CSPB 2400 - Park - Computer Systems

Started on	Monday, 15 April 2024, 6:39 PM
State	Finished
Completed on	Monday, 15 April 2024, 6:44 PM
Time taken	4 mins 14 secs
Marks	20.00/20.00
Grade	**10.00** out of 10.00 (**100**%)

Question **1**

Correct

Mark 1.00 out of 1.00

Mark & sweep garbage collectors are called conservative if:

Select one:

- a. They coalesce freed memory only when a memory request cannot be satisfied.
- b. They treat everything that looks like a pointer as a pointer. ✔
- c. They perform garbage collection only when they run out of memory.
- d. They do not free memory blocks forming a cyclic list.

Your answer is correct.

Question **2**

Correct

Mark 1.00 out of 1.00

Pick all that apply. You are penalized for incorrect answers.

Multi-level page tables...

Select one or more:

- [x] a. are used to implement large address spaces ✔
- [ ] b. act as a cache for virtual memory mapping
- [x] c. reduce the overhead of virtual memory ✔
- [ ] d. are used to speed the lookup of page table entries

Your answer is correct.

Question **3**

Correct

Mark 1.00 out of 1.00

Pick all which are correct. You are penalized for incorrect answers.

The TLB...

Select one or more:

- [x] a. acts as a cache for page table entries ✔
- [x] b. is accessed on each memory reference ✔
- [ ] c. is a four-level structure used to establish page mappings
- [ ] d. uses the physical address to determine access permissions

Your answer is correct.

Question **4**

Correct

Mark 1.00 out of 1.00

Select all the actions that occur when a **fork()** system call is performed. You will be penalized for incorrect answers.

Select one or more:

- [ ] a. memory regions are deallocated
- [ ] b. copies are made of each page in the stack segment
- [x] c. copies of the **mm_struct** are made ✔
- [x] d. data structures are created for the new process ✔
- [x] e. all pages are marked as read only ✔

Your answer is correct.

Question **5**

Correct

Mark 1.00 out of 1.00

When using a computer without virtual memory, which of the following are true (more than one may be true). You will be penalized for incorrect answers.

Select one or more:

- [ ] a. It is possible to share the memory of another process.
- [ ] b. No process may access the memory of another process.
- [x] c. All processes can always access the memory of other processes. ✔

Your answer is correct.

Question **6**

Correct

Mark 1.00 out of 1.00

In the implicit allocator system you worked on in the lab, up to 50% of the space can be wasted due to internal fragmentation.

Select one:

- True ✔
- False

Correct - the minimum payload size is 8 bytes and the overhead is also 8 bytes

Question **7**

Correct

Mark 1.00 out of 1.00

The first-fit memory allocation algorithm is slower than the best-fit algorithm (on average).

Select one:

- True
- False ✔

Question **8**

Correct

Mark 1.00 out of 1.00

In an allocator using an implicit free list, the header contains an allocated bit and the size of the current block ✔ .

Question **9**

Correct

Mark 12.00 out of 12.00

This problem will have you analyze the allocation pattern of a memory allocator to assess how different allocation policies affect where data is allocated and the corresponding fragmentation.

Assume that memory is word addressed and each word in the diagram below holds a single datum. To simplify the problem, assume there are not "header" and "footer" words and only allocate the words indicated in the call to **malloc**.

The heap is shown below and it is initially empty.

Memory address:	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**
Heap:											

Now we have the scenario of these instructions:

1: p1 = malloc(3);

2: p2 = malloc(3);

3: p3 = malloc(2);

4: p4 = malloc(3);

5: free(P1);

6: free(p3);

7: p5 = malloc(2);

8: free(p2);

9: free(p4);

10: p6 = malloc(6);

11:free(p5);

12: p7 = malloc(6);

If the heap is using the first fit policy in allocating blocks, what is the value of p5 after instruction 7th execution? 1 ✔

If the heap is using the best fit policy in allocating blocks, what is the value of p5 after instruction 7th execution? 7 ✔

If the heap is using the best fit policy in allocating blocks, what is the value of p6 after instruction 10th execution? 1 ✔

If the heap is using the best fit policy in allocating blocks, what is the value of p7 after instruction 12th execution? Null ✔