

# Initial Report : Struct

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## Introduction

struct is part of the julia library “LAR.jl”, this library perform geometric calculations on cellular complexes expressed through the Linear Algebraic Representation (LAR). Struct represent complex object and describe those object in they're coordinate system, in this way we can specify the edges. In the code Struct is used as a acyclic oriented graphs; an acyclic oriented graphs are a hierarchical structures formed by different component, and every component have they're different coordinate system

## Main interface

A user wanting to use this library will use the 4 main interface : `* Lar.Struct *`  
`Lar.apply * Lar.struct2lar * Lar.evalStruct`

The fonction Struct will create a object of type struct using as input an array of object. This fonction create a structure of geometrical object starting from an array of object. The attribute of a structure are `<body,box,name,dim,category>`. this fonction return a “Struct” type value and his coordinate system is based on the first object of the “struct” arguments. Also, the resulting geometrical value is often associated with a variable name. Every object in struct can be trasformed by a tensor wihtin its own container The generation of containers may continue hierarchically by suitably applying **Struct**. this fonction is implemented with 4 methods.

The fonction apply use the lar model in input with the affinateMatrix to return the lar model as a tuple formed by points an array of cells.

The fonction struct2lar return the struct given by input as his lar representation.

The fonction evalStruct return the world coordinate of the struct in input

## Example

To help with the project we used 3 example taken from the **LinearAlgebraicRepresentation.jl** package. the examples were chosen to have different complexity . Its possible to find the chosen example in the folder `/docs/examples`.

## Start

Before starting to improve the code, the work started with understanding the package struct as a whole, right after we started to study the singol fonction that compose struct.jl. Before starting to modify the code to optimaze the code,

we decide that's better to improve the readability of the code using new function when possible for example the function `<r(args...)>` can use 2 more function one for 2D rotation and another for the 3D.

```
function r(args...)
    n = length(args)
    if n == 1 # rotation in 2D
        mat=r2D(args)
    end

    if n == 3 # rotation in 3D
        mat=r3D(args)
    end
    return mat
end
```