



Rich's lesson module checklist

- ☐ Slides, Project, Lab X1 and Lab X2 posted
- ☐ WB converted from PowerPoint
- ☐ Print out agenda slide and annotate page numbers

- ☐ Flash cards
- ☐ Page numbers
- ☐ 1st minute quiz
- ☐ Web Calendar summary
- ☐ Web book pages
- ☐ Commands

- ☐ CUPS & printer demo equipment
- ☐ LabX1 and Project posted
- ☐ Timer lock set on turnin directory

- ☐ Backup slides, CCC info, handouts on flash drive
- ☐ Spare 9v battery for mic
- ☐ Key card for classroom door



Student Learner Outcomes

1. Navigate and manage the UNIX/Linux file system by viewing, copying, moving, renaming, creating, and removing files and directories.
2. Use the UNIX features of file redirection and pipelines to control the flow of data to and from various commands.
3. With the aid of online manual pages, execute UNIX system commands from either a keyboard or a shell script using correct command syntax.

Introductions and Credits



Jim Griffin

- Created this Linux course
- Created Opus and the CIS VLab
- Jim's site: <http://cabrillo.edu/~jgriffin/>



Rich Simms

- HP Alumnus
- Started teaching this course in 2008 when Jim went on sabbatical
- Rich's site: <http://simms-teach.com>

And thanks to:

- John Govsky for many teaching best practices: e.g. the First Minute quizzes, the online forum, and the point grading system (<http://teacherjohn.com/>)



Student checklist for attending class

The screenshot shows a web browser window with the address bar displaying simms-teach.com/cis90calendar.php. The page title is "Rich's Cabrillo College CIS Classes CIS 90 Calendar". On the left sidebar, there is a link labeled "CIS 90". The main content area has a tab labeled "Calendar". Below the calendar, there is a section titled "Presentation slides (download)" and a link labeled "Enter virtual classroom".

1. Browse to:
<http://simms-teach.com>
2. Click the **CIS 90** link.
3. Click the **Calendar** link.
4. Locate today's lesson.
5. Find the **Presentation slides** for the lesson and **download** for easier viewing.
6. Click the **Enter virtual classroom** link to join CCC Confer.
7. Log into Opus with Putty or ssh command.

Note: Blackboard Collaborate Launcher only needs to be installed once. It has already been downloaded and installed on the classroom PC's.

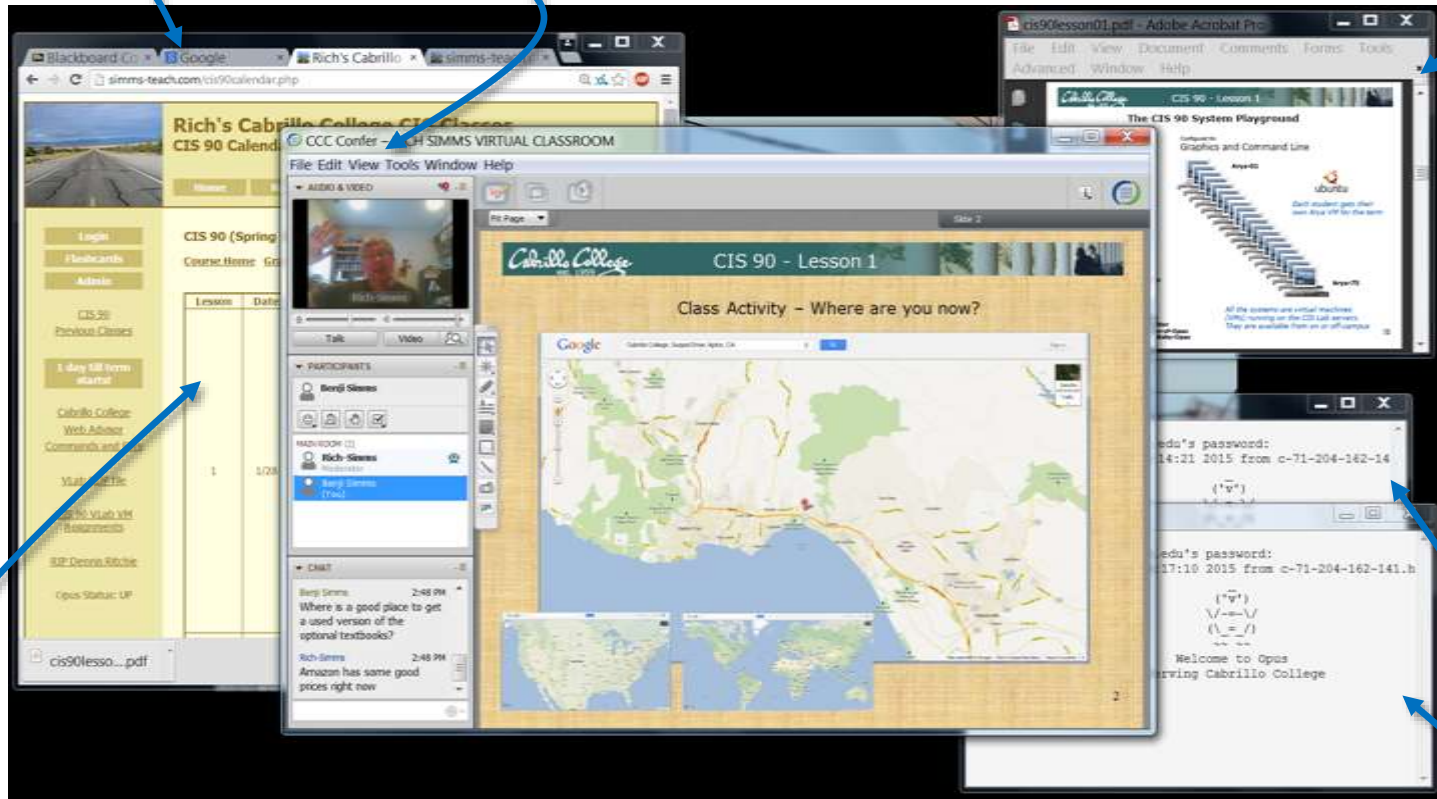


Student checklist for suggested screen layout

☐ Google

☐ CCC Confer

☐ Downloaded PDF of Lesson Slides



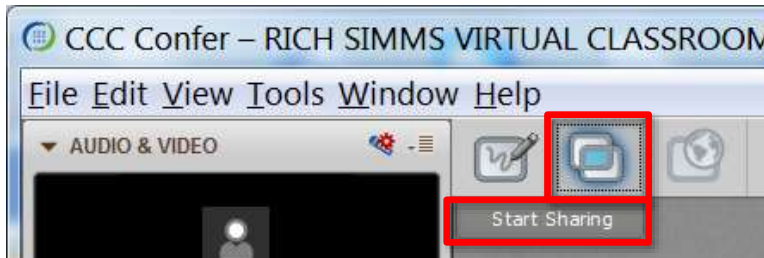
☐ CIS 90 website Calendar page

☐ One or more login sessions to Opus

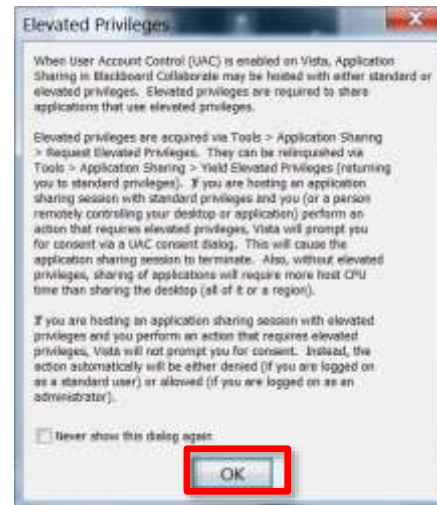


Student checklist for sharing desktop with classmates

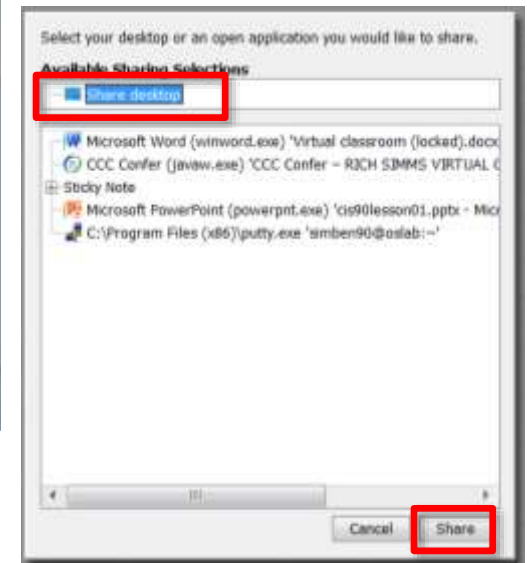
1) Instructor gives you sharing privileges



2) Click overlapping rectangles icon. If white "Start Sharing" text is present then click it as well.



3) Click OK button.



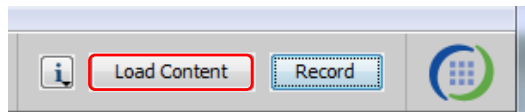
4) Select "Share desktop" and click Share button.



Rich's CCC Confer checklist - setup

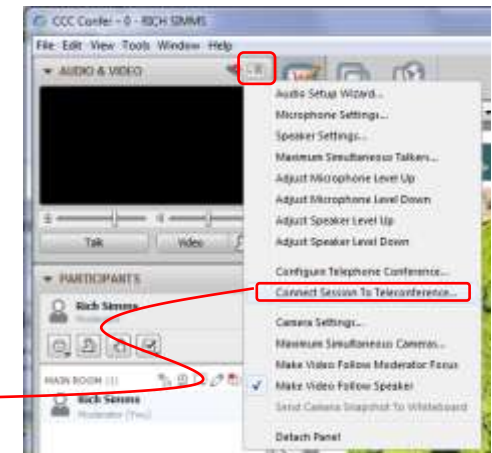


[] Preload White Board

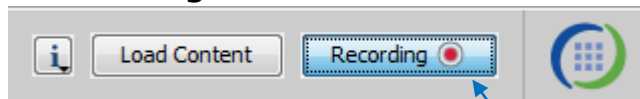


[] Connect session to Teleconference

Session now connected to teleconference



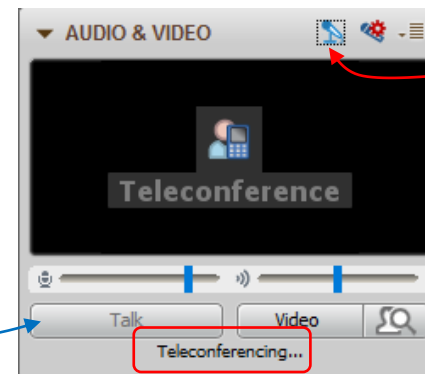
[] Is recording on?



Red dot means recording

[] Use teleconferencing, not mic

Should be grayed out



Should change from phone handset icon to little Microphone icon and the Teleconferencing ... message displayed



Rich's CCC Confer checklist - screen layout



The screenshot displays a Windows desktop environment during a CCC Confer session. The desktop is divided into several windows:

- CCC Confer - 0 - RIC...**: A window on the left showing the conferencing interface with a video feed of Rich Simms, a list of participants (Rich Simms, Moderator), and a chat window.
- simms-teach.com/docs/cis90/cis-90-TEST-1-Fall-12.pdf**: A web browser window displaying a quiz titled "Part 1 - Flashc (1 point each)". The quiz questions are:
 - [Q1] What command shows the other users logged in to the computer?
 - [A1] _____
 - [Q2] What environment variable is used by the shell to determine which directories to search when locating a command?
 - [A2] _____
- Terminal window**: A window titled "simben90@oslab:~" showing a login prompt and a password prompt. The output shows "Access denied" and "Last login: Mon Oct 8 18:58:43 2011".
- vSphere Client**: A window on the right showing the vSphere Client interface with a tree view of the vSphere environment.

Red boxes and arrows highlight specific components:

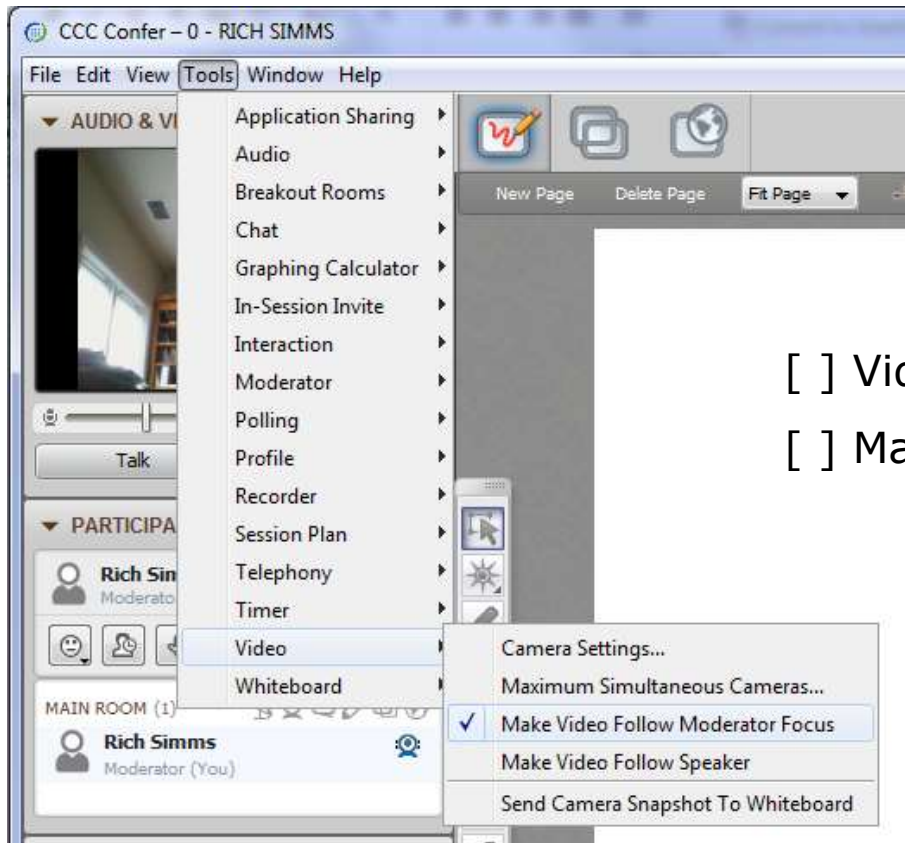
- foxit for slides**: A red box pointing to the "cis90lesson07.pdf" window.
- chrome**: A red box pointing to the "simms-teach.com" browser window.
- putty**: A red box pointing to the terminal window.
- vSphere Client**: A red box pointing to the vSphere Client window.

[] layout and share apps





Rich's CCC Confer checklist - webcam setup

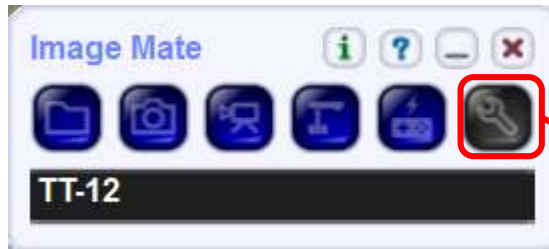


[] Video (webcam)

[] Make Video Follow Moderator Focus



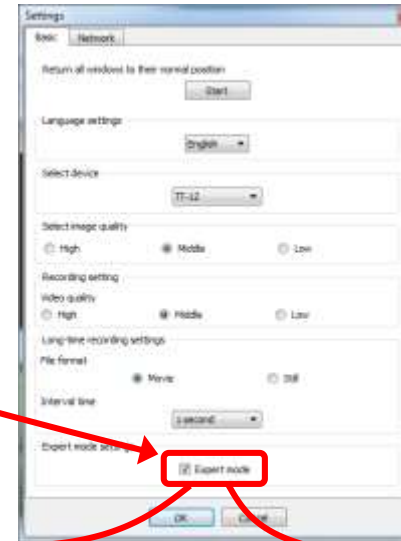
Rich's CCC Confer checklist - Elmo



Elmo rotated down to view side table



Run and share the Image Mate program just as you would any other app with CCC Confer



The "rotate image" button is necessary if you use both the side table and the white board.

Quite interesting that they consider you to be an "expert" in order to use this button!

Elmo rotated up to view white board





Rich's CCC Confer checklist - universal fixes

Universal Fix for CCC Confer:

- 1) Shrink (500 MB) and delete Java cache
- 2) Uninstall and reinstall latest Java runtime
- 3) <http://www.cccconfer.org/support/technicalSupport.aspx>

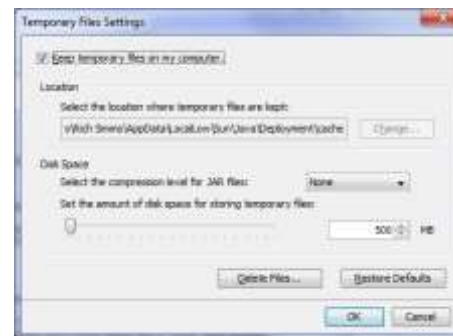
Control Panel (small icons)



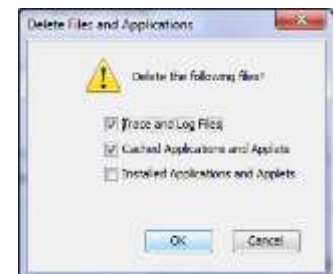
General Tab > Settings...



500MB cache size



Delete these



Google Java download





Start



Sound Check

*Students that dial-in should mute their line using *6 to prevent unintended noises distracting the web conference.*

*Instructor can use *96 to mute all student lines.*



Instructor: **Rich Simms**
Dial-in: **888-886-3951**
Passcode: **136690**



Jacob



Ethan



Amr



Becka



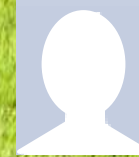
Brenda



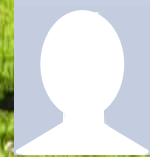
Nikki



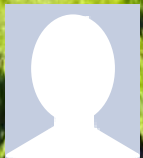
Brad



Tyler



Justin



Nick



Cody



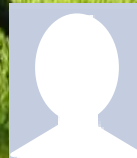
Alan



Carrie



Danny



Steven



Wes



Jade



Brandon



Bryanda



Nicole

First Minute Quiz

Please answer these questions **in the order** shown:

Use CCC Confer White Board

email answers to: risimms@cabrillo.edu

(answers must be emailed within the first few minutes of class for credit)

Shell Scripting and Printing

Objectives	Agenda
<ul style="list-style-type: none">• Understand how to write a script and how they run.• Learn how to print and manage print jobs waiting to print.	<ul style="list-style-type: none">• Quiz• Questions• Breaking things in Lab 10• Extra Credit Answer• Lesson 12 review• Grok that?• Housekeeping• Shell scripting 101• Final project myscript• Final project grading rubric• Final project permissions• Umask again!• Final project getting started• Final project forum tips• Scripting tips - echo• Tips on script names• Review how scripts are run• Printers• Printer configuration via CUPS• Printing in Linux• Managing print jobs• Assignment• Wrap up



Questions



Questions?

Lesson material?

Labs? Tests?

How this course works?

- Graded work in home directories
- Answers in /home/cis90/answers

Who questions much, shall learn much, and retain much.

- Francis Bacon

If you don't ask, you don't get.

