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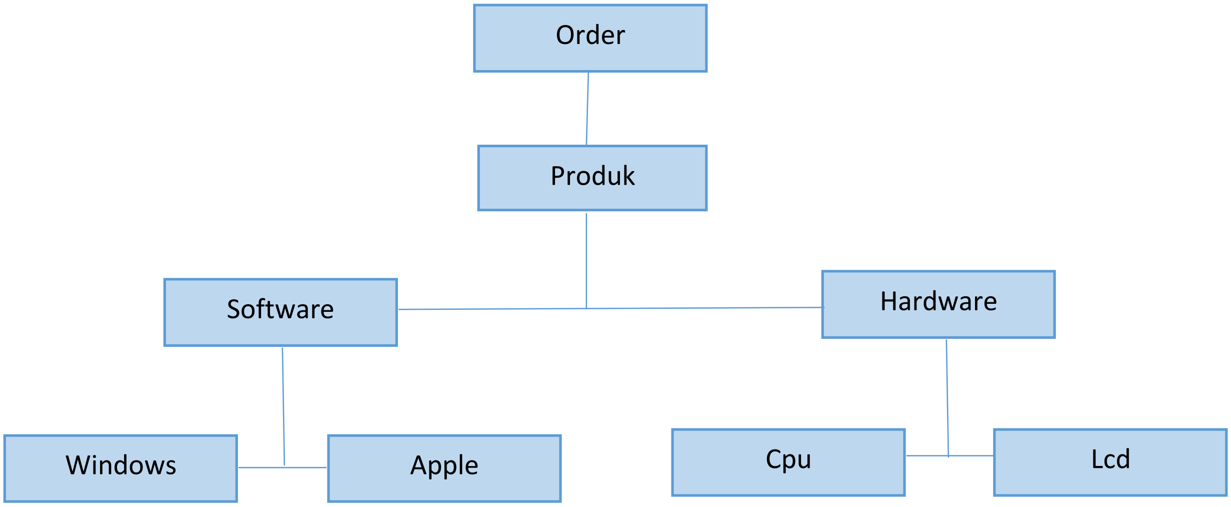
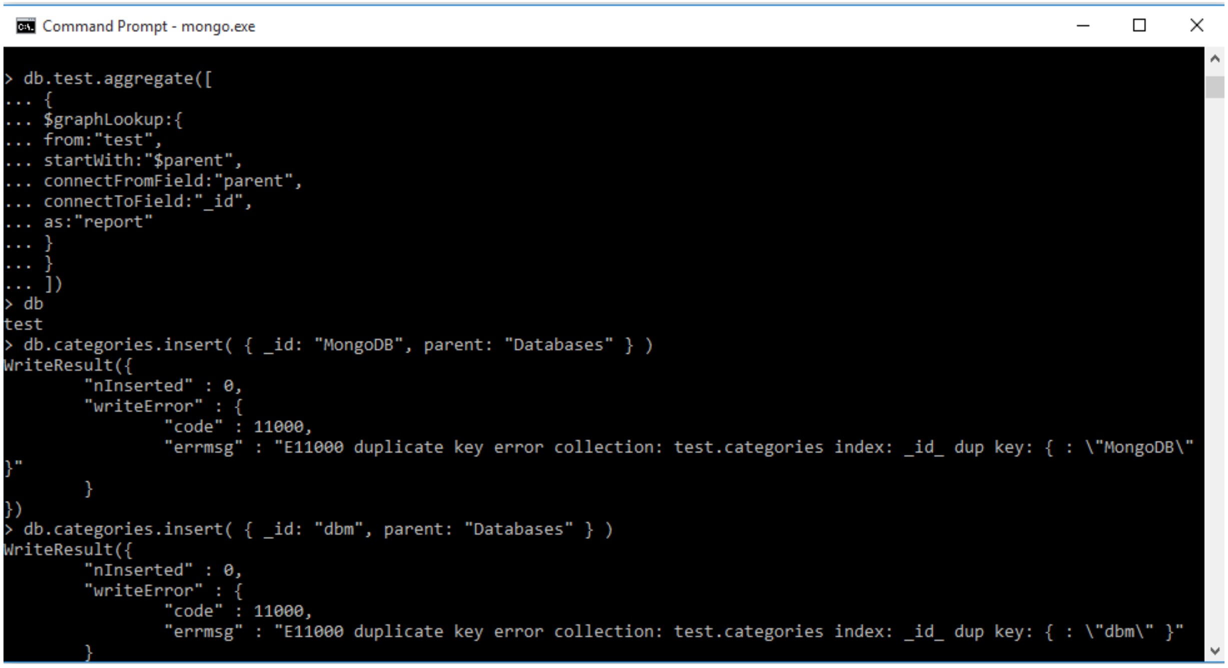
Prodi : D3 Manajemen Informatika

