CS494: HPC Benchmarking

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0 Device Specifications

Device Manufacturer: Hewlett Packard, Memory: 16 GiB, Processor: AMD Ryzen 9 5900hx, Disk Capacity: 1TB

1 Benchmarking my device

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Linpack Xtreme v1.1.5 by Regeneration
Current date/time: Wed Feb  8 18:01:16 2023
CPU frequency:    4.590 GHz
Number of CPUs: 1
Number of cores: 8
Number of threads: 16
Parameters are set to:
Number of tests: 1
Number of equations to solve (problem size) : 35000
Leading dimension of array                  : 35000
Number of trials to run                     : 10
Data alignment value (in Kbytes)            : 4
Maximum memory requested that can be used=9800704096, at the size=35000
========== Timing linear equation system solver ==========
```

Size	LDA	Time(s)	GFlops	Residual	Residual(norm)
35000	35000	132.220	216.1994	1.115330e−09	3.237635e−02
35000	35000	132.649	215.4997	1.115330e−09	3.237635e−02
35000	35000	136.371	209.6176	1.115330e−09	3.237635e−02
35000	35000	132.370	215.9533	1.115330e−09	3.237635e−02
35000	35000	132.879	215.1257	1.115330e−09	3.237635e−02
35000	35000	132.941	215.0268	1.115330e−09	3.237635e−02
35000	35000	133.100	214.7692	1.115330e−09	3.237635e−02
35000	35000	134.142	213.1015	1.115330e−09	3.237635e−02
35000	35000	139.609	204.7563	1.115330e−09	3.237635e−02
35000	35000	139.748	204.5525	1.115330e−09	3.237635e−02

```
Performance Summary (GFlops)
Size   LDA    Align.  Average  Maximal
35000  35000  4       212.4602 216.1994
```

2 Times my device would have made the top500

(date=1993-06, rank=1), (date=1993-11, rank=1), (date=1994-06, rank=1), (date=1994-11, rank=1), (date=1995-06, rank=1), (date=1996-06, rank=2), (date=1996-11, rank=4), (date=1997-06, rank=5), (date=1997-11, rank=9), (date=1998-06, rank=20), (date=1998-11, rank=28), (date=1999-06, rank=41), (date=1999-11, rank=51), (date=2000-06, rank=69), (date=2000-11, rank=91), (date=2001-06, rank=111), (date=2001-11, rank=141), (date=2002-06, rank=251), (date=2002-11, rank=349)

3 Fastest machine in 2000

Machine: ASCI White, SP Power3 375 MHz, IBM, Lawrence Livermore National Laboratory, United States

4 Fastest/Slowest in 2000

$$\frac{Rmax - of - fastest - in - 2000}{Rmax - of - slowest - in - 2000} = 112.68$$

The fastest was 112.68 times faster than the slowest in the year 2000.

5 HPC resources in 2000

1) In the year 2000 my current personal computer would have ranked 91st in November and 69th in June.
2) The Rank-1 in November has Rmax of 2 times that of Rank-1 in June.
3) The Rank-1 in November has Rpeak of 4 times that of Rank-1 in June.

6 Past 10 years November runs

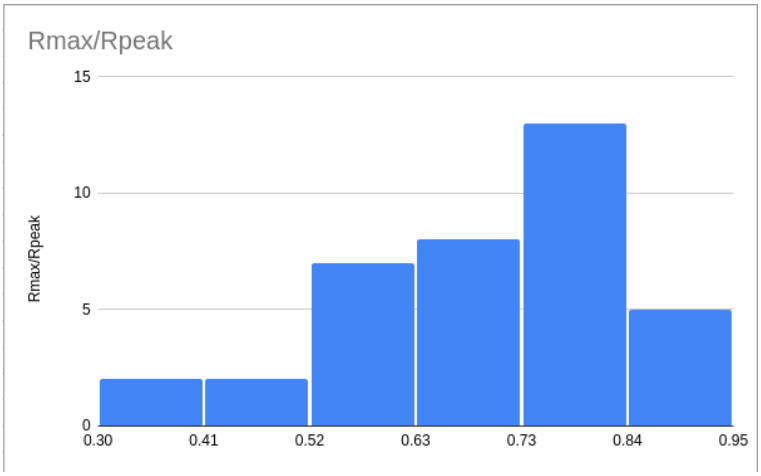

Figure 1: Rmax/Rpeak 2012-2022

7 Assignment comments

Good practice to get used to HPC terminology. Also learnt how to scrape data from a web page(top500.org) using a python script.