- Mahatma Gandhi

Chinese
Proverb

他問一個問題，五分鐘是個傻子，他不問一個問題仍然是一個傻瓜永遠。

He who asks a question is a fool for five minutes; he who does not ask a question remains a fool forever.

```
alias bill="cd /home/cis90/${LOGNAME%90}/poems/Shakespeare"
```



What the heck was this all about?

```
/home/cis90/milhom $ echo $LOGNAME
milhom90
```

```
/home/cis90/milhom $ echo ${#LOGNAME}
8
```

Length of the string

```
/home/cis90/milhom $ echo ${LOGNAME%90}
milhom
```

Extracts "90" from end of string

```
/home/cis90/milhom $ echo ${LOGNAME:3:3}
hom
```

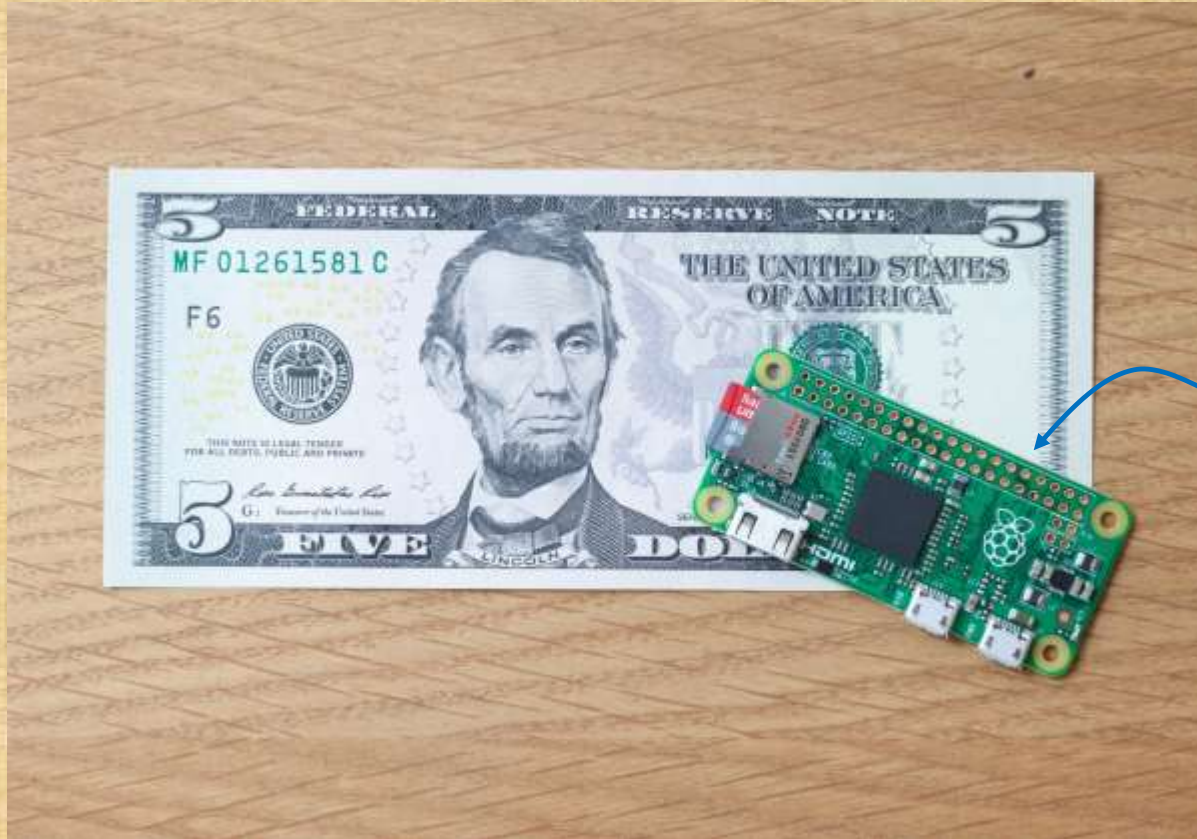
Substring extraction from position 3 length 3

```
/home/cis90/milhom $ echo ${LOGNAME#mil}
hom90
```

Extracts "mil" from front of string

For MANY MORE ways to manipulate strings Google "bash string manipulation" or browse to <http://tldp.org/LDP/abs/html/string-manipulation.html>

Activity



What is this?

Write your answer in the chat window



Breaking things in Lab 10

The path (PATH) variable ... a Review

- Lab 10 often results in clobbered paths and students may think some or all of the commands have disappeared!
- The path is a list of directories each containing commands, programs and scripts.
- The path is used by the shell to locate commands to run.
- The PATH variable defines the directories (separated by ":"s) and the search order.
- If your path gets clobbered it is still possible to run commands. However to do that you must specify the full absolute pathname. For example you can always run the **ttty** command as follows:

```
/home/cis90/simben $ /usr/bin/tty  
/dev/pts/0
```

The path (PATH) variable ... a Review

```
/home/cis90/simben $ echo $PATH
```

```
/usr/lib/qt-3.3/bin:/usr/local/bin:/bin:/usr/bin:/usr/local/sbin:
```

```
/usr/sbin:/sbin:/home/cis90/simben/../../bin:/home/cis90/simben/bin:.
```

1. Determine the 4th directory on the path above.
2. What is the name of the first command, in alphabetic order, found in this directory?

Put your answer in the chat window

Clobber your path on purpose

```
/home/cis90/simben $ oldpath=$PATH  
/home/cis90/simben $ unset PATH
```

Backup your current path

```
/home/cis90/simben $ tty  
-bash: tty: No such file or directory
```

The tty command can no longer be run by typing just it's name

```
/home/cis90/simben $ /usr/bin/tty  
/dev/pts/0
```

Instead the full absolute pathname must be used



Class Activity

Backup and remove your path variable:

```
/home/cis90/simben $ oldpath=$PATH
```

```
/home/cis90/simben $ unset PATH
```

```
/home/cis90/simben $ echo $PATH
```

```
/home/cis90/simben $ tty
```

```
/home/cis90/simben $ /usr/bin/tty
```

What is your shell path now?

Put your answer in the chat window

Life without a path

```
/home/cis90/simben $ ls letter
```

```
-bash: ls: No such file or directory
```



```
/home/cis90/simben $ /bin/ls letter
```

```
letter
```

```
/home/cis90/simben $
```

*On Opus the ls command
is in the /bin directory.
If we know that a
temporary workaround is
to specify the full path to
the command*

Life without a path

Some commands still work without a path ... why?

```
/home/cis90/simben $ echo "I want my path back"  
I want my path back
```

```
/home/cis90/simben $ type echo  
echo is a shell builtin
```

```
/home/cis90/simben $ type type  
type is a shell builtin
```

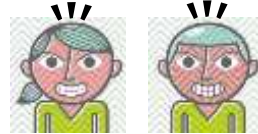
The shell has some commands built into it. The shell does not have to search the path to find these commands so they are always available.

Making a path from scratch

Fixing the path, one directory at a time ...

```
/home/cis90/simben $ ls letter
```

```
-bash: ls: No such file or directory
```



```
/home/cis90/simben $ PATH=/bin
```

*The **ls** command is in /bin
so lets put that on the path*

```
/home/cis90/simben $ ls letter  
letter
```

```
/home/cis90/simben $ stat letter
```

```
-bash: stat: command not found
```



```
/home/cis90/simben $ PATH=$PATH:/usr/bin
```

*The **stat** command is in /usr/bin so
lets append that directory to the
current path*

```
/home/cis90/simben $ stat letter
```

```
File: `letter'
Size: 1059          Blocks: 16          IO Block: 4096
regular file
Device: fd00h/64768d    Inode: 102594      Links: 1
Access: (0644/-rw-r--r--)  Uid: ( 1000/simben90)   Gid: (
90/   cis90)
Access: 2012-04-30 15:43:28.000000000 -0700
Modify: 2012-03-20 10:31:30.000000000 -0700
Change: 2012-04-30 07:34:30.000000000 -0700
```



You try it

```
ls letter  
PATH=/bin  
echo $PATH  
ls letter
```

```
stat letter  
PATH=$PATH:/usr/bin  
echo $PATH  
stat letter
```

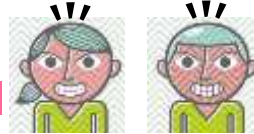
What is your shell path now?

Put your answer in the chat window

Making a path from scratch

```
/home/cis90/simben $ allscripts
```

```
-bash: allscripts: command not found
```



*The **allscripts** shell script is in /home/cis90/bin so let's add that directory to the path as well*

```
/home/cis90/simben $ PATH=$PATH:/home/cis90/bin
```

```
/home/cis90/simben $ allscripts
```

```
*****
*                               *
*           Fall 2012 CIS 90 Online Projects           *
*                               *
*****
1) Andrew
2) Ben
3) Benji
4) Bryn
5) Carlile
6) Carlos
  <snipped>
21) Ray
22) Rita
23) Sean C.
24) Sean F.
25) Shahram

99) Exit

Enter Your Choice:
```



You try it

```
allscripts  
PATH=$PATH:/home/cis90/bin  
echo $PATH  
allscripts
```

What is your shell path now?

Put your answer in the chat window

Making a path from scratch

```
/home/cis90/simben $ tryme
```

```
-bash: tryme: command not found
```



*The **tryme** shell script is in your own bin directory so lets add that to the path as well*



```
/home/cis90/simben $ PATH=$PATH:/home/cis90/simben/bin
```

```
/home/cis90/simben $ tryme
```

```
My name is "tryme"
```

```
I am pleased to make your acquaintance, Homer Miller
```

```
/tmp
```

```
/home/cis90/simben $
```

You try it

```
tryme  
PATH=$PATH:/home/cis90/simben/bin  
echo $PATH  
tryme
```

*Change this to your
own home directory*

or

```
tryme  
PATH=$PATH:$HOME/bin  
echo $PATH  
tryme
```

What is your shell path now?

Put your answer in the chat window

Making a path from scratch

```
/home/cis90/simben $ dogbone
```

```
-bash: dogbone: command not found
```



```
/home/cis90/simben $ ./dogbone
```

```
What is your name? Benji
```

```
What is your favorite bone? Chicken
```

```
Hi Benji, your favorite bone is Chicken
```

*A temporary workaround is
to put a ./ in front of the
command*

*How can I run a script in the current directory without
having to put a ./ in front of it?*

Making a path from scratch

Easy ... add the "." directory to the path

```
/home/cis90/simben $ dogbone
```

```
-bash: dogbone: command not found
```



```
/home/cis90/simben $ PATH=$PATH:.
```

```
/home/cis90/simben $ dogbone
```

```
What is your name? Benji
```

```
What is your favorite bone? Chicken
```

```
Hi Benji, your favorite bone is Chicken
```

You try it

```
cd  
cp /home/cis90/depot/scripts/dogbone .
```

*Did you do this the hard
way or use tab completes?*

```
chmod +x dogbone
```

```
dogbone  
./dogbone
```

```
PATH=$PATH: .  
dogbone
```

What is your shell path now?

Put your answer in the chat window

Making a path from scratch

Rebuilding the path by appending directories one at a time

```
/home/cis90/simben $ unset PATH
/home/cis90/simben $ echo $PATH
```

```
/home/cis90/simben $ PATH=/bin
/home/cis90/simben $ echo $PATH
/bin
```

Start with /bin which has all the essential UNIX/Linux commands

```
/home/cis90/simben $ PATH=$PATH:/usr/bin
/home/cis90/simben $ echo $PATH
/bin:/usr/bin
```

Append /usr/bin which has hundreds of additional UNIX/Linux commands

```
/home/cis90/simben $ PATH=$PATH:/home/cis90/bin
/home/cis90/simben $ echo $PATH
/bin:/usr/bin:/home/cis90/bin
```

Append the CIS 90 class bin directory

```
/home/cis90/simben $ PATH=$PATH:/home/cis90/simben/bin
/home/cis90/simben $ echo $PATH
/bin:/usr/bin:/home/cis90/bin:/home/cis90/simben/bin
```

Append your own student bin directory

```
/home/cis90/simben $ PATH=$PATH:.
/home/cis90/simben $ echo $PATH
/bin:/usr/bin:/home/cis90/bin:/home/cis90/simben/bin:.
```

Append the current directory

*CIS 90 class bin
directory*

*Student bin
directory*

*Current
directory*

.bash_profile

Making the path permanent using .bash_profile

```
/home/cis90/simben $ cat .bash_profile
```

```
# .bash_profile
```

```
# Get the aliases and functions
```

```
if [ -f ~/.bashrc ]; then
```

```
    . ~/.bashrc
```

```
fi
```

```
# User specific environment and startup programs
```

```
PATH=$PATH:/home/cis90/bin:$HOME/bin:.
```

```
BASH_ENV=$HOME/.bashrc
```

```
USERNAME=""
```

```
PS1='$PWD $ '
```

```
export USERNAME BASH_ENV PATH
```

```
umask 002
```

```
set -o ignoreeof
```

```
stty susp
```

```
eval `tset -s -m vt100:vt100 -m :\?${TERM:-ansi} -r -Q `
```

```
/home/cis90/simben $
```

This customizes the normal path by appending the class bin directory, the student's bin directory and the "current" directory




Extra Credit Special Answer



Extra Credit Special (from Lesson 12)

1) *Why did the prompt change?*

```
/home/cis90/simben $ bash  
[simben@opus ~]$ exit  
exit  
/home/cis90/simben $
```



2) *What command could be issued prior to the **bash** command above that would prevent the prompt from changing?*

For 2 points extra credit, email risimms@cabrillo.edu answers to **both** questions before the Lesson 13 class starts



Lesson 12

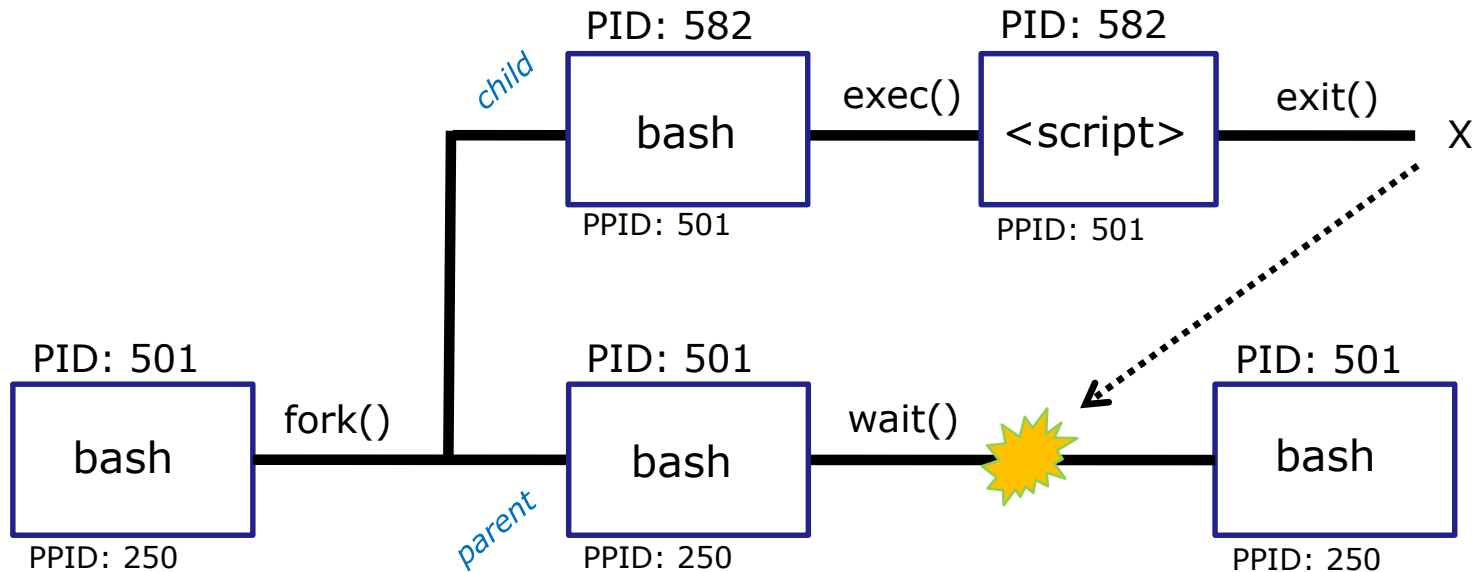
Review

The rules of the road for variables

Process Rule #1: When a shell forks a child, only copies of exported variables are made available to the child.

Process Rule #2: A child can modify the variables it receives but those modifications will not change the parent's variables.

Running a script



Scripts run as a child process and the rules apply:

- When a shell forks a child process, only copies of exported variables are made available to the child.
- A child process can modify the variables it receives but those modifications will not change the parent's variables.

But what if we want a script to change the parent's variables?

. and **SOURCE**

Sometimes it is desirable to run a shell script (like `.bash_profile` or `.bashrc`) that will initialize or change shell variables in the parent environment.

<code>. <script></code>	} <i>equivalent</i>
source <script>	

To do this, the shell (bash) provides a `.` (dot) or **source** command, which instructs the shell to execute the shell script itself, without spawning a child process to run the script, and then continue on where it left off.

In the generic example above, the commands in the file `<script-name>` are run by the parent process, and therefore, any changes made to the environment will last for the duration of the login session.

You try it

```
echo "smartphone=android" > google
echo 'echo smartphone is $smartphone' >> google
cat google
chmod +x google
```

Check that your google file contains:
smartphone=android
smartphone is \$smartphone

```
echo $smartphone
```

Should be null

```
google
echo $smartphone
```

*Run google script as a
child process*

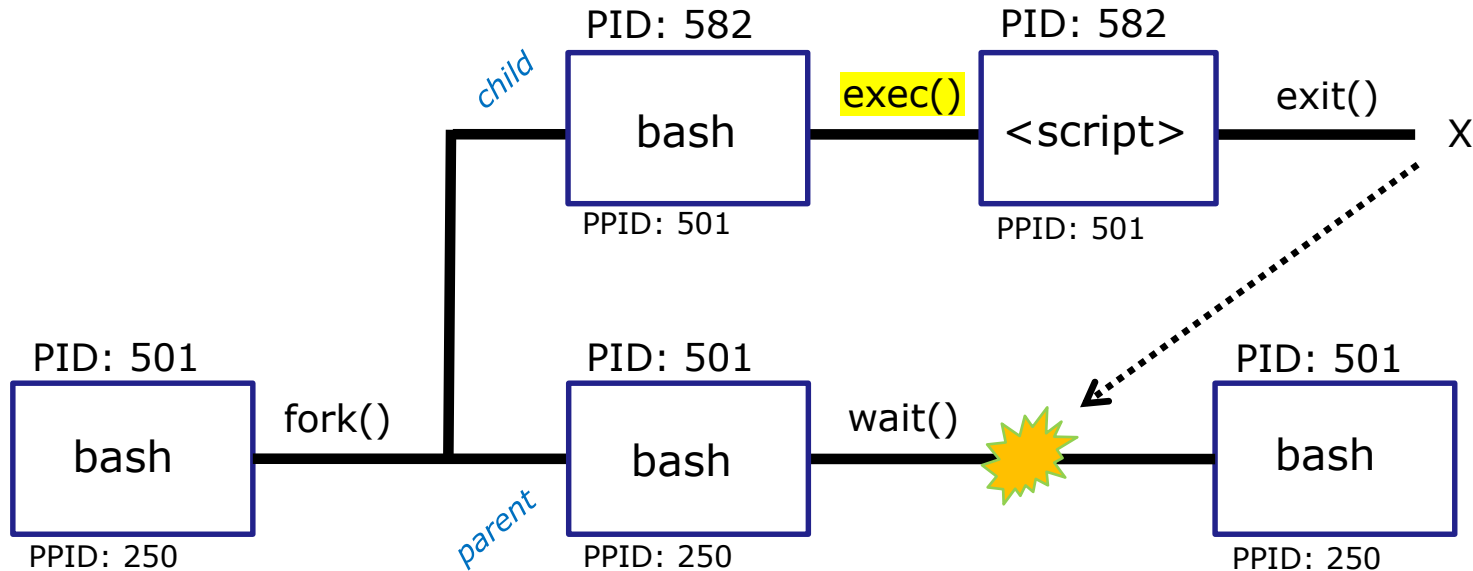
```
. google
echo $smartphone
```

*Source google script so it runs
as part of the parent process*

Which method of running a script above changed
the parent's smartphone variable?

Put your answer in the chat window

The exec system call



The `exec()` system call overlays the code in the child process with the script commands

exec command

exec *<command>*

If a UNIX command is run using the **exec** *<command>*, the bash code in the process is overlaid by the *<command>* code, when finished the process will terminate.

You try it

```
echo "smartphone=android" > google
echo 'echo smartphone is $smartphone' >> google
cat google
chmod +x google
```

Check that your google file contains:
smartphone=android
smartphone is \$smartphone

```
echo $smartphone
```

Should be null

```
google
echo $smartphone
```

*Run google script as a
child process*

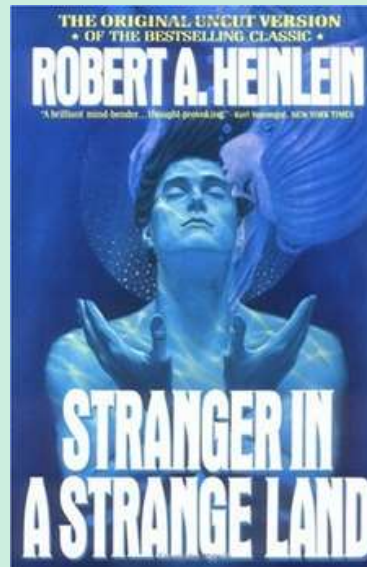
```
exec google
```

*Exec the script so it replaces the code
in the parent bash process*

When you exec a script what happens when the script is finished?

Put your answer in the chat window

grok that?