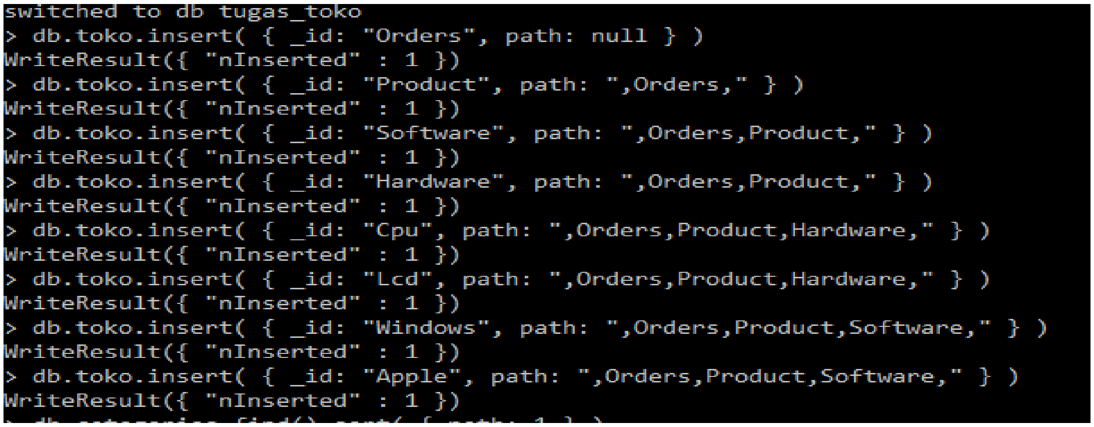
Struktur Database :



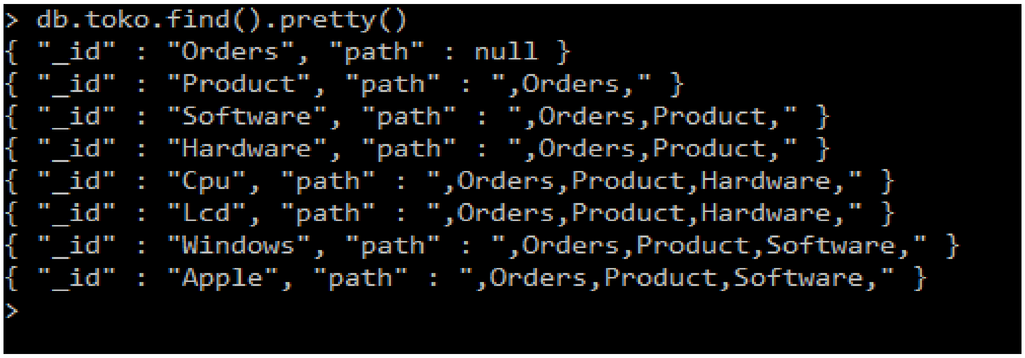
- Model Tree Structures with Materialized Path



```
> db.test.aggregate([
... {
... $graphLookup:{
... from:"test",
... startWith:"$parent",
... connectFromField:"parent",
... connectToField:"_id",
... as:"report"
... }
... }
... ])
> db
test
> db.categories.insert( { _id: "MongoDB", parent: "Databases" } )
WriteResult({
        "nInserted" : 0,
        "writeError" : {
                "code" : 11000,
                "errmsg" : "E11000 duplicate key error collection: test.categories index: _id_ dup key: { : \"MongoDB\"
}"
        }
})
> db.categories.insert( { _id: "dbm", parent: "Databases" } )
WriteResult({
        "nInserted" : 0,
        "writeError" : {
                "code" : 11000,
                "errmsg" : "E11000 duplicate key error collection: test.categories index: _id_ dup key: { : \"dbm\" }"
        }
```

