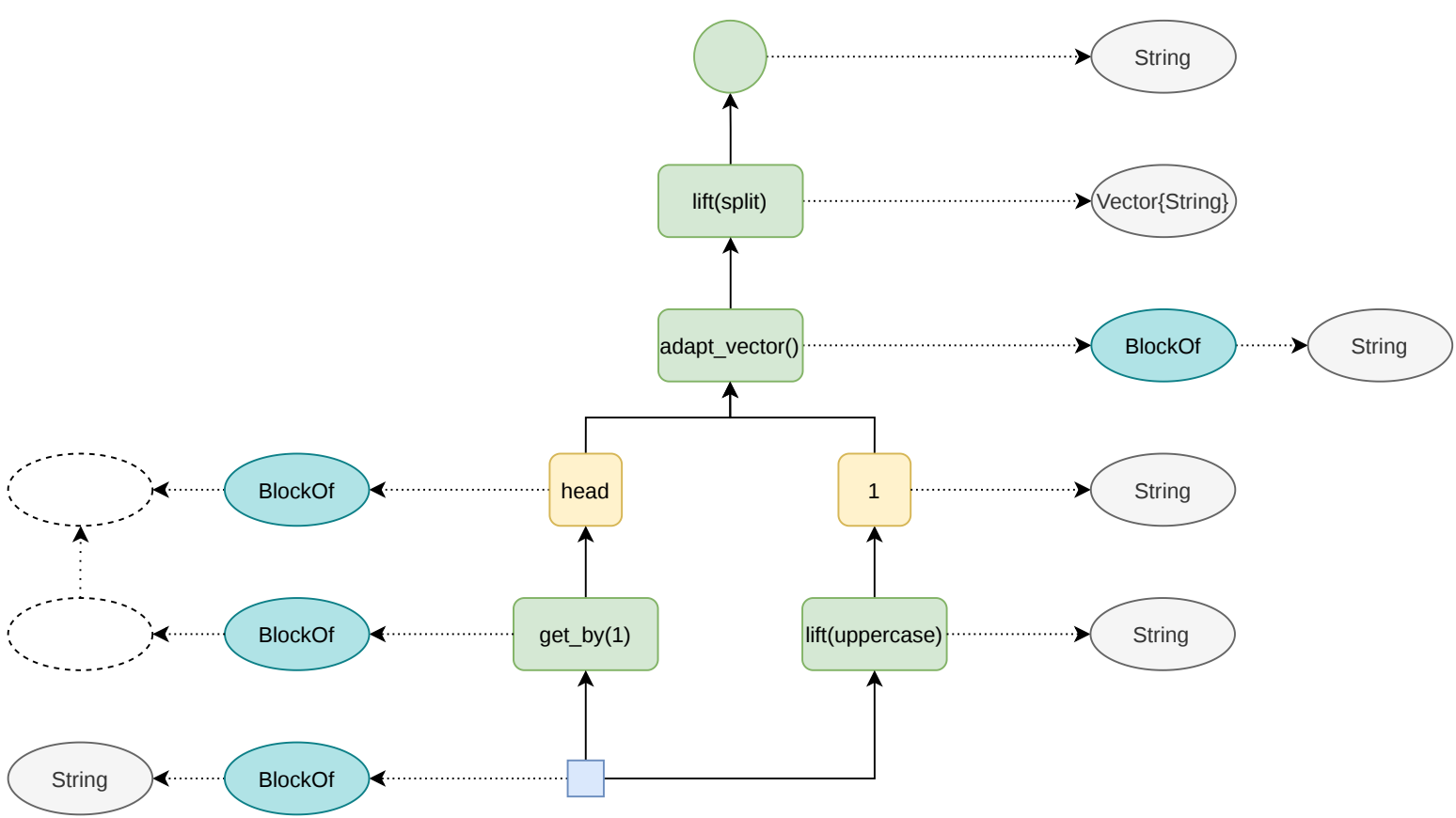




The diagram illustrates the transformation of a flat table into a hierarchical tree structure through four stages, connected by large grey arrows.