The flowers script /home/cis90/bin/flowers

```
#!/bin/bash
#
# Useful alias:
#   alias go='echo roses are \"$roses\" and violets are \"$violets\"'
#
echo
echo "==> Entering child process <=="
ps -f
echo "==> showing variables in child <=="
echo "  " roses are '$roses'
echo "  " violets are '$violets'
echo "==> setting variables in child <=="
roses=black
violets=orange
echo "  " roses are '$roses'
echo "  " violets are '$violets'
echo "==> Leaving child process <=="
echo
```

Show the parent, child and the ps processes

Show the values of the roses and violets variables

Set the values of the roses and violets variables to new values

The flowers script /home/cis90/bin/flowers

```
/home/cis90/simben $ flowers
```

```
==> Entering child process <==
```

UID	PID	PPID	C	STIME	TTY	TIME	CMD
simben90	17518	17512	0	08:32	pts/0	00:00:00	-bash
simben90	17568	17518	0	08:33	pts/0	00:00:00	/bin/bash /home/cis90/bin/flowers
simben90	17575	17568	8	08:33	pts/0	00:00:00	ps -f

```
==> showing variables in child <==
```

```
roses are ""
violets are ""
```

```
==> setting variables in child <==
```

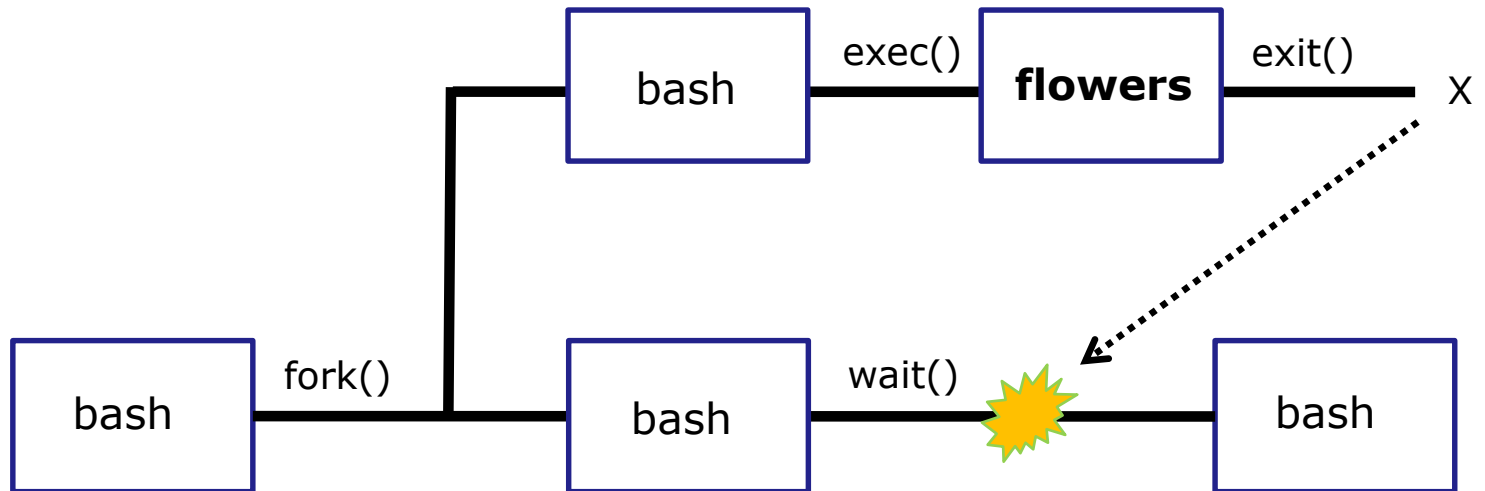
```
roses are "black"
violets are "orange"
```

```
==> Leaving child process <==
```

```
/home/cis90/simben $
```

```
#!/bin/bash
#
# Useful alias:
#   alias go='echo roses are \"$roses\" and violets are \"$violets\"'
#
echo
echo "==> Entering child process <=="
ps -f
echo "==> showing variables in child <=="
echo "  roses are '$roses'"
echo "  violets are '$violets'"
echo "==> setting variables in child <=="
roses=black
violets=orange
echo "  roses are '$roses'"
echo "  violets are '$violets'"
echo "==> Leaving child process <=="
echo
```

The flowers script /home/cis90/bin/flowers



*Use the **flowers** script to test your understanding of how variables are handled with child processes*

Create an alias to show variable values

Note, the double quotes are escaped. We don't want bash to treat them as special metacharacters. We just want the double quotes preserved so they can be seen in the output of the echo command.

```
/home/cis90/simben $ alias go='echo roses are \"$roses\" and violets are \"$violets\"'
```

```
/home/cis90/simben $ alias go
alias go='echo roses are \"$roses\" and violets are \"$violets\"'
```

```
/home/cis90/simben $ go
roses are "" and violets are ""
```

Since there are no shell variables named roses or violets the echo command prints nothing for them.



Activity

Setup this alias so you can use it in activities that follow:

```
alias go='echo roses are \"$roses\" and violets are \"$violets\"'
```

What happens now when you type the go command?

Type your answer in the chat window

Use the alias to show the values of the two variables

```
/home/cis90/simben $ go  
roses are "" and violets are ""
```

```
/home/cis90/simben $ roses=red  
/home/cis90/simben $ go  
roses are "red" and violets are ""
```

*Now the roses variable
has been created and
initialized*

```
/home/cis90/simben $ violets=blue  
/home/cis90/simben $ go  
roses are "red" and violets are "blue"
```

*Now the violets variable
has been created and
initialized*

Use the alias to show the values of the two variables

```
/home/cis90/simben $ unset roses  
/home/cis90/simben $ go  
roses are "" and violets are "blue"
```

*Now the roses
variable no longer
exists*

```
/home/cis90/simben $ unset violets  
/home/cis90/simben $ go  
roses are "" and violets are ""
```

*Now the violets
variable no longer
exists*

Activity

```
/home/cis90/simben $ roses=red; violets=blue  
/home/cis90/simben $ go  
roses are "red" and violets are "blue"  
/home/cis90/simben $ env | grep roses  
/home/cis90/simben $ env | grep violets  
/home/cis90/simben $ flowers
```



When the flowers script runs will it see the values of the roses and violets variables?

Write your answer in the chat window

***NO**, the roses and violets variables were not exported*

```
/home/cis90/simben $ flowers
```

```
==> Entering child process <==
```

UID	PID	PPID	C	STIME	TTY	TIME	CMD
simben90	25106	25059	0	17:16	pts/8	00:00:00	-bash
simben90	27052	25106	0	17:19	pts/8	00:00:00	/bin/bash /home/cis90/bin/flowers
simben90	27059	27052	0	17:19	pts/8	00:00:00	ps -f

```
==> showing variables in child <==
```

```
roses are ""  
violets are ""
```

*The child cannot view the values of the parent's
non-exported variables (Rule #1)*

```
==> setting variables in child <==
```


```
roses are "black"  
violets are "orange"
```

```
==> Leaving child process <==
```

```
/home/cis90/simben $
```

Activity

```
/home/cis90/simben $ roses=red; violets=blue
/home/cis90/simben $ export roses
/home/cis90/simben $ env | grep roses
roses=red
/home/cis90/simben $ env | grep violets
/home/cis90/simben $ go
roses are "red" and violets are "blue"
/home/cis90/simben $ flowers
```



When the flowers script runs will it see the value of the roses variable or the violets variable?

Write your answer in the chat window

Yes, the flowers script can see the roses variable now which was exported

```
/home/cis90/simben $ flowers
```

```
==> Entering child process <==
```

UID	PID	PPID	C	STIME	TTY	TIME	CMD
simben90	25106	25059	0	17:16	pts/8	00:00:00	-bash
simben90	32147	25106	0	17:27	pts/8	00:00:00	/bin/bash /home/cis90/bin/flowers
simben90	32154	32147	0	17:27	pts/8	00:00:00	ps -f

```
==> showing variables in child <==
```

```
roses are "red"
```

```
violets are ""
```

The child now sees the value of roses but not violets (Rule #1)

```
==> setting variables in child <==
```

```
roses are "black"
```

```
violets are "orange"
```

```
==> Leaving child process <==
```

```
/home/cis90/simben $
```


Activity

```
/home/cis90/simben $ roses=red; violets=blue
/home/cis90/simben $ export roses violets
/home/cis90/simben $ env | grep roses
roses=red
/home/cis90/simben $ env | grep violets
violets=blue
/home/cis90/simben $ go
roses are "red" and violets are "blue"
/home/cis90/simben $ flowers
```



Will the flowers process change the values of the roses and violets variables?

Write your answer in the chat window



No, the flowers script which runs as a child process cannot change the parent's variables

```
/home/cis90/simben $ flowers
```

```
==> Entering child process <==
```

UID	PID	PPID	C	STIME	TTY	TIME	CMD
simben90	28732	28724	0	17:51	pts/0	00:00:00	-bash
simben90	29383	28732	0	18:11	pts/0	00:00:00	/bin/bash /home/cis90/bin/flowers
simben90	29390	29383	0	18:11	pts/0	00:00:00	ps -f

```
==> showing variables in child <==
```

```
    roses are "red"
```

```
    violets are "blue"
```

```
==> setting variables in child <==
```

```
    roses are "black"
```

```
    violets are "orange"
```

*The child can only change
copies of the parents variables*

```
==> Leaving child process <==
```

```
/home/cis90/simben $ go
```

```
roses are "red" and violets are "blue"
```

```
/home/cis90/simben $
```

*The child cannot change the
parent's variables (Rule #2)*

Activity

```
/home/cis90/simben $ roses=red; violets=blue
/home/cis90/simben $ export roses violets
/home/cis90/simben $ env | grep roses
roses=red
/home/cis90/simben $ env | grep violets
violets=blue
/home/cis90/simben $ go
roses are "red" and violets are "blue"
/home/cis90/simben $ . flowers
```



Now will the flowers process change the values of the roses and violets variables?

Write your answer in the chat window

Yes, if sourced, flowers will not run as a child process and can change the parent's variables

```
/home/cis90/simben $ . flowers
```

```
==> Entering child process <==
```

UID	PID	PPID	C	STIME	TTY	TIME	CMD
simben90	28732	28724	0	17:51	pts/0	00:00:00	-bash
simben90	29480	28732	0	18:15	pts/0	00:00:00	ps -f

```
==> showing variables in child <==
```

```
    roses are "red"
```

```
    violets are "blue"
```

```
==> setting variables in child <==
```

```
    roses are "black"
```

```
    violets are "orange"
```

```
==> Leaving child process <==
```

```
/home/cis90/simben $ go
```

```
roses are "black" and violets are "orange"
```

```
/home/cis90/simben $
```

```
/home/cis90/rodduk $ cat .bash_profile
# .bash_profile

# Get the aliases and functions
if [ -f ~/.bashrc ]; then
    . ~/.bashrc
fi

# User specific environment and startup programs

PATH=$PATH:$HOME/../../bin:$HOME/bin:..
BASH_ENV=$HOME/.bashrc
USERNAME=""
PS1='$PWD $ '
export USERNAME BASH_ENV PATH
umask 002
set -o ignoreeof
stty susp
eval `tset -s -m vt100:vt100 -m`

/home/cis90/rodduk $
```

And now you know why the bash login scripts are sourced rather than run as child processes.

*Note: the . (dot) and **source** commands are equivalent*

```
/home/cis90/rodduk $ cat .bashrc
# .bashrc

# User specific aliases and functions

# Source global definitions
if [ -f /etc/bashrc ]; then
    . /etc/bashrc
fi
alias print="echo -e"
```



Activity

```
/home/cis90/simben $ roses=red; violets=blue
/home/cis90/simben $ export roses violets
/home/cis90/simben $ env | grep roses
roses=red
/home/cis90/simben $ env | grep violets
violets=blue
/home/cis90/simben $ go
roses are "red" and violets are "blue"
/home/cis90/simben $ exec flowers
```

What will happen if flowers is exec'ed?

Write your answer in the chat window

The flowers script overlays and replaces the bash code in your current process. It runs to completion and your session ends!

Housekeeping



1. Lab 10 due by 11:59PM tonight
2. Use the **check10** script to check your work
3. After you submit your lab10 file you may comment out your riddle command in *.bash_profile*
4. The Extra Credit Labs X1 and X2 (30 points each) are available. They will be graded after the day of the final.
5. The Final Project is available and due in **two weeks**.

Heads up on Final Exam

Test #3 (final exam) is **MONDAY** May 16 7-9:50AM

Monday	5/16	Test #3 (the final exam)	5 posts <u>Lab X1</u> <u>Lab X2</u>
		Time <ul style="list-style-type: none"> MONDAY 7:00AM - 9:50AM in Room 828 Materials <ul style="list-style-type: none"> Test (<u>canvas</u>) CCC Confer <ul style="list-style-type: none"> <u>Enter virtual classroom</u> <u>Class archives</u> 	

*Extra credit
labs and
final posts
due by
11:59PM*

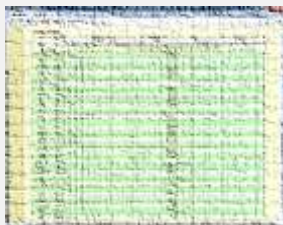
- All students will take the test at the same time. The test must be completed by 9:50AM.
- Working and long distance students can take the test online via CCC Confer and Canvas.
- Working students will need to plan ahead to arrange time off from work for the test.
- Test #3 is mandatory (even if you have all the points you want)

Where to find your grades

Send me your survey to get your LOR code name.

The CIS 90 website Grades page

<http://simms-teach.com/cis90grades.php>



Points that could have been earned:

9 quizzes: 27 points
9 labs: 270 points
2 tests: 60 points
3 forum quarters: 60 points
Total: 417 points

Percentage	Total Points	Letter Grade	Pass/No Pass
90% or higher	504 or higher	A	Pass
80% to 89.9%	448 to 503	B	Pass
70% to 79.9%	392 to 447	C	Pass
60% to 69.9%	336 to 391	D	No pass
0% to 59.9%	0 to 335	F	No pass

At the end of the term I'll add up all your points and assign you a grade using this table

Or check on Opus

checkgrades *codename*
(where *codename* is your LOR codename)



Written by Jesse Warren a past CIS 90 Alumnus

grades *codename*
(where *codename* is your LOR codename)



Written by Sam Tindell a past CIS 90 Alumnus.
Try his tips, schedule and forums scripts as well!

Stuck on something or just like some extra help?



If you would like some additional help come over to the CIS Lab. There are student lab assistants and instructors there to work with you.

Takashi, Melissa, Josh and Andrew are CIS 90 Alumni.

Chris is a STEM tutor and can help you Mondays 3-3:30 & 5:30-9 and Wednesdays 4-5 & 7-9.

Mike Matera is the other Linux instructor.

I'm in there Mondays 10:00-12:30.





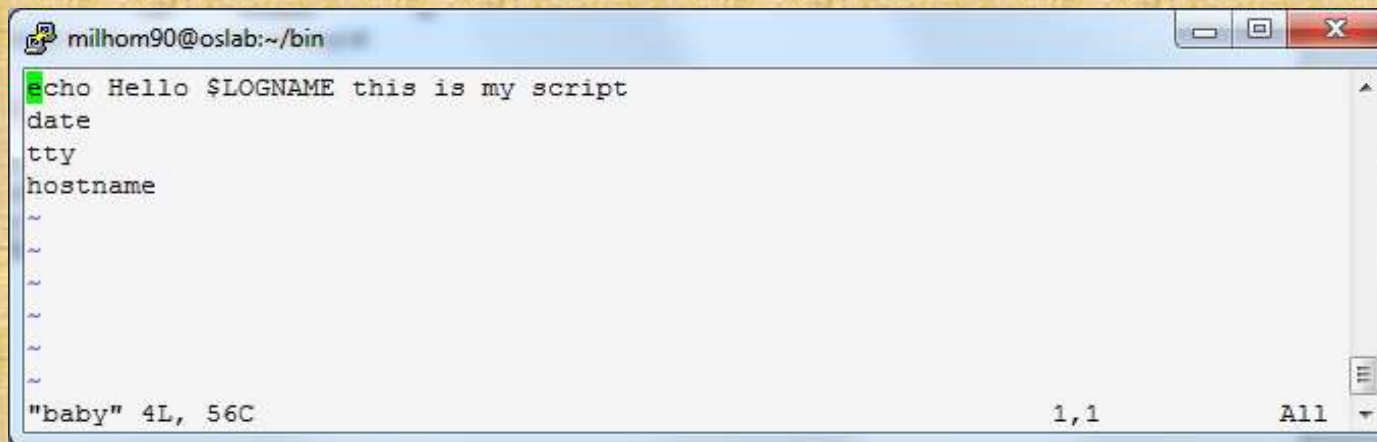
Shell Scripting 101

Shell Scripts

- In its simplest form a shell script can just be a list of commands in a file
- Execute "x" permissions must be enabled on the script file.
- The script must either be on your path or you must use an absolute pathname to run it.
- Putting `#!/bin/bash` on line 1 specifies which program should be used to execute the script. The default if not specified is `/bin/bash`. Note this enables vi to use color syntax.
- Putting the `exit` command at the end triggers a system call to the kernel to terminate the process and release all resources. Note a numerical status can be specified as an argument (e.g. `exit 20`) which will be communicated back to the parent process.

Class Activity

```
/home/cis90/milhom $ cd bin  
/home/cis90/milhom/bin $ cp ../../depot/scripts/baby .  
/home/cis90/milhom/bin $ vi baby
```



The screenshot shows a terminal window titled 'milhom90@oslab:~/bin'. Inside the terminal, the vi editor is open, editing a file named 'baby'. The editor's command line shows 'echo Hello \$LOGNAME this is my script'. The main text area contains the following lines: 'date', 'tty', 'hostname', and four tilde (~) characters. The status bar at the bottom left shows '"baby" 4L, 56C', and the bottom right shows '1,1' and 'All'.

use  **:wq** *to save file and quit vi*

```
/home/cis90/milhom/bin $ chmod +x baby  
/home/cis90/milhom/bin $ baby  
Hello milhom90 this is my script  
Tue Nov 24 14:10:42 PST 2015  
/dev/pts/3  
oslab.cis.cabrillo.edu
```

$\$(some-command)$

Utilizing `$(some-command)`

The **\$** metacharacter provides the "value" of both variables, e.g. `$PS1` or commands, e.g. `$(some-command)`:

```
/home/cis90/simben $ echo $PS1
```

```
$PWD $
```

```
/home/cis90/simben $ echo $(grep love poems/Shakespeare/* | wc -l)
```

```
11
```

```
/home/cis90/simben $ myname=$(grep $LOGNAME /etc/passwd | cut -f5 -d":")
```

```
/home/cis90/simben $ echo My name is $myname
```

```
My name is Benji Simms
```

This is useful when you want to insert the output of a command into a sentence being echoed

More on the date command

Utilizing the date command

```
/home/cis90/milhom/bin $ date  
Tue Nov 24 14:33:41 PST 2015
```

```
/home/cis90/milhom/bin $ date +%r  
02:33:53 PM
```

```
/home/cis90/milhom/bin $ date +%A  
Tuesday
```

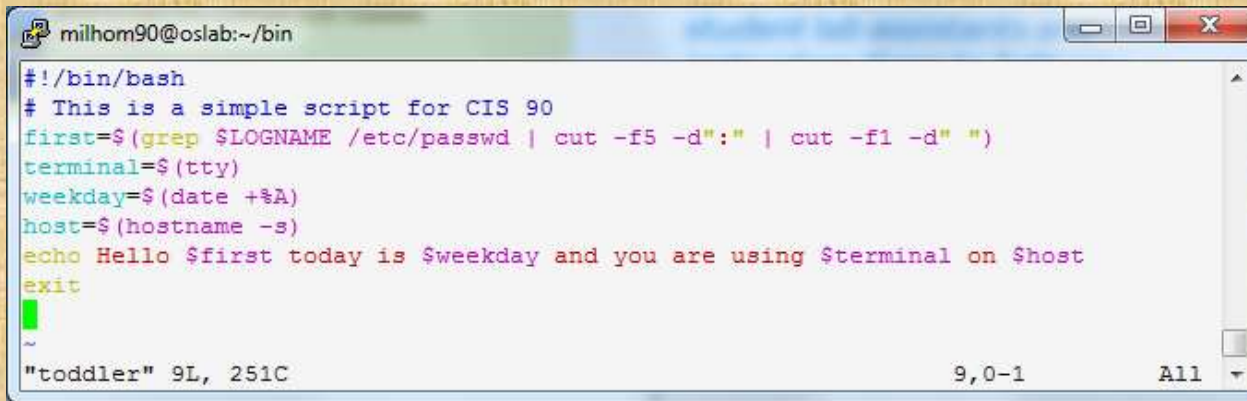
```
/home/cis90/milhom/bin $ date +%m/%d/%Y  
11/24/2015
```



