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](https://example.com), the [Youtube Channel](https://example.com)
  - A few hours work!
  - Post questions on Discord channel ([join link](https://example.com))
- 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