

The background is a dark blue field filled with white, yellow, and blue circuit-like lines. These lines form various geometric shapes, including rectangles, circles, and paths that resemble electronic traces. Some lines end in small circles, while others are open. The lines are scattered across the entire frame, creating a technical and digital aesthetic.

Computer Organization and Architecture Project

CCCS 217



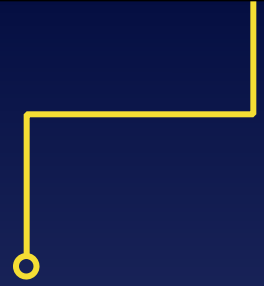
GROUP OF MEMBERS



1. Hala Sarwi - 2111394
 2. Reem Alsayed - 2110712
 3. Lara Alofi - 2110886
- 

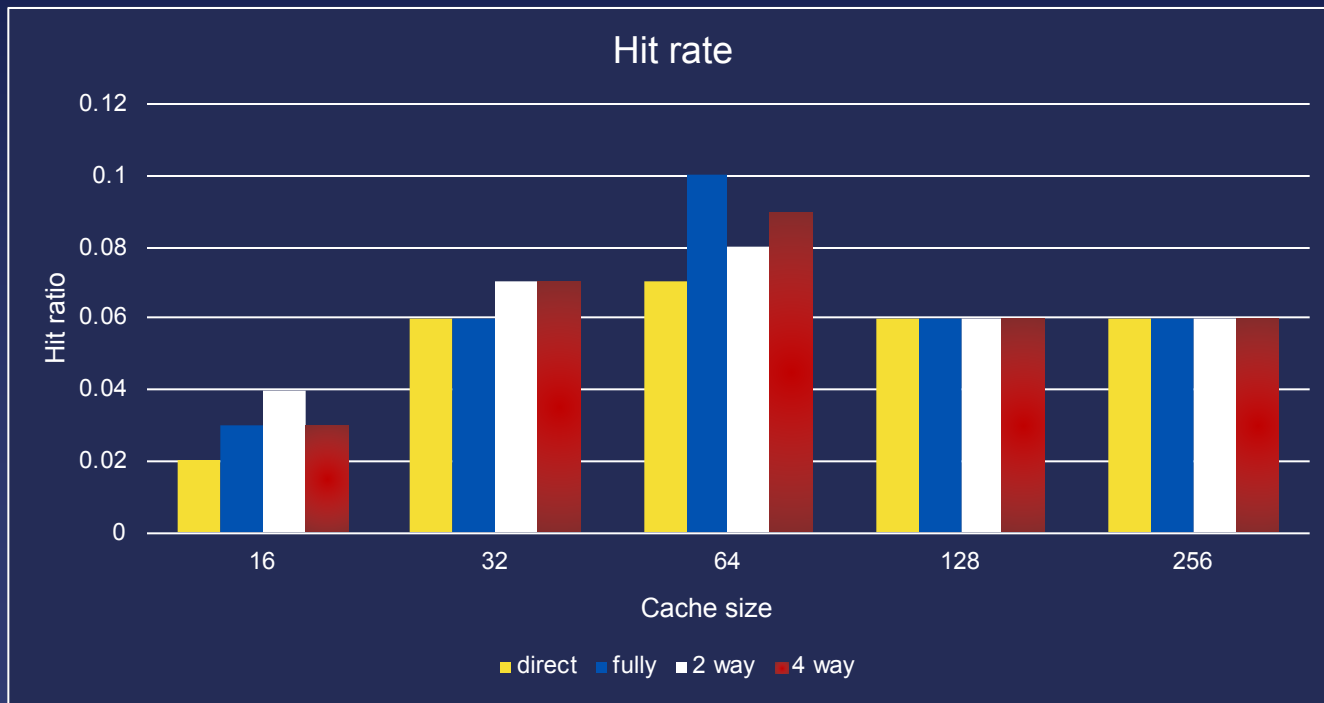
CONTENTS

- 4. Same size of caches
- 6. Difference size of caches
- 7. Tag
- 8. C
- 12. Output of code



