

MDUG

DYNAMO PARA TODOS

LUIS JAVIER LÓPEZ

UN NIVEL DE COMPLEJIDAD PARA CADA TAREA



¿Y este... quién es?

– Arquitecto

- Coordinador BIM AECOM

– Estudiante ingeniería informática

- Enfocado al desarrollo de software

– Amante de las nuevas tecnologías

- Impresión 3d
- Varios cursos de programación e inteligencia artificial
- Python
- C#

– Profesor en Tutellus

- Dynamo



UN NIVEL DE COMPLEJIDAD PARA CADA TAREA

– USO BÁSICO

- NODOS BUILT IN Y PAQUETES
 - POTENCIA DESDE EL INICIO
 - MANTENIMIENTO DIARIO DE MODELOS

– USO INTERMEDIO

- NODOS PERSONALIZADOS Y PYTHON BÁSICO
 - SCRIPTING BÁSICO EN PYTHON
 - TAREAS COTIDIANAS COMPLEJAS

– USO AVANZADO

- PYTHON AVANZADO
 - POO Y EL USO DE FUNCIONES, CLASES Y LIBREARIAS PROPIAS
 - LA CALIDAD EN GRANDES PROYECTOS



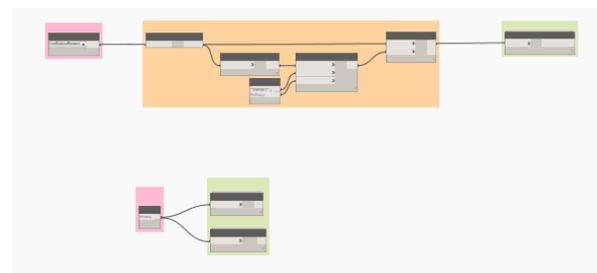
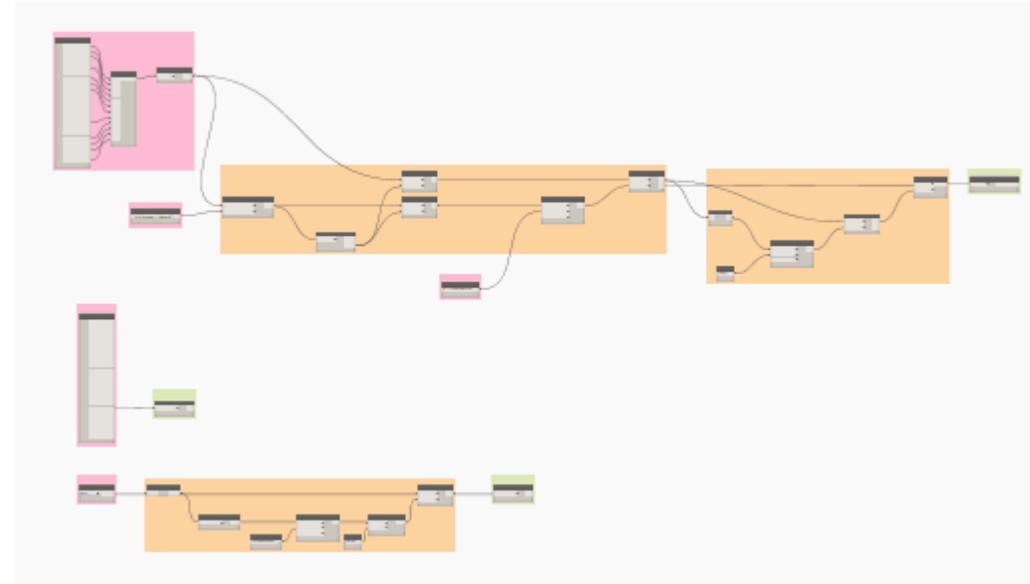
USO BÁSICO