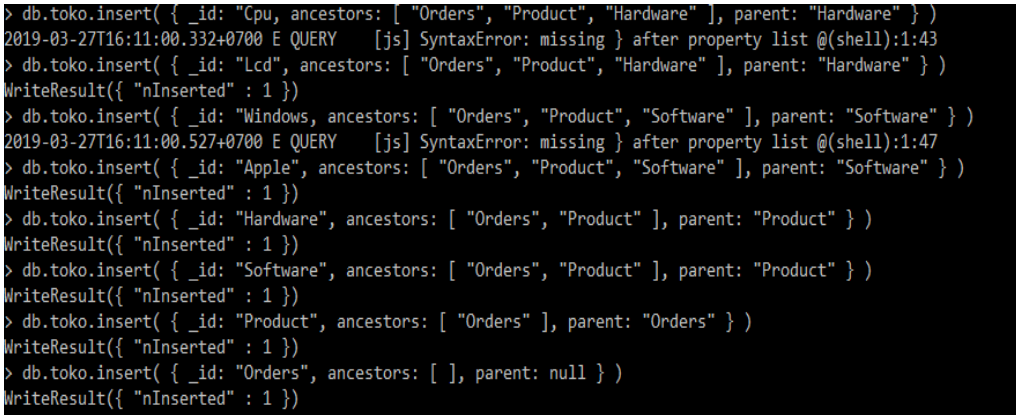


```
switched to db tugas_toko
> db.toko.insert( { _id: "Orders", path: null } )
WriteResult({ "nInserted" : 1 })
> db.toko.insert( { _id: "Product", path: ",Orders," } )
WriteResult({ "nInserted" : 1 })
> db.toko.insert( { _id: "Software", path: ",Orders,Product," } )
WriteResult({ "nInserted" : 1 })
> db.toko.insert( { _id: "Hardware", path: ",Orders,Product," } )
WriteResult({ "nInserted" : 1 })
> db.toko.insert( { _id: "Cpu", path: ",Orders,Product,Hardware," } )
WriteResult({ "nInserted" : 1 })
> db.toko.insert( { _id: "Lcd", path: ",Orders,Product,Hardware," } )
WriteResult({ "nInserted" : 1 })
> db.toko.insert( { _id: "Windows", path: ",Orders,Product,Software," } )
WriteResult({ "nInserted" : 1 })
> db.toko.insert( { _id: "Apple", path: ",Orders,Product,Software," } )
WriteResult({ "nInserted" : 1 })
> db.categories.find().sort( { path: 1 } )
```

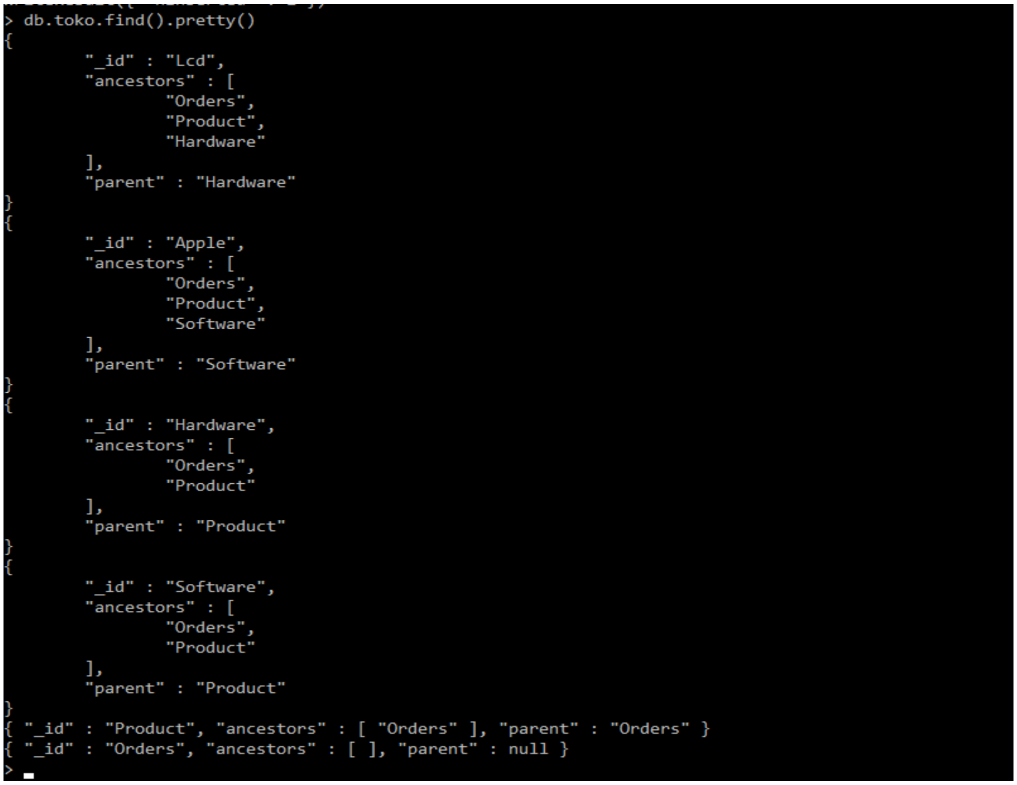


```
> db.toko.find().pretty()
{ "_id" : "Orders", "path" : null }
{ "_id" : "Product", "path" : ",Orders," }
{ "_id" : "Software", "path" : ",Orders,Product," }
{ "_id" : "Hardware", "path" : ",Orders,Product," }
{ "_id" : "Cpu", "path" : ",Orders,Product,Hardware," }
{ "_id" : "Lcd", "path" : ",Orders,Product,Hardware," }
{ "_id" : "Windows", "path" : ",Orders,Product,Software," }
{ "_id" : "Apple", "path" : ",Orders,Product,Software," }
>
```