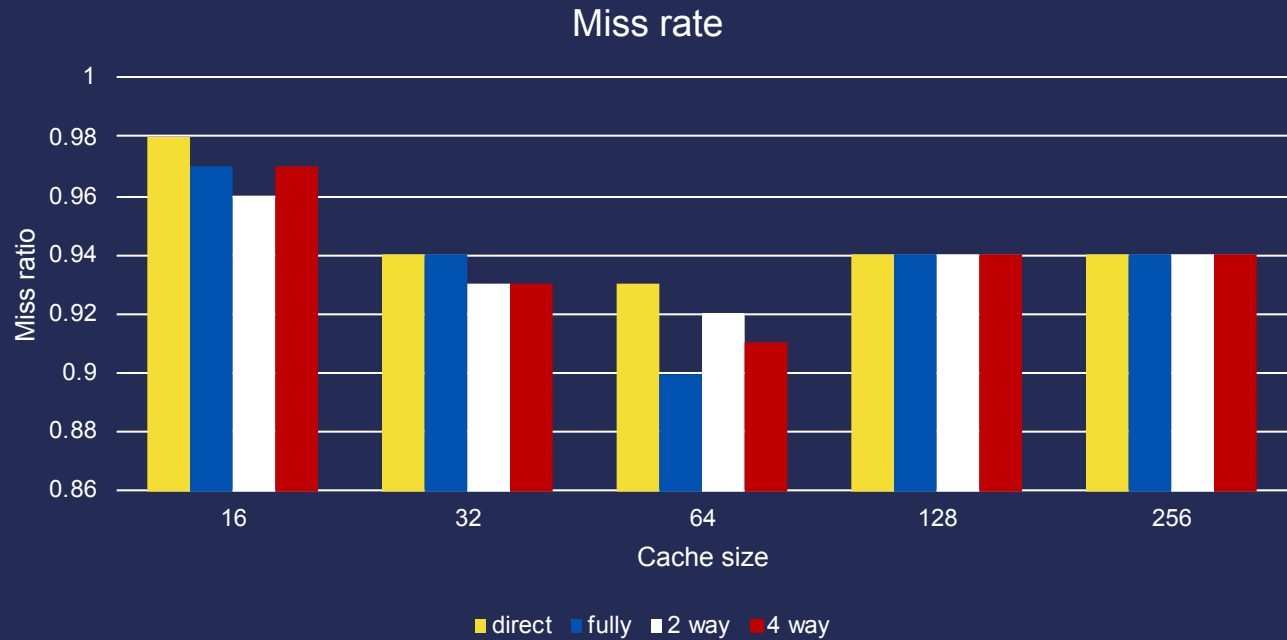
A - SAME SIZE OF CACHE

Memory Size: 512



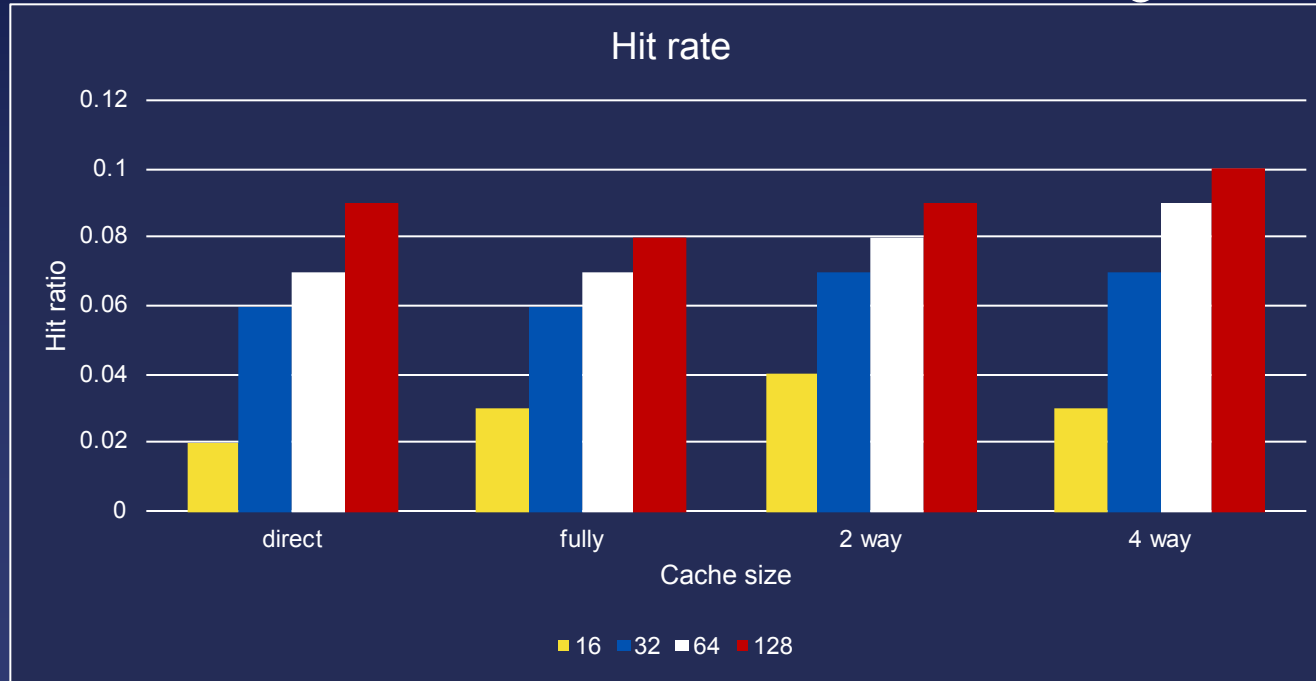
A - SAME SIZE OF CACHE

Memory Size: 512



B - DIFFERENCE SIZE OF CACHE

Memory Size: 512



C-

Memory Size: 512

Allocate		98	
Memory Size (power of 2)	512		
Offset Bits	0		
		Gen. 88 Random Instructions	Submit

