






Name: Sang Hwa Lee

This exam has five (5) short answer questions with each question is worth five (5) points. The exam is worth a total of twenty-five (25) points.

Exams are **individual work**. Permitted materials include *your* notes, the lecture slides, recorded lectures, and any assigned or optional readings. Internet searches are not a permitted resource.

Table 1: Permitted Resources

	 OPEN NOTES	 USE BOOK	 SEARCH ONLINE	 ASK FRIENDS	 WORK IN GROUPS
Exams	✓	✓	✗	✗	✗

Your submission will be collected via Turnitin on our course ELMS page. For information about Turnitin, how it works, and the feedback reports you may have access to, visit [Turnitin Originality Checker for Students](#). The Turnitin report will show the report to you after you submit. **If Turnitin identifies part of the instructions or submission template as potential plagiarism, you do not need to worry.** Common responses based on the material I have provided will sometimes be identified. A high score is not sufficient to raise concerns. I provide this report to you because my goal is to avoid any potential issues.

## Honor Pledge

The University has a nationally recognized Honor Code, administered by the Student Honor Council. The Student Honor Council proposed and the University Senate approved an Honor Pledge. The University of Maryland Honor Pledge reads:

*I pledge on my honor that I have not given or received any unauthorized assistance on this assignment/examination.*

**Please type the honor pledge in the space provided below.** Students who fail to write and sign the Pledge will be asked to confer with the instructor.

(<https://studentconduct.umd.edu/you/students/honor-pledge>)

*I pledge on my honor that I have not given or received any unauthorized assistance on this assignment/examination.*

– Sang Hwa Lee –

## Questions

1. Your friend is really excited to play a new video game. In preparation he has been researching upgrades to his computer. When talking to him, he mentions that he needs to buy more RAM because he is running out of storage space on his laptop and won't have room to install the game. Use the primary and secondary storage to gently explain to your friend how he is mistaken and what hardware he should look to purchase.

Answer:

Friend misunderstands about RAM and storage. RAM is the primary storage that needed to quickly use data on his computer. However, he needs more storage space. So, I can recommends replace his secondary storage space like HDD or SSD which has large capacity. Also, I can recommend external hard drive or USB flash drive.

**Reference : (Slide 27,30,34~36, week 3-1)**

2. We agreed to say that modern computers implement the von Neumann architecture. Explain how the von Neumann architecture makes our computers vulnerable to viruses when the Harvard Architecture would not.

Answer:

The von Neumann architecture is set to have a single bus, with no distinction between data memory and program memory. This means that all memory can store all program elements, data, and instructions. That means viruses can act as if they were memory instructions and malfunction the computer. However, the Harvard architecture is not vulnerable to viruses because data and instructions are stored in separate memory.

**Reference : (Slide 12, week 1-2),  
<https://www.livescience.com/20718-computer-history.html>**

3. In the LMC, one of the pre-conditions was that the program existed in memory when the computer started, but this isn't how modern computers work. Identify and explain the process that takes your computer from having nothing in memory and no programs running to the environment you expect when interacting with a modern computer.

Answer: **Bootting (process)**

Bootting is process of initializing a computer by having smaller programs load larger programs until the Operating System. **Reference : (Slide 16, week 5-1)**  
Usually, bootting process is 1)BIOS, 2)POST, 3)Bootstrap, 4)Bootloader, 5)OS.

BIOS - The CPU is turned on and the CPU gets the BIOS data in ROM.

POST - The BIOS runs POST(Power on self-test) to verify that the hardware is functioning properly.

Bootstrap - If there is no problem with POST, the BIOS executes the bootstrap to read the booting information to memory.

Bootloader - The role of reading the operating system to memory.

OS - The CPU runs the first process through the imported operating system commands.

4. Explain why R and Python are more popular with information professionals than alternative programming languages. Your answer should clearly explain the difference between low-level and high-level languages. Be sure to include a clear description of compiled and interpreted languages and to identify where R and Python fall into these categories.

Answer:

High-level language features are programmer friendly. It is more readable and easier to handle than lower programming languages. Easy to debug. It can run on any platform. A compiler is required for translation. This helps programmers create code efficiently. However, memory efficiency is poor.

The characteristic of low-level languages is machine friendly. It is difficult for programmers to understand, and debugs are relatively complex. The machine is dependent and requires assemblers for translation. Relatively complex maintenance and management. Therefore, considerable knowledge and effort are required when writing a program.

That's why R and Python, which have high-level language features, are more popular with information experts than alternative programming languages.

**Reference :** <https://www.bbc.co.uk/bitesize/guides/zkcck2p/revision/1>

**(Provided by professor)**

5. You are purchasing a new server for your company. This server will be home to data that is critical to the success of the business. Identify one of the RAID levels that would protect this data from loss if a drive failed for some reason. Explain why the chosen RAID configuration makes sense in this situation making sure to describe how this configuration would protect the data.

Answer:

RAID 1 is data storage that is reliable and safe. The company wants to protect its data without losing it. RAID 1 allows data to continue to be available to other drives even if one of the drives is completely lost. It uses a method of mirroring the data, so you can keep your data safe. Therefore, RAID 1 is the best option for your situation.

**Reference : (Slide 39 ~ 43 week 3-1)**

## Works Cited

*Slice 27, week 3-1 (Module 03)*

*Slide 16, week 5-1 (Module 04)*

*Slide 12, week 1-2 (Module 00)*

*Slide 39 ~ 43 week 3-1 (Module 03)*

BBC. (n.d.). *Low-level languages - types of programming language - edexcel - GCSE computer science revision - edexcel - BBC bitesize*. BBC News. Retrieved October 9, 2022, from <https://www.bbc.co.uk/bitesize/guides/zkcck2p/revision/1>

Williamson, T. (2022, January 25). *History of computers: A brief timeline*. LiveScience. Retrieved October 9, 2022, from <https://www.livescience.com/20718-computer-history.html>