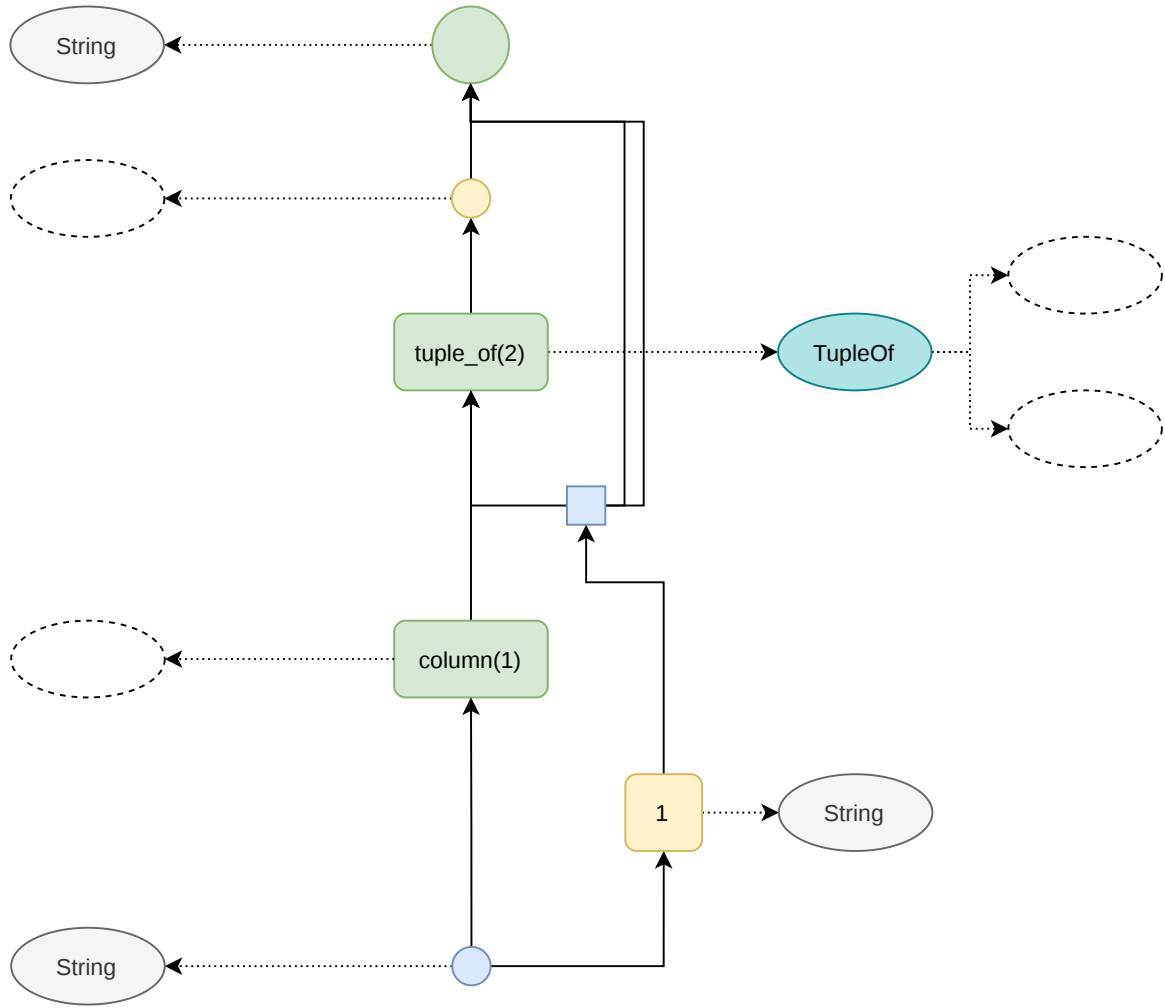
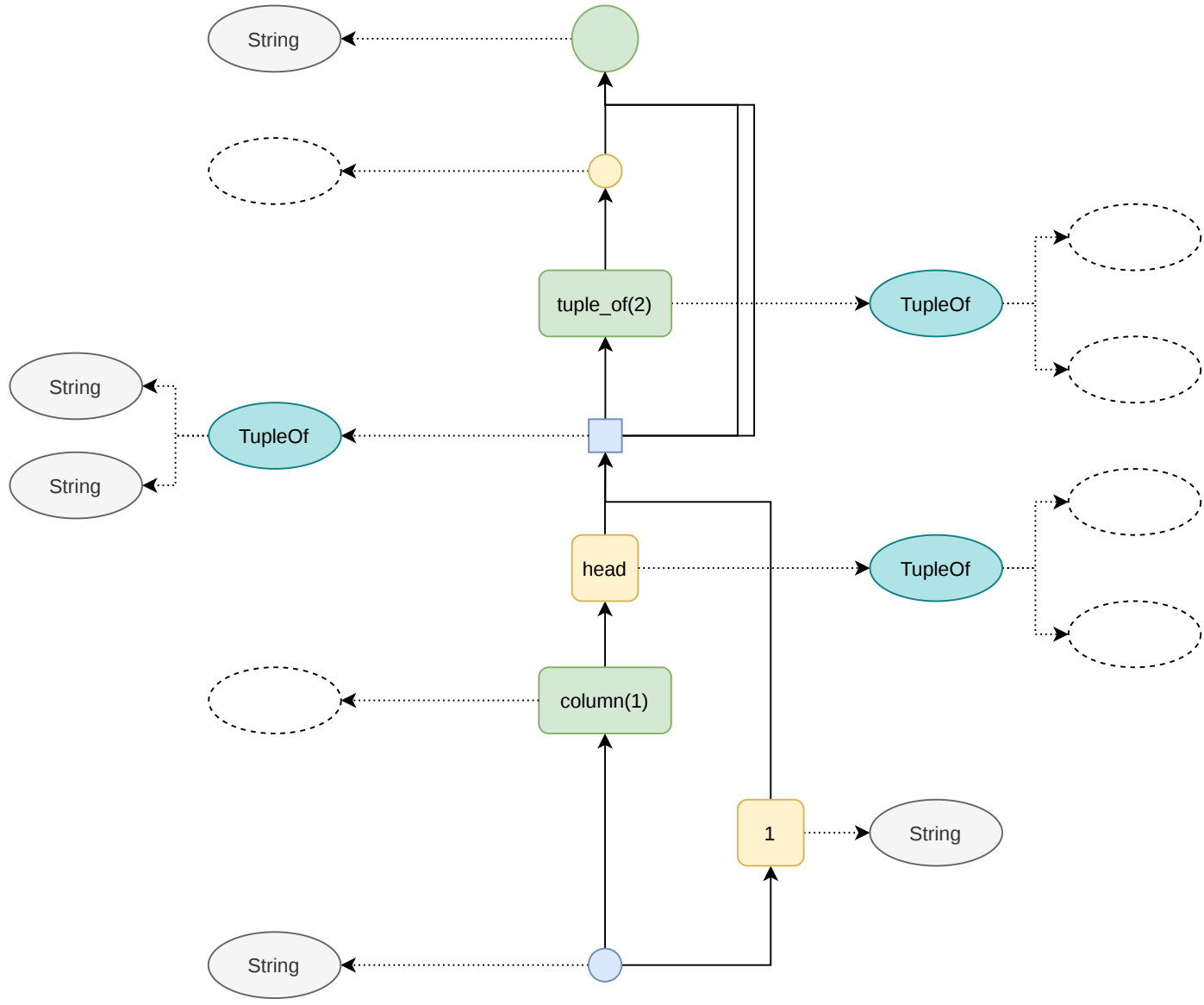
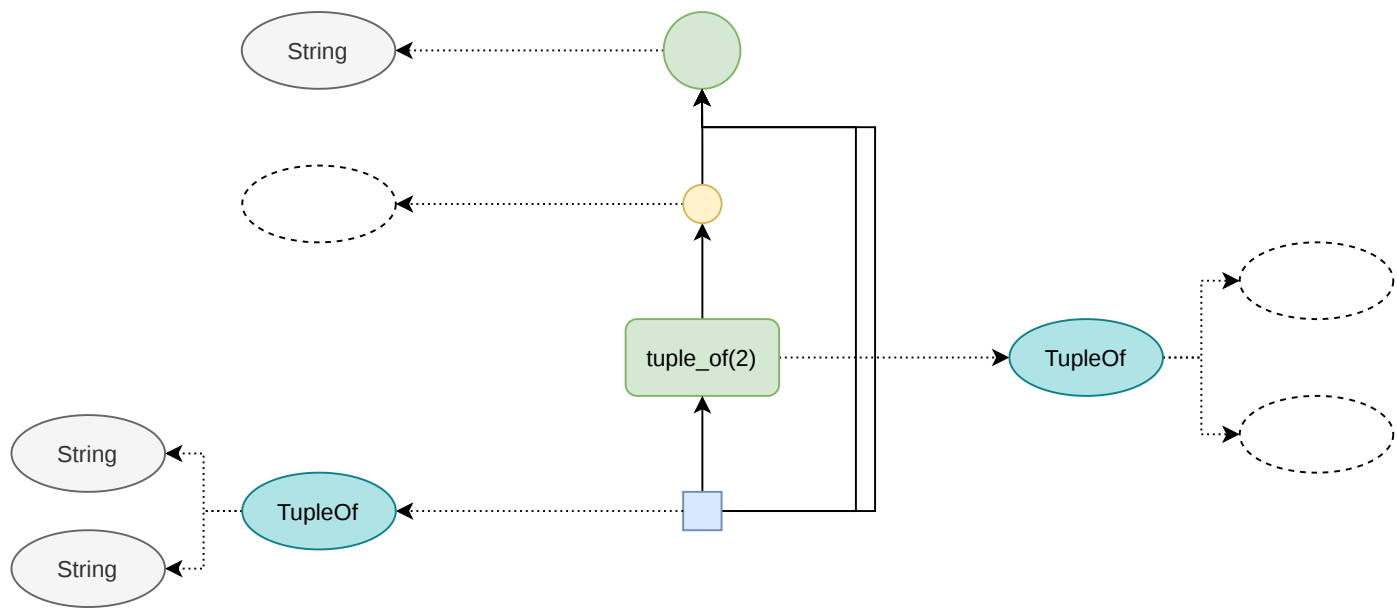
- Stage 1:** A flat table with two columns: an index column (1) and a value column ("Hello World").
- Stage 2:** The table is transformed into a hierarchical structure. The root node is a table with one column (1) and one row (String["Hello", "World"]). This root node branches into two child nodes, each a table with two columns (1, 2) and two rows:
  - Left child: (1, 2) | (1, 3)
  - Right child: (1, 2) | ("Hello", "World")
- Stage 3:** The hierarchical structure is further transformed. The root node branches into two child nodes:
  - Left child: (1, 2) | (1, 3)
  - Right child: (1, 2) | ("HELLO", "WORLD")
- Stage 4:** The final stage shows a more complex hierarchical structure. The root node branches into two child nodes:
  - Left child: (1, 2) | (1, 2)
  - Right child: (1, 2) | (1, 2)