See the man page on date for lots of other % codes

Class Activity

```
/home/cis90/milhom/bin $ cd ~/bin
/home/cis90/milhom/bin $ cp ../../depot/scripts/toddler .
/home/cis90/milhom/bin $ vi toddler
```



```
milhom90@oslab:~/bin
#!/bin/bash
# This is a simple script for CIS 90
first=$(grep $LOGNAME /etc/passwd | cut -f5 -d":" | cut -f1 -d" ")
terminal=$(tty)
weekday=$(date +%A)
host=$(hostname -s)
echo Hello $first today is $weekday and you are using $terminal on $host
exit
```

"toddler" 9L, 251C 9,0-1 All

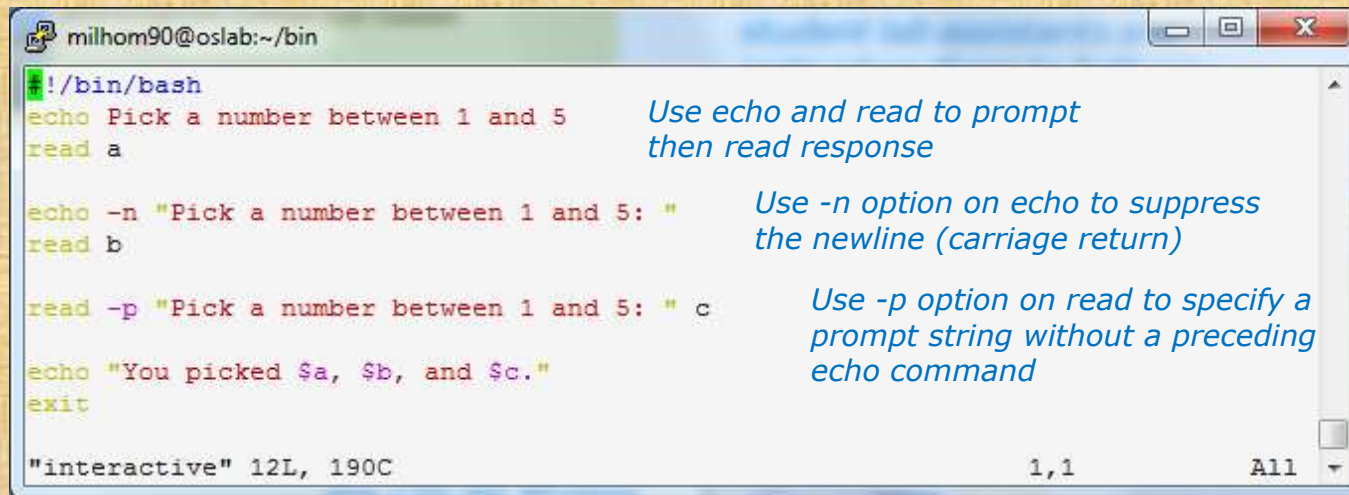
use  **:wq** to save file and quit vi

```
/home/cis90/milhom/bin $ chmod +x toddler
/home/cis90/milhom/bin $ toddler
Hello Homer today is Tuesday and you are using /dev/pts/3 on oslab
```

Interactive scripts using the read command

Class Activity

```
/home/cis90/milhom/bin $ cd ~/bin
/home/cis90/milhom/bin $ cp ../../depot/scripts/interactive .
/home/cis90/milhom/bin $ vi interactive
```



```
milhom90@oslab:~/bin
#!/bin/bash
echo Pick a number between 1 and 5
read a

echo -n "Pick a number between 1 and 5: "
read b

read -p "Pick a number between 1 and 5: " c

echo "You picked $a, $b, and $c."
exit
```

Use echo and read to prompt then read response

Use -n option on echo to suppress the newline (carriage return)

Use -p option on read to specify a prompt string without a preceding echo command

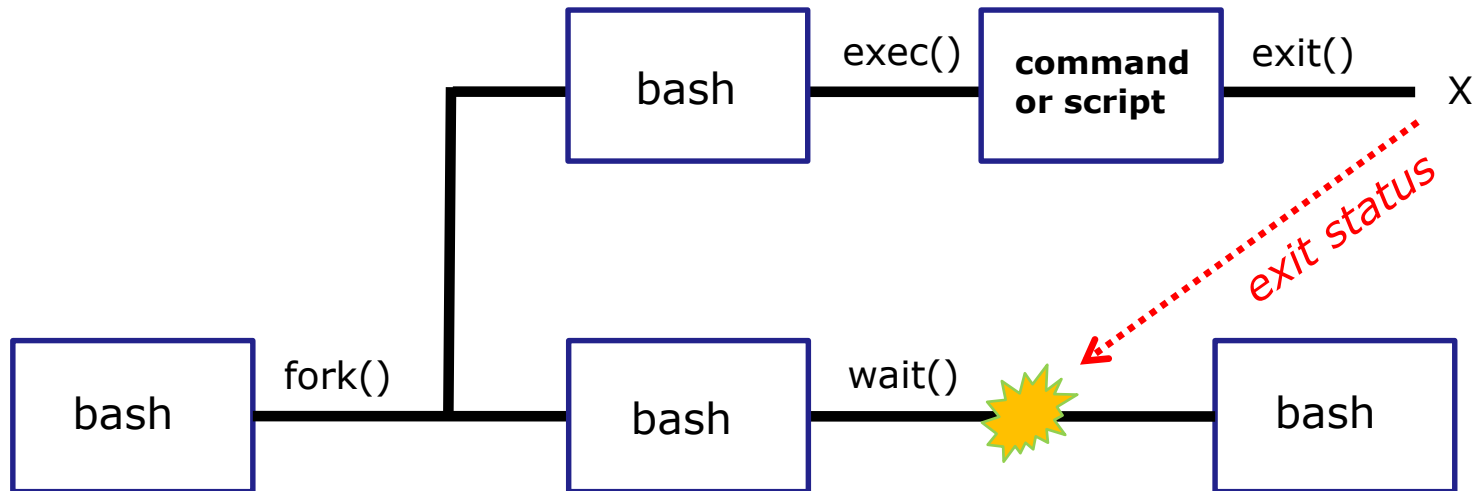
"interactive" 12L, 190C 1,1 All

use **Esc** :wq to save file and quit vi

```
/home/cis90/milhom/bin $ chmod +x interactive
/home/cis90/milhom/bin $ interactive
Pick a number between 1 and 5
2
Pick a number between 1 and 5: 4
Pick a number between 1 and 5: 5
You picked 2, 4, and 5.
```

Communicating status back to parent

The child can communicate status back to the parent



The child process makes a `exit()` system call to release all resources. The child remains a zombie until the exit status is communicated to the parent.

Utilizing the status

Yes, there is a variable named ?

This variable will be set to the exit status of the command or script that just ran.

```
/home/cis90/milhom/bin $ grep bogus /etc/passwd > /dev/null  
/home/cis90/milhom/bin $ echo $?  
1 status=1 (grep found no matches)
```

```
/home/cis90/milhom/bin $ grep $LOGNAME /etc/passwd > /dev/null  
/home/cis90/milhom/bin $ echo $?  
0 status=0 (grep found one or more matches)
```

A status=0 typically indicates success and non-zero values are error codes

Utilizing the status

```
/home/cis90/milhom/bin $ ping -c1 son-of-opus.simms-teach.com  
PING son-of-opus.simms-teach.com (52.8.145.169) 56(84) bytes of data.
```

```
--- son-of-opus.simms-teach.com ping statistics ---  
1 packets transmitted, 0 received, 100% packet loss, time 10000ms
```

```
/home/cis90/milhom/bin $ echo $?
```

```
1 status=1 (Son-of-Opus system at AWS is down right now to save $)
```

```
/home/cis90/milhom/bin $ ping -c1 simms-teach.com
```

```
PING simms-teach.com (208.113.154.64) 56(84) bytes of data.  
64 bytes from apache2-dap.giles.dreamhost.com (208.113.154.64): icmp_seq=1 ttl=43 time=78.9 ms
```

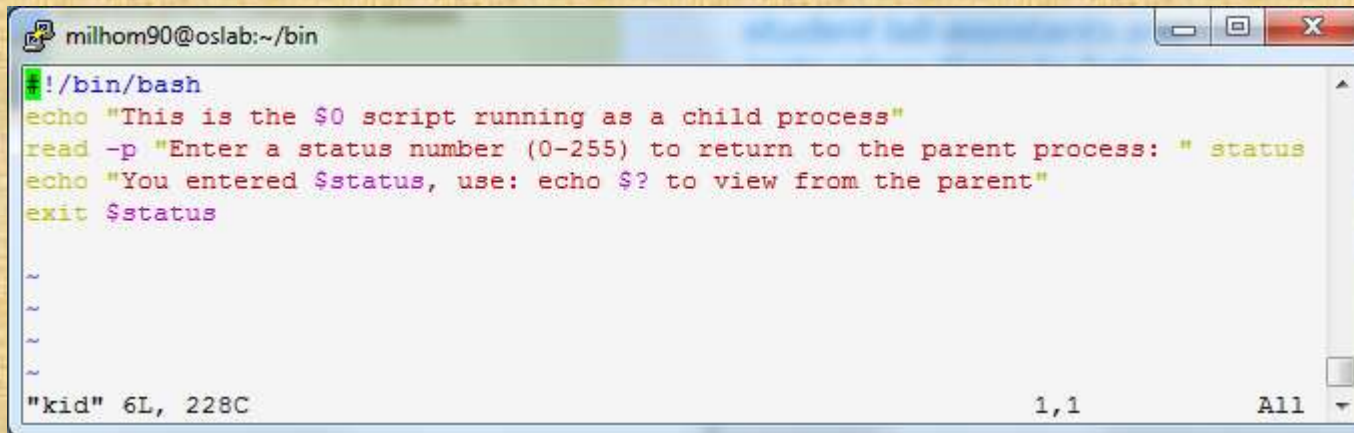
```
--- simms-teach.com ping statistics ---  
1 packets transmitted, 1 received, 0% packet loss, time 164ms  
rtt min/avg/max/mdev = 78.957/78.957/78.957/0.000 ms
```

```
/home/cis90/milhom/bin $ echo $?
```

```
0 status=0 (simms-teach.com website is up right now)
```

Class Activity

```
/home/cis90/milhom/bin $ cd ~/bin
/home/cis90/milhom/bin $ cp ../../depot/scripts/kid .
/home/cis90/milhom/bin $ vi kid
```



The screenshot shows a terminal window titled 'milhom90@oslab:~/bin'. The terminal displays the contents of the 'kid' script, which is a bash script. The script starts with a shebang line, followed by an echo statement, a read statement for a status number, another echo statement, and an exit statement. The terminal also shows the status of the file 'kid' as 6L, 228C.

```
#!/bin/bash
echo "This is the $0 script running as a child process"
read -p "Enter a status number (0-255) to return to the parent process: " status
echo "You entered $status, use: echo $? to view from the parent"
exit $status

~
~
~
~

"kid" 6L, 228C 1,1 All
```

use  **:wq** to save file and quit vi

```
/home/cis90/milhom/bin $ ./kid
This is the ./kid script running as a child process
Enter a status number (0-255) to return to the parent process: 25
You entered 25, use: echo 0 to view from the parent
/home/cis90/milhom/bin $ echo $?
25
```



Final Project

myscript

```
milhom90@oslab:~/bin
#!/bin/bash
#
# menu: A simple menu template
#
while true
do
    clear
    echo -n "
        CIS 90 Final Project
    1) Task 1
    2) Task 2
    3) Task 3
    4) Task 4
    5) Task 5
    6) Exit

    Enter Your Choice: "
    read RESPONSE
    case $RESPONSE in
        1)    # Commands for Task 1
            ;;
        2)    # Commands for Task 2
            ;;
        3)    # Commands for Task 3
            ;;
        4)    # Commands for Task 4
            ;;
        5)    # Commands for Task 5
            ;;
        6)    exit 0
            ;;
        *)    echo "Please enter a number between 1 and 6"
            ;;
    esac
    echo -n "Hit the Enter key to return to menu "
    read dummy
done
~
```

You will modify and extend this script for your final project



Final Project

If you did not do this last week, please do so now

Getting Started

1) On Opus, cd to your home directory and enter:

cd

cp ../depot/myscript bin/

2) Give your script execute permissions with:

chmod +x bin/myscript

3) Run the script:

myscript

Final Project



```
simben90@oslab:~  
*****  
*           Spring 2015 CIS 90 Online Projects           *  
*****  
1) Abraham C.  
2) Abraham N.  
3) Ahmad  
4) Al  
5) Benji C.  
6) Benji S.  
7) Cameron  
8) Chris  
9) Clara  
10) Django  
11) Duke  
12) Eddie  
13) Efrain  
14) Emilio  
15) Ethan  
16) Homer  
17) Ian  
18) John  
19) Mario  
20) Mateo  
21) Mike  
22) Monte  
23) Roberto  
24) Ryan  
25) Tess  
26) Tim  
  
99) Exit  
  
Enter Your Choice: █
```

*Before leaving class today you
want to make sure can run
your **myscript** from **allscripts***



Final Project Grading Rubric

Grading rubric (60 points maximum)

Possible Points	Requirements
30	Implementing all five tasks (6 points each): <ul style="list-style-type: none"> Requirements for each task: <ul style="list-style-type: none"> Minimum of 10 "original" script command lines Has comments to explain what it does Has user interaction
25	You don't have to do all of these but do at least five: <ul style="list-style-type: none"> Redirecting stdin (5 points) Redirecting stdout (5 points) Redirecting stderr (5 points) Use of permissions (5 points) Use of filename expansion characters (5 points) Use of absolute path (5 points) Use of relative path (5 points) Use of a PID (5 points) Use of inodes (5 points) Use of links (5 points) Use of a GID or group (5 points) Use of a UID or user (5 points) Use of a signal (5 points) Use of piping (5 points) Use of an environment variable (5 points) Use of /bin/mail (5 points) Use of a conditional (5 points) <p>The maximum for this section are 25 points.</p>
5	Present your script in front of the class
Points lost	
-15	Fails to run from allscripts
-15	Other students in the class are unable to read and execute your script.
-15	Error messages are displayed when running one or more tasks
-up to 90	No credit for any task which contains unoriginal script code that: <ul style="list-style-type: none"> Doesn't give full credit to the original author Doesn't indicate where the code was obtained from Doesn't include licensing terms Violates copyright or licensing terms
Extra credit	
30	Up to three additional tasks (10 points each)



Final Project

permissions

A past forum post ...



Group Write Permissions

ls -l /home/cis90/*/bin/myscript

```
rsimms@oslab:~$ date
Tue Nov 24 13:39:12 PST 2015
rsimms@oslab ~]$ ls -l /home/cis90/*/bin/myscript
-rwxr-xr-x. 1 fertho90 cis90  158 Nov 19 09:59 /home/cis90/fertho/bin/myscript
-rwxrwxr-x. 1 frisea90 cis90 1373 Nov 18 16:24 /home/cis90/frisea/bin/myscript
-rwxrwxr-x. 1 hawwil90 cis90  763 Nov 18 14:45 /home/cis90/hawwil/bin/myscript
-rwxrwxr-x. 1 hipmig90 cis90  709 Nov 18 14:24 /home/cis90/hipmig/bin/myscript
-rwxrwxr-x. 1 koujen90 cis90  710 Nov 18 14:28 /home/cis90/koujen/bin/myscript
-rwxrwxr-x. 1 linmay90 cis90  719 Nov 23 20:23 /home/cis90/linmay/bin/myscript
-rwxrwxr-x. 1 milhom90 cis90 1526 Nov 16 19:09 /home/cis90/milhom/bin/myscript
-rwxrwxrwx. 1 neljoa90 cis90  578 Nov 22 20:16 /home/cis90/neljoa/bin/myscript
-rwxrwxr-x. 1 remlis90 cis90  719 Nov 23 18:29 /home/cis90/remlis/bin/myscript
-rwxr-xr-x. 1 simben90 cis90 10550 Nov 16 18:55 /home/cis90/simben/bin/myscript
-rwxrwxr-x. 1 watshe90 cis90  765 Nov 18 14:24 /home/cis90/watshe/bin/myscript
rsimms@oslab ~]$
```

*Which **myscript** files can only be edited by their owner?
Which ones could be edited by anyone in the CIS 90 class?
Which ones could be edited by anyone on Opus?*

Group Read and Execute Permissions

```
rsimms@oslab:~$ /home/cis90/bin/checkmyscripts
-rwxr-xr-x. 1 simben90 cis90 10550 Nov 16 18:55 /home/cis90/simben/bin/myscript
-rwxrwxr-x. 1 milhom90 cis90 1526 Nov 16 19:09 /home/cis90/milhom/bin/myscript
ls: cannot access /home/cis90/rodduk/bin/myscript: No such file or directory
ls: cannot access /home/cis90/gamant/bin/myscript: No such file or directory
-rwxrwxr-x. 1 koujen90 cis90 710 Nov 18 14:28 /home/cis90/koujen/bin/myscript
-rwxrwxrwx. 1 neljoa90 cis90 578 Nov 22 20:16 /home/cis90/neljoa/bin/myscript
ls: cannot access /home/cis90/tinsam/bin/myscript: No such file or directory
ls: cannot access /home/cis90/beycha/bin/myscript: No such file or directory
ls: cannot access /home/cis90/davwil/bin/myscript: No such file or directory
ls: cannot access /home/cis90/drydan/bin/myscript: No such file or directory
-rwxr-xr-x. 1 fertho90 cis90 158 Nov 19 09:59 /home/cis90/fertho/bin/myscript
ls: cannot access /home/cis90/johjos/bin/myscript: No such file or directory
-rwxrwxr-x. 1 linmay90 cis90 719 Nov 23 20:23 /home/cis90/linmay/bin/myscript
ls: cannot access /home/cis90/popchr/bin/myscript: No such file or directory
ls: cannot access /home/cis90/porjos/bin/myscript: No such file or directory
-rwxrwxr-x. 1 remlis90 cis90 719 Nov 23 18:29 /home/cis90/remlis/bin/myscript
ls: cannot access /home/cis90/spiive/bin/myscript: No such file or directory
ls: cannot access /home/cis90/tosbre/bin/myscript: No such file or directory
ls: cannot access /home/cis90/brevic/bin/myscript: No such file or directory
-rwxrwxr-x. 1 frisea90 cis90 1373 Nov 18 16:24 /home/cis90/frisea/bin/myscript
-rwxrwxr-x. 1 hawwil90 cis90 763 Nov 18 14:45 /home/cis90/hawwil/bin/myscript
-rwxrwxr-x. 1 hipmig90 cis90 709 Nov 18 14:24 /home/cis90/hipmig/bin/myscript
ls: cannot access /home/cis90/juetay/bin/myscript: No such file or directory
ls: cannot access /home/cis90/locjer/bin/myscript: No such file or directory
ls: cannot access /home/cis90/mcgcam/bin/myscript: No such file or directory
ls: cannot access /home/cis90/primic/bin/myscript: No such file or directory
ls: cannot access /home/cis90/schrob/bin/myscript: No such file or directory
ls: cannot access /home/cis90/fegmig/bin/myscript: No such file or directory
ls: cannot access /home/cis90/prites/bin/myscript: No such file or directory
[rsimms@oslab ~]$
```

Which myscript files cannot be run by classmates?



Class Activity

Note: One of the requirements for the final project is setting permissions on your script so that all cis90 members can read and run it.

To meet this requirement use:

```
cd
chmod 750 bin bin/myscript
ls -ld bin bin/myscript
```

When finished check that your script can be run by other CIS 90 students:

```
su - cis90
    (use the "funny Cabrillo" password)
allscripts
exit
```

Run you script and write "success" or "not working" into the chat window

umask again!

Permissions

Why can other classmates write to my scripts?

Before Lab 10

```
/home/cis90/simben/bin $ umask  
0002  
/home/cis90/simben $ rm newscript; touch newscript  
/home/cis90/simben $ ls -l newscript  
-rw-rw-r-- 1 simben cis90 0 Nov 23 16:17 newscript  
/home/cis90/simben $ chmod +x newscript  
/home/cis90/simben $ ls -l newscript  
-rwxrwxr-x 1 simben cis90 0 Nov 23 16:17 newscript
```

After Lab 10

```
/home/cis90/simben $ umask  
0006  
/home/cis90/simben $ rm newscript; touch newscript  
/home/cis90/simben $ ls -l newscript  
-rw-rw---- 1 simben cis90 0 May 12 08:44 newscript  
/home/cis90/simben $ chmod +x newscript  
/home/cis90/simben $ ls -l newscript  
-rwxrwx--x 1 simben cis90 0 May 12 08:44 newscript
```

Because your umask setting allows group members to have write permission on any new files you create!

