Homework 8

Gavin Monroe - ComS 352

1. (20 points) Exercise 9.13

Using First-fit

- P1 will be allotted to F4. Therefore, F4 will have a final area of 5MB from (205 - 200).
- P2 will be allotted to F1. Therefore, F1 will have a last area of 85MB from (100 - 15).
- P3 will be allotted F5. Therefore, F5 will have a closing area of 115MB from (300 - 185).
- P4 will be allotted to the closing house of F1. Since F1 has a closing house of 85MB, if P4 is assigned there, the final area of F1 will be 10MB from (85 - 75).
- P5 will be allotted to F6. Therefore, F6 will have a last area of 10MB from (185 - 175).
- P6 will be allotted to F2. Therefore, F2 will have an ultimate area of 90MB from (170 - 80).

The ultimate free house whilst the use of First-fit include: F1 having 10MB, F2 having 90MB, F3 having 40MB as it used to be now not used at all, F4 having 5MB, F5 having 115MB and F6 having 10MB.

Using Best-fit

- P1 will be allotted to F4. Therefore, F4 will have an ultimate house of 5MB from (205 - 200).
- P2 will be allotted to F3. Therefore, F3 will have a closing area of 25MB from (40 - 15).
- P3 will be allotted to F6. Therefore, F6 will have no ultimate area as it is completely occupied with the aid of P3.
- P4 will be allotted to F1. Therefore, F1 will have a final area of 25MB from (100 - 75).
- P5 will be allotted to F5. Therefore, F5 will have a closing house of 125MB from (300 - 175).
- P6 will be allotted to the phase of the last area of F5. Therefore, F5 will have a last area of 45MB from (125 - 80).

The closing free house whilst the use of Best-fit include: F1 having 25MB, F2 having 170MB as it was once no longer used at all, F3 having 25MB, F4 having 5MB, F5 having 45MB and F6 having no house remaining.

Using Worst-fit

- P1 will be allotted to F5. Therefore, F5 will have an ultimate house of 100MB from (300 - 200).
- P2 will be allotted to F4. Therefore, F4 will have a last house of 190MB from (205 - 15).
- P3 will be allotted to the section of F4 final space. Therefore, F4 will have a last area

of 5MB from (190 - 185).

- P4 will be allotted to F6. Therefore, the final area of F6 will be 110MB from (185 - 75).
- P5 will no longer be allotted to any of the accessible areas due to the fact none can include it.
- P6 will be allotted to F2. Therefore, F2 will have a last house of 90MB from (170 - 80).

The last free area whilst the use of Worst-fit include: F1 having 100MB, F2 having 90MB, F3 having 40MB, F4 having 5MB, F5 having 100MB and F6 having 110MB.

Explanation:

First-fit allocation method to the very first on hand reminiscence that can comprise the process.

Best-fit allocate procedure to the reminiscence that precisely incorporates the method whilst attempting to decrease advent of smaller partitions that may lead to wastage.

Worst-fit allocation method to the greatest handy memory.

From the reply given; best-fit operates nicely as all procedures are allotted to reminiscence and it reduces wastage in the structure of the smaller partition. Worst-fit is certainly the worst as some method may want to no longer be assigned to any reminiscence partition.

2. (10 points) Exercise 9.15 (a) and (b)

Statement of Theory 1:
Contiguous reminiscence allocation scheme suffers from exterior fragmentation as address areas are allocated contiguously and holes boost as historic methods die and new methods are initiated. It additionally does not now permit procedures to share code, on the grounds that a process's digital reminiscence section is no longer damaged into non-contiguous fine-grained segments.

Statement of Theory 2:
Pure segmentation additionally suffers from external fragmentation as a section of a technique is laid out contiguously in bodily reminiscence and fragmentation would appear as segments of useless methods are changed with the aid of segments of new processes. Segmentation, however, permits strategies to share code; for instance, two one-of-a-kind strategies may want to share a code section however have wonderful date segments.

Statement of Theory 3:
Pure paging does now not go through from external fragmentation, however as an alternative suffers from interior fragmentations. Processes are allotted in web page granularity and if a web page is now not definitely utilized, it results in inside fragmentation and a corresponding wastage of space. Paging additionally allows strategies to share code at the granularity of pages.

3. (12 points) Exercise 9.21 (a) and (b)

1KB = 1024;

Address	Page Number (Address / 1024)	Offset (Address mod 1024)
21205 20	725	
164250	160 410	

4. (12 points) A process' logical address consists of 4 pages and page size is 2KB. The page table of the process is given in Figure 9.9.
Compute the physical address for each of the following logical addresses (provided as decimal numbers).
a. 1500
b. 7500

Page size is 2KB = 2096

a) 1500
Add. offset = 1500 % 2096 = 1500
Page # = 1500 / 2096 = 0
Frame for Page 0 = 1
So, physical for logical address 1500 = 1 * 2096 + 1500
= 3596

b) 7500
Add. offset = 7500 % 2096 = 1212
Page # = 7500 / 2096 = 3
Frame = Page 3 = 7
So, physical for logical address 7500 = 7 * 2096 + 1212
= 15884

5. (10 points) Exercise 9.23

(a) How many bits are required in the logical address?
Size of logical address space = 2m = # of pages x page size
= 2048 × 4096
= 211 x 212
= 223
So the # of required bits in the logical address =23 bit

(b) How many bits are required in the physical address?
Size of physical address space = # of frames × frame size
(frame size = page size)
Size of physical address space = 512 × 4096
2m =29 × 212
2m = 221
# of required bits in the physical address =21 bit

6. (6 points) Consider a computer system with a 32-bit logical address and 8-KB page size. The system supports up to 1GB of physical memory. How many entries are there in a page table?

Continue Down.

Logical Address Space size = 2^32 bytes
Physical Memory size = 1GB = 2^30 bytes
Page size = 8 KB = 2^3 * 2^10 bytes = 2^13 bytes

a)# of entries in single-level page table = Number of pages in the Logical Memory
= 2^32 bytes / 2^13 bytes = 2^19 entries

b)# of entries in inverted page table = number of pages/frames in the Physical memory
= 2^30 / 2^13 = 2^17 entries