## Lecture 14: Caching intro

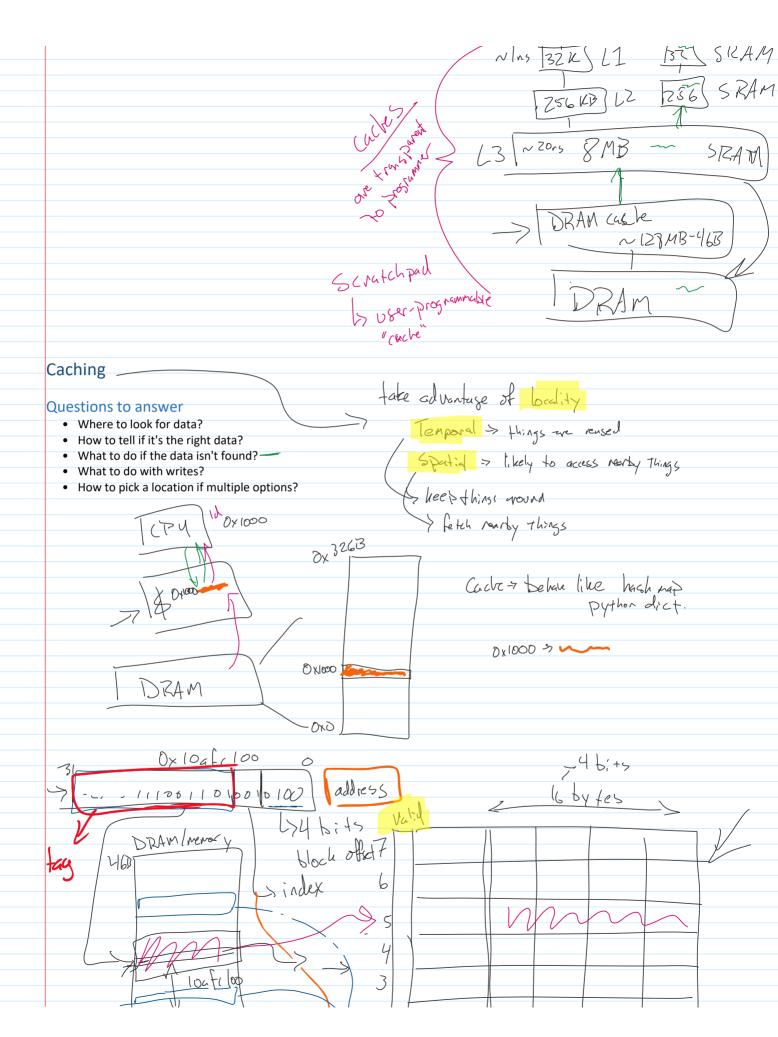
Thursday, February 22, 2018 9:32 AM

## Outline

- Why memory hierarchy
- How to control memory hierarchy
  - Data movement technologies
- Cache basics
  - Direct-mapped
  - Tag & data
  - Miss & hit
  - Handling writes

## From last time...

Typical access time Cost per gigabyte Max in machine    North												
Plash ~ 20 as \$20			Typical access time	Cost per gigabyte	Max in machine	1 1	Ly paver					
Flash ~ 10/12 JOSO ~ 100TB > thirted by wiver bus  Flash ~ 10/12 JOSO ~ 100TB > thirted by wiver bus  Shirked ~ 100ns - 1/12 MIDB > thirted by wiver bus  Shirked ~ 100ns - 1/12 JOSO ~ 100TB  That I wiver to have date?  - cachins  -7 copy "som"  The cloud  The clou	IDV M	SRAM	~Ins	\$300	~163	> limited	> 100	1791e-				
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Solish Nons 80.03 Not B Thirted by was & Space (the Standard Nons) 1,25 Not B Shall amount of SRAM  The archy Some DRAM  Low to wore data? Le monal locality  Low Some Things marby are likely to be used mobe from 1;50 gmb Stuff March  Spatial locality  DRAM  Locality  Locality  DRAM  Locality  Locali	6001	Flash	~ 10 Ms	\$0,50	~ 100TB	> linited	by wires	/ ÞJS	1c Au			
Bartent ~ 100 ns - 1 ns \$1.25 ~ 17B  That best at anything  Some DRAM  Flosh  F	2001	Disk	~ 10 ms	\$0.03	~ looTB	> / mited	by wins t	spale	(100)			
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how to move data? The cloud  - caching  - ca			2 3 3 1 1 1 1 1 1		. 0			/-	1			
lots of storage flush/lisks  how to move data? The cloud  - (achins  -7 copy "som"  Things marby are likely to be used move from list  Grab stuff rour  To patral locality  DRAM  Lyon byte?  Nove from DIAM  to SRAM  NOVE Bytes				Small a	mount of C	SKAN		DĪ	ZAMA			
lots of storage flash/disks  how to more data? The Mount ocality  - (achins  -7 (0) y "som"  The Mount of things marby are likely to be used more from lise  Grab Stuff man of byte?  DRAM  To SRAM  NOW Bytes  TO ICE		His	archy	Some	Ĺ	SAM		F1,	1. 1			
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- (aching  - 7 (opy "som")  - 7 (opy "som")  Things marby are likly to be used more from list  Grab Stuff 1997  To Spatial locality  Loc		temporal locality										
- (aching  -7 (0) y "som"  Things marby are likely to be used mobe from list  Grab Stuff rear of Spatial locality  DRAM  Lyon byte?  Lyon byte?  Lyon DHAM  Los RAM  NOUR From DHAM  Los RAM  NOUR Bytes		now to more auta. Is reuse save data / be cloud										
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Nove from DiAM  to SRAM  NOG Bytes												
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to SRAM ~64 Bytes						,			S ZMB			
to SRAM ~64 Bytes			nove from DiAM									
~64 Bytes		to SRAM										
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NINS 32K L1 337								TO		1		
NIns 32K L1 137												
/VIN7 15LL LI							01104	1271/	11	1377	SRA	
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