



Google Summer of Code



Open-Source Simulations for Gas Detector on Python

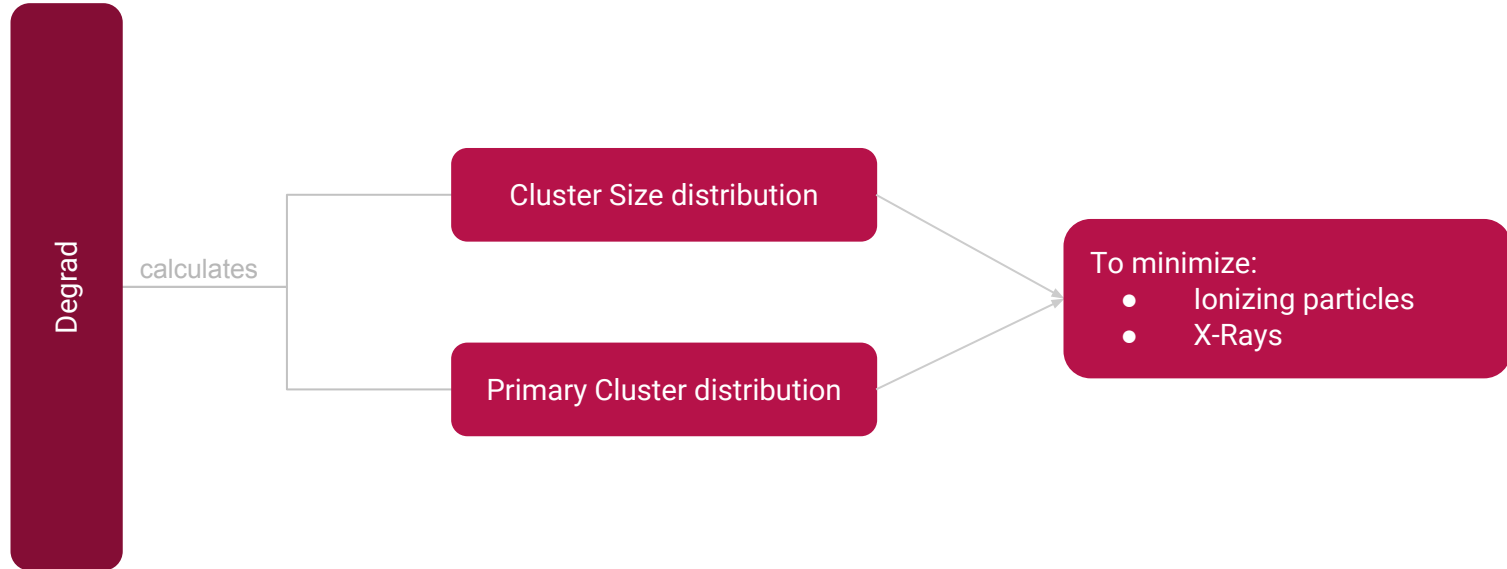
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About Degrad





Definition of problem

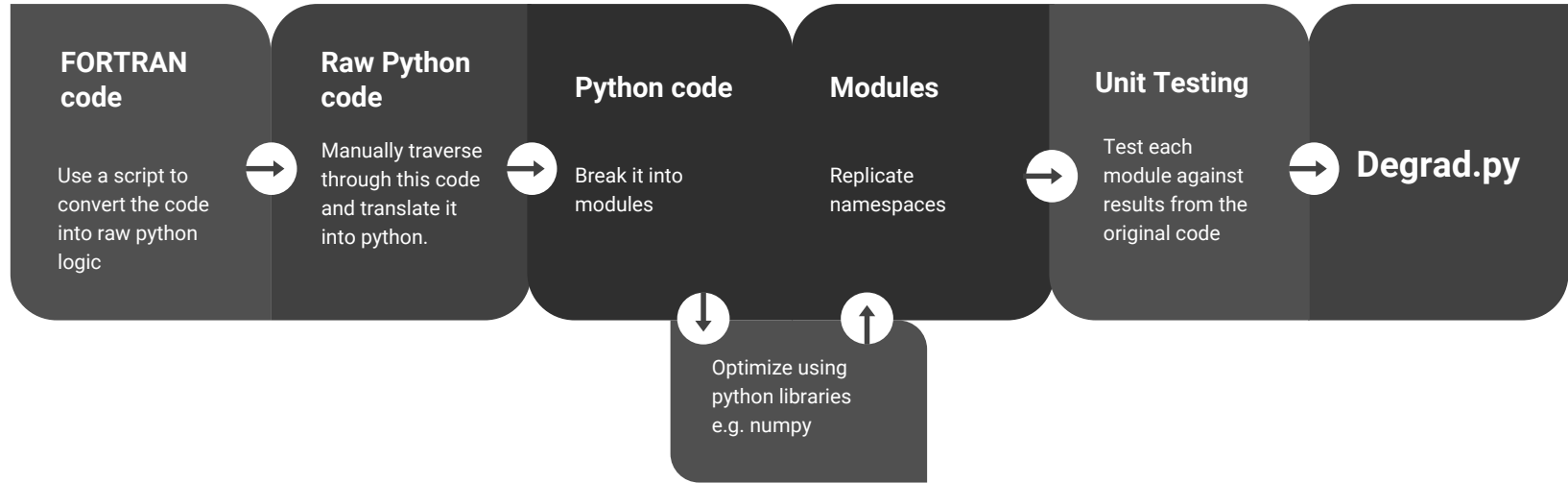
- Degrad is currently a FORTRAN routine of over 80k lines of code.
- Although fast, it's difficult to engage more developers

