**TASK 1**

1. **What is DevOps? How does DevOps Work?**

DevOps is an approach to software development that combines development (Dev) and IT operations (Ops) to create a culture of collaboration and communication. The main goal of DevOps is to improve the speed and efficiency of the software development lifecycle by automating software delivery and infrastructure changes. DevOps teams work together throughout the entire software development process, using a variety of tools and technologies to automate the different stages of the process, such as version control systems, configuration management tools, and continuous integration and deployment tools.

DevOps involves several stages, including planning, coding, building, testing, deployment, and monitoring. DevOps teams use automation and continuous integration and delivery (CI/CD) to make the software development process faster, more efficient, and more reliable. The benefits of DevOps include increased collaboration between teams, improved quality and reliability of software releases, and reduced costs and time for software development and maintenance. Overall, DevOps is an approach that emphasizes collaboration, communication, and automation to improve the software development process.

1. **Describe the DevOps lifecycle.**

The DevOps lifecycle typically includes the following stages:

* Plan: In this stage, the development and operations teams work together to plan the software development process. This involves identifying the requirements, setting goals and objectives, and deciding on the tools and technologies to be used.
* Code: In this stage, the development team writes and tests the code for the software application. They use version control systems to manage code changes and ensure that the code is of high quality and meets the requirements.
* Build: In this stage, the code is built into an executable package, such as a binary or Docker image. This involves compiling the code and packaging it with any dependencies and libraries required for the application.
* Test: In this stage, the software application is tested to ensure that it meets the requirements and is of high quality. This involves automated testing, such as unit testing and integration testing, as well as manual testing by the development and operations teams.
* Deploy: In this stage, the software application is deployed to the production environment. This involves configuring the infrastructure, setting up the application, and deploying the code.
* Operate: In this stage, the operations team manages the software application in the production environment. This involves monitoring the application, troubleshooting issues, and making any necessary changes to the infrastructure or code.
* Monitor: In this stage, the performance and usage of the software application are monitored. This involves tracking metrics such as response time, uptime, and user activity, and making any necessary improvements to the application or infrastructure.

1. **Describe DevOps Principles.**

There are several key principles that underpin the DevOps approach to software development:

* Collaboration: DevOps emphasizes collaboration between development and operations teams, as well as other stakeholders in the software development process. This involves breaking down silos and fostering a culture of communication and cooperation.
* Continuous Integration and Delivery: DevOps emphasizes continuous integration and delivery (CI/CD), which involves automating the build, test, and deployment processes. This enables faster, more frequent releases of software, while also improving quality and reducing errors.
* Automation: DevOps emphasizes automation of manual processes, such as testing, deployment, and infrastructure management. Automation reduces the risk of errors and improves efficiency, allowing teams to focus on higher-level tasks.
* Infrastructure as Code: DevOps emphasizes the use of infrastructure as code (IaC), which involves managing infrastructure in the same way as software code. This enables teams to treat infrastructure as a version-controlled asset, with changes tracked and managed like any other code.
* Monitoring and Logging: DevOps emphasizes monitoring and logging of software applications and infrastructure, with metrics and logs used to identify and troubleshoot issues. This enables teams to identify problems quickly and make improvements to the software and infrastructure.
* Security: DevOps emphasizes security throughout the software development lifecycle, with security testing integrated into the CI/CD pipeline. This helps to ensure that software is secure and compliant with regulations.

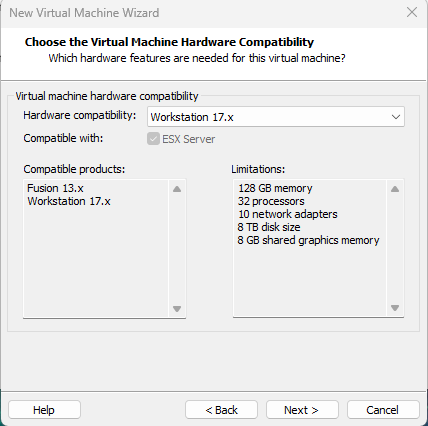
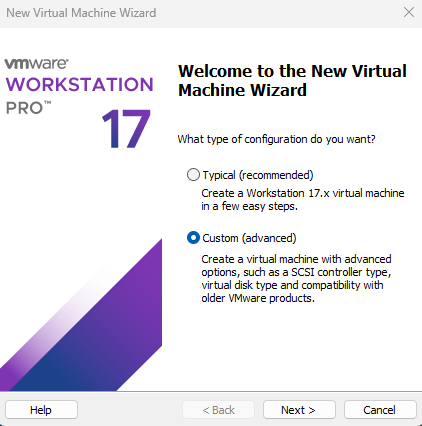
1. **Explain the benefits of DevOps.**