- Model Tree Structures with an Array of Ancestors

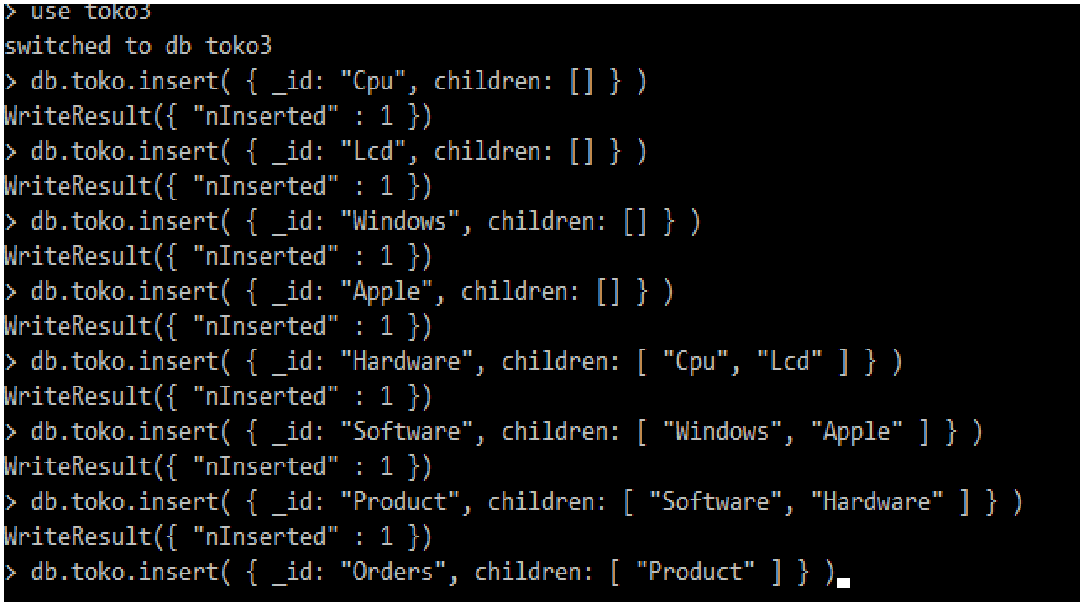


```
> db.toko.insert( { _id: "Cpu, ancestors: [ "Orders", "Product", "Hardware" ], parent: "Hardware" } )
2019-03-27T16:11:00.332+0700 E QUERY    [js] SyntaxError: missing } after property list @(shell):1:43
> db.toko.insert( { _id: "Lcd", ancestors: [ "Orders", "Product", "Hardware" ], parent: "Hardware" } )
WriteResult({ "nInserted" : 1 })
> db.toko.insert( { _id: "Windows, ancestors: [ "Orders", "Product", "Software" ], parent: "Software" } )
2019-03-27T16:11:00.527+0700 E QUERY    [js] SyntaxError: missing } after property list @(shell):1:47
> db.toko.insert( { _id: "Apple", ancestors: [ "Orders", "Product", "Software" ], parent: "Software" } )
WriteResult({ "nInserted" : 1 })
> db.toko.insert( { _id: "Hardware", ancestors: [ "Orders", "Product" ], parent: "Product" } )
WriteResult({ "nInserted" : 1 })
> db.toko.insert( { _id: "Software", ancestors: [ "Orders", "Product" ], parent: "Product" } )
WriteResult({ "nInserted" : 1 })
> db.toko.insert( { _id: "Product", ancestors: [ "Orders" ], parent: "Orders" } )
WriteResult({ "nInserted" : 1 })
> db.toko.insert( { _id: "Orders", ancestors: [ ], parent: null } )
WriteResult({ "nInserted" : 1 })
```