D- Direct Mapping

Tag	Index(line)	Offset (Word)
100	000100	0
3 bit	6 bit	0 bit

MEMORY SIZE = 512 $\rightarrow 2^9$, CACHE SIZE = 64 $\rightarrow 2^6$, BLOCK/LINE OFFSET = 0

PHYSICAL ADDRESS = $\text{LOG}_2 512 = 9$ BITS

9 BITS WILL BE DIVIDED INTO TAG AND CACHE LINE

NUMBER OF LINES = $\text{CACHE SIZE} / \text{LINE SIZE}$

NUMBER OF LINES = $2^6 / 2^0 = 2^6 \rightarrow$ LINE INDEX OF 6 BITS

NUMBER OF BLOCKS = $\text{MEMORY SIZE} / \text{BLOCK SIZE}$

NUMBER OF BLOCKS = $2^9 / 2^0 = 2^9 \rightarrow$ BLOCK INDEX OF 9 BITS

TAG = BLOCK INDEX - LINE INDEX

TAG = $9 - 6 = 3$ BITS

TAG OF 3 BITS WILL IDENTIFY WHICH PARTICULAR BLOCK IS CURRENTLY STORED IN A SPECIFIC LINE.

D- Fully Associative

Tag	Offset (Word)
100010100	0
9 bit	0 bit

MEMORY SIZE = 512 $\rightarrow 2^9$, CACHE SIZE = 64 $\rightarrow 2^6$, BLOCK/LINE OFFSET = 0

PHYSICAL ADDRESS = $\log_2 512 = 9$ BITS

NUMBER OF BLOCKS = CACHE SIZE / BLOCK SIZE

NUMBER OF BLOCKS = $2^9 / 2^0 = 2^9 \rightarrow$ BLOCK INDEX OF 9 BITS

TAG BIT SIZE = BLOCK INDEX

TAG = 9 BITS

D- 2-Way associative

Tag	Index (Set)	Offset (Word)
111	100110	0
3 bit	6 bit	0 bit

MEMORY SIZE = 512 $\rightarrow 2^9$, CACHE SIZE = 64 $\rightarrow 2^6$, BLOCK/LINE OFFSET = 0

PHYSICAL ADDRESS = $\log_2 512 = 9$ BITS

9 BITS WILL BE DIVIDED INTO TAG AND SET INDEX

NUMBER OF LINES = CACHE SIZE / LINE SIZE

NUMBER OF LINES = $2^6 / 2^0 = 2^6$

NUMBER OF SET = NUMBER OF LINES / SET SIZE

NUMBER OF SET = $2^6 / 2^2 = 2^4$

SET INDEX = 4 BITS

TAG = ADDRESS LENGTH - (NUMBER OF SET + OFFSET)

TAG = $9 - (4 + 0) = 5$ BITS

TO IDENTIFY WHICH BLOCK IS MAPPED TO A SPECIFIC LINE, WE ONLY SEARCH INSIDE THE SET THAT THE BLOCK IS MAPPED TO USING COMPARATOS OF SIZE 2 BITS.

D- 4-Way associative

Tag	Index (Set)	Offset (Word)
00111	1100	0
5 bit	4 bit	0 bit

MEMORY SIZE = 512 $\rightarrow 2^9$, CACHE SIZE = 64 $\rightarrow 2^6$, BLOCK/LINE OFFSET = 0