NODOS BUILT IN Y PAQUETES

Model cleaning workflow



AEC-ARC-MOD-02-900-EC-0000305_UnderApronEastCentral_B02_B01_pedro.nadal



USO BÁSICO

NODOS BUILT IN Y PAQUETES

Family quality control workflow

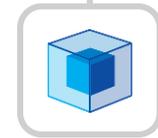
*.rvt arch models



*.rvt schedules model



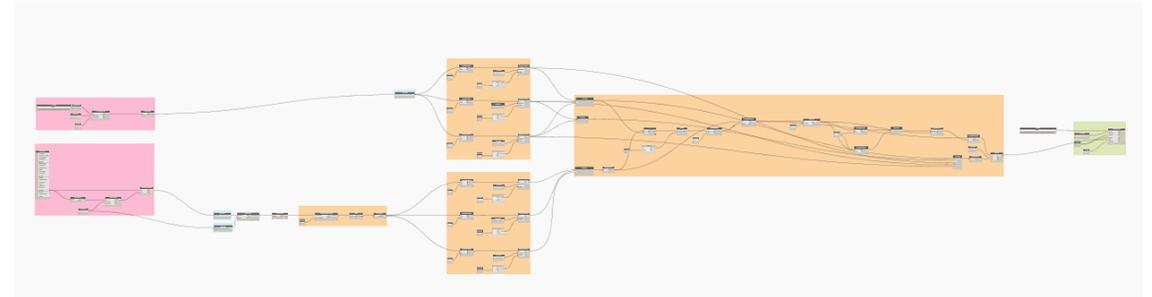
*.rvt content model



VS



*.xls Families Control Report



USO BÁSICO

NODOS BUILT IN Y PAQUETES

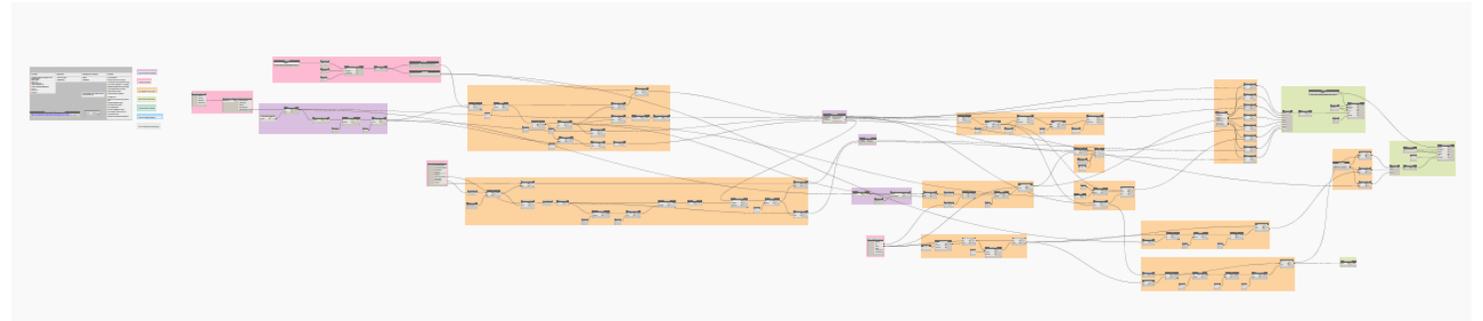
Workset maintenance workflow

Dynamo Player

Filter...

