Alexandria University
Faculty of Engineering
Comp. & Comm. Engineering
CC373: Operating Systems

جامعة الاسكندرية
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مادة نظم التشغيل

Lab2
Writing a Shell Script to Backup a Directory

Objectives

- To learn how to write .sh file
- Write a shell script in bash
- Write first simple Makefile

Overview

The Linux **make** command is used to build and maintain groups of programs and files from the source code. In Linux, it is one of the most frequently used commands by the developers. It assists developers to install and compile many utilities from the terminal.

https://opensource.com/article/18/8/what-how-makefile

Part1: Write Backup script:

Write a backup script ***backupd.sh*** that will automatically backup a directory.

```
backupd.sh dir backupdir interval-secs max-backups
```

Parameters:

- `dir` the source directory that have list of file we need to backup.
- `backupdir` the destination directory that will have the backup
- `interval-secs` time to wait between every check
- `max-backups` maximum number of backups need to be reserved

This script will first backup the directory dir by making a copy of dir in the directory **backupdir/<current-date>**. Then, every interval-secs if the dir has been modified since the last backup, it will back it up again in the directory **backupdir/<current-date>**.

N.B. <current-date> will have the format YYYY-MM-DD-hh-mm-ss

To compare if a directory has been modified, first run a "**ls -lR {dir}** > **directory-info.last** " before backing up dir. The command "**ls -lR**" lists the entries of a directory and subdirectories and displays the last modification time of every file. Then every interval-secs run again a" **ls -lR dir** > **directory-info.new**". If ls-lR.new and ls-lR.last are different then back up the directory again into **backupdir/<current-date>** and then copy **directory-info**.new into **directory-info**.last.

Algorithm:

```
Get the initial directory info and save to file directory-info.last
Copy your source to destination
Loop forever
    Sleep interval of time
    Get the directory info and save to new file directory-info.new
    If ( directory data was changed)
         Copy the directory to new backup location backupdir/<current-date>.
         Update the directory-info.last
```

To compare if a directory has been modified, first run a "**ls -lR {dir}** > **directory-info.last**

Make sure that the maximum number of backup directories is limited to **max-backups**. Only the "max-backups" recent directories will be kept and the other ones should be erased.

Part2: Write Makefile to run bash script:

Create a **Makefile** that

1. Runs a bash script and provide provide the arguments.
2. Should have pre-build step to create the destination backup directory if not created

Part3: Write a README file :

A **README** is a text file that introduces and explains a project. It contains information that is commonly required to understand what the project is about.

Create a **README.md** :

1. Overview about the code in the folder with folder hirealically
2. Write down any prepreqisits need to be insalled and how to install on ubuntu
3. Step by step instructions users should do to run the backup solution that you have made.

https://www.makeareadme.com/

BOUNS:

You are required to do the three parts of the Lab first and don't change the files you have done

Definitely, there is a better option to run a background backup job that runs every 1 minute in ubuntu. This option is called a cron job. You are required to implement the same 3 parts but as a cron job. You can learn what a cron job is and how to build one here https://www.freecodecamp.org/news/cron-jobs-in-linux

Requirements: :

1. Create a new backup-cron.sh file that will be run every 1 minute.
2. Make sure to update the README.md file with:
   a. Step by step manual to configure the cron job.
   b. Write down prerequisites user should do before following your step by step instructions if any (services, installations , files , etc)
   c. What should be the cron expression if I need to run this backup every 3rd Friday of the month at 12:31 am

How to Submit

- Step outside the directory containing your code.
- Name your work directory as yourid-lab# (for id: 5678 and lab#4, the directory should be called 5678-lab4)
- Create a .tar.gz file using

```
tar cvfz 5678-lab4.tar.gz <path_of_directory>
```

- Submission to the form (https://forms.office.com/r/g0HmqewqBM). No other means of submission. File submitted to this form is the one that will be graded.

Policies

- Students will work **individually**.
- You may talk together on the algorithms or functions being used, but are NOT allowed to look at **anybody**'s code or to copy any part of code from any source, even from the web.
- *Revise the academic integrity note found on the class web page.*