**SOLUTION**

**Spring 2021 CSC332,Sec K Quiz 3 100 Points**

**75 Min.**

**Submit your answers as an attachment and upload it** rather than directly typing your answers in BB system. Use  **Notepad or Word files**.

Q1. (50 Points) (Memory)

Consider a paging scheme.

Suppose the page frame size is 128 bytes.

Suppose all of process A is currently loaded in memory.

Assume the page i of process A is loaded in page frame

2i + 3 (for any page i of the process).

In process A, there is an array B[0..100].

Assume that each element of B occupies 2 bytes.

The physical address of the beginning byte of B[80]

(i.e., the byte 0 of B[80]) is 1000.

Compute the physical address of beginning byte of B[20].

Show your calculations. Clearly write down the final answer in one place.

**Solution:**

For B[80]: page frame # = 1000/128= 7. Offset=1000 – 128\*7 = 1000 – 896 = 104.

Page# is j. 2j+3= 7, so j =page#=2.

Logical address= 2\*128 + 104 = 360

For B[20]: logical addr = 360 – (80-20)\*2 = 240.

Page# = 240/128 = 1

Offset = 240 – 128\*1 = 112

Page frame# = 2\*1+3 = 5

Physical addr = 5\*128 + 112 = 640 + 112 = **752**

Q2. (50 Points) (Threads)

Cobegin-Coend are as discussed in slides.

Assume that **all** **the variables before cobegin are in heap; so they are shared** with the children threads.

As in slides, after coend is done (i.e., children thread have finished), the parent thread resumes execution.

What is the **MAXIMUM** value printed in this code?

Give one scenario that results in this output.

int X=5;

cobegin

S11: X = X + 1; S21: X = X - 1;

S12: X = X - 1; S22: X = X + 1;

coend;

print(X);

**Answer:**

Max is 7. Scenario:

Thread 1 Thread 2

In S11, load X in R1.

Now R1==5

Start and finish S21.

Finish rest of S11.

(R1++; store R1 to X)

Now X==6

In S22, load X in R2.

Now R2==6

Start and finish S12

Finish rest of S22

(R2++; store R2 to X)

**Now X==7**