- 00_Worksets and Links Manager_v2.0
Ready
- 01_Links to Worksets_v4.0
Ready

AEC-ARC-MOD-02-900-EC-0000305_UnderApronEastCentral_B02_B



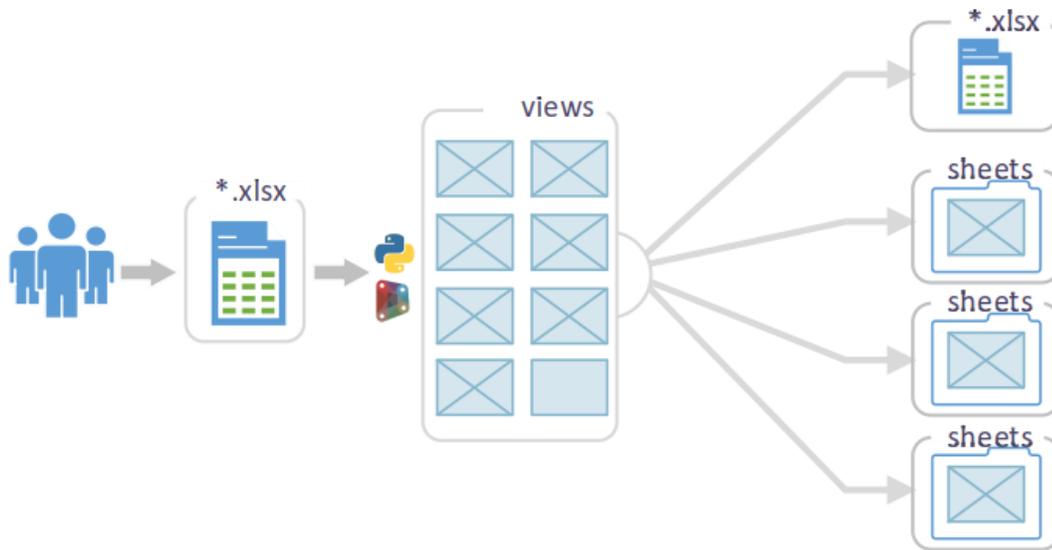
| | A | B | C | D | E | F | G | H | | A | B | C | |
|----|--|----------|---------------------|--------------|--------------------|-----------|-----------|----------------------------------|--|----|--------------------------|-------------------------|--------------------------|
| 1 | LINK | WORKSET | REPORT | WORKSET TYPE | REPORT | SHOULD BE | PATH TYPE | SAVED PATH | | 1 | CREATED WORKSETS | WORKSETS TO DELETE | MODELS NOT LISTED |
| 2 | AEC-ARC-MOD-02-900-02_LINK_RVT_AEC_ARC | Correct! | 02_LINK_RVT_AEC_ARC | Correct! | | | Absolute | K:\02_TEB\ARC_AECGM\BIM_Models\ | | 2 | 02_LINK_RVT_AEC_ARC_WC | 02_LINK_RVT_GMW_ARC_N | AEC-ARC-MOD-02-900-EC-00 |
| 3 | AEC-ARC-MOD-02-900-02_LINK_RVT_AEC_ARC | Correct! | 02_LINK_RVT_AEC_ARC | Correct! | | | Absolute | K:\02_TEB\ARC_AECGM\BIM_Models\ | | 3 | 02_LINK_RVT_AEC_ARC_XX | 02_LINK_RVT_GMW_ARC_N | |
| 4 | AEC-ARC-MOD-02-900-02_LINK_RVT_AEC_ARC | Correct! | 02_LINK_RVT_AEC_ARC | Correct! | | | Absolute | K:\02_TEB\ARC_AECGM\BIM_Models\ | | 4 | 02_LINK_RVT_AEC_ARC_XX | 02_LINK_RVT_GMW_ARC_N | |
| 5 | AEC-ARC-MOD-02-900-02_LINK_RVT_AEC_ARC | Correct! | 02_LINK_RVT_AEC_ARC | Correct! | | | Absolute | K:\02_TEB\ARC_AECGM\BIM_Models\ | | 5 | 02_LINK_RVT_AEC_SPE_Fire | 02_LINK_RVT_GMW_ARC_N | |
| 6 | AEC-ARC-MOD-02-900-02_LINK_RVT_AEC_ARC | Wrong! | 02_LINK_RVT_AEC_ARC | Wrong! | 02_LINK_RVT_GMW_AI | | Absolute | K:\02_TEB\ARC_AECGM\BIM_Models\ | | 6 | | 02_LINK_RVT_GMW_ARC_N | |
| 7 | AEC-ARC-MOD-02-900-02_LINK_RVT_AEC_ARC | Correct! | 02_LINK_RVT_AEC_ARC | Correct! | | | Absolute | K:\02_TEB\ARC_AECGM\BIM_Models\ | | 7 | | 02_LINK_RVT_GMW_ARC_W | |
| 8 | AEC-ARC-MOD-02-900-02_LINK_RVT_AEC_ARC | Correct! | 02_LINK_RVT_AEC_ARC | Correct! | | | Relative | K:\02_TEB\ARC_AECGM\BIM_Models\ | | 8 | | 02_LINK_RVT_GMW_ARC_W | |
| 9 | AEC-ARC-MOD-02-900-02_LINK_RVT_AEC_ARC | Correct! | 02_LINK_RVT_AEC_ARC | Correct! | | | Absolute | K:\02_TEB\ARC_AECGM\BIM_Models\ | | 9 | | 02_LINK_RVT_GMW_ARC_W | |
| 10 | AEC-ARC-MOD-02-900-02_LINK_RVT_AEC_ARC | Correct! | 02_LINK_RVT_AEC_ARC | Correct! | | | Absolute | K:\02_TEB\ARC_AECGM\BIM_Models\ | | 10 | | 02_LINK_RVT_GMW_ARC_W | |
| 11 | AEC-ARC-MOD-02-900-02_LINK_RVT_AEC_SPE | Correct! | 02_LINK_RVT_AEC_SPE | Correct! | | | Absolute | K:\02_TEB\ARC_AECGM\BIM_Models\ | | 11 | | 02_LINK_RVT_GMW_ARC_W | |
| 12 | AEC-BIM-MOD-00-000-02_LINK_RVT_AEC_BIM | Correct! | 02_LINK_RVT_AEC_BIM | Correct! | | | Absolute | K:\00_COR\00_BIM_AECBM\Coordinat | | 12 | | 02_LINK_RVT_MTT_FSS_EC_ | |
| 13 | AEC-BIM-MOD-00-000-02_LINK_RVT_AEC_BIM | Wrong! | 02_LINK_RVT_AEC_BIM | Wrong! | 02_LINK_RVT_GMW_AI | | Absolute | K:\00_COR\00_BIM_AECBM\Coordinat | | 13 | | 02_LINK_RVT_MTT_HVA_EC_ | |
| 14 | AEC-BIM-MOD-00-000-02_LINK_RVT_AEC_BIM | Correct! | 02_LINK_RVT_AEC_BIM | Correct! | | | Absolute | K:\00_COR\00_BIM_AECBM\Coordinat | | 14 | | 02_LINK_RVT_MTT_PLB_EC_ | |
| 15 | GMW-ARC-MOD-02-900-02_LINK_RVT_GMW_AI | Correct! | 02_LINK_RVT_GMW_AI | Correct! | | | Absolute | K:\02_TEB\ARC_AECGM\BIM_Models\ | | 15 | | 02_LINK_RVT_PRB_STR_EC_ | |
| 16 | GMW-ARC-MOD-02-900-02_LINK_RVT_GMW_AI | Correct! | 02_LINK_RVT_GMW_AI | Correct! | | | Absolute | K:\02_TEB\ARC_AECGM\BIM_Models\ | | 16 | | 02_LINK_RVT_PTD_ELC_EC_ | |
| 17 | GMW-ARC-MOD-02-900-02_LINK_RVT_GMW_AI | Correct! | 02_LINK_RVT_GMW_AI | Correct! | | | Absolute | K:\02_TEB\ARC_AECGM\BIM_Models\ | | 17 | | 02_LINK_RVT_PTD_ELC_EC_ | |
| 18 | GMW-ARC-MOD-02-900-02_LINK_RVT_GMW_AI | Correct! | 02_LINK_RVT_GMW_AI | Correct! | | | Absolute | K:\02_TEB\ARC_AECGM\BIM_Models\ | | 18 | | | |
| 19 | GMW-ARC-MOD-02-900-02_LINK_RVT_GMW_AI | Correct! | 02_LINK_RVT_GMW_AI | Correct! | | | Absolute | K:\02_TEB\ARC_AECGM\BIM_Models\ | | 19 | | | |