The benefits of DevOps include:

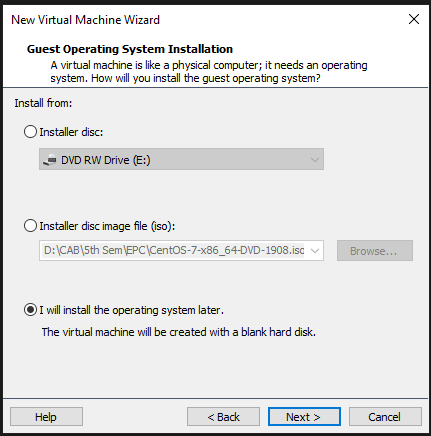
* Faster time to market: DevOps enables quicker releases by automating testing and integrating CI/CD pipelines.
* Improved collaboration: DevOps fosters communication between teams, breaking down silos and promoting a unified approach.
* Higher quality software: DevOps automation and testing improve reliability, reducing errors and defects.
* Lower costs: DevOps automation streamlines processes, reducing time and effort and enabling faster delivery.
* Improved security: DevOps security practices reduce the risk of breaches and ensure compliance with regulations.
* Greater scalability and flexibility: DevOps enable fast and efficient scaling and changes to meet business requirement.

**TASK 2**

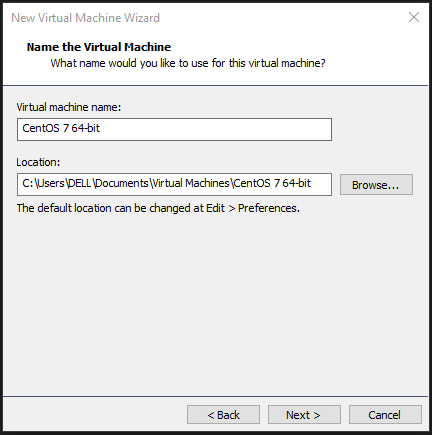
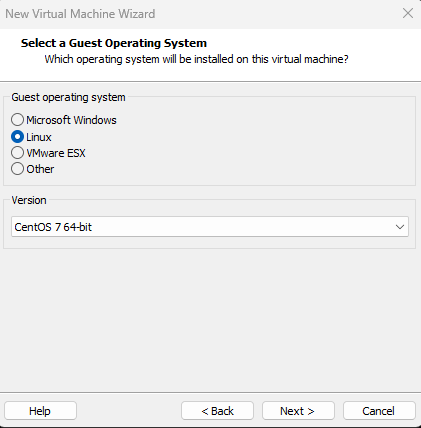
1. **Installing VMware Workstation or VirtualBox.**
2. Download the installation file
3. Run the installation file
4. Accept the license agreement
5. Choose the installation location
6. Choose the setup type
7. Configure shortcuts
8. Install VMware Workstation
9. Finish the installation
10. **Creating Virtual Machine of CentOS 7.**
11. Open VMware Workstation
12. Create a new virtual machine



