

**CSE321**  
**Home Quiz 1**  
**Total Marks: 15**  
**Deadline: 30 January (During Class Time)**

**Note: Hardcopies should be submitted, softcopies not allowed. Deadline is fixed. It will not be extended. There will be no make up of take home quizzes.**

**Name:**

**ID:**

**Section:**

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**Answer all the questions below.**

**Q1 [2 marks]:** Before playing a game you have updated your graphics driver and adjusted the screen resolution from settings. Then you have launched the game and started recording the screen using a third party recorder. Specify what types of softwares you have used here. Relate them with proper logic.

**Q2 [1.5 marks]:** Briefly explain about kernel and its necessity.

**Q3 [2 marks]:** Explain logically why main memory is typically volatile?

**Q4 [1.5 marks]:** Explain how modern OS are interrupt driven?

**Q5 [3 marks]:** In a doctor's chamber potential patients need to follow 2 steps in order to consult the doctor. First, they have to take a serial over the phone. If they get serials then the first 20 patients of the serial get called for the consultation. After getting called, patients need to maintain a queue of 5 pupils according to their serials and others need to wait. Once a patient gets called by the doctor, a patient from waiting can join in the queue according to the serial. Logically explain which functions from operating systems structure have similarities with the above scenario?

**Q6 [2.5 marks]:** Differentiate between multiprocessor and clustered systems.

**Q7 [2.5 marks]:** Differentiate between monolithic and microkernel structures.

# CSE321

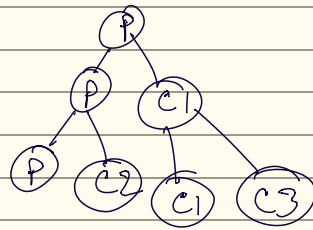
## Take Home Exam 1

Marks: 10

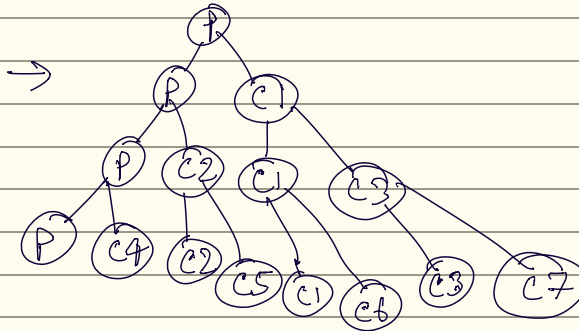
1.	<p><b>Describe</b> the requirements of multiprogramming</p>	2
2.	<p><b>Explain</b> the loading of the operating system into memory during booting</p> <p>Bootstrap Program:</p> <p>When a computer system is powered up or rebooted, the initial program that runs to start the system is called the bootstrap program or bootstrap loader. The bootstrap program is typically stored in firmware (e.g., ROM or EEPROM) and is responsible for locating the operating system kernel, loading it into main memory, and initiating its execution.</p> <p>Bootstrap Process:</p> <p>The bootstrap program is executed by the CPU upon system startup. It performs basic hardware initialization, such as setting up system registers, initializing devices, and configuring memory. The bootstrap program locates the operating system kernel on a storage device (e.g., hard disk) and loads it into main memory for execution.</p> <p>Loading the Kernel:</p> <p>Once the bootstrap program has identified the location of the operating system kernel, it reads the kernel image from the storage device into a specific area of main memory. The kernel image is loaded into a reserved portion of memory known as the kernel space, where it can access system resources and manage hardware components.</p>	2
3.	<p>Which OS structure is more extensible? <b>Explain</b> why.</p> <p>microkernel structure- as i can add more features faster</p>	2

4.	<b>Discuss</b> the protection of the operating system using dual-mode operation	<b>2</b>
5.	<b>Explain</b> the main challenge in multiprocessor systems	<b>2</b>

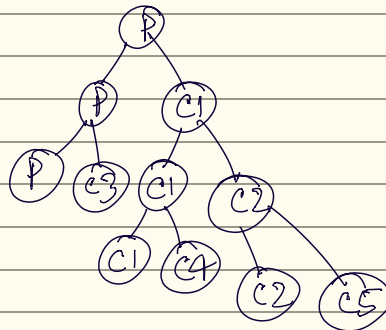
i) fork();  
 fork();  
 printf("A");  
 ↓  
 AAAA



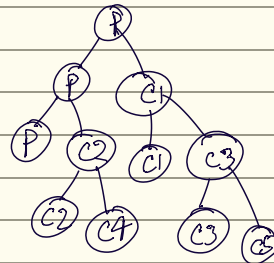
ii) fork();  
 fork();  
 fork();  
 printf("A");  
 ↓  
 AAAAAAA



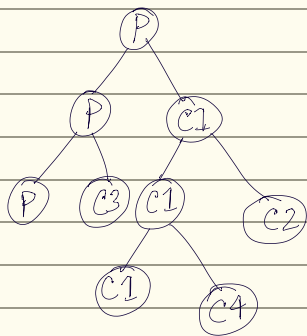
iii) a = fork();  
 if (a == 0)  
 fork();  
 fork();  
 printf("A");  
 ↓  
 AAAAA



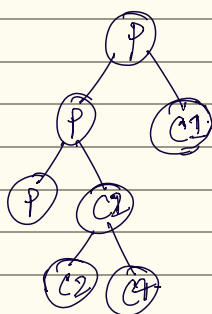
iv) fork();  
 a = fork();  
 if (a == 0)  
 fork();  
 printf("A");  
 ↓  
 AAAAA



