

VE482

Introduction to Operating Systems

LAB 3

October 7, 2021

Yihua Liu 518021910998

1 Project 1: presentations (part 2)

2 Working with source code

2.1 The `rsync` command

- In Minix 3 install the `rsync` software

```
1 pkgin install rsync
```

- Install `rsync` on you Linux system `rsync` has already installed on my WSL Ubuntu and Ubuntu VMware virtual machine.
- Read `rsync` manpage

```
1 man rsync
```

- Create an exact copy of the directory `/usr/src` into the directory `/usr/src_orig`

```
1 cp -r /usr/src/ /usr/src_orig
```

- If you have already altered Minix 3 source code for homework 2 undo your changes from `/usr/src_orig` I have not altered Minix 3 source code for homework 2.
- Create an exact copy of the Minix 3 directory `/usr/src` into your Linux system, using `rsync` and `ssh` (note that the `ssh` server must be activated under Linux)

```
1 rsync -avz minix:/usr/src /mnt/f/Resources
```

Here `minix` is the host that we have added before.
 The meanings of the options are [1]: `-a`, `--archive` archive mode; equals `-rlptgoD` (no `-H,-A,-X`)
`-v`, `--verbose` increase verbosity
`-z`, `--compress` compress file data during the transfer

```

src/usr/sbin/pwd_mkdb/Makefile
src/usr/sbin/pwd_mkdb/pwd_mkdb.8
src/usr/sbin/pwd_mkdb/pwd_mkdb.c
src/usr/sbin/user/
src/usr/sbin/user/Makefile
src/usr/sbin/user/defs.h
src/usr/sbin/user/group.8
src/usr/sbin/user/groupadd.8
src/usr/sbin/user/groupdel.8
src/usr/sbin/user/groupinfo.8
src/usr/sbin/user/groupmod.8
src/usr/sbin/user/main.c
src/usr/sbin/user/user.8
src/usr/sbin/user/user.c
src/usr/sbin/user/useradd.8
src/usr/sbin/user/userdel.8
src/usr/sbin/user/userinfo.8
src/usr/sbin/user/usermod.8
src/usr/sbin/user/usermod.conf.5
src/usr/sbin/user/usermod.h
src/usr/sbin/user/usermod.8
src/usr/sbin/vipw/
src/usr/sbin/vipw/Makefile
src/usr/sbin/vipw/vipw.8
src/usr/sbin/vipw/vipw.c
src/usr/sbin/zic/
src/usr/sbin/zic/Makefile

sent 255,428 bytes  received 67,947,672 bytes  259,821.33 bytes/sec
total size is 134,514,974  speedup is 1.97
yihua@DESKTOP-R7BDQNG: /mnt/c/Users/Yihua

```

Figure 1. Output of `rsync` command.

Note: you cannot run `rsync` under Minix 3 like

```
1 rsync -a /usr/src ubuntu:~/
```

```

Minix panic. System diagnostics buffer:

MINIX booting
APIC disabled, using legacy PIC

MINIX 3.2.1. Copyright 2012, Urije Universiteit, Amsterdam, The Netherlands
MINIX is open source software, see http://www.minix3.org
Initiating legacy i8253 timer
CPU 0 freq 2000 MHz
kernel: selecting intel sysemtor ipc style
Started UFS: 0 worker thread(s)
Thu Oct 7 10:41:24 GMT 2021
main.c:53: assert "IS_UFS_FS_TRANSID(transid) !! transid == 0" failed, function
'main'
pfs(9): panic: assert failed
syslib.panic.c: stacktrace: 0x804d80f 0x804d226 0x8048aa8 0x80481b2 0x80480c7
core system service died: service 'pfs' *(slot 10, ep 9, pid 13)
rs 2 0xf1001339 0x8051967 0x8051730 0x80514b1 0x8051511 0x804c721 0x8
049339 0x8050028 0x8051478 0x804875b 0x80481b2 0x80480c7
kernel panic: cause_sig: sig manager 2 gets lethal signal 6 for itself
kernel on CPU 0: 0xf042a317 0xf04297c6 0xf042a9dc 0xf0429682 0xf04295b5 0xf0419d
05
System has panicked, press any key to reboot

```

Figure 2. System panicked if `rsync` under Minix 3.