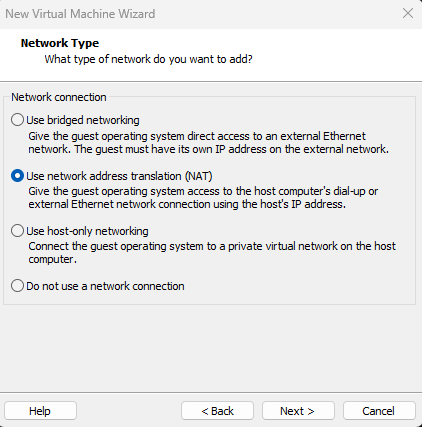
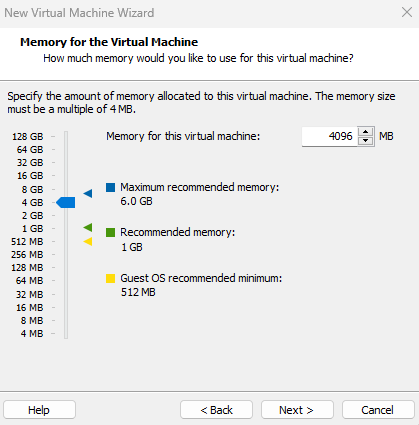
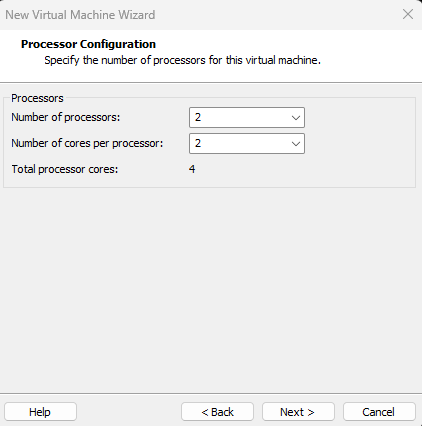
1. Choose the installation media

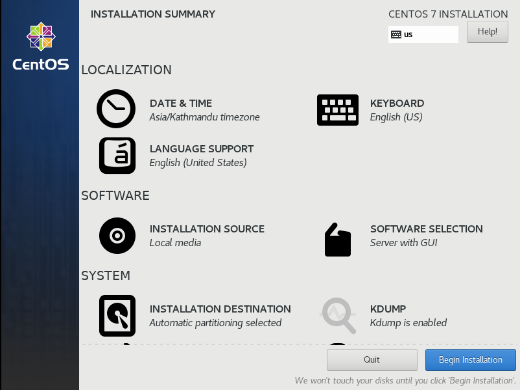
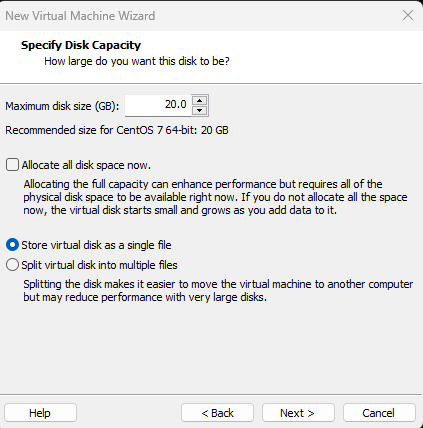
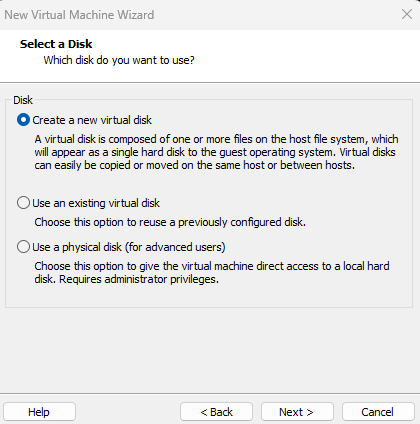


1. Select the guest operating system



1. Configure the virtual machine hardware.

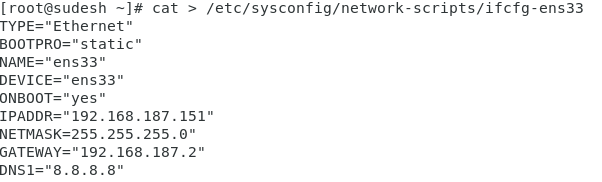
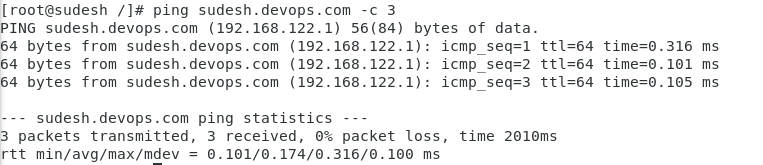




1. Customize other settings
2. Finish creating the virtual machine
3. Start the virtual machine
4. Install CentOS 7
5. Complete the installation.
6. **Assign the hostname of Linux machine as <yourname>.devops.com**



