ME344: Introduction to Building High Performance Computing Clusters

Instructor: Steve Jones
Co-instructor: Shesha Krishnapura
Guest Speaker: Mourad Bouache
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Email: stevejones@stanford.edu
Class Hours: Monday 12:00pm-1:20pm
Thornton 110

Course Description

ME 344 is an introductory course on building High Performance Computing Clusters. Students will learn about HPC clusters from the ground up and gain a solid foundation in parallel computer architectures, cluster operating systems, resource management, and containers. They will build their own systems via remote installation of physical hardware, configuration and optimization of a high-speed network, and integration of other technologies used throughout the HPC world. Classes consist of lectures reinforced with assignments on HPC systems located in a teaching laboratory, where discussion and collaboration will be key components of the course. Students will come away with a solid skill set in a field of computing that has broad implications for science and technology

There are no prerequisites for computer programming languages. Many of the tasks involve scripting languages. Knowledge of bash and python are helpful to get the most out of the course. Group work and collaboration on projects is allowed and encouraged.

Schedule

Week 1	
Mon 6/24	Course Overview, HPC Introduction, Automated Installation of a Cluster
Week 2	
Mon 7/1	Open HPC Installation, Cluster Building Session in the lab
Week 3	
Mon 7/8	Real World Computer Architectures Shesha Krishnapura, Intel IT CTO and Intel Fellow
Week 4	

Mon 7/15	HPC and Hyperscale Compute Environments Shesha Krishnapura, Intel IT CTO and Intel Fellow
Week 5	
Mon 7/22	Containers, Containerized HPC, Course Project Discussion
Week 6	
Mon 7/29	Scaling Sentiment Analysis, Optimizing NLP Workflows for Local Machines and High Performance Computing Clusters: Gain hands-on experience fine-tuning LLMs and applying them to diverse NLP challenges
Week 7	
Mon 8/5	Node Health Check, Third-Party Applications, Course Project Discussion
Week 8	
Mon 8/12	Final Presentations

Be sure to have a look at "ME344S HPC-AI Summer Seminar Series"!
It's a one unit seminar series where leaders from industry and research labs share their thoughts on topics related to HPC and AI!