0/8 Questions Answered

Check-in Quiz 04, memory allocaiton, caches, threads

Q1
1 Point

When will MMU evict an entry from TLB? Select all that apply.

- [ ] When a requested virtual page number is missed in the TLB and TLB is full.
- [ ] When a requested virtual page number is hit in the TLB.
- [ ] When an entry in the page table is evicted from memory to swap file and the same address is also evicted from the TLB.

Save Answer

Q2
1 Point

The best-fit memory allocation scheme always results in less fragmentation and satisfies more block requests compared to the first-fit scheme.

True

False

Save Answer

Q3
2 Points

Lets say that someone wanted to allocate 99 contiguous pages using the buddy algorithm. You can assume that the buddy algorithm is able to complete this allocation request.

Q3.1
1 Point

How many pages would be allocated by the buddy algorithm?

Please simplify your answer to a number (e.g. `1337`), do not leave any exponents or multiplication symbols in your answer.

Save Answer

Q3.2
1 Point

How many pages of the allocation would be fragmentation?

Please simplify your answer to a number (e.g. `1337`), do not leave any exponents or multiplication symbols in your answer.

Save Answer

Q4 Cache
4 Points

For this question, assume that we are working in an architecture that has 64-byte cache lines.

Lets say we had the following C array:

```
// array of bytes. Array is 1024 long
uint8_t data[1024];
```

For simplicity, assume that:

- our L1 cache can only hold 1 cache line of the array data at a time
- any other data accessed outside of the array is inside the cache already (and won't be evicted)
- the array is aligned to a cache line (the first byte in the array is the beginning of a new cache line)

Lets say we had the following C Code to initialize the array:

```
// array of bytes. Array is 1024 long
uint8_t data[4096];
for (int i = 0; i < 1024; i++) {
  data[i] = rand()  % 256;  // assign it a random number
}
```

Q4.1
2 Points

How many times will the cache miss (data we access is not in the cache) when setting `data[i]`?

Assume that the cache originally contains no cache lines that contain a part of the `data` array.

Save Answer

Q4.2
2 Points

How many times will the cache hit (data we access is in the cache) when setting `data[i]`?

Assume that the cache originally contains no cache lines that contain a part of the `data` array.

Save Answer

Q5 Threads vs Processes
2 Points

Q5.1
1 Point

Which of these are unique to every thread?

- [ ] Data in Files on Disk
- [ ] File Descriptors
- [ ] Global Variables
- [ ] Dynamic Storage (The Heap)
- [ ] Local Variables (The Stack)
- [ ] CPU Registers

Save Answer

Q5.2
1 Point

Which of these are unique to every process?

- [ ] Data in Files on Disk
- [ ] File Descriptors
- [ ] Global Variables
- [ ] Dynamic Storage (The Heap)
- [ ] Local Variables (The Stack)
- [ ] CPU Registers

Save Answer

Save All Answers

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