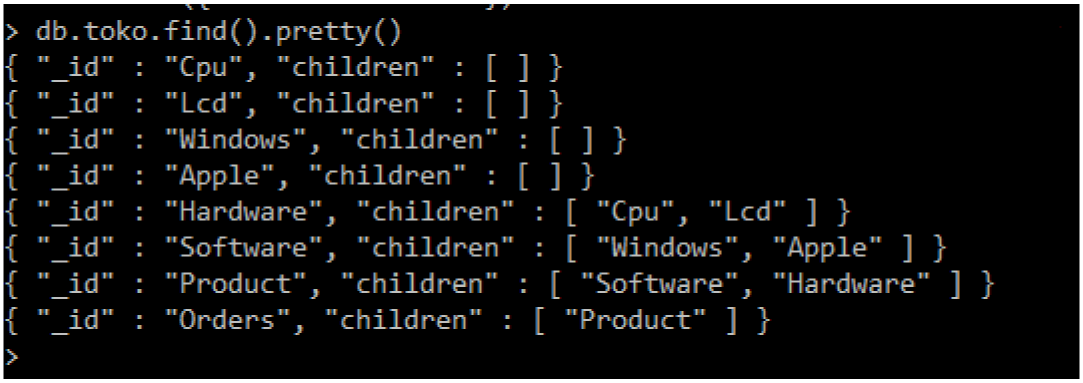


```
> db.toko.find().pretty()
{
        "_id" : "Lcd",
        "ancestors" : [
                "Orders",
                "Product",
                "Hardware"
        ],
        "parent" : "Hardware"
}
{
        "_id" : "Apple",
        "ancestors" : [
                "Orders",
                "Product",
                "Software"
        ],
        "parent" : "Software"
}
{
        "_id" : "Hardware",
        "ancestors" : [
                "Orders",
                "Product"
        ],
        "parent" : "Product"
}
{
        "_id" : "Software",
        "ancestors" : [
                "Orders",
                "Product"
        ],
        "parent" : "Product"
}
{ "_id" : "Product", "ancestors" : [ "Orders" ], "parent" : "Orders" }
{ "_id" : "Orders", "ancestors" : [ ], "parent" : null }
> 
```

- Model Tree Structures with Child References

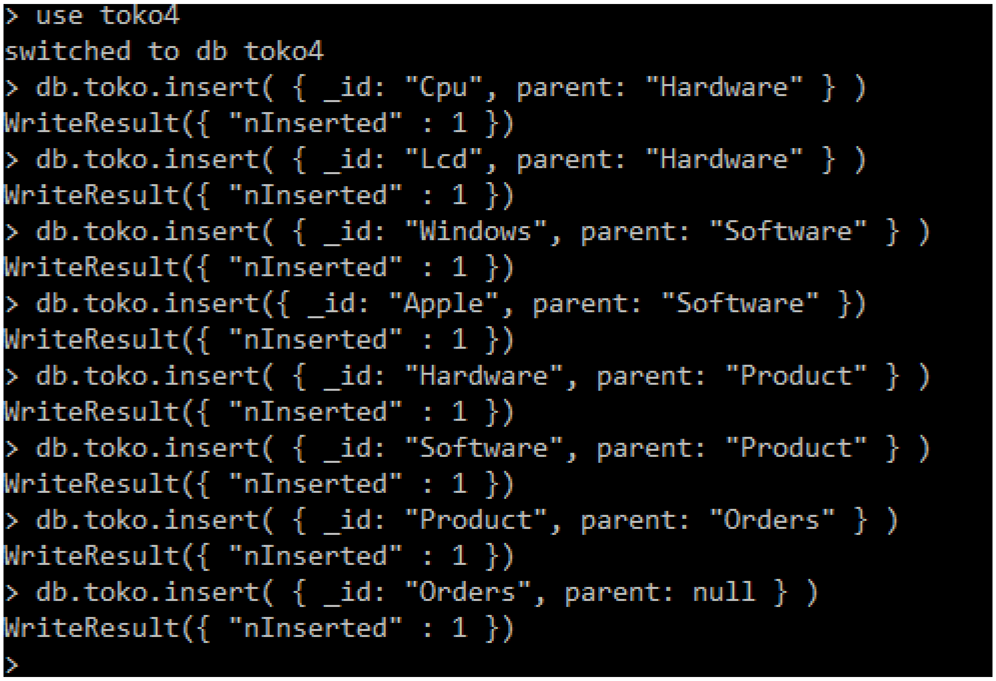


```
> use toko3
switched to db toko3
> db.toko.insert( { _id: "Cpu", children: [] } )
WriteResult({ "nInserted" : 1 })
> db.toko.insert( { _id: "Lcd", children: [] } )
WriteResult({ "nInserted" : 1 })
> db.toko.insert( { _id: "Windows", children: [] } )
WriteResult({ "nInserted" : 1 })
> db.toko.insert( { _id: "Apple", children: [] } )
WriteResult({ "nInserted" : 1 })
> db.toko.insert( { _id: "Hardware", children: [ "Cpu", "Lcd" ] } )
WriteResult({ "nInserted" : 1 })
> db.toko.insert( { _id: "Software", children: [ "Windows", "Apple" ] } )
WriteResult({ "nInserted" : 1 })
> db.toko.insert( { _id: "Product", children: [ "Software", "Hardware" ] } )
WriteResult({ "nInserted" : 1 })
> db.toko.insert( { _id: "Orders", children: [ "Product" ] } )
```