2.2 The `diff` and `patch` commands

- Read the manpages of `diff` and `patch`

```
1 man diff
2 man patch
```

- Edit a file of your choice in `/usr/src`, e.g. add a comment to a file

```
1 vi /usr/src/build.sh # Add an empty comment in
   ↪ the beginning
```

- Using the `diff` command, create a patch corresponding to the above changes

```
1 diff /usr/src_orig/build.sh /usr/src/build.sh >
   ↪ build.patch
```

- Retrieve your patch on your Linux system

```
1 rsync -avz minix:~/build.patch ~
```

- Apply your patch to the copy of `/usr/src_orig` on your Linux system

```
1 patch -p0 build.sh ~/build.patch
```

- Revert the patch

```
1 patch -R build.sh ~/build.patch
```

```

> patch in System32
yihua@DESKTOP-R7BDQNG:/mnt/c/Users/yihua$ cd /mnt/f/Resources/src
yihua@DESKTOP-R7BDQNG:/mnt/f/Resources/src$ rsync -avz minix:~/build.patch ~
receiving incremental file list
build.patch

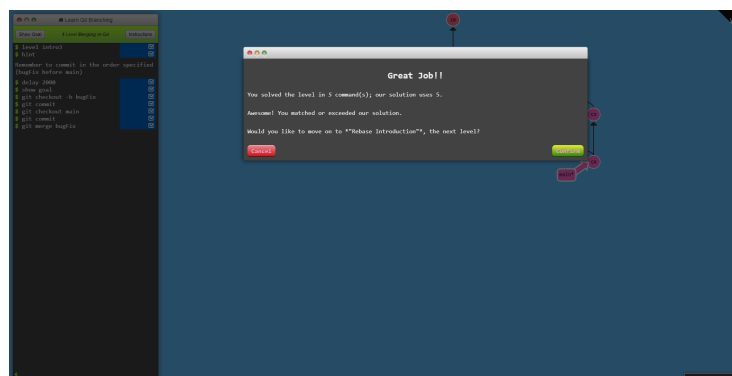
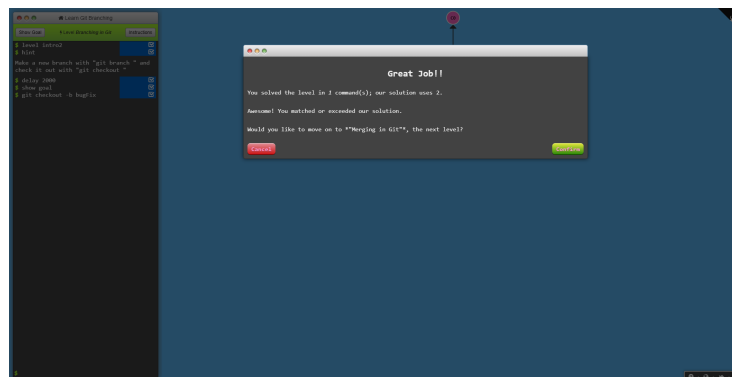
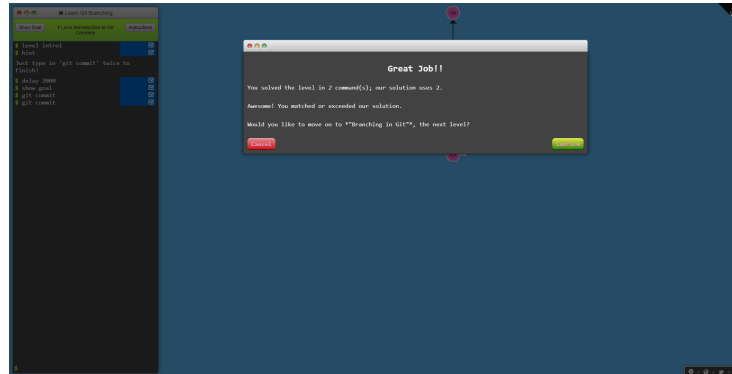
sent 30 bytes  received 89 bytes  238.00 bytes/sec
total size is 8  speedup is 0.07