Aim

To create a modular python program for degrad and facilitate maintenance and further development.



Methodology





What have we achieved ?



Modular Degrad.py

Each function has been made into a separate module.

Namespaces have been replicated to allow communication across modules

Over 50 modules



Semi-Automated translator

A script to translate FORTRAN into crude python.

A methodology for fastest translation (description of tools, libraries and algorithms).

Helps facilitate translation of very large projects.

```
124 ('dmax0', 'max'),
125 ]
126
127
128 def file2list(fname, include_eol=False):
129     """ text file to list of string """
130     with open(fname, encoding="utf8") as f:
131         if include_eol:
132             content = f.readlines() # \n is included
133         else:
134             content = f.read().splitlines() # \n is not included
135         return content
136
137 def ireplace(old, new, text):
138     """ Case Insensitive Replace excluding comments
139     based on
140     http://stackoverflow.com/questions/919056/python-case-insensitive-replace
141     """
142     idx = 0
143     lim = text.find('#')
144     if lim == 0:
145         lim = len(text)
146     while idx < lim:
147         # while idx < len(text):
148         index_l = text.lower().find(old.lower(), idx)
149         if index_l == -1:
150             return text
151         text = text[:index_l] + new + text[index_l + len(old):]
152         idx = index_l + len(old)
153     return text
154 def replace_statements(content, map_list):
155     """ replace all statements in map list for all lines """
156     result = list(content) # make a copy
```

User Interface

PyQt 5 user-interface to ease the interaction with degrad (python and fortran).

Include graph plotting options.

Make degrad accessible to researchers with little acquaintance with terminals.

Card 1		Card 2		Card 3		Card 4		Card 5	
NGAS	2	NGAS1	2	FRAC1	80.0	EFIELD	2.0	DETEFF	50.0
NDELTA	100	NGAS2	12	FRAC2	20.0	BMAG	3.0	EXCWGHT	0.55
IMIP	5	NGAS3	0	FRAC3	0.0	BTHETA	30.0	KGAS	2
NDVEC	1	NGAS4	0	FRAC4	0.0	IWRITE	0	LGAS	1
NSEED	0	NGAS5	0	FRAC5	0.0	IPEN	0	LCMP	1
ESTART	1.0	NGAS6	0	FRAC6	0.0			LRAY	1
ETHRM	1.5			TEMP	20.0			LPAP	1
ECUT	2.0			TORR	760.0			LBRM	1
								IECASC	1


Reset Quit Submit

Documentation

Documentation using slate framework.

Can be hosted on github itself.

Display color formatted code and documentation side-by-side.


SLATE
REPLACE THIS WITH YOUR LOGO
OR SOURCE/THANKS/LOGO.PNG

Introduction

Progress Report

Tasks Completed

TO-DO

How to Use

Code

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Documentation

Using

Function Documentation

Contribute to Documentation

Sign Up for a Developer Key

Documentation Powered by Slate

Documentation

- The code documentation is available further in this page itself
- [Link to translation methodology](#)

Using

Degrad is written in python3 and FORTRAN

The input interface for degrad UI has been written in pyqt-5. main.ui contains the ui structure of the interface, created in the qt-designer. Kittn uses API keys to allow access to the API. You can register a new Kittn API key at our [developer portal](#).

Kittn expects for the API key to be included in all API requests to the server in a header that looks like the following:

i Make sure you're in the same directory as the file you're executing.

Function Documentation

DEGRADE()

This is the main function which calls all the subroutines.

Arguments

Argument	Description
no arguments	

shell fortran python javascript

To run Degrad, use this code:

```
# to run fortran code
gfortran degrad3.3.f
./a.out
```

```
# to run python
python3 test_degrad.py
```

```
# With shell, you can just run the input interface if you have python3 and qt5 installed on your
cd UI/
python3 MAIN.py
```

Make sure you're in the same directory as the file you're executing.



Future plans

Implement OOPS

Parallelize all code

Include more plotting options

Translate MAGBOLTz and other FORTRAN routines into python.



THANK YOU

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