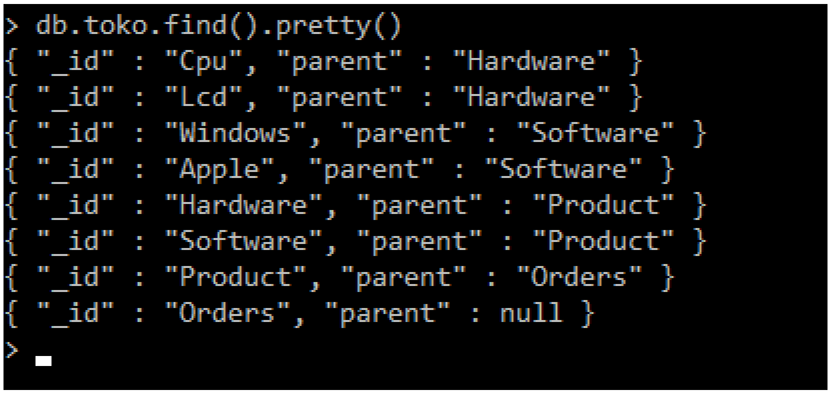


```
> db.toko.find().pretty()
{ "_id" : "Cpu", "children" : [ ] }
{ "_id" : "Lcd", "children" : [ ] }
{ "_id" : "Windows", "children" : [ ] }
{ "_id" : "Apple", "children" : [ ] }
{ "_id" : "Hardware", "children" : [ "Cpu", "Lcd" ] }
{ "_id" : "Software", "children" : [ "Windows", "Apple" ] }
{ "_id" : "Product", "children" : [ "Software", "Hardware" ] }
{ "_id" : "Orders", "children" : [ "Product" ] }
>
```

- Model Tree Structures with Parent References



```
> use toko4
switched to db toko4
> db.toko.insert( { _id: "Cpu", parent: "Hardware" } )
WriteResult({ "nInserted" : 1 })
> db.toko.insert( { _id: "Lcd", parent: "Hardware" } )
WriteResult({ "nInserted" : 1 })
> db.toko.insert( { _id: "Windows", parent: "Software" } )
WriteResult({ "nInserted" : 1 })
> db.toko.insert({ _id: "Apple", parent: "Software" })
WriteResult({ "nInserted" : 1 })
> db.toko.insert( { _id: "Hardware", parent: "Product" } )
WriteResult({ "nInserted" : 1 })
> db.toko.insert( { _id: "Software", parent: "Product" } )
WriteResult({ "nInserted" : 1 })
> db.toko.insert( { _id: "Product", parent: "Orders" } )
WriteResult({ "nInserted" : 1 })
> db.toko.insert( { _id: "Orders", parent: null } )
WriteResult({ "nInserted" : 1 })
>
```



```
> db.toko.find().pretty()
{ "_id" : "Cpu", "parent" : "Hardware" }
{ "_id" : "Lcd", "parent" : "Hardware" }
{ "_id" : "Windows", "parent" : "Software" }
{ "_id" : "Apple", "parent" : "Software" }
{ "_id" : "Hardware", "parent" : "Product" }
{ "_id" : "Software", "parent" : "Product" }
{ "_id" : "Product", "parent" : "Orders" }
{ "_id" : "Orders", "parent" : null }
>
```