IT5002 Computer Systems and Applications
Tutorial 8 Suggested Solutions

Question 1

It is explained in the lecture. The problem with allocation is that, in order to minimize the meta-data, we allocate memory in blocks of fixed size. As such, in every block, some memory remains unused. This leads to internal fragmentation. Now, when we allocate a large area of memory, this will take several blocks. We need these blocks to be contiguous. It may be the case that our system might have the required number of free blocks that would cover the allocation request, but if these blocks are not contiguous, it is not possible to carry the allocation request through. This is external fragmentation.

Internal fragmentation can be reduced by smaller size of allocation blocks.
External fragmentation can be reduced by relocating occupied blocks.

Question 2

(a) 219+430, legal access
(b) 2300+10, legal access
(c) 1327+500, legal access
(d) 1952+400, illegal access

Question 3

List the blocks in the system

(a) 256 allocated, 256 free, 512 free
(b) 256 allocated, 128 allocated, 128 free, 512 free
(c) 256 allocated, 128 allocated, 64 allocated, 64 free, 512 free
(d) 256 a, 128 a, 64 a, 64 f, 256 a, 256 f
(e) -- first block freed
256 f, 128 a, 64 a, 64 f, 256 a, 256 f
(f) -- third block freed
256 f, 128 a, 128 f, 256 a, 256 f
(g) -- fourth block freed
256 f, 128 a, 128 f, 512 f