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Software Training in HEP

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Long term sustainability of the high energy physics (HEP) research software ecosystem is essential for the field. With upgrades and new facilities coming online throughout the 2020s this will only become increasingly relevant throughout this decade. Meeting this sustainability challenge requires a workforce with a combination of HEP domain knowledge and advanced software skills. The required software skills fall into three broad groups. The first is fundamental and generic software engineering (e.g. Unix, version control, C++, continuous integration). The second is knowledge of domain-specific HEP packages and practices (e.g., the ROOT data format and analysis framework). The third is more advanced knowledge involving more specialized techniques. These include parallel programming, machine learning and data science tools, and techniques to preserve software projects at all scales. This paper discusses the collective software training program in HEP and its activities led by the HEP Software Foundation (HSF) and the Institute for Research and Innovation in Software in HEP (IRIS-HEP). The program equips participants with an array of software skills that serve as ingredients from which solutions to the computing challenges of HEP can be formed. Beyond serving the community by ensuring that members are able to pursue research goals, this program serves individuals by providing intellectual capital and transferable skills that are becoming increasingly important to careers in the realm of software and computing, whether inside or outside HEP.

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