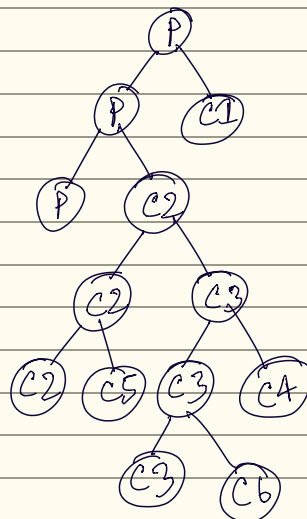
1.  
if (fork() || fork())  
fork();



2.  
if (fork()) {  
if (!fork()) {  
fork();  
printf("1");  
}  
else {  
printf("2");  
}  
}  
else {  
printf("3");  
}  
printf("4");

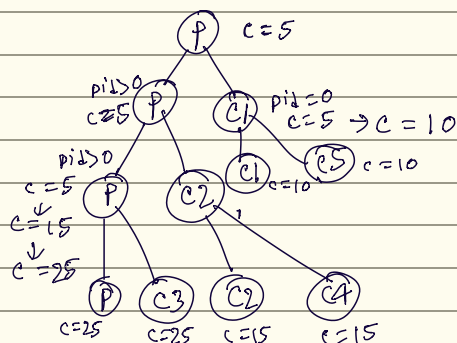


3.  
if (fork() && (!fork())) {  
if (fork() || fork()) {  
fork();  
}  
}  
printf("2");



2 2 2 2 2 2 2

4.  
c = 5;  
pid = fork();  
if (pid == 0)  
c += 5;  
else {  
pid = fork();  
c += 10;  
if (pid) {  
c += 10;  
}  
}  
fork();  
printf("id: %d, c: %d");



→ Total 6 processes

→ Possible output of c = {10, 15, 25}

Name: \_\_\_\_\_ ID: \_\_\_\_\_ Section: \_\_\_\_\_

Department of Computer Science and Engineering

CSE321: Operating Systems

Spring 2024

Take Home Quiz-1

Full Marks: 5

Submission: During the Class of 30/1/24

*Please remember that you just have to write very short answers to the given questions. Please submit only handwritten answers.*

1. What role does the kernel play in an operating system?
2. Explain the concept of a device abstraction layer in the context of system software.
3. Explain the purpose of a file system in an operating system.
4. What is the significance of system calls in the interaction between application software and the operating system?
5. How do real-time operating systems (RTOS) differ from general-purpose operating systems?
6. Where is the Bootstrap Program typically stored?
7. What is the primary purpose of User Mode in dual-mode operation?
8. How does the dual-mode operation enhance system security?
9. How does a layered operating system handle communication between different layers, and what challenges may arise?
10. Explain the trade-offs between monolithic and microkernel operating system architectures.

**CSE321**  
**Take Home Quiz 1**  
**Total Marks: 15**  
**Deadline: 6 February (During Lab Class Time)**

**Note: Hardcopies should be submitted, softcopies are not allowed. Deadline is fixed and will not be extended. There will be no make up of take home quizzes.**

<b>Name:</b>	<b>ID:</b>	<b>Section:</b>
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**Answer all the questions below.**

**Read the scenario below for questions 1-4.**

You powered on your personal computer and waited for some time. After logging in, you checked your agendas for the day in the default calendar app. Then you opened the mail application to send an email to your advisor. After your advising was complete, you visualized your finalized class routine in a spreadsheet. While doing your work you were listening to some music in Spotify running in the background.

1. What types of softwares did you use? Mention each of the above softwares and their types. [2]
2. What is a bootstrap program and where is it stored? [2]
3. Elaborate the complete sequence of starting the operating system. [3]
4. How does dual mode operation prevent unwanted access to the operating system? [2]
5. How does layered operating system provide its services. State an advantage and disadvantage of it. [3]
6. State the roles of long term scheduler and short term scheduler. Why is long term scheduler important? [3]

## **CSE321**

**SEC:10**

### **TAKE HOME QUIZ**

**Total Marks : 20**

**Deadline:3/2/24 (During Class Time)**

**\*\*\*\*\*You must submit the Hard Copy\*\*\*\*\***

**Q1)** Explain the difference between multiprogramming & multitasking. [2]

**Q2)** How two modes of hardware provides security to the Operating System? [2]

**Q3)** What are the requirements of multi-programming? Explain the characteristics of each requirement. [2]

**Q4)** What are the limitations of Monolithic and Layered architecture? How does Microkernel structure overcome those limitations? [2.5]

**Q5)** What are the types of system calls? Explain each briefly. [2]

**Q6)** Explain the potential security risks in a time-sharing environment. [2.5]

**Q7)** Imagine a software developer working on a critical project with strict deadlines. Their work involves compiling large codebases, running performance tests, and debugging complex algorithms.

Explain which approach would be more appropriate between a time-sharing system and a single-user system in this scenario. [3.5]

**Q8)** A technology company is planning to upgrade its server infrastructure to support a variety of tasks, including web hosting, database management, and virtualization. They need to decide whether to implement symmetric multiprocessing or asymmetric multiprocessing for their system. Recommend the most suitable approach for their server infrastructure. [3.5]



