1a) Instance of a program that is being executed by 1 or more threads

* Provides illusion of concurrency
* Provides isolation between programs
* Allows better utilisation of resources

b)

4 states where you go z,x,z,x and you get 2 2/3rd

2 states where you go z,z,x,x and you get 1 1/3rd

c) There is never a deadlock as each student can use 3 computers each with 5 to spare and so 5 students can finish their projects, freeing up computers for other students and so on

d) Access Control List: a list of permission attached to an object

Capabilities: a token which designates an object and gives the program the authority to perform a specific set of actions on that object

ACL pros: harder to forge unauthorised user since ACL would need to be modified

Cap pros: does not care about user identity, so is flexible

2a) A hypervisor is a type of Virtual Machine Monitor (partitions hardware among different OSs) which runs on ‘bare metal’.

Type 1: When a virtual machine attempts to perform a priveleged operation the instruction is trapped to the hypervisor which is grouped tightly with the kernel mode.

Type 2: the hypervisor sits in user mode, therefore any priveleged operation must be sent through the host operating system.

Virtualisation intercepts all instructions and emulates their execution on actual hardware.

A hypervisor gives better performance than virtualisation and with type 2, you can use services, like scheduling from the host OS. Virtualisation’s obsticle is that on some architectures, some sensitive instructions don’t trap.

b) Array of 1s and 0s to indicate if a block is free: 1 for not free, 0 for free

Advantage is that less memory is needed, faster processing times when compared to a linked list – more specifically updating/adding and reading is faster in a bitmap than in a list.

ii) Contiguous File Allocation

+ Successive logical records typically physically adjacent

- External fragmentation

- Poor performance if files grow and shrink over time

Block chaining

iii)

ci) Raid 1: A backup is necessary due to important data

ii) Raid 0: Large (can store more if no backups), temporary storage space integrity doesn’t m

iii) Raid 5: Both speed and data integrity is needed here