1. **Configure your network interface with static ip address and start the network service.**





1. **Map your static ip address to your hosts name in configuration file /etc/hosts**



**TASK 3**

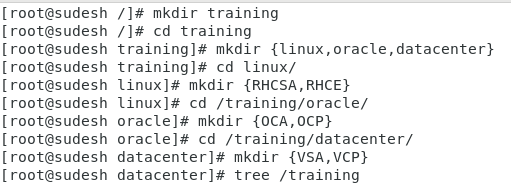
1. **Write brief history of Linux.**

Linux is a free and open-source operating system created by Linus Torvalds in 1991. It was made as an alternative to proprietary operating systems like Windows and macOS. Linux is known for its stability, security, and flexibility, and is widely used in many industries. It is available in many different versions called distributions, and the Linux community continues to contribute to its development.

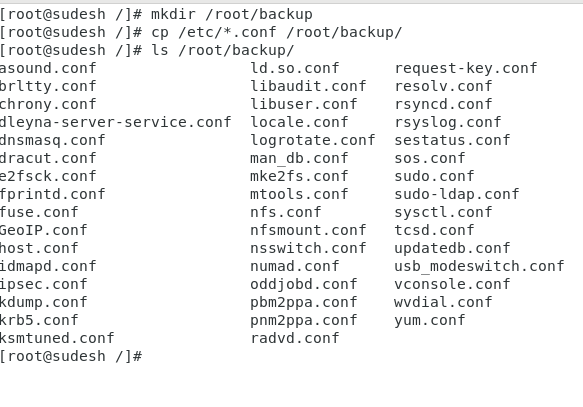
1. **Describe briefly about the following Linux Filesystems Hierarchy: /boot, /root, /user, /home, /usr/bin, /bin, /user/sbin, /sbin, /usr/lib64, /lib64, /usr/lib, /lib, /dev, /etc, /media, /mnt, /opt, /proc, /tmp, /var, /run**

* /boot: Contains files needed for the boot process, including the Linux kernel and bootloader.
* /root: Home directory for the root user, which is the system administrator.
* /user: A directory that typically contains subdirectories for user-specific data and programs.
* /home: Home directories for regular users on the system.
* /usr/bin: Contains executable files for system-wide use.
* /bin: Contains essential executable files required for booting and system maintenance.
* /usr/sbin: Contains system administrator executables that are not essential for the system boot process.
* /sbin: Contains essential system administrator executables required for system booting and maintenance.
* /usr/lib64: Contains shared libraries for 64-bit applications.
* /lib64: Contains shared libraries for 64-bit essential executables.
* /usr/lib: Contains shared libraries for system-wide use.
* /lib: Contains shared libraries for essential executables.
* /dev: Contains device files for hardware devices.
* /etc: Contains system configuration files.
* /media: Mount point for removable media devices.
* /mnt: Mount point for temporary filesystems.
* /opt: Contains optional software packages.
* /proc: A virtual filesystem that contains system process information.
* /tmp: A directory for temporary files.
* /var: Contains variable files, including logs and other data that changes frequently.
* /run: Contains system runtime data.

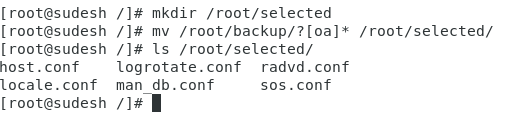
1. **Login from root user then create folders according to following tree structure.**

****

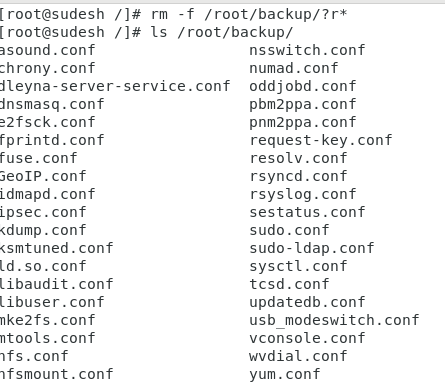
1. **Copy all the files that have .conf filename extensions inside /etc directory to /root/backup directory.**

****

1. **Create a directory /root/selected then move all files of /root/backup directory that have ‘o’ or ‘a’ as the second character of their file name to /root/selected directory.**