Permissions

```
[rodduk90@opus bin]$ cat /home/cis90/rodduk/.bash_profile
```

```
# .bash_profile
```

```
# Get the aliases and functions
```

```
if [ -f ~/.bashrc ]; then
```

```
    . ~/.bashrc
```

```
fi
```

```
# User specific environment and startup programs
```

```
PATH=$PATH:$HOME/../../bin:$HOME/bin:..
```

```
BASH_ENV=$HOME/.bashrc
```

```
USERNAME=""
```

```
PS1='$PWD $ '
```

```
export USERNAME BASH_ENV PATH
```

```
umask 002
```

```
set -o ignoreeof
```

```
stty susp
```

```
eval `tset -s -m vt100:vt100 -m :\?${TERM:-ansi} -r -Q`
```

Note your umask is defined in .bash_profile which runs every time you login. In lab 10 you change this setting to 006.



Class Activity

- Change your umask to 026
- Can group or other users modify future new files now?
- Try it, **touch** a new file and check the permissions with **ls -l**

How would you make this a permanent umask setting?

Write your answer in the chat window

Final Project Getting Started

What takes longer?



Writing the script?

Or deciding what to script?



One way to get started ... select a random command to build a script around

Commands

.	echo	lpstat	sort
at	env	ls	spell
banner	exit	mail	su
bash	export	man	tail
bc	file	me	tee
cal	find		touch
cancel	finger	more	type
cat	grep	mv	umask
cd	head	passwd	uname
chgrp	history		unset
chmod	id	rm	vi
chown	jobs	rmdir	wc
clear	kill	set	who
cp	ln	sleep	write
date	lp/lpr		xxd



For this example we will pick the grep command

Research your command by reading the man page and googling examples

```
rsimms@opus:~/cis90/project
GREP (1)
NAME
    grep, egrep, fgrep - print lines matching a pattern

SYNOPSIS
    grep [options] PATTERN [FILE...]
    grep [options] [-e PATTERN | -f FILE] [FILE...]

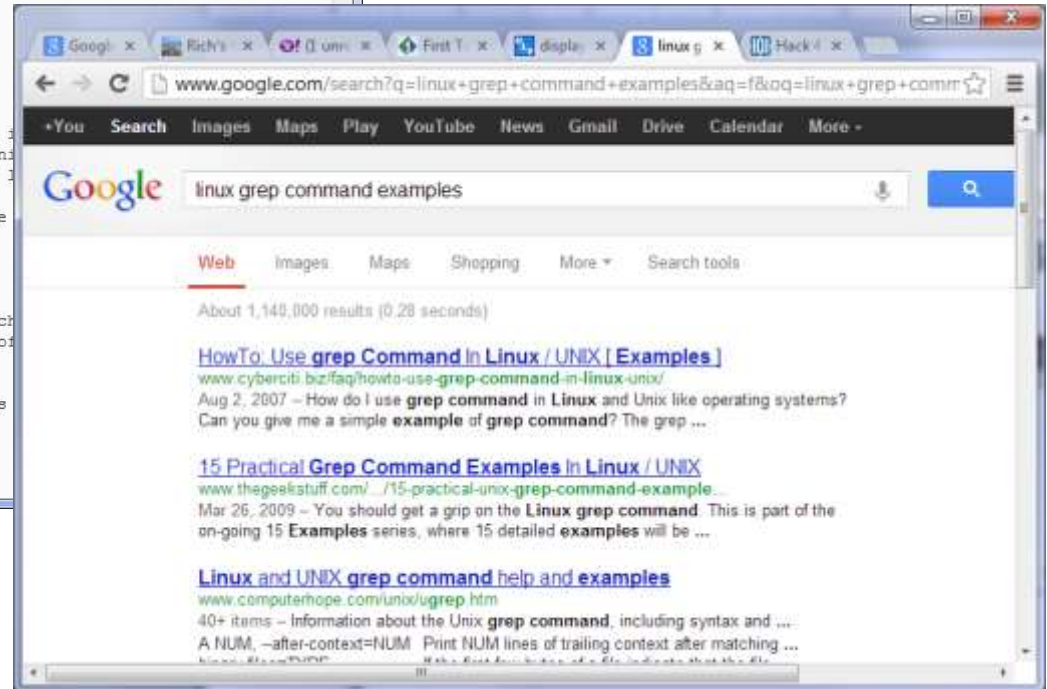
DESCRIPTION
    Grep searches the named input FILES (or standard input, if no
    named, or the file name - is given) for lines containing
    given PATTERN. By default, grep prints the matching lines.

    In addition, two variant programs egrep and fgrep are
    the same as grep -E. Fgrep is the same as grep -F.

OPTIONS
    -A NUM, --after-context=NUM
        Print NUM lines of trailing context after match
        line containing -- between contiguous groups of
        matches.

    -a, --text
        Process a binary file as if it were text; this
        --binary-files=text option.

    -B NUM, --before-context=NUM
```



Review the various options and arguments for the command

Next, decide what you want to do with the command you selected. For this example we will:

1. Start a new task in **myscript**
2. Customize the menu for the new task
3. Start with a simple **grep** command
4. Add some simple interaction
5. Add successive grep commands that experiment with different options
6. Iterate till happy with it.

Start hacking
the menu!

*Customize the menu
options for Task 1*

After

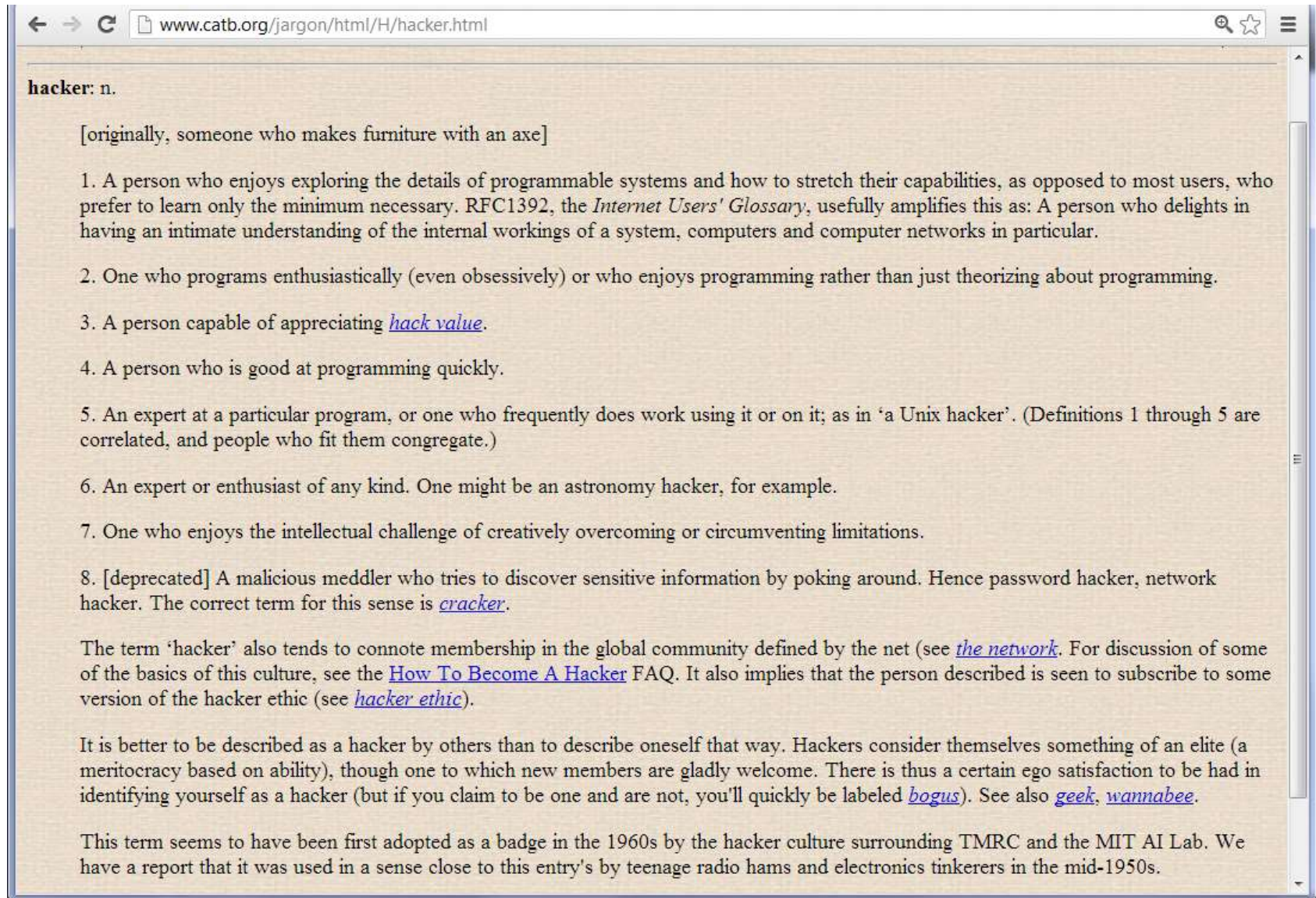
```
rodduk90@oslab:~/bin
#!/bin/bash
#
# menu: A simple menu template
#
while true
do
    clear
    echo -n "
        CIS 90 Final Project
    1) Task 1
    2) Task 2
    3) Task 3
    4) Task 4
    5) Task 5
    6) Exit

    Enter Your Choice: "
    read RESPONSE
    case $RESPONSE in
        1)    # Commands for Task 1
            ;;
        2)    # Commands for Task 2
            ;;
        *)
            ;;
    esac
done
"myscript" 37L, 546C
```

Before

```
rodduk90@oslab:~/bin
#!/bin/bash
#
# menu: A simple menu template
#
while true
do
    clear
    echo -n "
        CIS 90 Final Project
    1) Hacking with the grep command
    2) Task 2
    3) Task 3
    4) Task 4
    5) Task 5
    6) Exit

    Enter Your Choice: "
    read RESPONSE
    case $RESPONSE in
        1)    # Commands for Task 1
            ;;
        2)    # Commands for Task 2
            ;;
        *)
            ;;
    esac
done
-- INSERT --
10,5-12
Top
```

The screenshot shows a web browser window with the address bar displaying www.catb.org/jargon/html/H/hacker.html. The page content is as follows:

hacker: n.

[originally, someone who makes furniture with an axe]

1. A person who enjoys exploring the details of programmable systems and how to stretch their capabilities, as opposed to most users, who prefer to learn only the minimum necessary. RFC1392, the *Internet Users' Glossary*, usefully amplifies this as: A person who delights in having an intimate understanding of the internal workings of a system, computers and computer networks in particular.
2. One who programs enthusiastically (even obsessively) or who enjoys programming rather than just theorizing about programming.
3. A person capable of appreciating [hack value](#).
4. A person who is good at programming quickly.
5. An expert at a particular program, or one who frequently does work using it or on it; as in 'a Unix hacker'. (Definitions 1 through 5 are correlated, and people who fit them congregate.)
6. An expert or enthusiast of any kind. One might be an astronomy hacker, for example.
7. One who enjoys the intellectual challenge of creatively overcoming or circumventing limitations.
8. [deprecated] A malicious meddler who tries to discover sensitive information by poking around. Hence password hacker, network hacker. The correct term for this sense is [cracker](#).

The term 'hacker' also tends to connote membership in the global community defined by the net (see [the network](#). For discussion of some of the basics of this culture, see the [How To Become A Hacker](#) FAQ. It also implies that the person described is seen to subscribe to some version of the hacker ethic (see [hacker ethic](#)).

It is better to be described as a hacker by others than to describe oneself that way. Hackers consider themselves something of an elite (a meritocracy based on ability), though one to which new members are gladly welcome. There is thus a certain ego satisfaction to be had in identifying yourself as a hacker (but if you claim to be one and are not, you'll quickly be labeled [bogus](#)). See also [geek](#), [wannabee](#).

This term seems to have been first adopted as a badge in the 1960s by the hacker culture surrounding TMRC and the MIT AI Lab. We have a report that it was used in a sense close to this entry's by teenage radio hams and electronics tinkerers in the mid-1950s.

Hacking (building, exploring) is not cracking (malicious)

Layout your work area on the screen

```
rodduk90@oslab:~/bin
#!/bin/bash
# menu: A simple menu template
#
while true
do
    clear
    echo -n "
    CIS 90 Final Project
    1) Hacking with the grep command
    2) Task 2
    3) Task 3
    4) Task 4
    5) Task 5
    6) Exit

    Enter Your Choice: "
    read RESPONSE
    case $RESPONSE in
        1) # Commands for Task 1
            ;;
        2) # Commands for Task 2
            ;;
        3) # Commands for Task 3
            ;;
        4) # Commands for Task 4
            ;;
        5) # Commands for Task 5
            ;;
        6) exit 0
        *) echo "Please enter a number between 1 and 6"
            ;;
    esac
    echo -n "Hit the Enter key to return to menu: "
    read dummy
done
-- INSERT --
```

1st

```
rodduk90@oslab:~/bin
/home/cis90/rodduk $ cd bin
/home/cis90/rodduk/bin $ myscript
```

2nd

```
rodduk90@oslab:~
GREP(1)
NAME
    grep, egrep, fgrep - print lines matching a pattern

SYNOPSIS
    grep [OPTIONS] PATTERN [FILE...]
    grep [OPTIONS] [-e PATTERN | -f FILE] [FILE...]

DESCRIPTION
    grep searches the named input FILES (or standard input if no files are
    named, or if a single hyphen-minus (-) is given as file name) for lines
    containing a match to the given PATTERN. By default, grep prints the
    matching lines.

    In addition, two variant programs egrep and fgrep are available. egrep
    is the same as grep -E. fgrep is the same as grep -F. Direct
    invocation as either egrep or fgrep is deprecated, but is provided to
    allow historical applications that rely on them to run unmodified.

OPTIONS
    Generic Program Information
    --help Print a usage message briefly summarizing these command-line
```

3rd

Utilize screen real estate with multiple windows:

- the 1st for vi,
- the 2nd for testing **myscript**,
- and a 3rd for experimenting or showing man pages

Test your menu change

```
rodduk90@roslab:~/bin
#!/bin/bash
#
# menu: A simple menu template
#
while true
do
    clear
    echo -n "
    CIS 90 Final Project
    1) Hacking with the grep command
    2) Task 2
    3) Task 3
    4) Task 4
    5) Task 5
    6) Exit

    Enter Your Choice: "
    read RESPONSE
    case $RESPONSE in
        1) # Commands for Task 1
            ;;
        2) # Commands for Task 2
            ;;
        3) # Commands for Task 3
            ;;
        4) # Commands for Task 4
            ;;
        5) # Commands for Task 5
            ;;
        6) # Exit 0
            ;;
        *) echo "Please enter a number between 1 and 6"
            ;;
    esac
    echo -n "Hit the Enter key to return to menu "
    read dummy
done
```

```
rodduk90@roslab:~/bin
CIS 90 Final Project
1) Hacking with the grep command
2) Task 2
3) Task 3
4) Task 4
5) Task 5
6) Exit

Enter Your Choice: 
```

Changes work!

```
rodduk90@roslab:~
GREP(1)
NAME
    grep, egrep, fgrep - print lines matching a pattern

SYNOPSIS
    grep [OPTIONS] PATTERN [FILE...]
    grep [OPTIONS] [-e PATTERN | -f FILE] [FILE...]

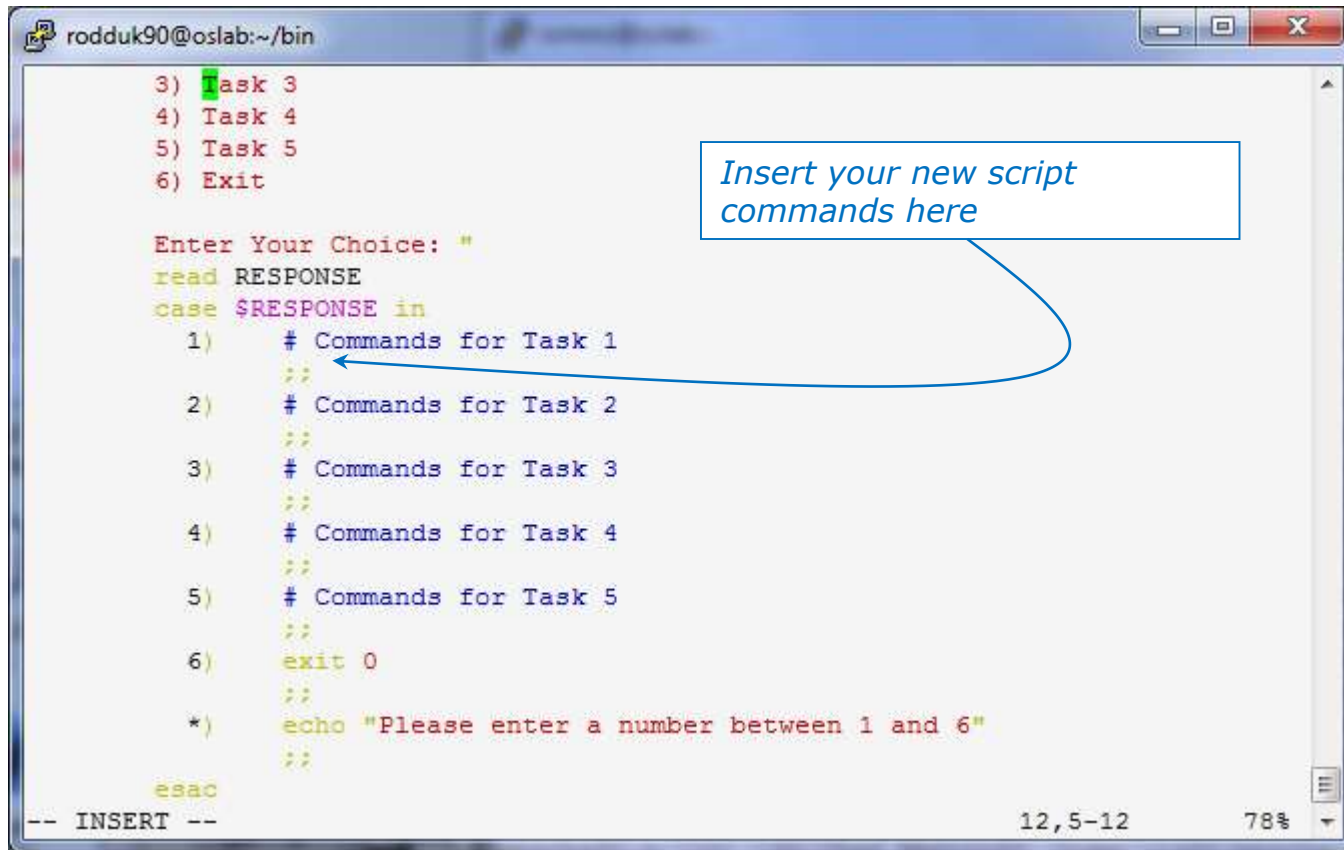
DESCRIPTION
    grep searches the named input FILEs (or standard input if no files are
    named, or if a single hyphen-minus (-) is given as file name) for lines
    containing a match to the given PATTERN. By default, grep prints the
    matching lines.

    In addition, two variant programs egrep and fgrep are available. egrep
    is the same as grep -E. fgrep is the same as grep -F. Direct
    invocation as either egrep or fgrep is deprecated, but is provided to
    allow historical applications that rely on them to run unmodified.

OPTIONS
    Generic Program Information
    --help Print a usage message briefly summarizing these command-line
```

Run **myscript** in the 2nd window and verify your changes work

Find the location to insert your new task commands



```

rodduk90@oslab:~/bin
3) Task 3
4) Task 4
5) Task 5
6) Exit

Enter Your Choice: "
read RESPONSE
case $RESPONSE in
  1) # Commands for Task 1
    ;;
  2) # Commands for Task 2
    ;;
  3) # Commands for Task 3
    ;;
  4) # Commands for Task 4
    ;;
  5) # Commands for Task 5
    ;;
  6) exit 0
    ;;
  *) echo "Please enter a number between 1 and 6"
    ;;
esac
-- INSERT --
  
```

Insert your new script commands here

Now its time to add some commands to the task.