yihua@DESKTOP-R7BDQNG:/mnt/f/Resources/src$ patch -p0 build.sh build.patch
patch: **** Can't open patch file build.patch : No such file or directory
yihua@DESKTOP-R7BDQNG:/mnt/f/Resources/src$ patch -p0 build.sh ~/build.patch
patching file build.sh
yihua@DESKTOP-R7BDQNG:/mnt/f/Resources/src$ vim build.sh
yihua@DESKTOP-R7BDQNG:/mnt/f/Resources/src$ patch -R build.sh
^C
yihua@DESKTOP-R7BDQNG:/mnt/f/Resources/src$ patch -R build.sh ~/build.patch
patching file build.sh
yihua@DESKTOP-R7BDQNG:/mnt/f/Resources/src$ vim build.sh
yihua@DESKTOP-R7BDQNG:/mnt/f/Resources/src$ head build.sh
#!/usr/bin/env sh
#
# NetBSD: build.sh,v 1.256 2012/09/29 04:02:42 tsutsui Exp $
#
# Copyright (c) 2001-2011 The NetBSD Foundation, Inc.
# All rights reserved.
#
# This code is derived from software contributed to The NetBSD Foundation
# by Todd Vierling and Luke Mewburn.
#
# Redistribution and use in source and binary forms, with or without
yihua@DESKTOP-R7BDQNG:/mnt/f/Resources/src$

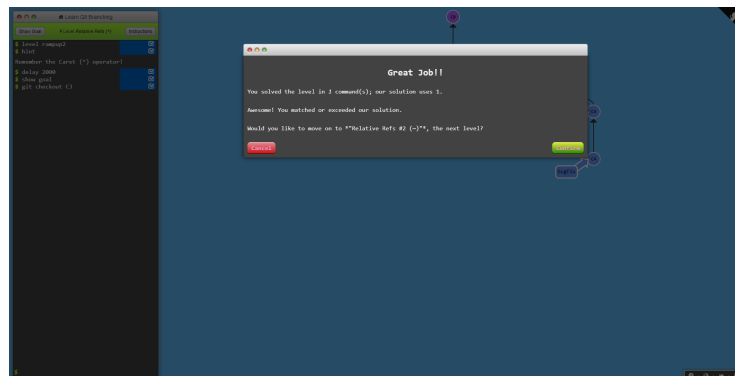
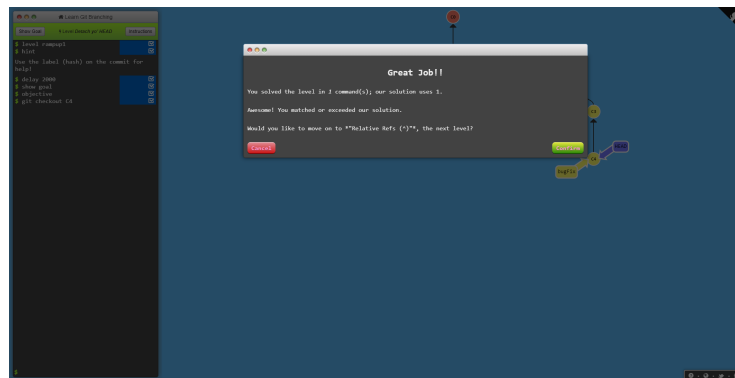
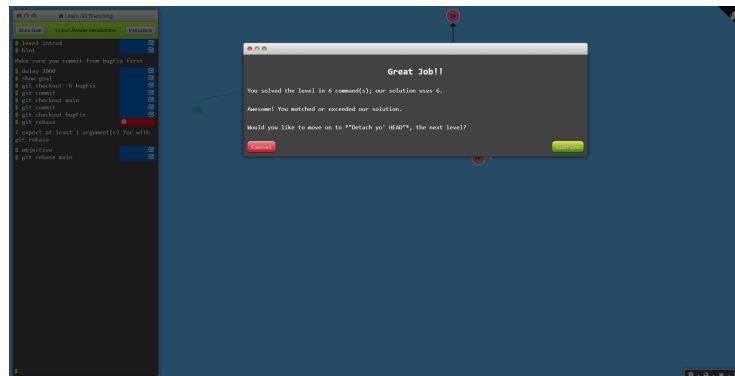
```

