

Assignment 2



"I confirm that I will keep the content of this assignment confidential. I confirm that I have not received any unauthorized assistance in preparing for or writing this assignment. I acknowledge that a mark of 0 may be assigned for copied work."

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Section 1

Question 1:

1. Name at least four CPU status flags. (1 point)
 - a. Carry Flag
 - b. Sign Flag
 - c. Zero Flag
 - d. Interruption Flag
2. In 32-bit mode, aside from the stack pointer (ESP), what other register points to variables on the stack? (1 point)
 - a. Stack Base Pointer Register (EBP)
 - b. Stack Segment (SS)
3. At which levels can an assembly language program manipulate input/output? List all three of them. (2 points)
 - a. Hardware, Operating System and Bios
4. In real-address mode, convert the following hexadecimal segment-offset address to a linear address: OCEC:0130. (2 points)

OCEC:0130		OCEC + 0130		0D11C
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5. Which two additional steps are required in the instruction execution cycle when a memory operand is used? (2 points)
 - a. Fetch Memory Operands
 - b. Store Memory Operands
6. Briefly explain why do game programs often send their sound output directly to the sound card's hardware ports? (2 points)
 - a. The reason why game programs often send their sounds output directly to the sound card's hardware ports is that it often tries to take benefits of the of the newest and latest features in specialized sound cards. MS-Windows is less prone than MS-DOS game applications.

Question 2:

- i. Briefly explain the main differences between Logical and Physical Memory Addresses (4 points)

Logical Memory Address	Physical Memory Address
Generated by CPU while running program	Identified as physical location of required data in memory.
Is a virtual address, also known as Virtual Address	Can access by its corresponding logical address.
The set of all logical addresses generated by a program's perspective is called Logical Address Space	All physical addresses corresponding to the logical addresses in a Logical address space is called Physical Address Space
The hardware device called Memory-Management Unit is used for mapping logical address to its corresponding physical address.	The logical address must be mapped to the physical address by MMU before they are used.

- ii. Briefly explain the main differences between Flat Segment and Multi-Segment Models (6 points)

Paging	Segmentation
Paging is a method which is used for non-contiguous memory allocation.	Segmentation is another non-contiguous memory allocation scheme like paging
It is a fixed size partitioning theme	It is variable size partitioning theme
Both main memory and secondary memory are divided into equal fixed size partitions	Process is not divided indiscriminately into fixed size pages
The partitions of secondary memory area unit known as pages	The partitions of secondary memory area unit known as segments

- iii. Intel has announced four new processor families recently. Discuss the performance improvements of the latest Intel microprocessors. (10 points)
- Intel has announced four new processor families during its CES 2021 news conference.
 - Intel launched the 11th Gen Intel Core vPro and Intel Evo vPro platform. The company also launched the new series N-Series Intel Pentium Silver and Intel Celeron Processor for educational-targeted systems.

Intel Core vPro Intel Evo vPro
<ul style="list-style-type: none"> The new Intel Core/Evo vPro will focus on business-class performance and experience while delivering the most comprehensive hardware-based security. Intel's new Control-Flow Enforcement Tech will immediately shut down the whole class of attacks which was sometimes get by software solutions. Intel Evo vPro will provide immense visual experience and will upgrade the battery-life of the laptop, Enhance the instance wake-up and better responsiveness. Both Core and Evo vPro will feature Intel Xe Graphics, Thunderbolt 4 ports and Optane memory H2O with SSD. Intel also claims Core vPro processor are designed to accelerate Artificial Intelligence related application and workflows.

Intel Pentium Silver Intel Celeron Process
<ul style="list-style-type: none">• Designed for Educational purposes• Both processors are designed on 10nm architecture and can deliver up to 35% better application performance.• Improved Graphic performance by 78%.• Processors are strong enough for browsing while multitasking, plus advance camara and connectivity feature for better and smooth video conference and better visual experience.