BM 4302 Medical Image Processing
Configuring CMake for ITK and Essential System Concepts

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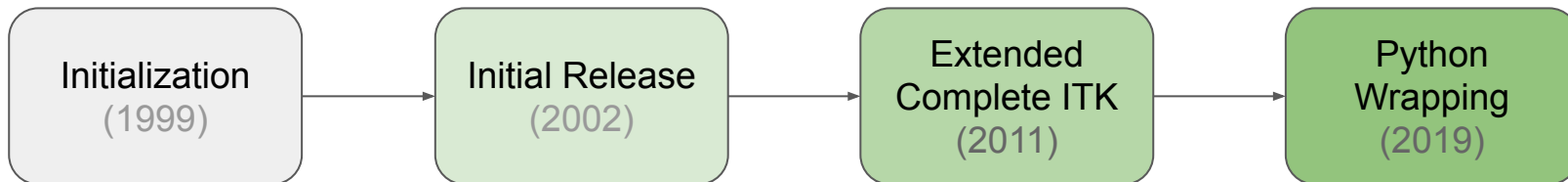
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ITK, and its Historical Overview

ITK

- An Open-source, Object-oriented software system for, Image processing, segmentation, and registration.
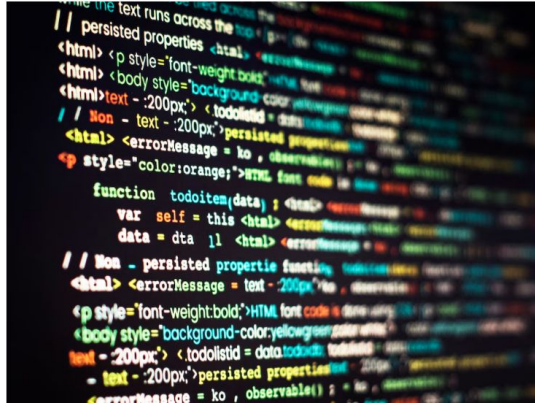
Historical Overview

Initialization (1999) → Initial Release (2002) → Extended Complete ITK (2011) → Python Wrapping (2019)

What is CMake ?

Pizza ??　———————→　Pizza Hut　———————→　Customized Pizza

What is CMake ?

Source Codes $\longrightarrow$ CMake $\longrightarrow$ Happy Programming!!!
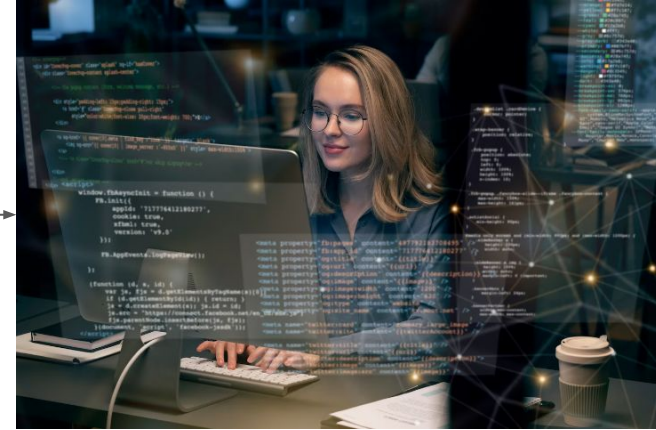
Configuring ITK Using CMake

- Preparing CMake and gathering source codes.
- Configuring ITK
  - Basic configuration
  - Advanced configuration with Modules and Groups
  - Generating build files
  - Compiling
- Building first programme
- Other installation methods
- Wrapping for Python

Other Installation Methods

- Using package managers.

```
sudo apt-get install libinsighttoolkit5-dev

brew install itk
```

- Wrapping for Python

```
python -m pip install --upgrade pip
python -m pip install itk
```

Basic System Concepts

- Generic Programming
  - Writing a code that works for any data types.
- Smart Pointers
  - Smart pointers are used to manage the lifetime of dynamically allocated objects
- Exception Handling
  - Handling errors during the execution of the program
- Event Handling
  - Allowing to trigger custom actions in response to certain events like progress updates.
- Multithreading
  - Running multiple threads in parallel

Resources

ITK Documentation: https://docs.itk.org/en/latest/

ITK Software Guide: https://itk.org/ItkSoftwareGuide.pdf

CMake Documentation: http://www.cmake.org/

Publicly Available Test Data: https://github.com/InsightSoftwareConsortium/

https://www.nlm.nih.gov/research/visible/visible_human.html

public.kitware.com/pub/itk/Data/