Version – February 8, 2022

Week 3 – February 8/10, 2022

Introduction to Object Oriented Programming

C++, Python, ROOT

Objectives

- Understand role of computing in High Energy Physics research
- Identify benefits and limitations of C vs python in HEP work
- Demonstrate ability to deconstruct code and identify its critical components, such as classes, objects, instances, functions, arguments, dependencies/inheritance
- Understand the difference between heap and stack, and how to appropriately manage memory allocation
- Identify resources to help debug, in particular memory leaks

Weekly Checklist

☐ Complete git CI/CD tutorial

Exercises

- First dive into ATHENA: find electron, muon, and jet objects
- Family Tree of a Jet Tagger
- Fix memory leak (git)
- First plots on ROOT (git)

HW due Today Feb 8th (Postponed to Thursday Feb 10th):

- Complete HSF CI/CD Training Tutorial, the Youtube Channel
  - A few hours work!
  - Post questions on Discord channel (join link)
- When done, send an email to Johan with a link to your branch/repository

HW due Tuesday Feb 15th 8:15am Pacific:

- Complete git exercises (available on Thursday)
- Read paper of your choice, 5-minute presentation

Class Outline

- Review of Higgs Papers (15 minutes)
    - Overview given by Johan, explain plots
        - DOI 10.1016/j.physletb.2012.08.020 (ATLAS)
        - DOI 10.1016/j.physletb.2012.08.021 (CMS)
        - CERN Document Server (cds.cern.ch)
    - Thursday, first 15-minutes for presentations (2x5 + 5)
    - 4 students per paper, 5-min total, split between yourselves
    - Go to breakout room/lounge now (5-min)
- Version control, solve last week's roakblocks
    - HSF CI/CD Training Tutorial, Youtube Channel, GitHub exercise
    - Gitlab documentation, GitHub documentation
- Code, Deconstructed
    - Types of files: header, source, scripts
    - Types of objects: class, function, instances
    - Memory allocation, heap vs stack
        - This is *most* of HEP bugs