15-210: Parallel and Sequential Data Structures and Algorithms

Instructors: Umut Acar and Guy Blelloch
Staff

Professors:

- **Umut Acar**
  - Research: PL and Parallel Algorithms
  - Hobbies: Climbing, Diderot

- **Guy Blelloch**
  - Research: Parallel Algorithms and PL
  - Hobbies: Biking, Skiing, and above
Staff

TAs:
Alex and Shreyan (head TAs)
Abinaya, Aditya, Ajay, Alisa, Butut, Coral, David Z.,
David H., Jennifer, Junqing, Komal, Manogna,
Medha, Meheresh, Nanita, Rohan, Shashank, and
Yiming (recitations)
Jason and Sam (infrastructure)
Web Page + Diderot

Google (or Bing): 15210
- Schedule available online
- Book + discussions on Diderot
- Syllabus
  - Bucket model for grading labs
  - We use gradescope and our own “autolab”
  - Exams graded on curve
  - No piazza, but Diderot
  - Don’t cheat!!!!
210: Not your generic algorithms and data structures class

- Parallelism throughout
- Purely functional style
Parallelism is Recent and Relevant
Why Parallelism?
Why Parallelism?
64 core blade servers ($6K) (shared memory)

\[ \text{Price: $792.99} \]
\[ \times 4 = \]
\[ $3171.96 \]
Xeon Phi: Knights Landing (64 cores)
Qualcomm readies up 48-core Centriq 2400 ARM server chip

by Zak Killian — 12:51 PM on December 9, 2016

Maybe 2017 will be the year that ARM servers finally become a thing. After demoing a 24-core server chip a little more than a year ago, Qualcomm's Datacenter Technologies subsidiary has announced the Centriq 2400 CPU. This new chip is a 48-core ARMv8 processor based on a new in-house CPU core design called Falkor, and it's compliant with ARM's Server Base System Architecture specification. Earlier in the week, Qualcomm showed off the new hardware running "a typical datacenter application" comprising Linux with Java and Apache Spark.
4992 “cuda” cores

Nvidia Tesla K80 24GB GPU Accelerator passive cooling 2x Kepler GK210 900-22080-0000-000
by NVIDIA
29 customer reviews | 11 answered questions

Price: $4,295.95 + $11.55 shipping
Note: Not eligible for Amazon Prime.

In Stock.
Ships from and sold by eServer PRO.

Estimated Delivery Date: Aug. 27 - Sept. 1 when you choose Expedited at checkout.

- Nvidia Tesla K80 GPU: 2x Kepler GK210
- Memory size (GDDR5): 24GB (12GB per GPU)
- CUDA cores: 4992 (2496 per GPU)
- Memory bandwidth: 480 GB/sec (240 GB/sec per GPU)
- 2.91 Tflops double precision performance with NVIDIA GPU Boost - See more at: http://www.nvidia.com/object/tesla-servers.html#sthash.IF5LVwFq.dpuf

4 new from $4,135.00

Upgrading to a Solid-State Drive?
Learn how to install an SSD with Amazon Tech Shorts. Learn more
Up to 300K servers
LG Optimus 2X: first dual-core smartphone launches with Android, 4-inch display, 1080p video recording

Samsung Galaxy S IV to feature Exynos 28nm quad-core processor?
Written by Andre Yoskowitz @ 01 Nov 2012 18:02

It has been a few weeks but there is a new rumor regarding the upcoming Samsung Galaxy S IV.

According to reports, Samsung will pack next year's flagship device with its "Adonis" Exynos processor, a quad-core ARM 15 beast that uses efficient 28nm tech.

Samsung is supposedly still testing the processor, but mass production is scheduled for the Q1 2013 barring any delays.
Lenovo Announces First Octa-Core Smartphone, The Vibe X2

10-core MediaTek Helio X20 is official

May 2015

Sep 2014
Mar 2017, 12 core
UDO0

Raspberry Pi 3
Parallelism is here... And Growing!

Number of Cores

2006 2007 2008 2009 2010 ...

Core 2 Duo (2)
Core2 Quad (4)
Dunnington (6)
Nehalem: 8+

Future: 100+

Parallelism for the Masses
"Opportunities and Challenges"

© Intel Corporation
Are the cores useful?

64 core Xeon Phi