Homework

List of top supercomputers based on highest number of Floating Point OPerations/Sec:

Rank	Site	System	Cores	Rmax	Rpeak
1	Oak Ridge National Lab, USA	**Summit** - IBM Power System AC922, IBM POWER9 22C 3.07GHz, NVIDIA Volta GV100, Dual-rail Mellanox EDR Infiniband IBM	2,414,592	148,600.0	200,794.9
2	Lawrence Liverpool National Lab, USA	**Sierra** - IBM Power System AC922, IBM POWER9 22C 3.1GHz, NVIDIA Volta GV100, Dual-rail Mellanox EDR Infiniband IBM / NVIDIA / Mellanox	1,572,480	94,640.0	125,712.0
3	National Supercomputing Center in Vuxi, China	**Sunway TaihuLight** - Sunway MPP, Sunway SW26010 260C 1.45GHz, Sunway NRCPC	10,649,600	93,014.6	125,435.9
4	National SuperComputer Center in Guangzhou, China	**Tianhe-2A** - TH-IVB-FEP Cluster, Intel Xeon E5-2692v2 12C 2.2GHz, TH Express-2, Matrix-2000 NUDT	4,981,760	61,444.5	100,678.7
5	Texas Advanced Computing Center, Univ. of Texas, USA	**Frontera** - Dell C6420, Xeon Platinum 8280 28C 2.7GHz, Mellanox InfiniBand HDR Dell EMC	448,448	23,516.4	38,745.9

List three major problems requiring supercomputing in the following domains:

– Structural Mechanics

- structural analyses, vibration analyses, soil mechanics, fluid analyses, acoustic analyses etc. All of these problems are part of a bigger problem which is mostly **simulating the physical behaviour** of any system/environment. Be it a bridge, an underground road, an aeroplane etc.

– Computational Biology

- Cancer Research (using vast amounts of biological data processed using algorithms of bioinformatics **for simulation of malignant protein structures** and **finding cures.**)

– Commercial Applications

- For increasing the throughput of **predictive analytical models** designed to predict the behaviour of capital markets in real-time constrained environment whereby multiple streams of data are being processed alongside historical data. Algorithmic trading is a big part of it.