wrap()



chain\_of(tuple\_of(2), column(1))



sieve\_by()



chain\_of(wrap(), block\_length())



@query "Hello World" split(it)

```
chain_of(
  wrap(),
  with_elements(
    chain_of(
      wrap(),
      lift(split),
      adapt_vector()),
    flatten())
```



untrace(n::NodeRef, guard::NodeRef)::Tuple{Pipeline,Vector{NodeRef}}

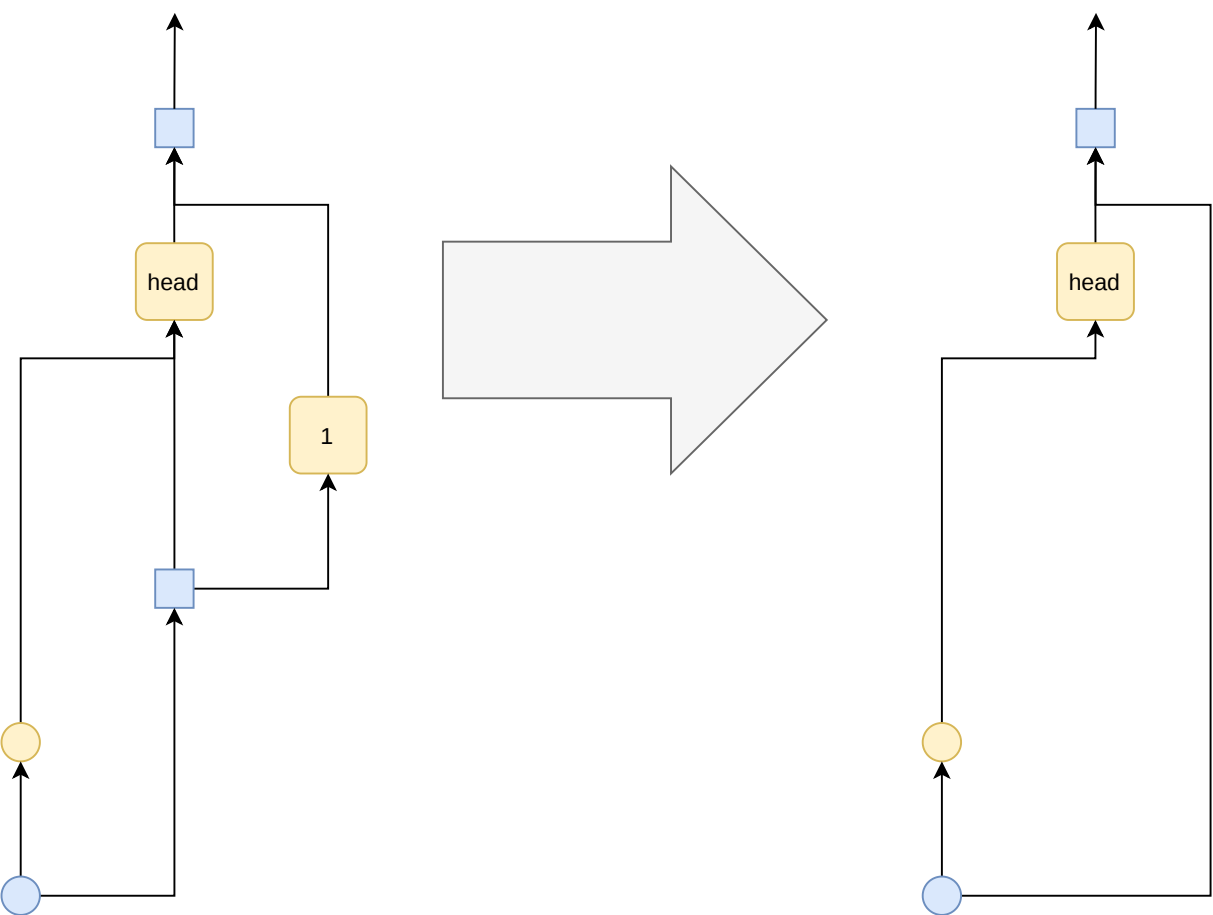






@query "Hello World" split(it)

```
chain_of(
  wrap(),
  with_elements(
    chain_of(
      wrap(),
      lift(split),
      adapt_vector()),
    flatten())
```







`untrace(n::NodeRef, guard::NodeRef)::Tuple{Pipeline,Vector{NodeRef}}`

`{it ^ 2, (it ^ 2) ^ 3}` `chain_of(f, tuple_of(g, h)) => tuple_of(chain_of(f, g), chain_of(f, h))`



`untrace(n::NodeRef, guard::NodeRef)::Tuple{Pipeline,Vector{NodeRef}}`

@query "Hello World" split(it)

```
chain_of(
  wrap(),
  with_elements(wrap()),
  with_elements(lift(split)),
  with_elements(adapt_vector()),
  flatten())
```