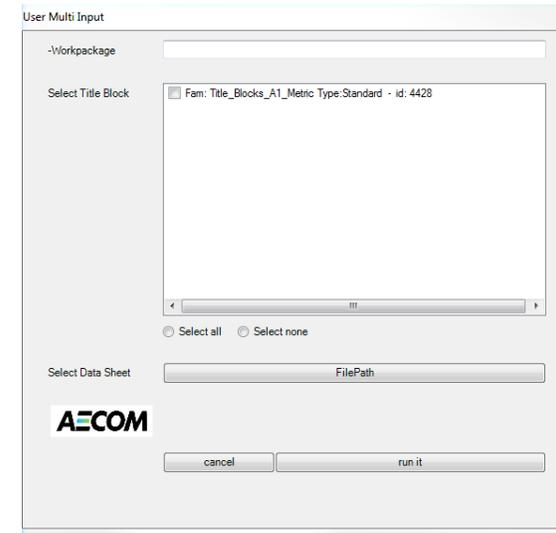
USO INTERMEDIO

NODOS PERSONALIZADOS Y PYTHON BÁSICO

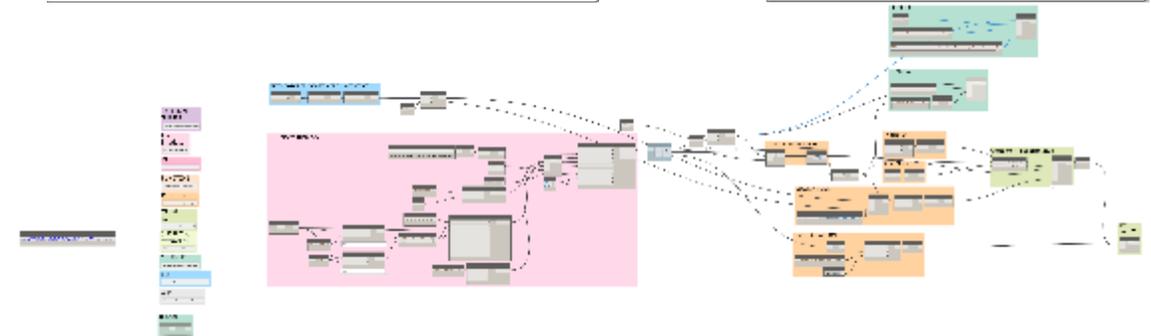
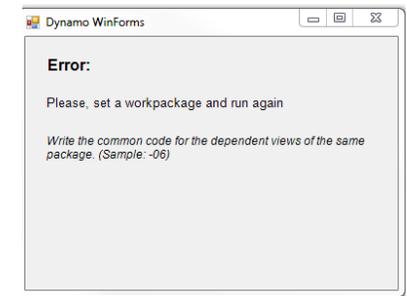
Massive views and sheets creation