*Be sure to insert commands **after** the generic comment and **before** the **;;***

Add a simple command first and test it

```
rodduk90@oslab:~/bin
#!/bin/bash
#
# menu: A simple menu template
#
while true
do
    clear
    echo -n "
    CIS 90 Final Project
    1) Hacking with the grep command
    2) Task 2
    3) Task 3
    4) Task 4
    5) Task 5
    6) Exit

    Enter Your Choice: "
    read RESPONSE
    case $RESPONSE in
        1) # Commands for Task 1
            grep beauty poems/*/*
            ;;
        2) # Commands for Task 2
            ;;
        3) # Commands for Task 3
            ;;
        4) # Commands for Task 4
            ;;
        5) # Commands for Task 5
            ;;
        6) exit 0
        *) echo "Please enter a number between 1 and 6"
            ;;
    esac
    echo -n "Hit the Enter key to return to menu "
    read dummy
done
```

```
rodduk90@oslab:~/bin

CIS 90 Final Project
1) Hacking with the grep command
2) Task 2
3) Task 3
4) Task 4
5) Task 5
6) Exit

Enter Your Choice: 1
grep: poems/*/*: No such file or directory
Hit the Enter key to return to menu
```

Oops, the change broke the script! Why?
Because the relative path (beauty poems/*/*)
does not work from the bin directory

```
rodduk90@oslab:~/
/home/cis90/rodduk $ grep beauty poems/*/*
poems/Shakespeare/sonnet1:That thereby beauty's rose might never die,
poems/Shakespeare/sonnet10: That beauty still may live in thine or thee.
poems/Shakespeare/sonnet11:Herein lives wisdom, beauty, and increase;
poems/Shakespeare/sonnet17:If I could write the beauty of your eyes,
poems/Shakespeare/sonnet2:And dig deep trenches in thy beauty's field,
poems/Shakespeare/sonnet2:Then being ask'd, where all thy beauty lies,
poems/Shakespeare/sonnet2:Now much more praise deserv'd thy beauty's use,
poems/Shakespeare/sonnet2:Proving his beauty by succession thine.
poems/Shakespeare/sonnet4:Upon thyself thy beauty's legacy?
poems/Shakespeare/sonnet4: Thy unus'd beauty must be tomb'd with thee,
poems/Shakespeare/sonnet5:Beauty's effect with beauty were bereft,
poems/Shakespeare/sonnet7:Yet mortal looks adore his beauty still,
poems/Shakespeare/sonnet9:But beauty's waste hath in the world an end,
poems/Yeats/old:And loved your beauty with love false or true,
/home/cis90/rodduk $
```

Experiment with a **grep** command in 3rd window

In the 1st window add the new grep command
then save with **<esc>:w** (don't quit vi)

Run **mymisc** in the 2nd second window to test
change.

Fix it and test again

```
rodduk90@oslab:~/bin
#!/bin/bash
#
# menu: A simple menu template
#
while true
do
    clear
    echo -n "
    CIS 90 Final Project
    1) Hacking with the grep command
    2) Task 2
    3) Task 3
    4) Task 4
    5) Task 5
    6) Exit

    Enter Your Choice: "
    read RESPONSE
    case $RESPONSE in
        1) # Commands for Task 1
            grep beauty /home/cis90/rodduk/poems/*/*
            ;;
        2) # Commands for Task 2
            ;;
        3) # Commands for Task 3
            ;;
        4) # Commands for Task 4
            ;;
        5) # Commands for Task 5
            ;;
        *) echo "Please enter a number between 1 and 6"
            ;;
    esac
    echo -n "Hit the Enter key to return to menu "
    read dummy
done
```

Fix task in 1st window by using an absolute pathname then save with **<esc>:w**

Re-run **myscript** in the 2nd second window and test your change. To do this quickly hit **Ctrl-C** then **<up arrow>** key.

```
rodduk90@oslab:~/bin
CIS 90 Final Project
1) Hacking with the grep command
2) Task 2
3) Task 3
4) Task 4
5) Task 5
6) Exit

Enter Your Choice: 1
/home/cis90/rodduk/poems/Shakespeare/sonnet1:That thereby beauty's rose might ne
ver die,
/home/cis90/rodduk/poems/Shakespeare/sonnet10: That beauty still may live in th
ine or thee.
/home/cis90/rodduk/poems/Shakespeare/sonnet11:Herein lives wisdom, beauty, and i
ncrease;
/home/cis90/rodduk/poems/Shakespeare/sonnet17:If I could write the beauty of you
r eyes,
/home/cis90/rodduk/poems/Shakespeare/sonnet2:And dig deep trenches in thy beauty
's field,
/home/cis90/rodduk/poems/Shakespeare/sonnet2:Then being ask'd, where all thy bea
uty lies,
/home/cis90/rodduk/poems/Shakespeare/sonnet2:How much more praise deserv'd thy b
eauty's use,
/home/cis90/rodduk/poems/Shakespeare/sonnet2:Proving his beauty by succession th
ine.
/home/cis90/rodduk/poems/Shakespeare/sonnet4:Upon thyself thy beauty's legacy?
/home/cis90/rodduk/poems/Shakespeare/sonnet4: Thy unus'd beauty must be tomb'd
with thee,
/home/cis90/rodduk/poems/Shakespeare/sonnet5:Beauty's effect with beauty were be
reft,
/home/cis90/rodduk/poems/Shakespeare/sonnet7:Yet mortal looks adore his beauty s
till,
/home/cis90/rodduk/poems/Shakespeare/sonnet9:But beauty's waste hath in the worl
d an end,
/home/cis90/rodduk/poems/Yeats/old:And loved your beauty with love false or true
Hit the Enter key to return to menu
```

Fix worked!



```
poems/Shakespeare/sonnet5:Beauty's effect with beauty were bereft,
poems/Shakespeare/sonnet7:Yet mortal looks adore his beauty still,
poems/Shakespeare/sonnet9:But beauty's waste hath in the world an end,
poems/Yeats/old:And loved your beauty with love false or true,
/home/cis90/rodduk $
```


Add some interaction

```
rodduk90@oslab:~/bin
#!/bin/bash
#
# menu: A simple menu template
#
while true
do
    clear
    echo -n "
    CIS 90 Final Project
    1) Hacking with the grep command
    2) Task 2
    3) Task 3
    4) Task 4
    5) Task 5
    6) Exit

    Enter Your Choice: "
    read RESPONSE
    case $RESPONSE in
        1) # Commands for Task 1
            echo "Are you ready to search for beauty in the poems?"
            read dummy
            grep beauty /home/cis90/rodduk/poems/*/*
            ;;
        2) # Commands for Task 2
            ;;
        3) # Commands for Task 3
            ;;
        4) # Commands for Task 4
            ;;
        5) # Commands for Task 5
            ;;
        6) exit 0
        *) echo "Please enter a number between 1 and 6"
            ;;
    esac
    echo -n "Hit the Enter key to return to menu "
    read dummy
done
"myscript" 40L, 711C written
```

Let's add some interaction

1) # Commands for Task 1

```
echo "Are you ready to search for beauty in the poems?"
read dummy
grep beauty /home/cis90/rodduk/poems/*/*
;;
```

```
rodduk90@oslab:~/bin

CIS 90 Final Project
1) Hacking with the grep command
2) Task 2
3) Task 3
4) Task 4
5) Task 5
6) Exit

Enter Your Choice: 1
Are you ready to search for beauty in the poems?

/home/cis90/rodduk/poems/Shakespeare/sonnet1:That thereby beauty's rose might never die,
/home/cis90/rodduk/poems/Shakespeare/sonnet10: That beauty still may live in thine or thee.
/home/cis90/rodduk/poems/Shakespeare/sonnet11:Herein lives wisdom, beauty, and increase;
/home/cis90/rodduk/poems/Shakespeare/sonnet17:If I could write the beauty of your eyes,
/home/cis90/rodduk/poems/Shakespeare/sonnet2:And dig deep trenches in thy beauty's field,
/home/cis90/rodduk/poems/Shakespeare/sonnet2:Then being ask'd, where all thy beauty lies,
/home/cis90/rodduk/poems/Shakespeare/sonnet2:Now much more praise deserv'd thy beauty's use,
/home/cis90/rodduk/poems/Shakespeare/sonnet2:Proving his beauty by succession thine.
/home/cis90/rodduk/poems/Shakespeare/sonnet4:Upon thyself thy beauty's legacy?
/home/cis90/rodduk/poems/Shakespeare/sonnet4: Thy unus'd beauty must be tomb'd with thee,
/home/cis90/rodduk/poems/Shakespeare/sonnet5:Beauty's effect with beauty were bereft,
/home/cis90/rodduk/poems/Shakespeare/sonnet7:Yet mortal looks adore his beauty still,
/home/cis90/rodduk/poems/Shakespeare/sonnet9:But beauty's waste hath in the world an end,
/home/cis90/rodduk/poems/Yeats/old:And loved your beauty with love false or true,
Hit the Enter key to return to menu
```

And it works!

Try a new option on the command

```
rodduk90@oslab:~/bin
#!/bin/bash
#
# menu: A simple menu template
#
while true
do
    clear
    echo -n "
    CIS 90
    1) Hacking with the grep command
    2) Task 2
    3) Task 3
    4) Task 4
    5) Task 5
    6) Exit

    Enter Your Choice: "
    read RESPONSE
    case $RESPONSE in
        1) # Commands for Task 1
            echo "Are you ready to search for beauty in the poems?"
            read dummy
            grep -h beauty /home/cis90/rodduk/poems/*/*
            ;;
        2) # Commands for Task 2
            ;;
        3) # Commands for Task 3
            ;;
        4) # Commands for Task 4
            ;;
        5) # Commands for Task 5
            ;;
        6) exit 0
        *) echo "Please enter a number between 1 and 6"
            ;;
    esac
    echo -n "Hit the Enter key to return to menu: "
    read dummy
done
"myscript" 40L, 714C written
```

Let's try the -h option and not print the leading file names

1) # Commands for Task 1

echo "Are you ready to search for beauty in the poems?"

read dummy

grep -h beauty /home/cis90/rodduk/poems/*/*

;;

```
rodduk90@oslab:~/bin
CIS 90 Final Project
1) Hacking with the grep command
2) Task 2
3) Task 3
4) Task 4
5) Task 5
6) Exit

Enter Your Choice: 1
Are you ready to search for beauty in the poems?
1
That thereby beauty's rose might never die,
That beauty still may live in thine or thee.
Herein lives wisdom, beauty, and increase;
If I could write the beauty of your eyes,
And dig deep trenches in thy beauty's field,
Thy beauty's fullness hath my sense deprived,
Then being ask'd, where all thy beauty lies,
How much more praise deserv'd thy beauty's use,
Proving his beauty by succession thine.
Upon thyself thy beauty's legacy?
Thy unass'd beauty must be tomb'd with thee,
Beauty's effect with beauty were bereft,
Yet mortal looks adore his beauty still,
But beauty's waste hath in the world an end,
And loved your beauty with love false or true,
Hit the Enter key to return to menu
```

And it works!

Add a new feature

Let's add a count of the strings found now

- 1) # Commands for Task 1


```
echo "Are you ready to search for beauty in the poems?"
read dummy
grep -h beauty /home/cis90/rodduk/poems/*/*
echo "Ready to count them?"
read dummy
grep -h beauty /home/cis90/rodduk/poems/*/* | wc -l
```

```
rodduk90@cislab:~$ #!/bin/bash
# menu: A s
#
while true
do
    cle
    ech
    1) # Commands for Task 1
    echo "Are you ready to search for beauty in the poems?"
    read dummy
    grep -h beauty /home/cis90/rodduk/poems/*/*
    echo "Ready to count them?"
    read dummy
    grep -h beauty /home/cis90/rodduk/poems/*/* | wc -l
    ;;
    2) # Commands for Task 2
    ;;
    3) # Commands for Task 3
    ;;
    4) # Commands for Task 4
    ;;
    5) # Commands for Task 5
    ;;
    6) exit 0
    ;;
    *) echo "Please enter a number between 1 and 6"
    ;;
esac
"myscript" 43L, 839C written
```

26,53-67

```
rodduk90@cislab:~$ CIS 90 Final Project
1) Hacking with the grep command
2) Task 2
3) Task 3
4) Task 4
5) Task 5
6) Exit

Enter Your Choice: 1
Are you ready to search for beauty in the poems?

That thereby beauty's rose might never die,
    That beauty still may live in thine or thee.
Herein lives wisdom, beauty, and increase;
If I could write the beauty of your eyes,
And dig deep trenches in thy beauty's field,
Then being ask'd, where all thy beauty lies,
How much more praise deserv'd thy beauty's use,
Proving his beauty by succession thine.
Upon thyself thy beauty's legacy?
    Thy unsad beauty must be tomb'd with thee,
Beauty's effect with beauty were bereft,
Yet mortal looks adore his beauty still,
But beauty's waste hath in the world an end,
And loved your beauty with love false or true,
Ready to count them?

14
Hit the Enter key to return to menu
```

How many points so far?

Let's score our mini-script so far

```
1) # Commands for Task 1
echo "Are you ready to search for beauty in the poems?"
read dummy
grep -h beauty /home/cis90/rodduk/poems/*/*
echo "Ready to count them?"
read dummy
grep -h beauty /home/cis90/rodduk/po
;;
```

Implementing all five tasks (6 points each):

- Requirements for each task:
- NO** -Minimum of 10 "original" script command lines
- NO** -Has one or more non-generic comments to explain what it is doing
- ✓ -Has user interaction

You don't have to do all of these but do at least five:

- Redirecting stdin (5 points)
- Redirecting stdout (5 points)
- Redirecting stderr (5 points)
- Use of permissions (5 points)
- ✓ • Use of filename expansion characters (5 points)
- ✓ • Use of absolute path (5 points)
- Use of relative path (5 points)
- Use of a PID (5 points)
- Use of inodes (5 points)
- Use of links (5 points)
- Use of scheduling (5 points)
- Use of a GID or group (5 points)
- Use of a UID or user (5 points)
- Use of a /dev/tty device (5 points)
- Use of a signal (5 points)
- ✓ • Use of piping (5 points)
- Use of an environment variable (5 points)
- Use of /bin/mail (5 points)
- Use of a conditional (5 points)

The maximum for this section is 25 points.

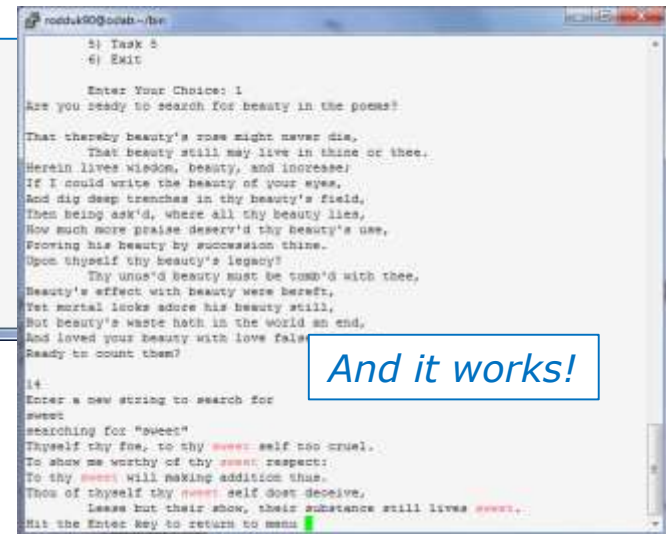
Make another enhancement

Enhance script to let user specify search string and use color

1) # Commands for Task 1

```
echo "Are you ready to search for beauty in the poems?"
read dummy
grep -h beauty /home/cis90/rodduk/poems/*/*
echo "Ready to count them?"
read dummy
grep -h beauty /home/cis90/rodduk/poems/*/* | wc -l
echo "Enter a new string to search for"
read string
echo searching for '$string'
grep -h --color $string /home/cis90/rodduk/poems/*/*
;;
```

```
read dummy
grep -h beauty /home/cis90/rodduk/poems/*/*
echo "Ready to count them?"
read dummy
grep -h beauty /home/cis90/rodduk/poems/*/* | wc -l
echo "Enter a new string to search for"
read string
echo searching for '$string'
grep -h --color $string /home/cis90/rodduk/poems/*/*
;;
```



```
rodduk90@odab:~$ ./be
1) Task 1
Are you ready to search for beauty in the poems?
That thereby beauty's rose might never die,
That beauty still may live in thine or thee.
Herein lives wisdom, beauty, and increase;
If I could write the beauty of your eyes,
And dig deep trenches in thy beauty's field,
Thy being ask'd, where all thy beauty lies,
How much more praise desert'd thy beauty's use,
Proving his beauty by succession thine.
Upon thyself thy beauty's legacy?
Thy uncle's beauty must be tomb'd with thee,
Beauty's effect with beauty were bereft,
Yet mortal locks adore his beauty still,
But Beauty's waste hath in the world an end,
And loved your beauty with love false
Ready to count them?
Enter a new string to search for
sweet
searching for 'sweet'
Thyself thy foe, to thy sweet self too cruel.
To show me worthy of thy sweet respect:
To thy sweet will making addition thus.
Thou of thyself thy sweet self dost deceive,
Lease but their show, their substance still lives sweet.
Hit the Enter key to return to menu
```

And it works!

Check the score again

Let's re-score modified script

```
1) # Commands for Task 1
echo "Are you ready to search for beauty in the poems?"
read dummy
grep -h beauty /home/cis90/rodduk/poems/*/*
echo "Ready to count them?"
read dummy
grep -h beauty /home/cis90/rodduk/poems/*/*
echo "Enter a new string to search for:"
read string
echo searching for "'$string'"
grep -h --color $string /home/cis90/rodduk/poems/*/*
;;
```

Implementing all five tasks (6 points each):

- Requirements for each task:
 - ✓ -Minimum of 10 "original" script command lines
 - NO -Has one or more non-generic comments to explain what it is doing
 - ✓ -Has user interaction

You don't have to do all of these but do at least five:

- Redirecting stdin (5 points)
- Redirecting stdout (5 points)
- Redirecting stderr (5 points)
- Use of permissions (5 points)
- ✓ • Use of filename expansion characters (5 points)
- ✓ • Use of absolute path (5 points)
- Use of relative path (5 points)
- Use of a PID (5 points)
- Use of inodes (5 points)
- Use of links (5 points)
- Use of scheduling (5 points)
- Use of a GID or group (5 points)
- Use of a UID or user (5 points)
- Use of a /dev/tty device (5 points)
- Use of a signal (5 points)
- ✓ • Use of piping (5 points)
- Use of an environment variable (5 points)
- Use of /bin/mail (5 points)
- Use of a conditional (5 points)

The maximum for this section is 25 points.

Bing - one task done that meets minimum requirements!

