**MASAI TECHNICAL TRAINING INSTITUTE**

**CRAFT CERTIFICATE IN INFORMATION TECHNOLOGY**

**MODULE 1**

**OPERATING SYSTEMS C.A.T.**

**2013 Term II – 18th June, 2013.**

**54 Minutes**

INSTRUCTIONS

Answer **ALL** questions.

1. (a) With the aid of sketches, distinguish between internal and external fragmentation as applied in memory management.

***Internal fragmentation***







(6mks)

(b) Explain the function of page table as applied in memory management. (2mks)

Functionality enhanced by page tables

• Code (instructions) is read-only

– A bad pointer can’t change the program code

• Dereferencing a null pointer is an error caught by hardware

– Don’t use the first page of the virtual address space – mark it as

invalid – so references to address 0 cause an interrupt

• Inter-process memory protection

– My address XYZ is different that your address XYZ

• Shared libraries

– All running C programs use libc

– Have only one (partial) copy in physical memory, not one per

process

– All page table entries mapping libc point to the same set of physical

frames

• DLL’s in Windows

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1. (a) A variable partition memory system has holes of the following sizes:

60k 45k 120k 180k 30k 75k

A new process of size 75k is to be loaded into one of the holes.

Determine the most appropriate hole to be used for each of the following placement policies:

1. best fit;
2. first fit;
3. worst fit. (6mks)

(b) Explain four conditions that must hold for a deadlock to occur in a multiprogramming system. (8mks)

* Mutual exclusion
  + Only one process may use a resource at a time
* Hold-and-wait
  + A process may hold allocated resources while awaiting assignment of others
* No preemption
  + No resource can be forcibly removed form a process holding it
* Circular wait
  + A closed chain of processes exists, such that each process holds at least one resource needed by the next process in the chain

1. (a) Outline four objectives of memory management within an operating system. (4mks)

(b) With the aid of sketches, describe the segmentation process as applied in memory management. (4mks)