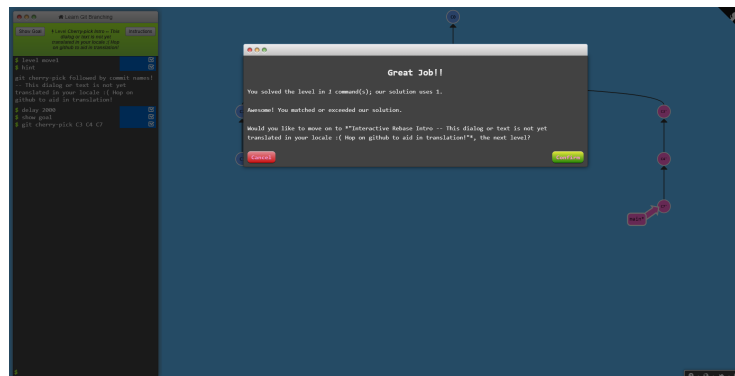
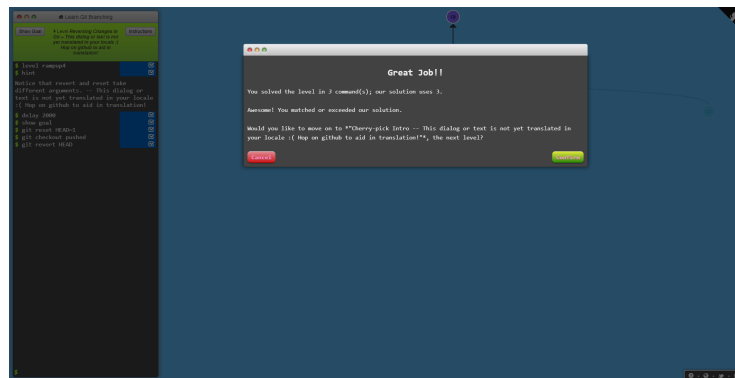
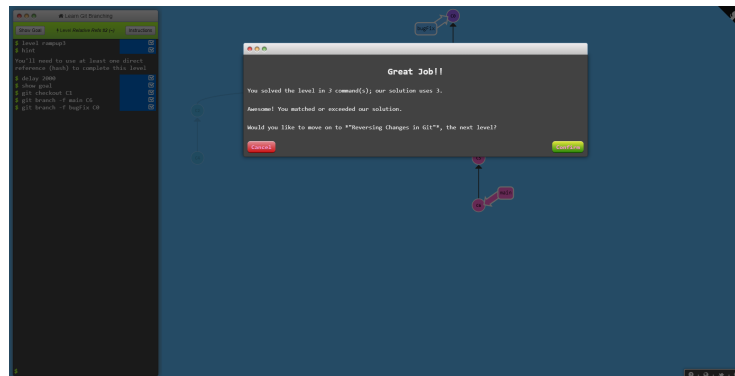
Figure 3. Retrieving, applying, and reverting the patch on Linux system.

