



TUNA EDU

INFO1112

刷题

Tutor: Eric

About Tutor

- * INFO1112: 87 分, 双专业均分 80+
- * Bachelor of Advanced Computing First Class Honors 毕业
- * 获悉大 Vice-Chancellor Scholarship
- * 两年授课经验, 教授过两届 21 年和 22 年 INFO1112, 过 4 门课程, 有 100+ 学生
- * 大中小厂实习工作经历

About us

图南教育是一家由悉尼大学留学生自发创立的, 专为在澳留学生提供教育培训类服务的海外教育企业。帮助同学轻松通关 USYD 是我们的宗旨, 协助学生高效得分是我们的出发点和归宿。

“图南”取自《庄子·逍遥游》中“背负青天……而后乃今将图南”一文。意在帮助广大留学生群体攻克语言障碍, 成为“莫之夭阏者”, 摆脱“挂科”、“低分”噩梦, 向“High Distinction”进发。

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1. 注意事项

- 这套题目偏简单，注重打好基础
- 考试中合理分配时间
 - 选择题：2 min max, $20 \times 2 = 40\text{min}$
 - 简答题：3 min max, $20 \times 3 = 60\text{min}$
 - Shell: 10min
 - 检查：10min
- 简答题首先判断答案中的点，然后踩点答题
- 使用简单直接的语言
- 正确使用专有名词

2. MCQ 单选题

1. Which of the following best describes the function of an operating system in managing hardware resources?
 - a) Converts high-level language to machine code.
 - b) Provides a user interface for interaction.
 - c) Manages and allocates memory, processing power, and storage.**
 - d) Acts as a security layer for network communication.
2. In a Unix-based system, what does the command `ls -l` display?
 - a) List of all running processes.
 - b) Long format listing of directory contents.**
 - c) Network configuration details.
 - d) System memory usage.
3. If a binary number is represented as 1010, its decimal equivalent is:
 - a) 10**
 - b) 8
 - c) 12

d) 5

4. Which of the following is the correct decimal for binary number 1010 in two's complement?

a) 12

b) 10

c) 6

d) -6

5. An operating system's primary function in managing a CPU includes:

a) Rendering 3D graphics.

b) Executing machine code instructions.

c) Connecting to network services.

d) Translating programming languages.

6. What is the result of using the command `grep 'abc' file.txt` in a Unix-based system?

a) Lists all files in the directory.

b) Searches for and displays lines containing 'abc' in 'file.txt'.

c) Changes the file permissions of 'file.txt'.

d) None of the above.

7. Which symbol is used in Unix shell to redirect the output of a command to a file?

a) |

b) >

c) &

d) \$

8. What does the command `chmod 755 filename` do?

a) Changes the owner of the file.

b) Deletes the file after 755 minutes.

c) Assigns read, write, and execute permissions to the owner, and read and execute permissions to others.

d) Assigns read, write, and execute permissions to the owner, and read and write permissions to group.

9. What is the primary function of the `fork` system call in Unix/Linux?

- a) To terminate a process.
- b) To create a new process by duplicating the existing process.**
- c) To change the priority of a process.
- d) To send a signal to a process.

10. Which component is first executed when a computer is turned on, initiating the bootstrap process?

- a) Operating System.
- b) Firmware.**
- c) Hard Drive.
- d) Kernel.

11. In Unix/Linux, what's the effect of using "renice -n 5 process" if the original nice value of process is 10?

- a) Lists all active processes.
- b) Increase the priority of the process.**
- c) Decrease the priority of the process.
- d) Creates a new process.

12. What is the purpose of virtual memory in an operating system?

- a) To store temporary files.
- b) To provide additional RAM using disk space.**
- c) To increase CPU speed.
- d) To manage network connections.

13. What is the primary purpose of using emulators in computing?

- a) To increase the processing speed of the computer.
- b) To emulate the instruction set of a different computing architecture.**
- c) To provide additional storage space.

d) To enhance the graphical capabilities of the system.

14. What does the Transmission Control Protocol (TCP) provide in TCP/IP networking?

- a) Physical connection to the internet.
- b) Unique IP addresses for devices.
- c) Reliable, ordered delivery of a stream of packets on the internet.**
- d) Encryption of data for secure communication.

15. What is the main purpose of a routing table in a network router?

- a) To store passwords and user credentials.
- b) To determine the best path for data packets to reach their destination.**
- c) To store the data being transmitted over the network.
- d) To list the devices currently connected to the network.