Horas desarrollo: 32h
Ahorro: 164horas/set 1000 planos



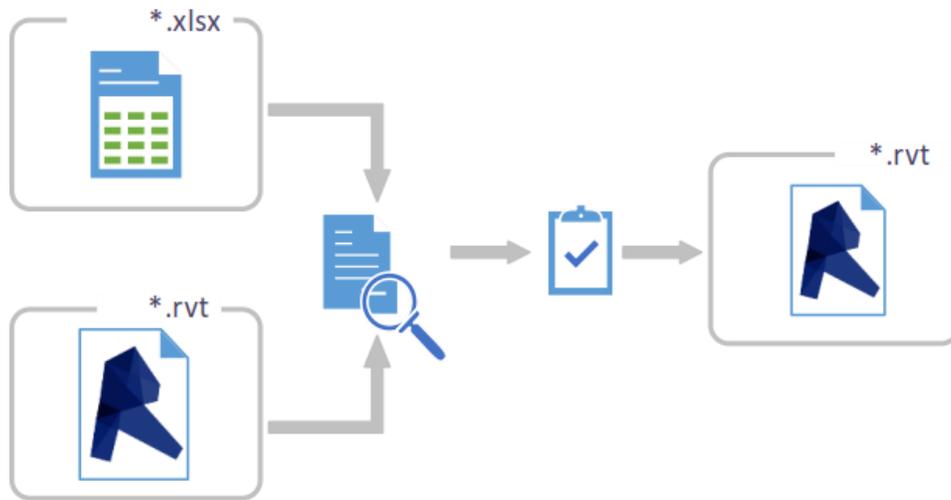
```
me, number, tb in zip(sheetnames, sheetnumbers, titleblock):  
sheet = ViewSheet.Create(doc, tb.Id)  
Create a new sheet where titleblock.Id is the Id of the titleblock  
sheet.Name = name  
sheet.SheetNumber = number  
sheetlist.append(newsheet)  
Check if list lengths are the same (The views and locations will  
be of lists here, but the outermost list layer should all be the  
same)  
len(sheetlist) == len(views) == len(points):  
# Loop through all lists  
for sht, v, p in zip(sheetlist, views, points):  
viewports = []  
try:  
# Check if it's possible to place view on sheet.  
if Viewport.CanAddViewToSheet(doc, sht, v, p):
```



USO INTERMEDIO

NODOS PERSONALIZADOS Y PYTHON BÁSICO

Data to Revit



Horas desarrollo: 8h
Ahorro: 16h/entrega

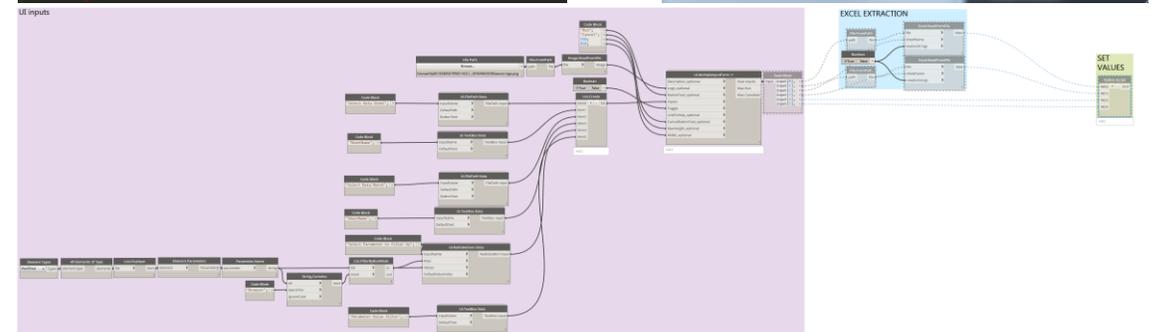
```
from Autodesk.Revit.DB import *
import sys
pyt_path = r"C:\Program Files (x86)\IronPython 2.7\Lib"
sys.path.append(pyt_path)

doc = DocumentManager.Instance.CurrentDBDocument
uiapp = DocumentManager.Instance.CurrentUIApplication
app = uiapp.Application

#The inputs to this node will be stored as a list in the DB variables.
dataEnteringNode = IN

collector = FilteredElementCollector(doc)
types = collector.WhereElementIsNotElementType().ToElements()
TransactionManager.Instance.EnsureInTransaction(doc)
result = dict()
result2 = []
if IN[0] == True:
    try:
        for e1 in types:
            e = UnwrapElement(e1)
            try:
                for i in e.Parameters:
                    if i.Definition.Name == "XIA_PP_Seq. Number":
                        if i.AsString() == None:
                            i.Set(e.Id.ToString())
                            result2.append("Successful")
                        else:
                            if i.AsString() != e.Id.ToString():
                                i.Set(e.Id.ToString())
                                result2.append("Successful")
                            else:
                                result2.append(e)
                    else:
                        pass
            except:
                pass
    except:
        pass
```

