Memory Management - some questions

1. What is the virtual address space of a process? Sketch a possible VA space for a process in a 32-bit architecture. Assume that the OS occupies half the VA space. Include memory mapped I/O and resident OS code.

2. What are the advantages of dynamic (run-time) relocation?

   - what minimal hardware is needed to support it?
   - does it avoid fragmentation of main memory?
   - does it make fragmentation easier for the OS to handle (if so, how)?

3. What is swap space?

4. Must all of a process be loaded into main memory when it is scheduled to run? Discuss assuming a)segmentation, b)paging hardware. Outline how the hardware would be used and the design of data structures such as segment and page tables.

5. How would you arrange for an OS to support processes larger than main memory assuming a)segmentation, b)paging hardware? Outline how the hardware would be used and the design of data structures such as segment and page tables.

6. How can sharing e.g. of execute-only code, be supported using a)segmentation, b)paging and c)segmentation with paging?

7. How can unshared and shared code be protected using a)segmentation, b)paging and c)segmentation with paging?

8. For the VA space you sketched in Qu1, indicate for each region whether a)caching and b)mapping in the MMU, is appropriate.