1. What is the difference between system and storage memory? Elaborate your answer with an example of a person working on his Laptop Computer, using a Power Point application from the Microsoft Office suite to draft his presentation slides.

   System → RAM ect

2. What memory type (SRAM, DRAM, NOR Flash, NAND Flash etc) would you use to implement the cache in Processor Cx1006-200M16 in the case study notes? Explain your choice.

   Sram fast, ex transistr   *Dram ok, page, Lhear. refresh*

3. Name two main types of Flash memory available in the market. What are the differences between them? Which application/product areas are they used in?

   NOR NAND   *NOR → System/XIP*   *NAND → USB/SDD*

4. Reference the two HDDs listed in the case study notes (HDD001 and HDD002)

   O1: 256MB O2: 1GB

   a. What is the **capacity** of each drive?

   Seek + Delay = 5×10^{-3} S + $\frac{1}{5000 \div 60} \div 2$ = 0.011 S

   b. For HDD001,
      i. What is its **access time**?
      ii. What is the time needed to transfer a 4Kbyte file stored in random non-consecutive sectors on different tracks? Assume that every sector is on a different track *$4 \times 2^{10} \div 512 = 8$ sector $T_T = \frac{512}{RPS \times 512 \times 128} = 0.09375$ ms*

      0.09375 + 0.011 = 0.08875,

      iii. After defragmenting HDD001, what would be the time needed to transfer a 280Kbyte file?

      $\frac{1}{RPS} \times 4 + \frac{512 \times 128 \times 0.375}{RPS \times 512 \times 128} + 0.011 \times 5 = 0.1075$ S

      $280 \times 2^{10} \div (512)(128) = 4.375$

   c. If you are building a Network Access Storage for your home to act as a backup storage for your home's computers, which HDD would you choose? Justify your choice. MTTF in the HDD parameters refer to Mean-Time-To-Failure. It's a statistical approximation of how long a product could last before failing. Note that MTTF=1M hours doesn't mean the product's mean time to failure is 1M hours, but the larger MTTF value does indicate that the product is more reliable (statistically).

   d. Would you use a SSD instead for Q4(c) above? Since SSD is more robust than HDD and robustness is very important for backup storage.

   ex√

5. What would be the memory choices for the system and storage memory for the use case scenario below? Justify your memory choice selection in terms of functionality, performance and cost.

   a. Entry level Microsoft Windows desktop computer for general office use but needs huge data storage capacity to store videos relating to the company product.

6. The main active storage of Data Centers are HDD. But HDD is prone to crashing due to the mechanical nature of its design. How does these centers mitigate this issue?

(Not necessary to be covered during tutorial)

7. Why does the Processor Cx1006-200M16 has two different types of non-volatile memory (Flash and EEPROM) on-chip? (Hint: Compare the Block/Page Size of the two memories).