16. Which of the following best describes symmetric key encryption?

- a) Encryption and decryption keys are different and not related.
- b) The same key is used for both encryption and decryption.**
- c) No keys are used in the encryption process.
- d) The encryption process is reversible without a key.

17. In a public-key infrastructure (PKI), what role does the Certificate Authority (CA) play?

- a) Encrypts data using the public key.
- b) Generates public and private keys for users.
- c) Issues and manages digital certificates.**
- d) Creates and stores symmetric keys.

18. Which of the following is a fundamental characteristic of cloud computing?

- a) Reduced data security.
- b) Limited scalability.
- c) On-demand self-service.**
- d) Dependence on local hardware.

3. True/False 判断对错题

1. ASCII and Unicode are both character encoding standards, but Unicode supports a significantly larger number of characters. **T**
2. In Unix-based systems, every file is treated as a directory. **F**
3. sed command in Unix is primarily used for sorting data. **F**
4. The 'kill' command in Unix/Linux can only terminate processes. **F**
5. A zombie process in Unix/Linux is a process that has completed execution but still has an entry in the process table. **T**
6. In Unix/Linux, every file is considered a process. **F**
7. Emulators are typically faster than the actual hardware they are emulating. **F**
8. Subnet masks are used to identify which part of an IP address represents the network and which part represents the host. **T**
9. A single IP address can be used by multiple devices on the same network simultaneously. **F**
10. DNS servers store a database of domain names and their corresponding IP addresses. **T**
11. The SMTP protocol is used for fetching web pages from servers. **F**
12. Encrypting a message guarantees that only the intended recipient can read it. **F**
13. Digital certificates are used to verify the owner of a public key **T**

4. Short Answer Question 简答题

1. Describe the significance of system calls in the context of an operating system.

- Interface for users to access computer resources
- File operations, creating a new process

System calls act as an interface for users to access computer resources via kernel. They help perform operations like creating or opening files and creating a new process.

2. What are regular expressions and how are they used in Unix?

- What are regex? - pattern matching tool, finds strings that matches a given pattern
- How are they used? Used in grep command or other commands

Regex is a pattern matching tool. It finds strings that matches a given pattern. It is used in various commands like grep to filter and process text.

3. How does the chmod command work in Unix and what is its significance?

- chmod grants or cancels file read, write, execute permissions for user, group and others
- It ensures files are only accessed by designated users, ensuring security.

4. Describe the boot sequence of a computer system.

The boot sequence involves initial hardware checks, jump instruction executed, firmware loading MBR, which starts GRUB, which starts kernel, which starts init and init starts everything else.

What is MBR and explain its function in linux boot sequence.

- Master Boot Record is the boot program that firmware loads into memory.
- It is the first boot program which loads the GRUB.

5. Explain the concept of virtual memory and how it benefits system performance.

- Virtual memory allows a computer to use disk storage as an extension of RAM, enabling the execution of more or larger programs than the physical memory can accommodate.
- This process improves system performance by efficiently managing memory resources.
- Virtual memory also facilitates shared memory among different processes, allowing for the reuse of common components such as library imports.
- One of the key features of virtual memory is 'copy-on-write,' where system memory is copied to a new location only when modifications are made, enhancing efficiency. This feature is particularly useful in optimizing the use of memory when forking processes or handling large data sets.

6. Explain the concept of virtual machines and their common uses.

- Virtual machines are software that emulate an actual operating system.
- Virtual machines are used for isolation, where malware run in the virtual system and do not harm the actual OS; testing: VM enables testing in another OS with only one physical device.

7. Explain the concept of packet switching and its advantages over circuit switching.

- Packet switching: break data into small packets, send each packet individually over network.

- Higher fault tolerance; packet switching is more reliable if there's a connection failure
- Bandwidth is not limited; circuit switching has fixed bandwidth but packet switching can adjust the bandwidth depending on the traffic.

8. Describe how IP addressing works in a network.

- A unique IP address is assigned to each device on the network.
- The IP address is used to identify source and destination and helps routing the packet to reach the correct device.

9. In the context of a TCP/IP model, describe how the data encapsulation process works when data is transmitted from a source to a destination over a network.

- In the TCP/IP model, data encapsulation involves wrapping data with protocol information at each layer of the model. Data is encapsulated with headers (and sometimes trailers) as it moves down the layers, and each header contains control and addressing information.