The screenshot shows the configuration interface for a 'Data-Shapes | Multi Input UI ++' node. The 'Select Data Sheet' dropdown is set to 'FilePath'. The 'SheetName' field is set to 'Default'. The 'Select Data Match' dropdown is also set to 'FilePath'. The 'Select Parameter to filter by' section contains a list of radio buttons for various parameter names: '_ACM_ZZ_Browser_Sheet_2_Stage', '_ACM_ZZ_Browser_Sheet_4_Category', '_AMD_Browser_Sheet_1_Stage', '_AMD_Browser_Sheet_2_Discipline', '_ACM_ZZ_Browser_Sheet_3_Discipline', '_ACM_ZZ_Browser_Sheet_1_General', and '_AMD_Browser_Sheet_3_Category'. The 'Parameter Value filter' field is set to 'Default'. The AECOM logo is visible at the bottom left of the window, and 'Cancel' and 'Run' buttons are at the bottom right.

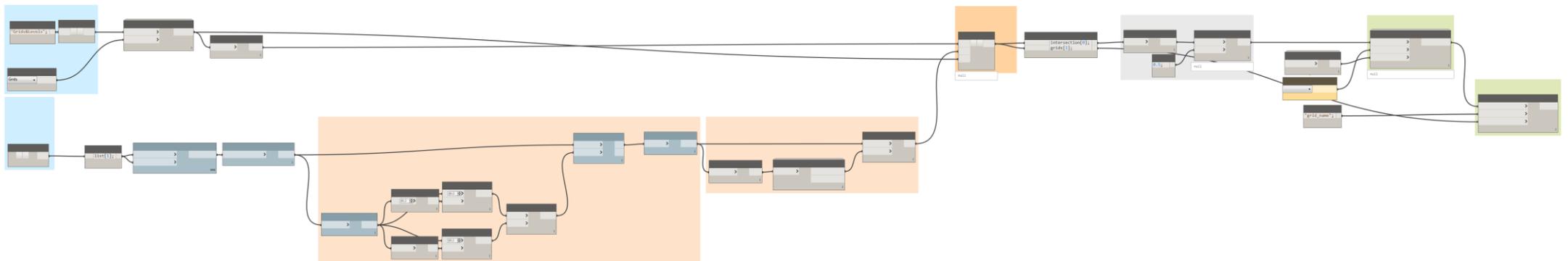


USO INTERMEDIO

NODOS PERSONALIZADOS Y PYTHON BÁSICO

Grids Marks by Scope boxes

```
iname = item.Name
if any ("_100_" in x for x in iname.split()):
    list.append(item)
    try:
        bbox = item.get_BoundingBox(doc.ActiveView)
        outline = Outline(bbox.Min, bbox.Max)
        cub = bbox.ToProtoType()
        bblist.append(cub)
        """filter1 = BoundingBoxIsInsideFilter(outline)
        collector = FilteredElementCollector
        (doc, elementIdList).WherePasses(filter1).ToElements()
        list.append(collector)"""
    except:
        pass
```



USO INTERMEDIO

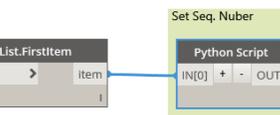
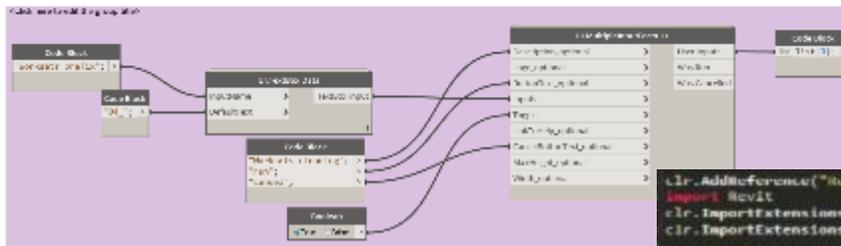
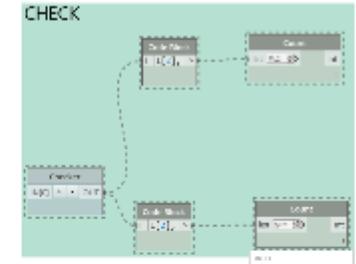
NODOS PERSONALIZADOS Y PYTHON BÁSICO

Ids to Elements Worksets Cleaner

```

24 clr.ImportExtensions(Revit.Elements)
25 clr.ImportExtensions(Revit.GeometryConversion)
26 #Importar regular expressions
27 #import re
28 #Definir entorno
29 doc = DocumentManager.Instance.CurrentDBDocument
30 uiapp = DocumentManager.Instance.CurrentUIApplication
31 app = uiapp.Application
32 uidoc=uiapp.ActiveUIDocument
33 #Definir entradas
34
35 #collect scopesboxes
36 scopesboxes = FilteredElementCollector(doc).OfCategory
37 (BuiltInCategory.OST_VolumeOfInterest).ToElements()
38 #ObtainTagboxes from Scope Boxes
39 hblist,list = [],[]
40 for item in scopesboxes:

