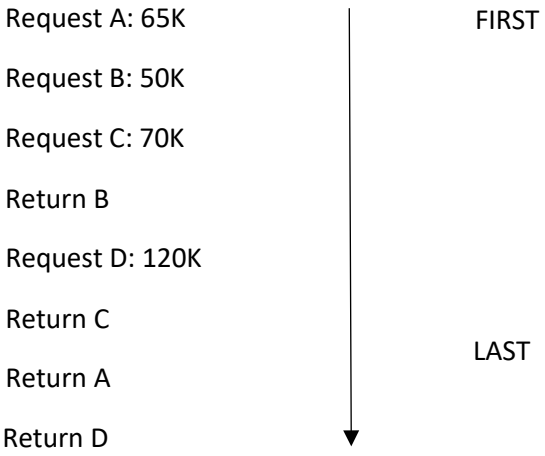
7SENG012W Operating Systems Tutorial questions

1. Resource allocation in a computer system has produced the following:

    - Process A holds resource r and wants w
    - Process B holds nothing and wants w
    - process C holds resource u and wants w and t
    - process D holds resource t and wants s
    - process E holds resource v and wants w
    - Process F holds resource s and wants u
    - Process G holds nothing and wants t

Show with the help of a diagram whether the system is deadlocked, and if so, which processes are involved and whether any of the processes can complete?

2. Assume that a computer system is equipped with 1024K memory starting at address 0. The memory is organised using the Buddy system. Initially all memory is free. Allocations and de-allocations are received as follows:



Show diagrammatically each of the steps including how allocations and deallocations

are carried out as well as the merger of blocks of memory.

3. A virtual memory has a page size of 2048 Bytes, six virtual pages and five physical page frames.

   The page table is as follows:

Virtual Page	Page Frame
0	3
1	Not in Memory
2	0
3	1
4	2
5	4

Generate a table showing the virtual addresses of each of the pages and the physical addresses of the existing page frames

Calculate the physical addresses for those of the following virtual addresses:

a. 1920
b. 2730
c. 655
d. 9120

4. Given a computer system using a linked list memory management scheme, with the following free list:

Element	Size
Element 1	100K
Element 2	100K
Element 3	270K
Element 4	300K
Element 5	200K
Element 6	350K

Using suitable tables, show how memory is allocated for each of the following memory management schemes:

- First fit
- Next fit
- Best fit
- Worst fit

In your answer, assume that the following four requests arrive in the order specified below:

Process 1	250K	FIRST
Process 2	50K	
Process 3	90K	
Process 4	80K	
Process 5	270K	LAST