Add some comments to help others understand what you are doing

```
1) # Task 1 - grep command explored

# Simple grep for "beauty"
echo "Are you ready to search for beauty in the poems?"
read dummy
grep -h beauty /home/cis90/rodduk/poem

# Same as before but counts matches to
echo "Ready to count them?"
read dummy
grep -h beauty /home/cis90/rodduk/poem

# Prompt user to supply search string
echo "Enter a new string to search for"
read string
echo searching for '$string'
grep -h $string /home/cis90/rodduk/poem
;;
```

Implementing all five tasks (6 points each):

- Requirements for each task:
 - ✓ -Minimum of 10 "original" script command lines
 - ✓ -Has one or more non-generic comments to explain what it is doing
 - ✓ -Has user interaction

You don't have to do all of these but do at least five:

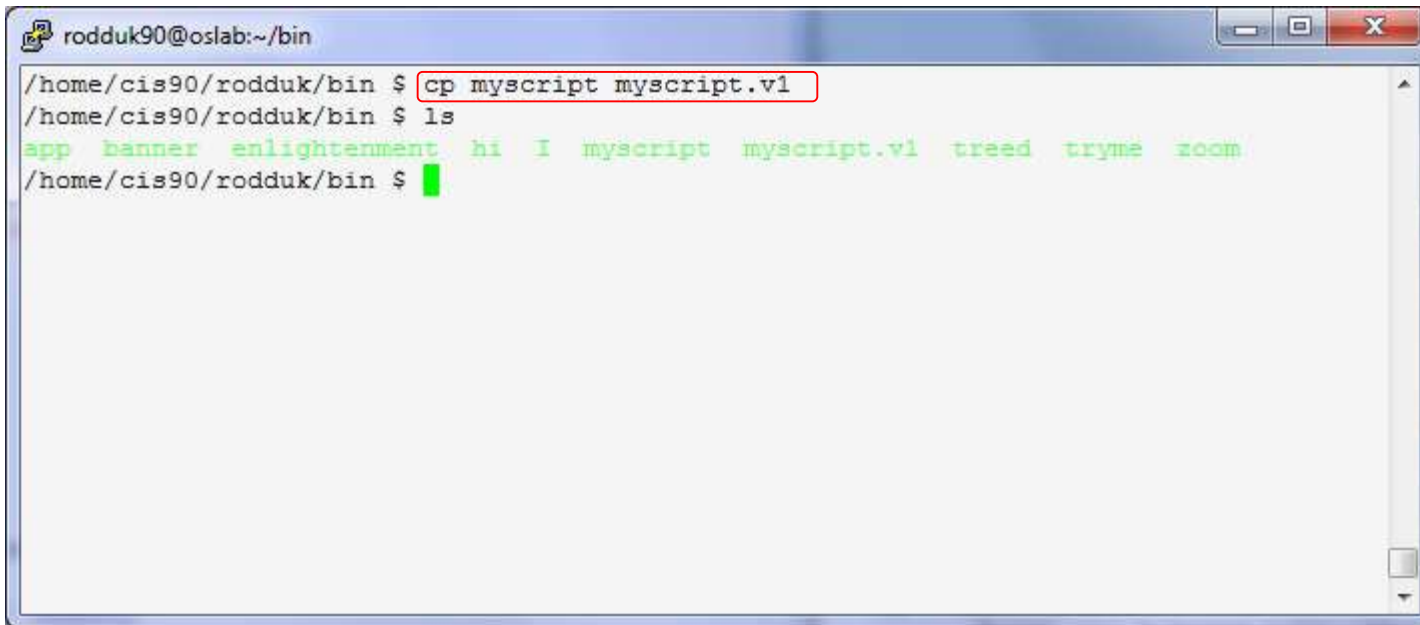
- Redirecting stdin (5 points)
- Redirecting stdout (5 points)
- Redirecting stderr (5 points)
- Use of permissions (5 points)
- ✓ • Use of filename expansion characters (5 points)
- ✓ • Use of absolute path (5 points)
- Use of relative path (5 points)
- Use of a PID (5 points)
- Use of inodes (5 points)
- Use of links (5 points)
- Use of scheduling (5 points)
- Use of a GID or group (5 points)
- Use of a UID or user (5 points)
- Use of a /dev/tty device (5 points)
- Use of a signal (5 points)
- ✓ • Use of piping (5 points)
- Use of an environment variable (5 points)
- Use of /bin/mail (5 points)
- Use of a conditional (5 points)

The maximum for this section is 25 points.

And has fulfilled three of the five requirements for the overall project!

Backup your work!

`cp myscript myscript.v1` *after first day of work*

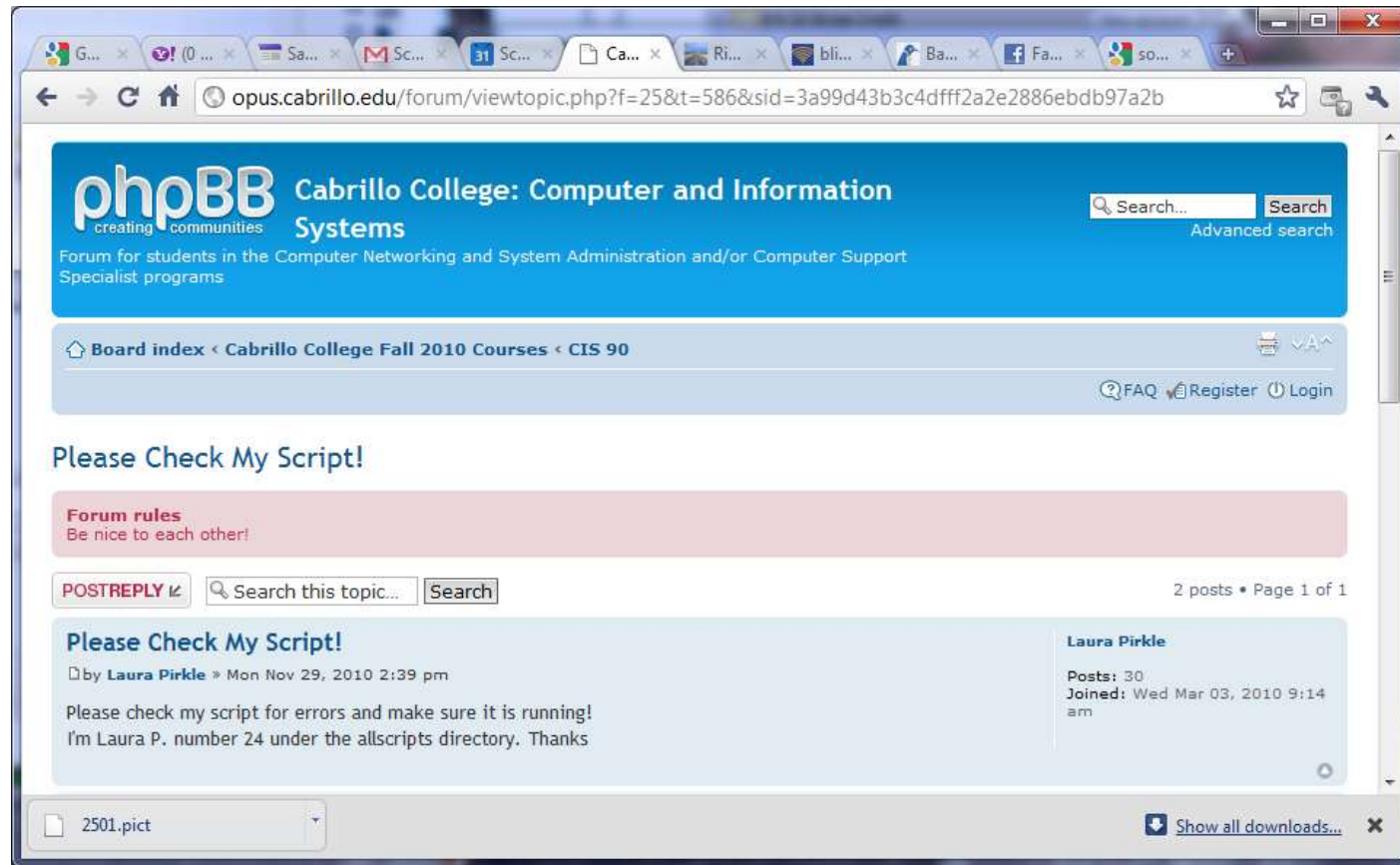


A terminal window titled 'rodduk90@oslab:~/bin' showing a command prompt. The user enters `cp myscript myscript.v1`, which is highlighted with a red box. The prompt changes to `/home/cis90/rodduk/bin $`. The user then enters `ls`, and the output is displayed in green text: `app banner enlightenment hi I myscript myscript.v1 treed tryme zoom`. The prompt returns to `/home/cis90/rodduk/bin $` with a green cursor.

`cp myscript myscript.v2` *after second day of work*
`cp myscript myscript.v3` *and so on ...*
`cp myscript myscript.v4`

Always be able to revert back to an earlier version in case you clobber the current one!

Testing your script



*The ask others on the forum to check your script
and give you feedback*

Plan extra time for:

- Figuring out how to do what you really want to do!
- Removing syntax errors
- Removing logic errors
- Posting script code on the forum and asking others to view it and suggest how to fix it
- Sleeping on it

*Don't wait till the last minute
to start your project!*



Final Project forum tips



Use the forum effectively to get scripting help

Not so good ...

Preview:

Help!

My script is getting weird error

- Homer

*Not enough information has been provided
on this post for others to help*

Use the forum effectively to get scripting help

Better ... but requires viewer to log into Opus and you may have modified the script since posting

Preview:

Help!

My script is getting weird error

My script is here:

/home/cis90/milhom/bin/myscript

And this is the error:

CODE: SELECT ALL

```
/home/cis90/simben/bin $ ./script99
simben90
-rwxr-x--- 1 simben90 cis90 10489 Apr 30 07:33 /home/cis90/simben/bin/myscript
./script99: line 8: unexpected EOF while looking for matching `"'
./script99: line 16: syntax error: unexpected end of file
/home/cis90/simben/bin $
```

- Homer

This post provides the location of the script and the error message which enables others to help you find and fix the problem

Use the forum effectively to get scripting help

B
i
u
Quote
Code
List
List=
[*]
Img
URL
Flash
Normal ▼
Font colour

Preview:

Help!

My script is getting weird error

This is the script:

CODE: SELECT ALL

```
#!/bin/bash
# Test script
#
echo $LOGNAME
dir=/home/cis90/simben
ls -l $dir/bin/myscript
if [ -f "$dir/bin/myscript" ]; then
    echo you have a myscript file in the bin directory
else
    echo there is no myscript file in your bin directory!
fi
exit
```

And this is the error:

CODE: SELECT ALL

```
/home/cis90/simben/bin $ ./script99
simben90
-rwxr-x--- 1 simben90 cis90 10489 Apr 30 07:33 /home/cis90/simben/bin/myscript
./script99: line 8: unexpected EOF while looking for matching `"'
./script99: line 16: syntax error: unexpected end of file
/home/cis90/simben/bin $
```

- Homer

Best ...

This post shows both the script and the error using code tags which enables others to help you find and fix the problem.



Scripting Tips

echo

Silence is golden ... but not always

Many UNIX commands that run successfully produce no output

```
[simben90@opus bin]$ alias probe=file  
[simben90@opus bin]$ cp quiet quiet.bak  
[simben90@opus bin]$ value=002  
[simben90@opus bin]$ umask $value  
[simben90@opus bin]$ cat quiet > /dev/null  
[simben90@opus bin]$ > important_file$$
```



Note there is a variable named \$ which gets set to the PID of your process.

Silence is golden ... but not always

Running or sourcing a script full of UNIX commands that produce no output still produces no output!

```
[simben90@opus bin]$ cat quiet
alias probe=file
cp quiet quiet.bak
value=002
umask $value
cat quiet > /dev/null
> important_file$$
```

```
[simben90@opus bin]$ quiet
[simben90@opus bin]$
```

```
[simben90@opus bin]$ source quiet
[simben90@opus bin]$
```

Silence is golden ... but not always

```
[simben90@opus bin]$ cat not-so-quiet
echo TRACE: Entering not-so-quiet script
echo Press Enter to create probe alias
read dummy
alias probe=file
echo probe alias created, try: probe letter
cp quiet quiet.bak
value=002
umask $value
echo TRACE value=$value
cat quiet > /dev/null
> important_file$$
echo Warning: the file named important_file$$ was just created or emptied
echo TRACE: Exiting not-so-quiet script
```

*You can use the echo command
in your scripts to provide:*

- *Interaction*
- *User feedback*
- *Tracing for debugging*

```
[simben90@opus bin]$ not-so-quiet
TRACE: Entering not-so-quiet script Debugging
Press Enter to create probe alias Interaction

probe alias created, try: probe letter User feedback
TRACE value=002 Debugging
Warning: the file named important_file29538 was just created or emptied User feedback
TRACE: Exiting not-so-quiet script Debugging
```




tips on script names

Don't name your scripts "script"

```
[simben90@opus bin]$ ls -l script  
-rwxr-x--- 1 simben90 cis90 47 Nov 23 16:44 script
```

```
[simben90@opus bin]$ cat script  
echo "Hello from the script file named script"
```

What would happen if you ran the script above?

Don't name your scripts "script"

```
[simben90@opus bin]$ cat script  
echo "Hello from the script file named script"
```

```
[simben90@opus bin]$ script  
Script started, file is typescript
```



*Why the heck doesn't
my script do what it's
supposed to do?*

Don't name your scripts "script"

```
[simben90@opus bin]$ cat script
echo "Hello from the script file named script"
```

```
[simben90@opus bin]$ script
Script started, file is typescript
```



Why the heck doesn't my script do what it's supposed to do?

```
[simben90@opus bin]$ Where is my script?
bash: Where: command not found
```

```
[simben90@opus bin]$ exit
Script done, file is typescript
```



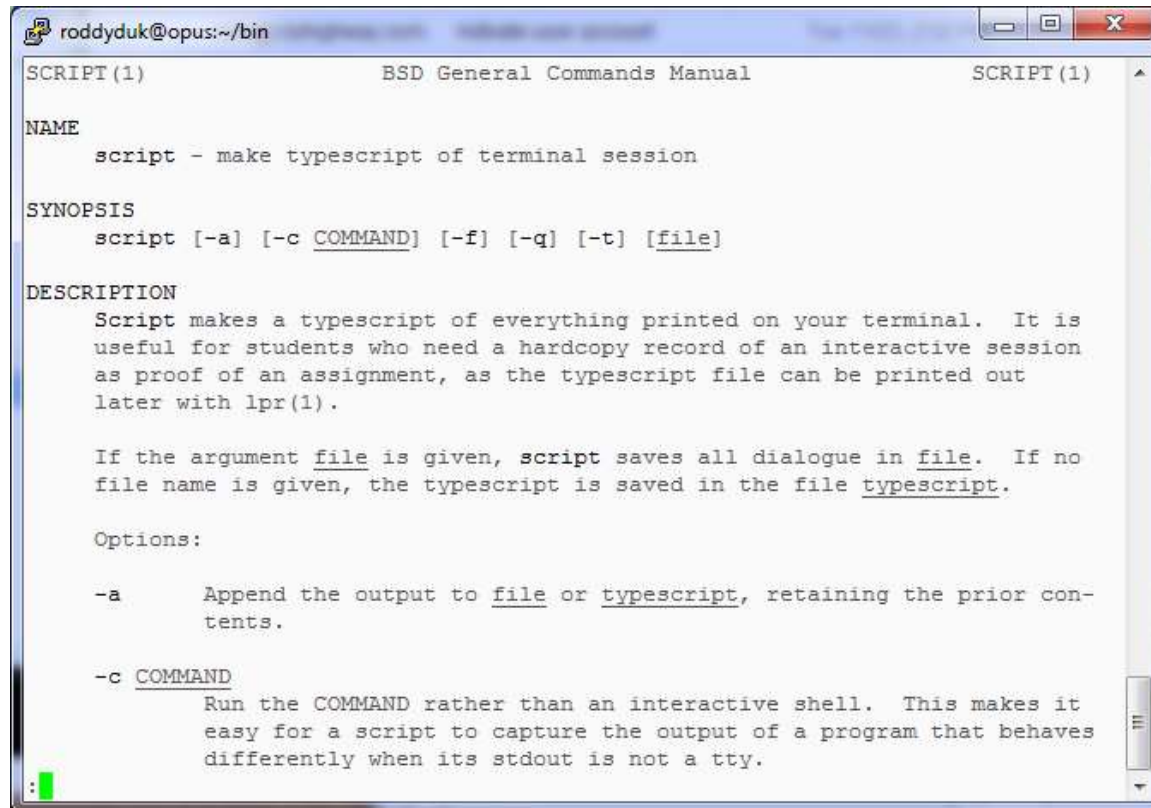
```
[simben90@opus bin]$ cat typescript
Script started on Wed 13 May 2009 08:00:02 AM PDT
[simben90@opus bin]$ Where is my script?
bash: Where: command not found
[simben90@opus bin]$ exit
```

```
Script done on Wed 13 May 2009 08:00:47 AM PDT
[simben90@opus bin]$
```

Don't name your scripts "script"

Why doesn't script do what it is supposed to do? ... because script is the name of an existing UNIX command!

```
[simben90@opus bin]$ man script  
[simben90@opus bin]$
```



The screenshot shows a terminal window titled "rododyduk@opus:~/bin". The terminal displays the output of the command "man script". The man page is titled "SCRIPT (1) BSD General Commands Manual SCRIPT (1)". It includes sections for NAME, SYNOPSIS, DESCRIPTION, and Options.

```
SCRIPT (1) BSD General Commands Manual SCRIPT (1)

NAME
    script - make typescript of terminal session

SYNOPSIS
    script [-a] [-c COMMAND] [-f] [-q] [-t] [file]

DESCRIPTION
    Script makes a typescript of everything printed on your terminal. It is
    useful for students who need a hardcopy record of an interactive session
    as proof of an assignment, as the typescript file can be printed out
    later with lpr(1).

    If the argument file is given, script saves all dialogue in file. If no
    file name is given, the typescript is saved in the file typescript.

Options:

    -a      Append the output to file or typescript, retaining the prior con-
            tents.

    -c COMMAND
            Run the COMMAND rather than an interactive shell. This makes it
            easy for a script to capture the output of a program that behaves
            differently when its stdout is not a tty.
```

Don't name your scripts "script"

There are (at least) two files named script on Opus

```
[simben90@opus bin]$ type script
script is hashed (/usr/bin/script)
[simben90@opus bin]$ file /usr/bin/script
/usr/bin/script: ELF 32-bit LSB executable, Intel 80386, version 1
(SYSV), for GNU/Linux 2.6.9, dynamically linked (uses shared libs),
for GNU/Linux 2.6.9, stripped
```

```
[simben90@opus bin]$ type /home/cis90/simben/bin/script
/home/cis90/simben/bin/script is /home/cis90/simben/bin/script
[simben90@opus bin]$ file /home/cis90/simben/bin/script
/home/cis90/simben/bin/script: ASCII text
[simben90@opus bin]$
```

Question: *Why did bash run the script in /usr/bin instead of the script in /home/cis90/simben/bin?*

Don't name your scripts "script"

Question: Why did bash run the script in /usr/bin instead of the script in /home/cis90/simben/bin?

The Linux **script** command is in this directory

```
[simben90@opus bin]$ echo $PATH  
/usr/kerberos/bin:/usr/local/bin:/bin:/usr/bin:/home/cis90/bin:  
/home/cis90/simben/bin:.
```

Our script, named **script**, is in this directory

Answer: bash searches the path in the order the directories are listed. It finds the script command in /user/bin first.

Don't name your scripts "script"

To override the PATH you can always specify an absolute pathname to the file you want to run:

```
[simben90@opus bin]$ /home/cis90/simben/bin/script  
Hello from the script file named script
```

```
[simben90@opus bin]$ ./script  
Hello from the script file named script
```

Note the shell treats the . above as "here" which in this case is /home/cis90/simben/bin



Try the script command

- Use the **script** command to start recording
- Type various commands of your choice
- Type **exit** or hit **Ctrl-D** to end recording
- Use **cat typescript** to see what you recorded

This would be a good way to record a session such as working one of the lab assignments for future reference.

When finished type "done" in the chat window



Review

```
function runningScript ()  
{
```

The rules of the road for variables

- Rule 1: A child process can only see variables the parent has exported.
- Rule 2: A child process cannot change the parent's variables.