```



```

clr.AddReference("RevitNodes")
import Revit
clr.ImportExtensions(Revit.Elements)
clr.ImportExtensions(Revit.GeometryConversion)

clr.AddReference("RevitServices")
import RevitServices
from RevitServices.Persistence import DocumentManager
from RevitServices.Transactions import TransactionManager

doc = DocumentManager.Instance.CurrentDBDocument
element = UnwrapElement(IN[0])
p1 = IN[1]
p2 = IN[2]
str1 = IN[3]
str2 = IN[4]
list1 = []
list2 = []
out = []
list = []

TransactionManager.Instance.EnsureInTransaction(doc)
# make sure familiesymbol is active

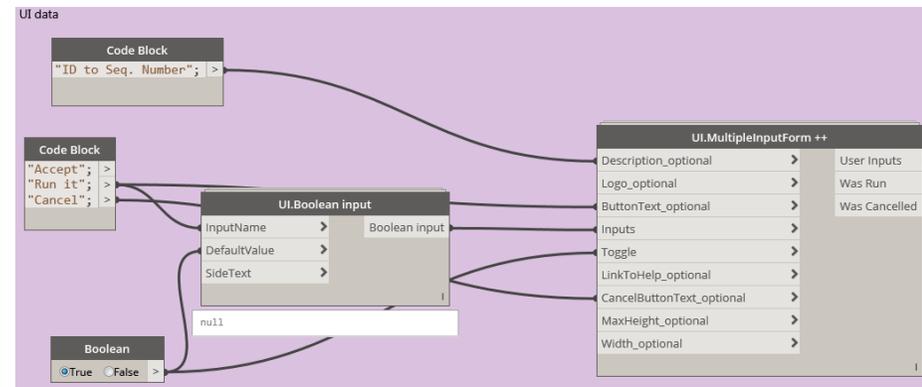
for e in element:
    list1.append(e.LookupParameter(p1).AsString())
    list2.append(e.LookupParameter(p2).AsString())
counter2 = 0
counter1 = 0