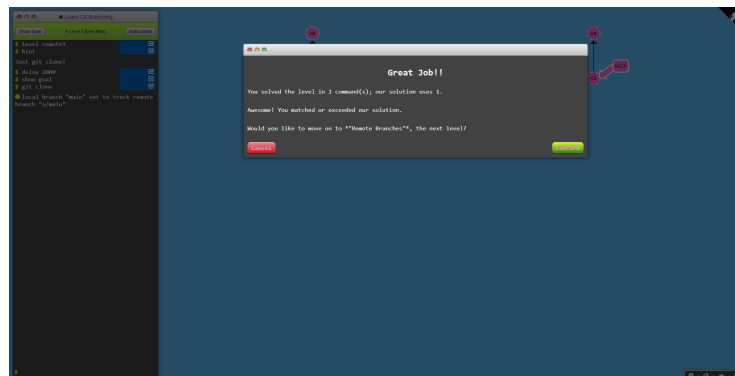
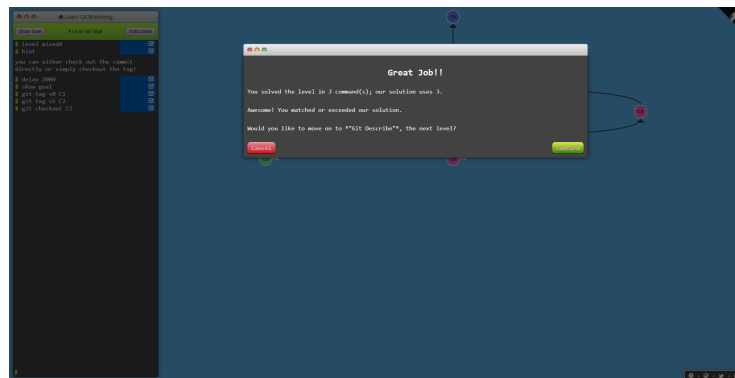
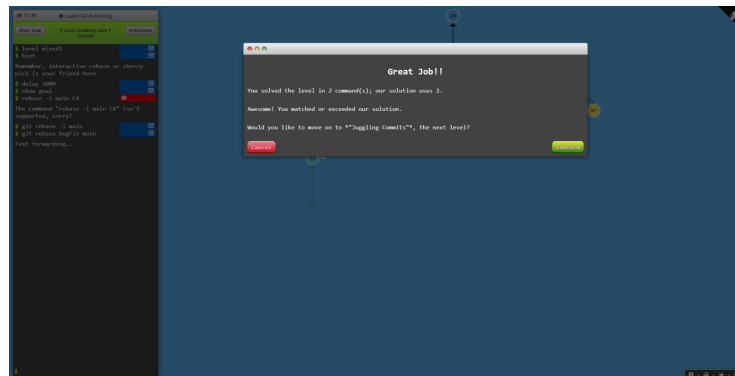
2.3 Remarks

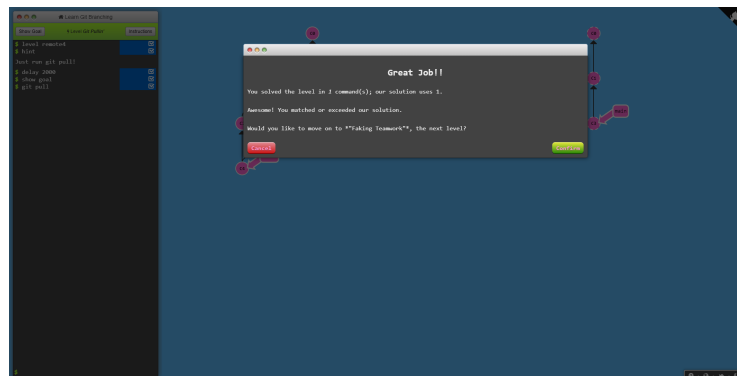
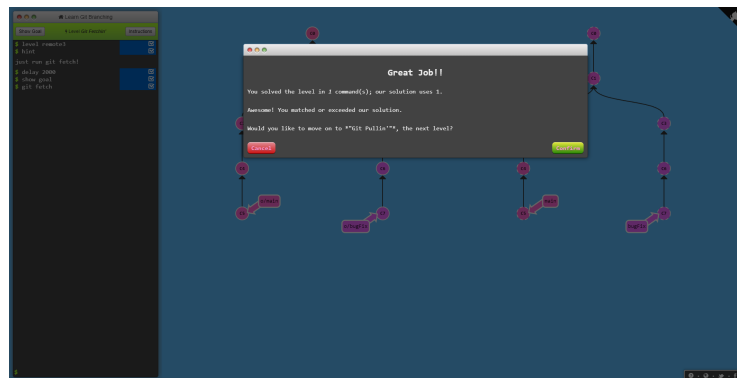
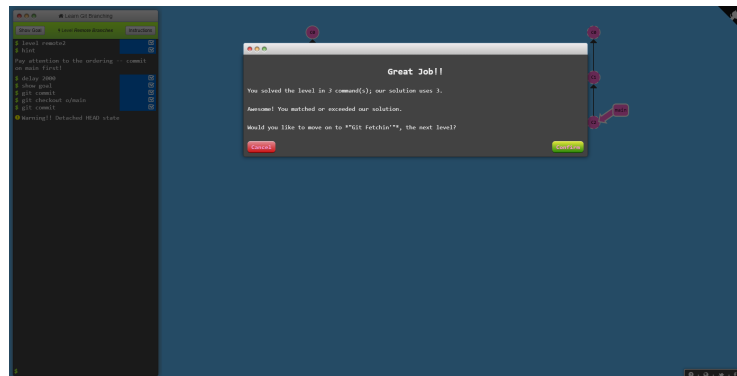
2.4 Basic git usage