1. **Remove second character with r in path /root/backup.**

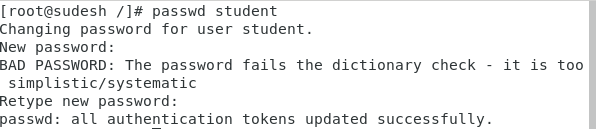


1. **Remove all files and directories in path /root/backup.**

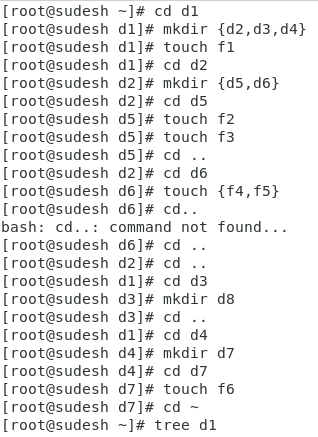


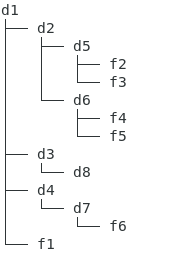
**TASK 4**

1. **Create a user named student.**

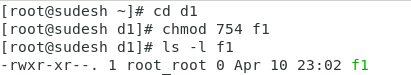


1. **Login from student user then create files and folders according to following tree structure. [where, d→ directory and f→ file]**





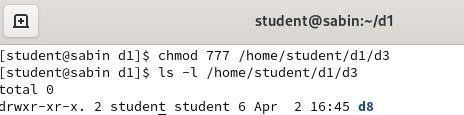
1. **Change the permission of the file f1 so that the owner will get full permission, group member will get read and execute permission and others will get read-only permissions.**



1. **Change permission of the file f2 such that the owner’s and group members will get read and write permission but others will get no permission.**

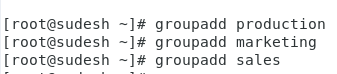


1. **Change permission of directory d3 such that all categories of users will get full permissions.**

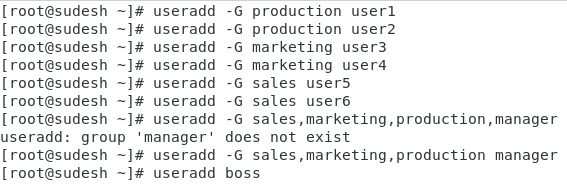


**TASK 5**

1. **Create group for each department (production, marketing, sales)**



1. **Create user account (user1, user2, user3, user4, user5, user6, manager, boss) for each employee assigning them respective group.**



1. **Create common directory (production, marketing and sales) for each department.**



1. **Change ownership of group directories such that boss will become the owner and the respective groups will be group owner.**



1. **Change the permission of the group directories such that only the owner and group member will get full permission and others will not get any permission.**



**TASK 6**

**Package and Service Management, and Firewall Configuration in CentOS 7:**

1. a) Enable EPEL repository (epel-release package) and verify the repo configuration in **/etc/yum.repos.d**



1. Table

   Description automatically generated



1. Graphical user interface, text, application, email

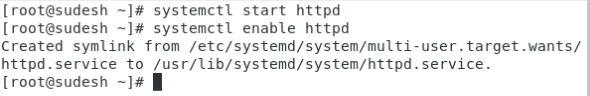
   Description automatically generated
2. b) Install firewalld package as well as start and enable firewall services.



1. Table

   Description automatically generated
2. c) Install httpd package as well as start and enable httpd services.
3. 
4. Table

