Media Computing Project

Python and Fusion 360 API

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ASSIGNMENT

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Script
def spacePadRight(value, length):
    pad = ''
    if type(value) == str:
        paddinglength = length - len(value) + 1
    else:
        paddinglength = length - value + 1
    while paddinglength > 0:
        pad += '
        paddinglength -= 1
    return str(value) + pad

def walkThrough(box):
    nStr = ''
    for item in box:
        nStr += spacePadRight(item['name'], 25) + str(spacePadRight(item['instances'], 15)) + str(item['volume']) + '\n'
    return nStr

def printBoxContext():
    product = app.activeProduct
    design = addsk.fusion.Design.cast(product)
    title = 'Extract BOM'
    if not design:
        ui.messageBox('No active design', title)
        return

    # Get all occurrences in the root component of the active design
    root = design.rootComponent
    occs = root.allOccurrences

    # Gather information about each unique component
    box = []
    for occ in occs:
        comp = occ.component
        if comp:
            box.append(comp)
            break

    # Process components
    for comp in box:
        obj = comp
        # Process the instantiated parts of the existing
        for inst in comp.instances:
            obj += 1
        printBoxContext
Decorators

• Allow to wrap a function with additional instructions
• Functions can be a parameter for another function
  • Logging
  • Runtime
  • …

```python
def my_awesome_function()
...
my_awesome_function = some_other_function(my_awesome_function)
```

```python
@some_other_function
def my_awesome_function()
...
```
List Comprehension

• Increase readability

```python
numbers = []
for i in range(100):
    if i%2 == 0:
        numbers.append(i)

numbers = [i for i in range(100) if i%2 == 0]
```
Generators

• Do not store all values in memory
• Used e.g. for context managers
• Use `yield` instead of `return` to pause the function
• Use `list()` to convert it to a list

def mcp_generator():
    yield(“M”)
    yield(“C”)
    yield(“P”)

gen = mcp_generator()
print(gen.next()) # M
print(gen.next()) # C
print(gen.next()) # P
SOFTWARE

Fusion 360 API
Imports

• If possible only use packages which are already available in Fusion

• Otherwise there are multiple options:
  • Use pip from Fusion to install a package
  • Install the package on your computer and adjust the system path within your script (not recommended)
  • Use python from your system to install the package into the fusion folder
    • Use the folder of your script for this
  • If the package is pure python, just place the file into the script folder
Script vs Add-In

• Access to the same functions

• Add-Ins usually also change the UI
  • Buttons
  • Dialogs
  • …

• Add-Ins can be run on startup

• Add-Ins need to be cleaned up when unloaded
Resources

• Fusion documentation:
  • “Programming Interface” —> “User Interface”
ASSIGNMENT

Tasks for next week
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• Convert the script from the last assignment to an Add-In
  • Allow user input with a dialog
    • Random number
    • Chosen number
    • At least one more functionality (be creative)
  • Clean up changes in the UI when unloading the Add-In

• Create a schedule for your project including all deadlines
MCP

Project Phase
Project Phase

- Weekly individual group meetings
  - Schedule a regular meeting with your supervisor

- Deadlines
  - **December 16, 2020**: alpha version
  - **January 27, 2020**: beta version (final documentation)
  - **February 10, 2020**: final presentation (including video trailers)

- Next meeting with everyone: December 16, 2020