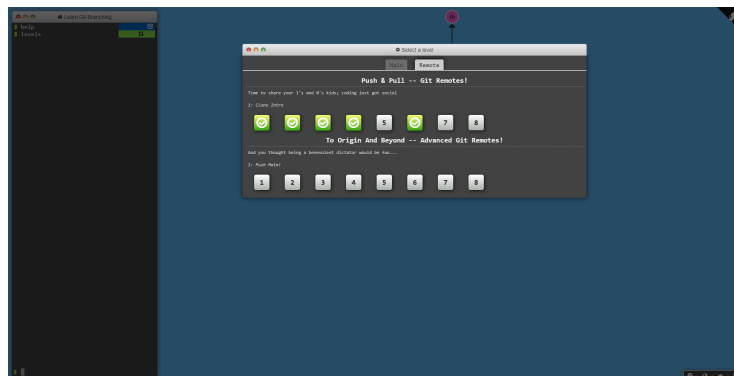
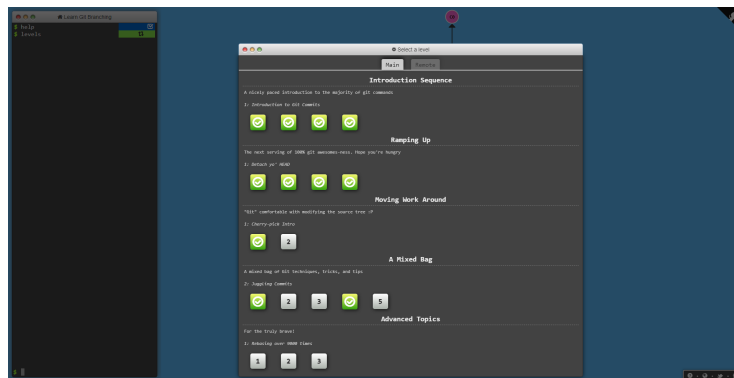
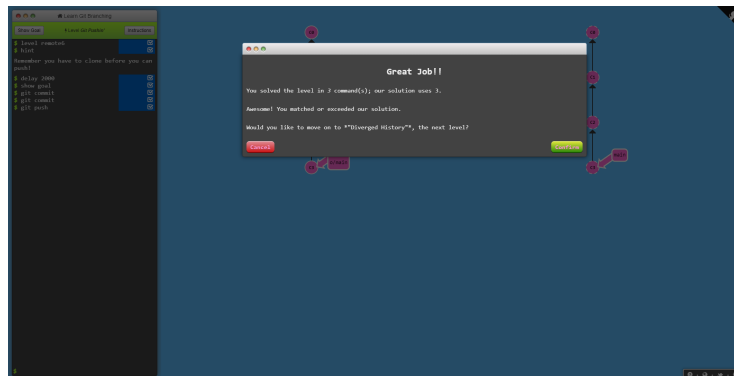












3 Scripting and regular expressions

1

```
curl "https://aqicn.org/?city=Shanghai&widgets&size=1"
  ↪ "arg" 2>/dev/null | sed -nE
  ↪ 's/.*title="Moderate">([[:digit:]]{1,3}).*>([[:digit:]]{1,5})<\\td><\\tr><\\.*AQ: \1 Temp: \2
  ↪ °C/p'
```

1

```
ifconfig | awk -e '{for (i = 1; i <= NF; ++i) {if  
↪ ($i=="inet") {printf $(i+1)"\n"}}}'
```

References

- [1] Andrew Tridgell, Paul Mackerras, and Wayne Davison. *rsync - a fast, versatile, remote (and local) file-copying tool*. Minix. Jan. 28, 2018.