10. How do subnet masks contribute to network organization and management?

- divide the IP address into network and host parts
- create subnetworks within an IP address space, improving network performance and security

11. Describe how digital signatures provide authenticity.

- Digital signatures provide authenticity (confirming the sender's identity) using asymmetric cryptography. It proves that the sender has the private key that he/she is supposed to have.

12. Discuss the difference between symmetric and asymmetric encryption.

- Symmetric: use same key; generally faster
- Asymmetric: use different but related key, generally slower

13. Describe the concept of 'serverless computing' in the cloud.

- a cloud computing model where the cloud provider manages server allocation and scaling
- developers to focus solely on writing and deploying code without worrying about the underlying infrastructure
- Pay by only the time of running the code

14. List the key components of the Window System and explain their role.

- Key components of the X Window system is the X server, X client and window manager.
- X server is responsible for handling requests to render GUI elements.
- X clients are individual applications the users interact with; they send requests to X server in response to users' actions.
- The window manager is a client and is responsible for the overall appearance of the window system.

15. What is Dalvik VM? What's the difference between a Dalvik VM and VM you installed on your computer?

- Dalvik VM is a virtual machine used in Android devices for running apps,
- optimized for mobile devices.
- Unlike general-purpose VMs on computers, Dalvik VM is designed specifically for Android's mobile environment and runs .dex files compiled from JAVA.

16. Suppose you are doing the INFO1112 homework 7, and you suddenly forgot how to use python list. You decided to google it up.

(a) Briefly describe what happens at your computer after you tap in "python list" in your browser's search bar and hit enter using the TCP/IP model.

- "python list" are wrapped with application data, becomes HTTP request
- Then TCP layer is wrapped around the application layer
- Then IP layer is wrapped around TCP layer, specifying the IP of google server
- Then IP packet is wrapped with ethernet header and trailer, ready to be sent out

(b) What happens outside your computer? How does your search of "python list" reach the google server?

- LAN routing: the packet reaches gateway address and ethernet header and trailer are removed
- WAN routing: it hops to a series of routers based on the routing table in the routers until it reaches the google server.

(c) How does the DHCP protocol enable you to complete this search?

- DHCP assigns IP address to my computer, completing IP packet with source address.

- DHCP provides the address of DNS server, which helps us to find the IP address of google server.

(d) What would be different if you use an Android phone instead of a computer to complete this search?

- Nothing is different.

17. You are communicating your friend online via a public channel. You want to send to your friend a video of his last birthday party where he made a mess. Both of you don't want others to acquire or see the video.

(a) What could you do to ensure no one else but you and your friend sees the video?

- Symmetric encryption
- Asymmetric encryption

(b) Your friend has been acting weird and you suspect someone might stole his identity. You know your friend has a secret token or private key that only he processes. How would you ask your friend to prove his identity?

- Digital certificate

(c) You also want to ensure that the video reaches your friend untempered. How would you ensure the video's integrity?

- Hash

5. Bash

Create a Bash script that takes a directory path as argument. For each file with name `FILENAME` in the given directory, print "`$FILENAME` is a file" if it is a file and print "`$FILENAME` is a directory if it is a directory" .

```
#!/bin/bash
```

```
for FILENAME in "$1"/*; do
```

```
    if [ -f "$FILENAME" ]; then
```

```
        echo "$FILENAME is a file"
```

```
    elif [ -d "$FILENAME" ]; then
```

```
        echo "$FILENAME is a directory"
```

```
    fi
```

```
done
```

Write a Bash script that reads a text file (input.txt) line by line and prints each line with the line number before it. If a line is empty, the script should print "Empty line" instead of the line number and content.

```
#!/bin/bash

line_number=1
cat input.txt | while read -r line; do
    if [ -z "$line" ]; then
        echo "$line_number: Empty line"
        chmod filename u+x # change file permission to 755
    else
        echo "$line_number: $line"
    fi
    ((line_number++))
done
```

Develop a Bash script that takes a directory path as an argument. The script should count and display the number of files and subdirectories in the given directory. It should also set read-only permissions for all text (.txt) files in that directory.

```
#!/bin/bash

directory=$1
file_count=0
dir_count=0

for item in "$directory"/*; do
    if [ -f "$item" ]; then
        file_count=$((file_count+1))
        if [[ $item == *.txt ]]; then
```

```
    chmod a-w "$item"
fi
elif [ -d "$item" ]; then
    dir_count=$((dir_count+1))
fi
done

echo "Number of files: $file_count"
echo "Number of subdirectories: $dir_count"
echo "Read-only permissions set for text files."
```

感谢收看

下学期：COMP2017!