```

User Multi Input

Worksets cleaning

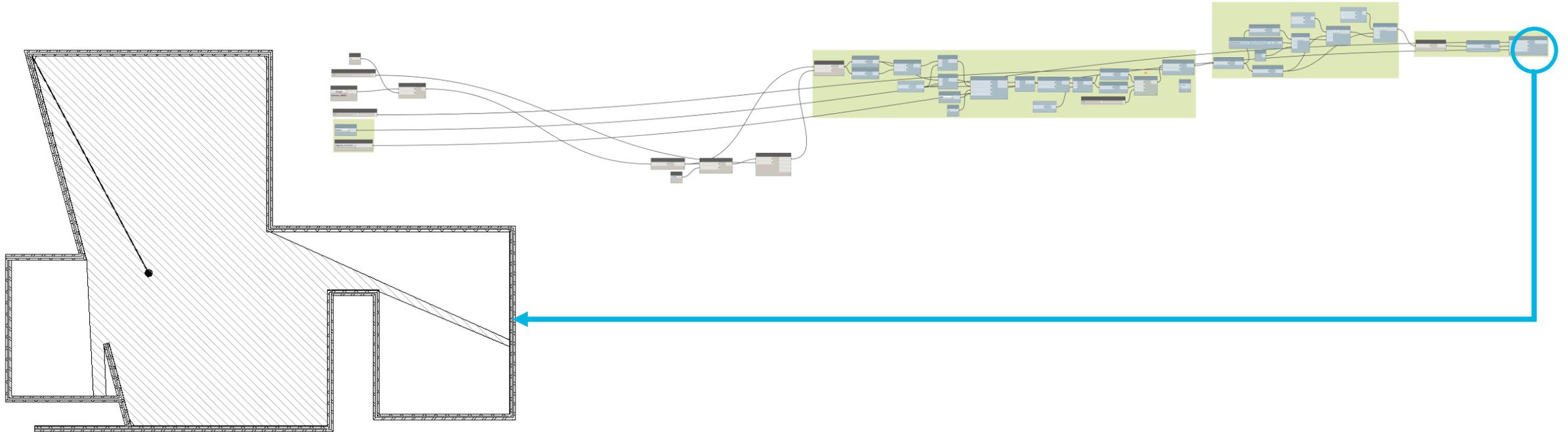
Worksets prefix



USO INTERMEDIO

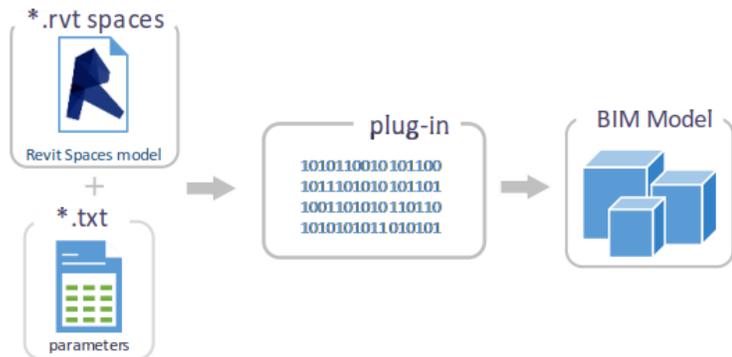
NODOS PERSONALIZADOS Y PYTHON BÁSICO

Camera FOV Ray tracer



USO AVANZADO PYTHON AVANZADO

4D LOCATION SCRIPT



Horas desarrollo: 50h
Ahorro: 3h / modelo
(3000 elementos)

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1 Internal = NeogptElement()
2 location = Internal.Location
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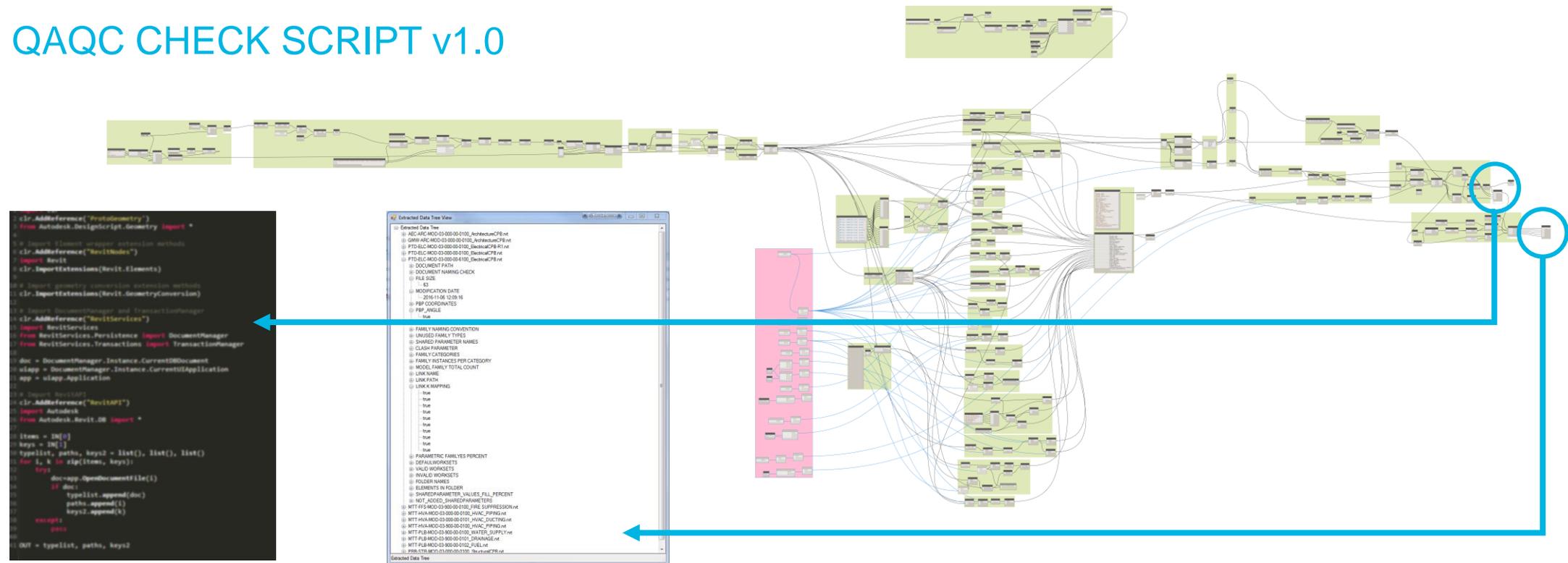
The screenshot shows a 'Dynamo WinForms' window with the following text: 'Family location points checked: Centroid: 88 elements, Curve: 100 elements, Point: 111 elements, Bbox: 0 elements, Not Computed: 0 elements'. To the right is a 3D model of a building structure with a grid overlay. Below the window is a complex Dynamo graph with several nodes circled in blue, indicating the script's execution flow.



USO INTERMEDIO

NODOS PERSONALIZADOS Y PYTHON BÁSICO

QAQC CHECK SCRIPT v1.0



GRACIAS

Con la colaboración de:
Edurne San Miguel
Pedro Nadal



MDUG