Cache Quiz

Due Mar 12 at 11:59pm **Points** 100 **Questions** 11

Available until Mar 13 at 11:59pm Time Limit None Allowed Attempts 3

Instructions

- This quiz should be done by yourself
- If you have questions please come to office hours
- If you find any mistakes in any of the questions, please let us know about them and we will fix them as soon as possible.

Take the Quiz Again

Attempt History

	Attempt	Time	Score
KEPT	Attempt 2	51 minutes	87.96 out of 100
LATEST	Attempt 2	51 minutes	87.96 out of 100
	Attempt 1	21,431 minutes	82.24 out of 100

① Correct answers are hidden.

Score for this attempt: 87.96 out of 100

Submitted Mar 12 at 6:56pm This attempt took 51 minutes.

Question 1	9 / 9 pts
You have a Direct Mapped ca	che with following parameters
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After partitioning the address, which is 32 bits big, into Tag, Set, and Offset, how many bits will be in each field?

	Tag		Set	Offse
Bits per field	[Select]	*	[Select]	∨ [Se
4				>
Ansv	ver 1:			
2	25			
Ansv	ver 2:			
5				

Answer 3:

2

Partial

Question 2

3 / 9 pts

You have a Fully Associative cache with following parameters

Cache Data Size (C)	8192	
Block Size (b)	64	

After partitioning the address, which is 32 bits big, into Tag, Set, and Offset, how many bits will be in each field?

	Tag	Set	Offset
Bits per field	21	5	6

Answer 1:

21

Answer 2:			
5			
Answer 3:			

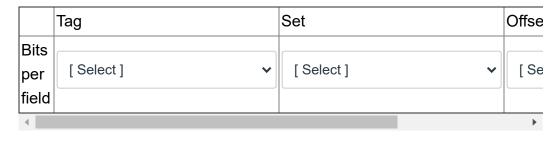
Question 3

9 / 9 pts

You have a K-Way set associative cache with following parameters

Cache Data Size (C)	2048
Block Size (b)	16
Blocks/Ways per set (K)	4

After partitioning the address, which is 32 bits big, into Tag, Set, and Offset, how many bits will be in each field?



Answer 1:

23

Answer 2:

5

Answer 3:

4

Question 4

9 / 9 pts

You have a single level cache system with the following setup

• CPU -- Cache -- Memory

The system has the following properties

Cache Access Time	763ns
Cache Hit Rate	76%
Memory Access Time	2,397ns

What is the average memory access time?

Report your answer to TWO decimal places.

1,338.28

Question 5

9 / 9 pts

You have a two-level cache system with the following set up

• CPU -- Cache 1 -- Cache 2 -- Memory

The system has the following properties

Cache1 Access Time	40ns
Cache1 Hit Rate	75%
Cache2 Access Time	257ns
Cache2 Hit Rate	90%
Memory Access Time	2,264ns

9 / 9 pts

What is the average memory access time?

Report your answer to **TWO** decimal places.

160.85

Question 6

You have a three-level cache system with the following set up

• CPU -- Cache 1 -- Cache 2 -- Cache 3 -- Memory

The system has the following properties

Cache1 Access Time	26ns
Cache1 Hit Rate	92%
Cache2 Access Time	298ns
Cache2 Hit Rate	78%
Cache3 Access Time	129ns
Cache3 Hit Rate	100%
Memory Access Time	1,623ns

What is the average memory access time?

Report your answer to **TWO** decimal places.

52.11

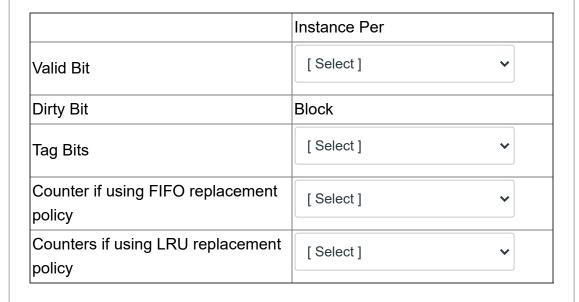
Question 7	9 / 9 pts
Select all of the statements that are TRUE	
☐ A Write Through Cache DOES have a dirty bit	
A Write Through Cache does NOT have a dirty bit	
A Write Back Cache DOES have a dirty bit	
A Write Back Cache does NOT have a dirty bit	

Partial

Question 8 7.2 / 9 pts

For each of the following overhead bits, select whether there are these bits per cache, per set, per block, or per value.

• Assume the cache is a K-way set associative cache.

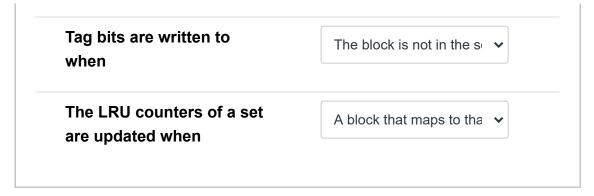


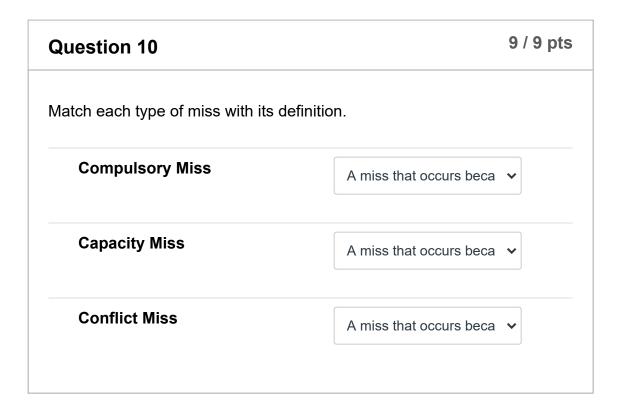
Answer 1:

Block	
Answer 2:	
Block	
Answer 3:	
Block	
Answer 4:	
Set	
Answer 5:	
Set	

Partial

6.43 / 9 pts **Question 9** For each action, match it with when it occurs. For this problem assume the cache is a K-way set associative cache using a Least Recently Used replacement policy. Valid Bit Is set to 0 when The computer is turned Valid bit is set to 1 when The cache reads a block > Dirty Bit is set to 0 when The computer is turned Dirty Bit is set to 1 when The CPU writes to this k A block is evicted from the The block is not in the se cache when





Partial

Question 11 8.33 / 10 pts

For each of the cache modifications that we could perform, select whether it will increase, decrease, have no effect, or have an unknown effect on the parameter.

- An unknown effect means that it could either decrease or increase the parameter in question.
- · No effect also includes marginal or very little effect
- When answering for multilevel caching, answer based on the caching system as a whole.

Improvement	Hit Rate		Cache Access Time
Increase Cache Size (C)	[Select]	•	[Select]
Increase Associativity(K)	[Select]	~	[Select]
Increase Block Size(b)	[Select]	~	[Select]
Use Multilevel Caching	[Select]	~	[Select]
1			
Answer 1:			
Increase			
Answer 2:			
Increase			
Answer 3:			
Unknown			
Answer 4:			
Increase			
Answer 5:			
Increase			
Answer 6:			
Unknown			
Answer 7:			
Unknown			
Answer 8:			
Increase			

Answer 9:	
Unknown	
Answer 10:	
Increase	
Answer 11:	
Increase	
Answer 12:	
Increase	

Quiz Score: 87.96 out of 100