PHYSICAL ADDRESS = $\log_2 512 = 9$ BITS

9 BITS WILL BE DIVIDED INTO TAG AND SET INDEX

NUMBER OF LINES = CACHE SIZE / LINE SIZE

NUMBER OF LINES = $2^6 / 2^0 = 2^6$

NUMBER OF SET = NUMBER OF LINES / SET SIZE

NUMBER OF SET = $2^6 / 2^2 = 2^4$

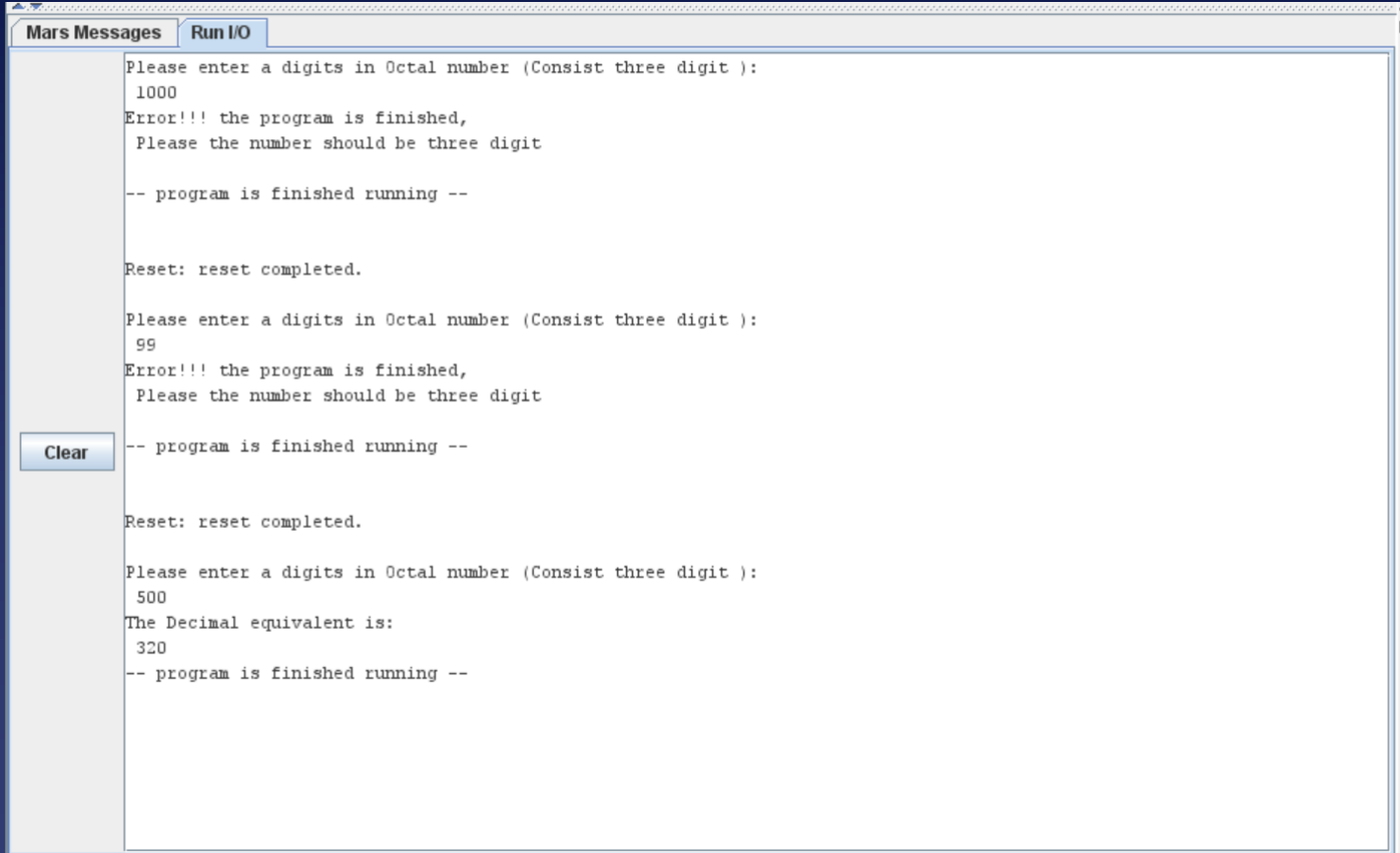
SET INDEX = 4 BITS

TAG = ADDRESS LENGTH - (NUMBER OF SET + OFFSET)

TAG = $9 - (4 + 0) = 5$ BITS

TO IDENTIFY WHICH BLOCK IS MAPPED TO A SPECIFIC LINE, WE ONLY SEARCH INSIDE THE SET THAT THE BLOCK IS MAPPED TO USING COMPARATORS OF SIZE 5 BITS.

OUTPUT OF CODE



The screenshot shows a window titled "Mars Messages" with a "Run I/O" button. The output text is as follows:

```
Please enter a digits in Octal number (Consist three digit ):
1000
Error!!! the program is finished,
Please the number should be three digit

-- program is finished running --

Reset: reset completed.

Please enter a digits in Octal number (Consist three digit ):
99
Error!!! the program is finished,
Please the number should be three digit

-- program is finished running --

Reset: reset completed.

Please enter a digits in Octal number (Consist three digit ):
500
The Decimal equivalent is:
320
-- program is finished running --
```

A "Clear" button is visible on the left side of the window.



**THANKS FOR
LISTENING**