

Assignment 2

CISC324 – Fall 2021

Deadline Nov 11, 2021 at 11:59 PM

Question 1: (6 Marks)

Consider a three programs. Inside the CPU they occupy virtual memory addresses of 0x0000 to 0x10FE (4350) for the first program, and 0x0000 to 0x0FFF (4095) for program 2, and 0x0000 to 0x2A1B (10779) for program 3; when each is run in the CPU separately.

All of these programs are loaded into the memory. Assume that the user memory is fully available 100%. And a contiguous memory allocation method for allocation of memory is used. The allocation at user memory starts at 0x1000 memory address. Finally assume they are allocated next to each other.

In the table below enter the following values of all programs after they are loaded into RAM memory:

- Base Register,
- Limit Register,
- RAM Start Address, and
- RAM End Address.

The Starting and Ending of the program addresses in the RAM are inclusive. For example: assume a program is located at address between 0x1000 and 0x20AB, it means the memory units of 0x1000 and 0x20AB are occupied by the program along with all bytes in-between.

CPU Start Address	CPU End Address	Base Register	Limit Register	RAM Start Address	RAM End Address
0x0000	0x10FE	0x1000	0x10FF	0x1000	0x20FE
0x0000	0x0FFF	0x20FF	0x1000	0x20FF	0x30FE
0x0000	0x2A1B	0x30FF	0x2A1C	0x30FF	0x5B1B

Question 2: (2 Marks)

A computer system has a 32-bit virtual address space with a page size of 8K.
How many pages are in the virtual address space?

$$8k = 2^{13} \text{ bytes} = 2^{15} \text{ bits}$$
$$32\text{-bit} = 2^{32}$$

$$\begin{aligned} \text{Pages} &= (\text{v_address_space})/(\text{page size}) \\ &= (2^{32})/(2^{15}) \\ &= 131,072 \text{ pages} \\ &= 2^{17} \text{ pages} \end{aligned}$$

Question 3: (2 Marks)

If a page size 4096 bytes and process size is 128,517 bytes what would be the internal fragmentation size:

$$\begin{aligned} 128,517 \% 4096 &= 1441 \\ 4096 - 1441 &= 2655 \\ \text{Internal Fragmentation size} &= 2055 \text{ bytes} \end{aligned}$$

How to Submit:

Write your answers to the given questions in a file and name it according to this format 324-1234 –Assn2.pdf, where 1234 stands for your last 4 digits of your students ID. Notice the extension is “pdf” it is preferred to submit a pdf file. If you can not save your file as pdf then you may save it as a document.

Then upload “423-1234 –Assn1.pdf into Assignment 2 dropbox on onQ. You may upload several times if you wish , however, onQ only keeps the last uploaded file. Please check your files after uploading.

An “*I uploaded the wrong file*” excuse will result in a mark of zero, no exceptions please!

Also note that last uploaded file always replaces previous file, and onQ is set to have only the last uploaded file.