   Description automatically generated



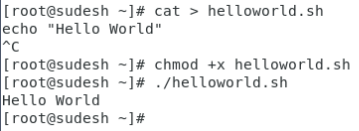
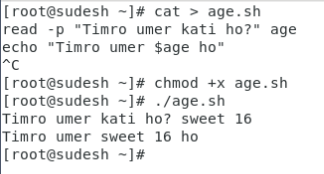
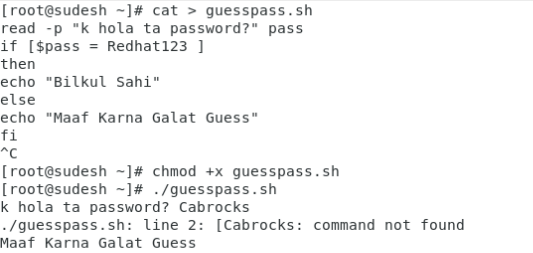
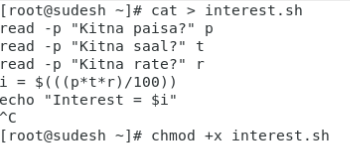
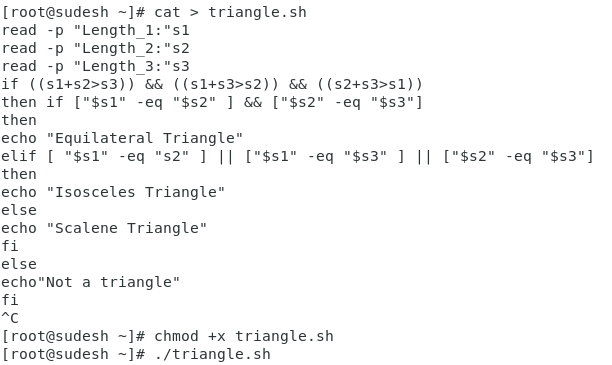
1. d) Add the following services and ports to allow packets through the firewall. **[Service = http, smtp port = 25 /tcp, 25/udp, 110/tcp]**
2. Table

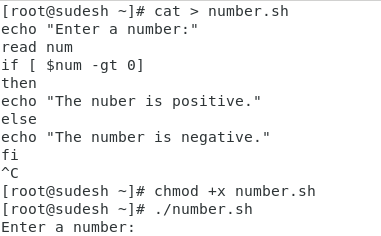
   Description automatically generated with low confidence
3. e) Remove the following services and ports to block packets through the firewall. **[Service = smtp port = 25 /tcp, 25/udp]**
4. Graphical user interface, text, application

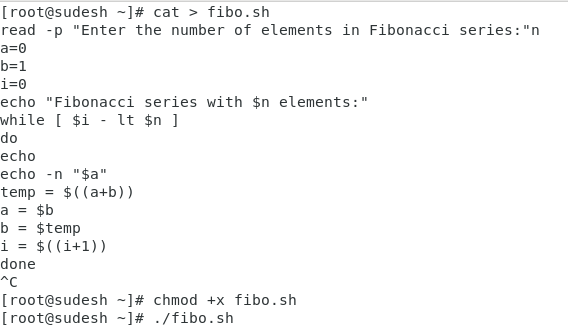
   Description automatically generated

**TASK 7**

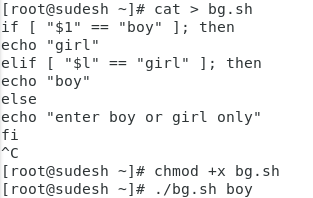
**Bash Shell Scripting:**

1. a) Write a command to find the path of the bash shell.
2. 
3. b) Write a script named helloworld.sh to display “Hello World”.
4. 
5. c) Write a script named age.sh to prompt for age and display it.
6. 
7. d) Write a script named guesspass.sh to guess admin password. [password = Redhat123]
8. 
9. e) Write a script to calculate simple interest.
10. 
11. f) Write a script to determine the type of tringle by reading the lengths of its sides.
12. 
13. Text

    Description automatically generated
14. g) Write a script to determine if a user-inputted number is positive, negative, or Zero.
15. 
16. Text

    Description automatically generated
17. h) Write a script to print the first 10 elements of Fibonacci series.
18. 
19. Graphical user interface, text, email

    Description automatically generated
20. i) Create a shell script named “bg.sh” inside /root directory which when execute with parameter ‘boy’, the output should be ‘girl’, when execute with the parameter ‘girl, the output should be ‘boy’ & when execute with some other parameter or no parameter the output should be “enter boy or girl only”.



Text

Description automatically generated

**College of Applied Business**

(Affiliated to Tribhuvan University)

****

**Final Assessment Report of**

DevOps Professional: Open-Source Software (OSS) - I

**Submitted by: Submitted to:**

**Name: Sudesh Acharya**  **Instructor: Indra Chaudhary**

**Roll No: 19134**

**Semester: 5th Semester**

**Faculty: Science and Technology**

**Level: Bachelor**

**Program: Bsc. CSIT**