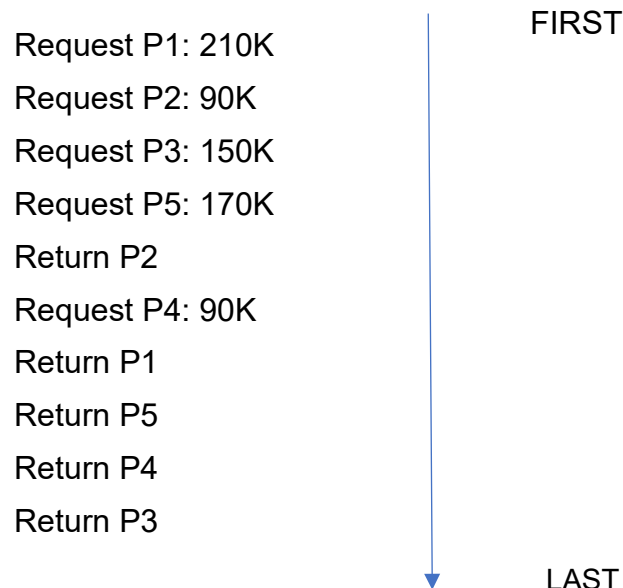# 7SENG012W Software Development Environments
Practice In-Class Test questions #2

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

FIRST

Request P1: 210K

Request P2: 90K

Request P3: 150K

Request P5: 170K

Return P2

Request P4: 90K

Return P1

Return P5

Return P4

Return P3

LAST

i. Show diagrammatically each of the steps including how allocations and de-allocations are carried out as well as the merger of blocks of memory.

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

Process **A** holds resource **t** and **z** and requests resources **g** and **y**

Process **B** holds resources **x** and requests resource **m** and **s**

Process **C** holds resource **f** and requests resources **x** and **y**

Process **D** holds resource **m** and requests resources **g** and **z**

Process **E** holds resource **s** and **x** and requests resource **t**

Process **F** holds resource **n** and requests resources **m** and **p**

Note there are two instances of resource x and only one instance of all other resources on the system.

i. Draw a resource-allocation diagram showing the current state of the system

ii. Describe the order in which the processes can complete. In your answer, highlight any potential or existing deadlocks clearly indicating which processes and resources are involved.

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

	Size
Element 1	300K
Element 2	100K
Element 3	50K
Element 4	150K
Element 5	200K

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	70K	FIRST
Process 2	50K	
Process 3	200K	
Process 4	150K	
Process 5	90K	LAST

4. A virtual memory has a page size of 1024K, seven virtual pages and five physical page frames.

The page table is as follows:

Virtual Page	Page Frame
0	2
1	4
2	3
3	1
4	6
5	Not in main memory
6	0

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

    ii.   Calculate the physical addresses for those of the following virtual addresses: 1015,4070,5130,6984

5. Consider the following data packet **1000010101**; insert the required hamming bits for transmission and determine their values using even parity

6. Considering the following data packet which includes the hamming bits with even parity, determine if there exists an error and if so the position where the error exists: **1101100**

7. Considering the following piece of binary data 1011011100 and using 101110 as the binary polynomial divisor, generate the appropriate CRC data packet that will be transmitted.

8. Convert the following decimal number to IEEE 32-bit floating-point number representation

-234.2

9. Describe what the ps -l command does on a Linux terminal

10. Using an 8 bit binary 2s complement representation show how 106 – 95 is evaluated (show all steps).

11. Explain the functionality of a repeater used in LAN Bus topology