

# Work in Progress: A Visual Cache Memory Simulator

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# Overview

- Motivation
- UAV Exercise Sequence
- Exercise Objectives
- Current Simulator
- Future Extensions

# Exercise Objectives

Goals	Tasks
Increased motivation	<ul style="list-style-type: none"><li>- GUI cache analysis</li><li>- Operational Air Force relevance</li></ul>
Comprehend cache design	<ul style="list-style-type: none"><li>- Examine results for various configurations</li><li>- Independent analysis report</li></ul>
Understand replacement algorithms	<ul style="list-style-type: none"><li>- Implement pseudo-code provided LRU algorithm</li></ul>
Gain profiling experience	Collect SPIM & Ada traces of PEX 3
Manipulate bits in a High-Level Language	Cache field extraction in Ada
Reinforce GUI programming	<ul style="list-style-type: none"><li>- Read/Update components</li><li>- Extra Credit: Add component(s)</li></ul>

Files

File Name

EZE.dat

Enable log?

File Progress

High-Speed?

Cache Organization

Associativity (m-way)	# Sets (cache lines)	Block Size (# words)	Word Size (# bytes)
1	1	1	1
2	2	2	2
4	4	4	4
8	8	8	8
16	16	16	16
32	32	32	32
64	64		
128	128		
256	256		
512	512		

**PAUSE!** **RESET!**

Cache Size (bytes)

64

Single Step...

Full Speed!

Controls

Counter

Percent (%)

Number (#)

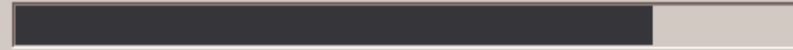
**TESTS!**

Hits



2

Misses (total)



9

Misses (collision)



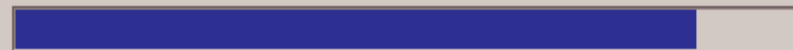
2

Misses (initialization)



7

Initialized



7

Summary

Address Fields

H/M	Block #	Tag	Set (Line) #	Block Offset	Byte Offset
	00	0000000001000111000001001111	0	0	00

Reference 04654320 DEC <--> BIN 00000000010001110000010011110000

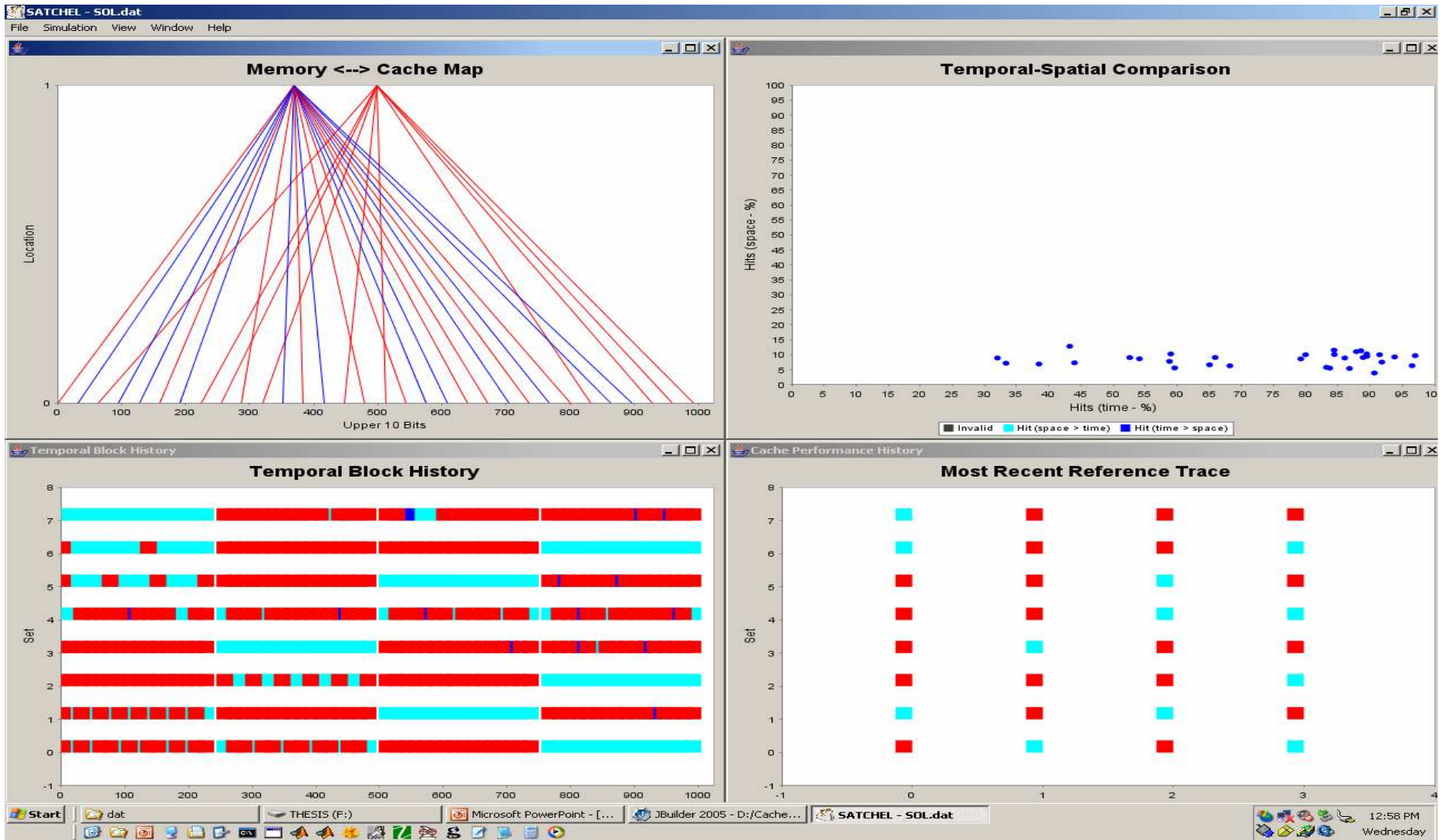
# Cache Visualization



Color	Meaning
Grey	Not initialized
Green	Hit
Yellow	Miss (initialization)
Red	Miss (contention)

32 x 2-way set associative

# Future Visualizations



# Concluding Remarks

- Spring 2005 Comments
- Extensions
- Results
- Questions