Running a Script

```
/home/cis90/simben $ cat mydate  
#!/bin/bash  
echo "Hola $LOGNAME"  
date +%m/%d/%Y  
echo $myvar1 $myvar2 $myvar3
```

*Add this line to
the last script we
made*

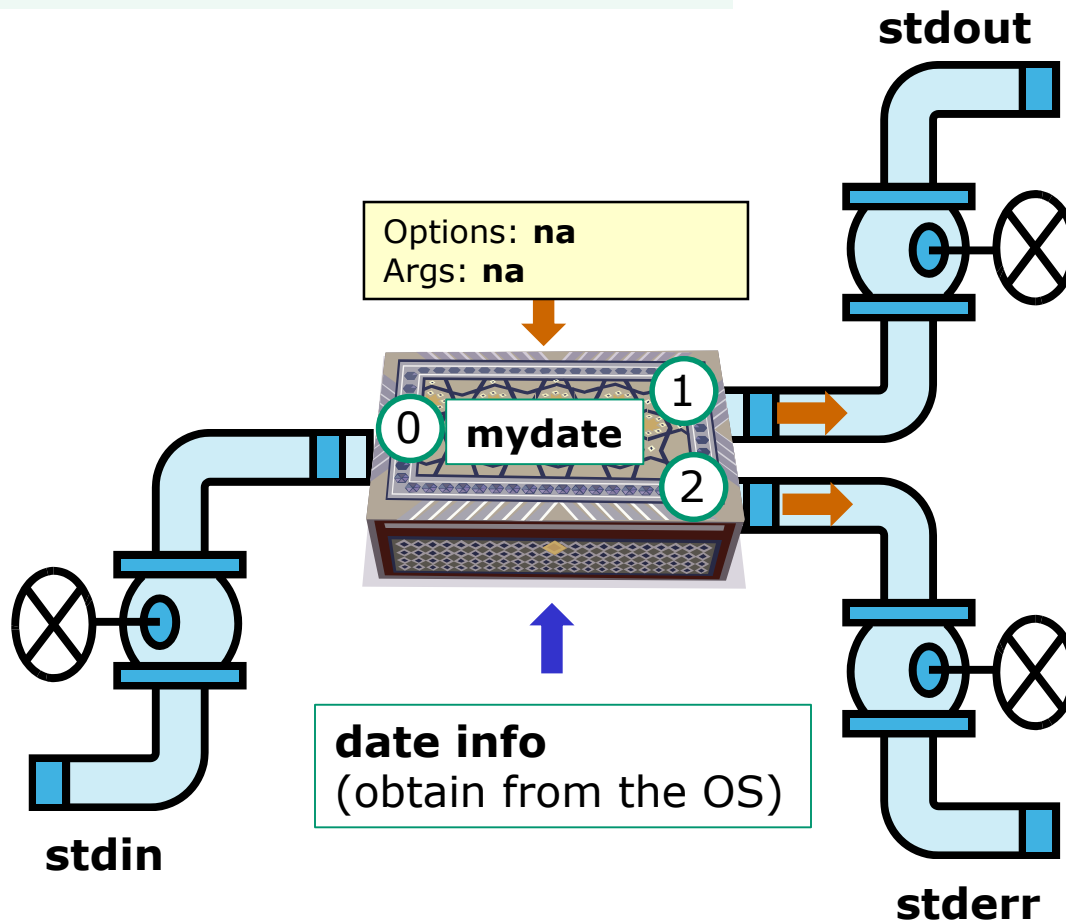
*Don't initialize
them yet*

```
/home/cis90/simben $ mydate  
Hola simben90  
05/16/2013  
  
/home/cis90/simben $
```

*Because the variables
don't exist yet the last
echo statement prints a
blank line*

Running a Script

```
$ mydate
```



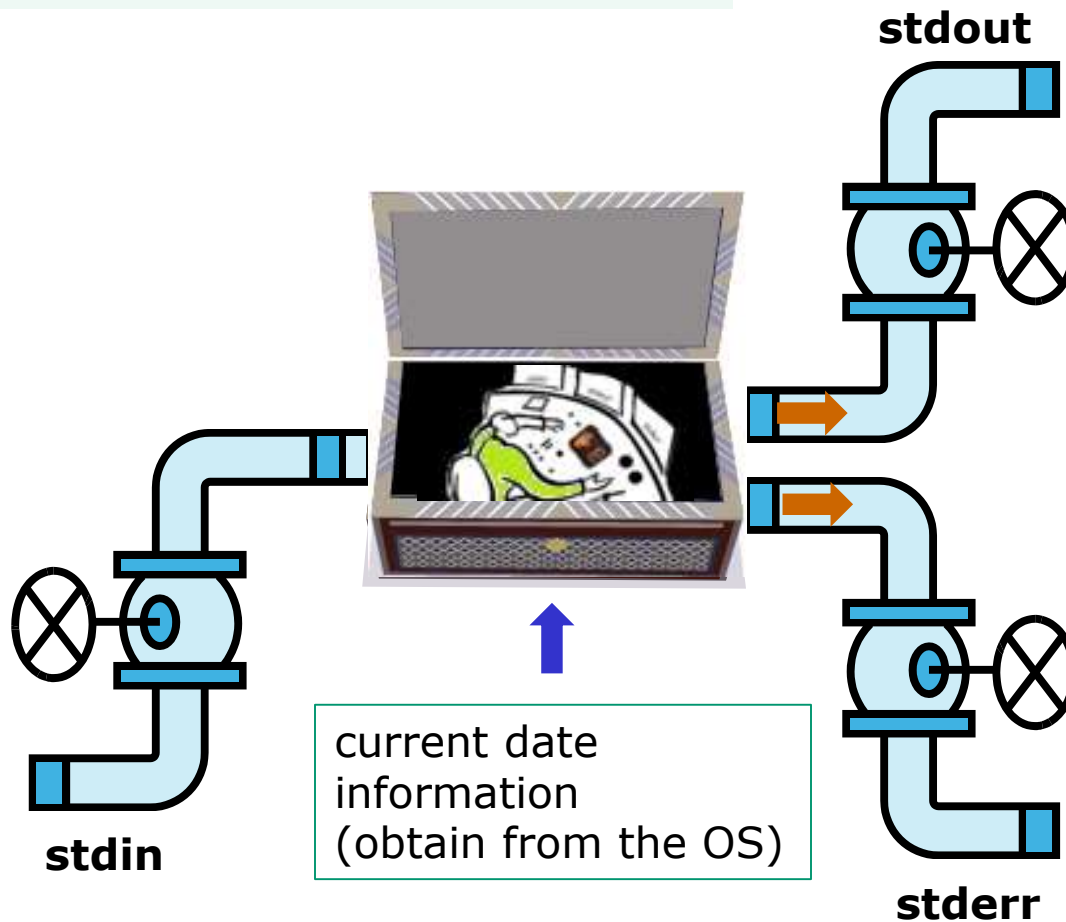
```
Hola simben90  
05/09/2013
```

*In this example, output from **myscript** goes to **stdout**.*

***stdout** has not been redirected so it goes to the default terminal device (your screen).*

Running a Script

```
$ mydate
```

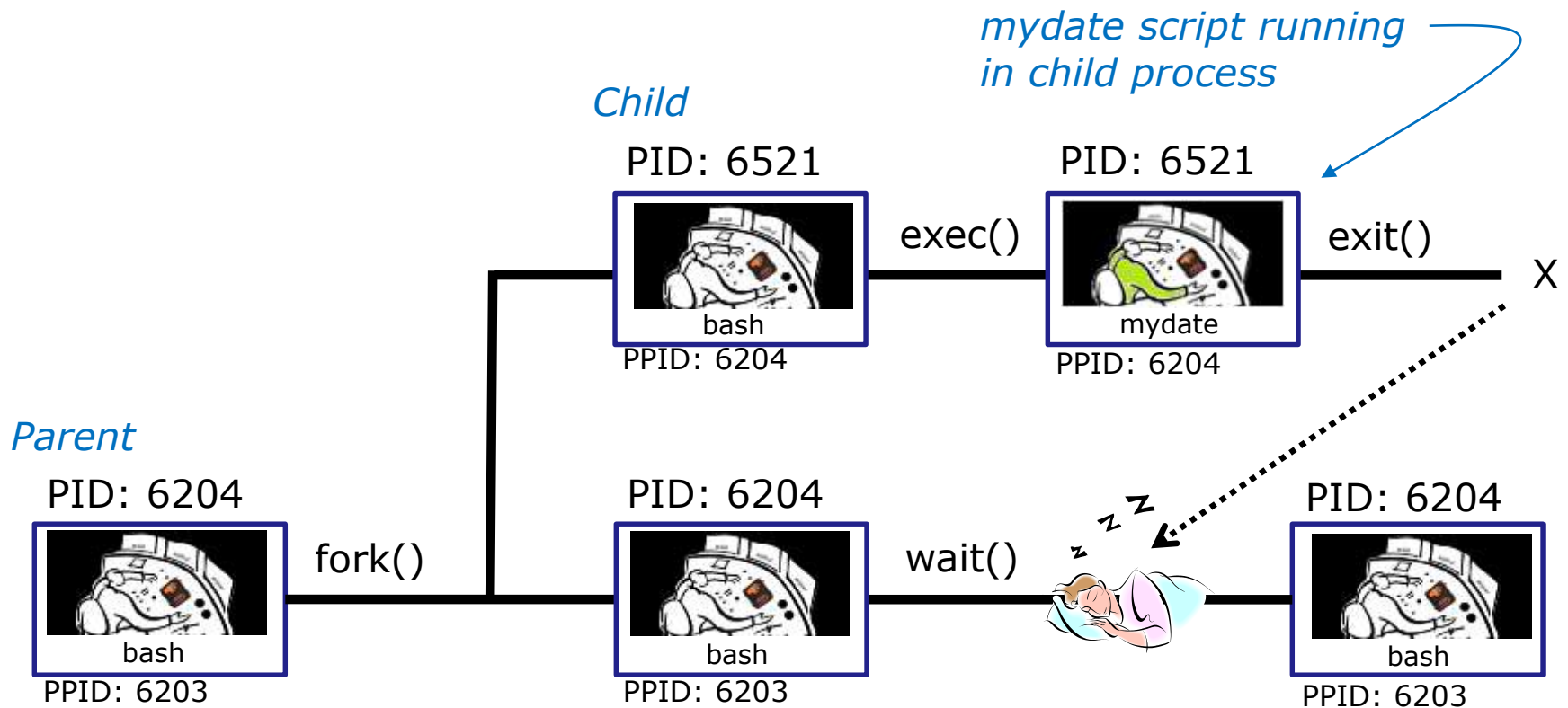


```
Hola simben90  
05/16/2012
```

*A sneak peek into memory
to see what our process
looks like!*



Running a Script



*Whenever you run any command, program, or script it runs as a **child process***

Running a Script

```
/home/cis90/simben $ cat mydate  
#!/bin/bash  
echo "Hola $LOGNAME"  
date +%m/%d/%Y'  
echo $myvar1 $myvar2 $myvar3
```

In the parent process, initialize the three variables

```
/home/cis90/simben $ myvar1=Tic; myvar2=Tac; myvar3=Toe  
/home/cis90/simben $ echo $myvar1 $myvar2 $myvar3  
Tic Tac Toe
```

*What happens if we run **mydate** now?*

Running a Script

```
/home/cis90/simben $ cat mydate
#!/bin/bash
echo "Hola $LOGNAME"
date +%m/%d/%Y'
echo $myvar1 $myvar2 $myvar3
```

```
/home/cis90/simben $ myvar1=Tic; myvar2=Tac; myvar3=Toe
/home/cis90/simben $ echo $myvar1 $myvar2 $myvar3
Tic Tac Toe
```

```
/home/cis90/simben $ mydate
Hola simben90
05/09/2012
```

*Running **mydate**
(as a child process)*

```
/home/cis90/simben $
```

Why no Tic Tac Toe output?

Running a Script

```
/home/cis90/simben $ export myvar1  
/home/cis90/simben $ mydate  
Hola simben90  
05/09/2012  
Tic
```

*Rule 1: A child
process can only see
variables the parent
has exported*

```
/home/cis90/simben $ export myvar2  
/home/cis90/simben $ mydate  
Hola simben90  
05/09/2012  
Tic Tac
```

```
/home/cis90/simben $ export myvar3  
/home/cis90/simben $ mydate  
Hola simben90  
05/09/2012  
Tic Tac Toe
```


Running a Script

```
/home/cis90/simben $ echo $myvar1 $myvar2 $myvar3  
Tic Tac Toe
```

```
/home/cis90/simben $ cat mydate
```

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

```
echo "Hola $LOGNAME"
```

```
date +%m/%d/%Y'
```

```
echo $myvar1 $myvar2 $myvar3
```

```
myvar1=red myvar2=white myvar3=blue
```

```
echo $myvar1 $myvar2 $myvar3
```

*Add these
new lines*

```
/home/cis90/simben $ mydate
```

```
Hola simben90
```

```
05/09/2012
```

```
Tic Tac Toe
```

```
red white blue
```

*Rule 2: A child process
cannot change the
parent's variables.*

```
/home/cis90/simben $ echo $myvar1 $myvar2 $myvar3
```

```
Tic Tac Toe
```

Running a Script

Unless we want them to

```
/home/cis90/simben $ echo $myvar1 $myvar2 $myvar3  
Tic Tac Toe
```

```
/home/cis90/simben $ source mydate  
Hola simben90  
05/09/2012  
Tic Tac Toe  
red white blue
```

Sourcing a script causes the instructions to be run in the parent process. A child process is not created

```
/home/cis90/simben $ echo $myvar1 $myvar2 $myvar3  
red white blue
```

```
}  
while no-comprende  
do  
    runningScript  
done
```



Printers

Sneak Peak for CIS 90 Students



Two predominate types of printers

- Thermal inkjet technology
- Laser, drum, toner technology



So many ways to hook them up ...

Now:

- Network
- USB
- Wireless (Bluetooth, IR)



Back then:

- Serial cable
- Parallel printer cable



Printer Configuration via CUPS

CUPS Demo on RPi and HP Envy 4500

Raspberry Pi configuration

1. Bootup with monitor
2. Connect to wireless CIS90Net
(might need HDMI monitor and keyboard)
3. As root:
usermod -a -G lpadmin username
apt-get update
apt-get install cups
apt-get install hplip
apt-get install sysvbanner
apt-get install tightvncserver
4. As *username*:
vncserver

Classroom Instructor PC

- Instructor PC: install tightvnc from <http://www.tightvnc.com/>
- Run Elmo Image Mate in expert mode and rotate image
- Run TightVNC Viewer and connect to:
<Raspberry Pi IP>:5901
 - Browse to <http://localhost:631>

CIS Router

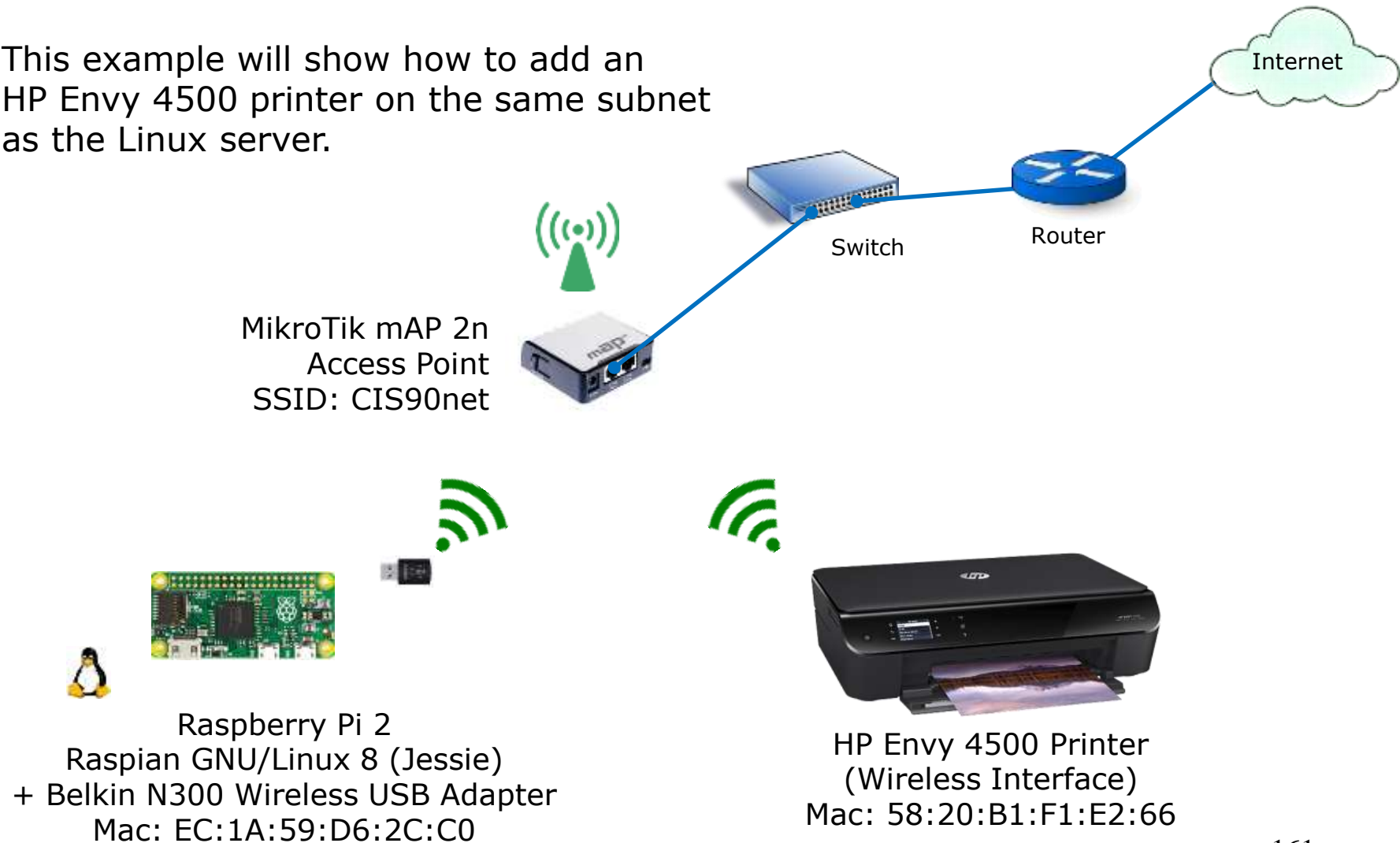
```
ip dhcp pool rp07
host 172.30.1.34 255.255.255.0
client-identifier 01ec.1a59.d62c.c0
```

```
ip dhcp pool hpenvy4500
host 172.30.1.35 255.255.255.0
client-identifier 0158.20b1.f1e2.66
```

NoCry#**show ip dhcp binding**

CUPS Demo on RPi Zero and HP Envy 4500

This example will show how to add an HP Envy 4500 printer on the same subnet as the Linux server.

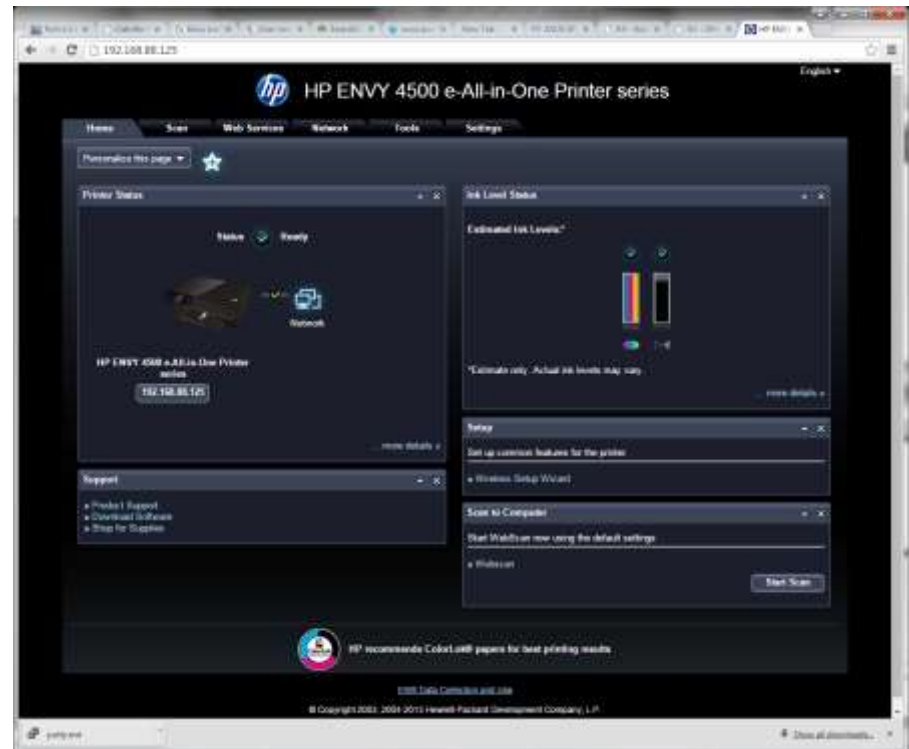


CUPS Demo on RPi and HP Envy 4500

Networked HP printers have a built in web-server



IP Address for this printer is:
192.168.88.125 (home)
172.30.1.35 (room 828)



Browsing to the IP address of the printer

CUPS Demo on RPi and HP Envy 4500

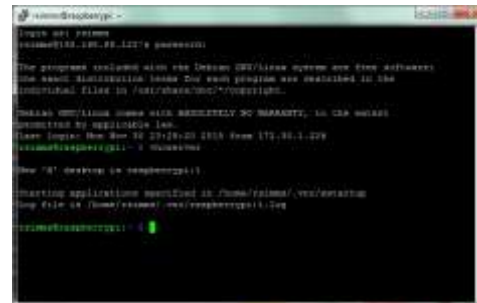


Local access with
monitor, keyboard
and mouse

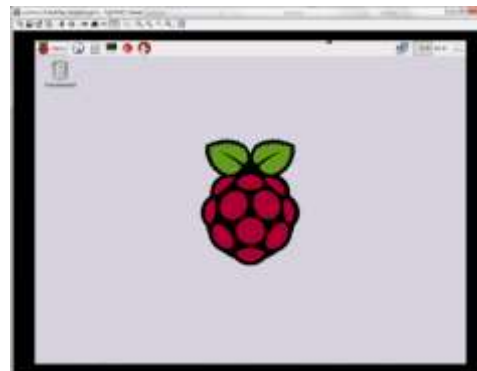


IP Address for this RPi is:

- 192.168.88.122 (home)
- 172.30.1.34 (room 828)

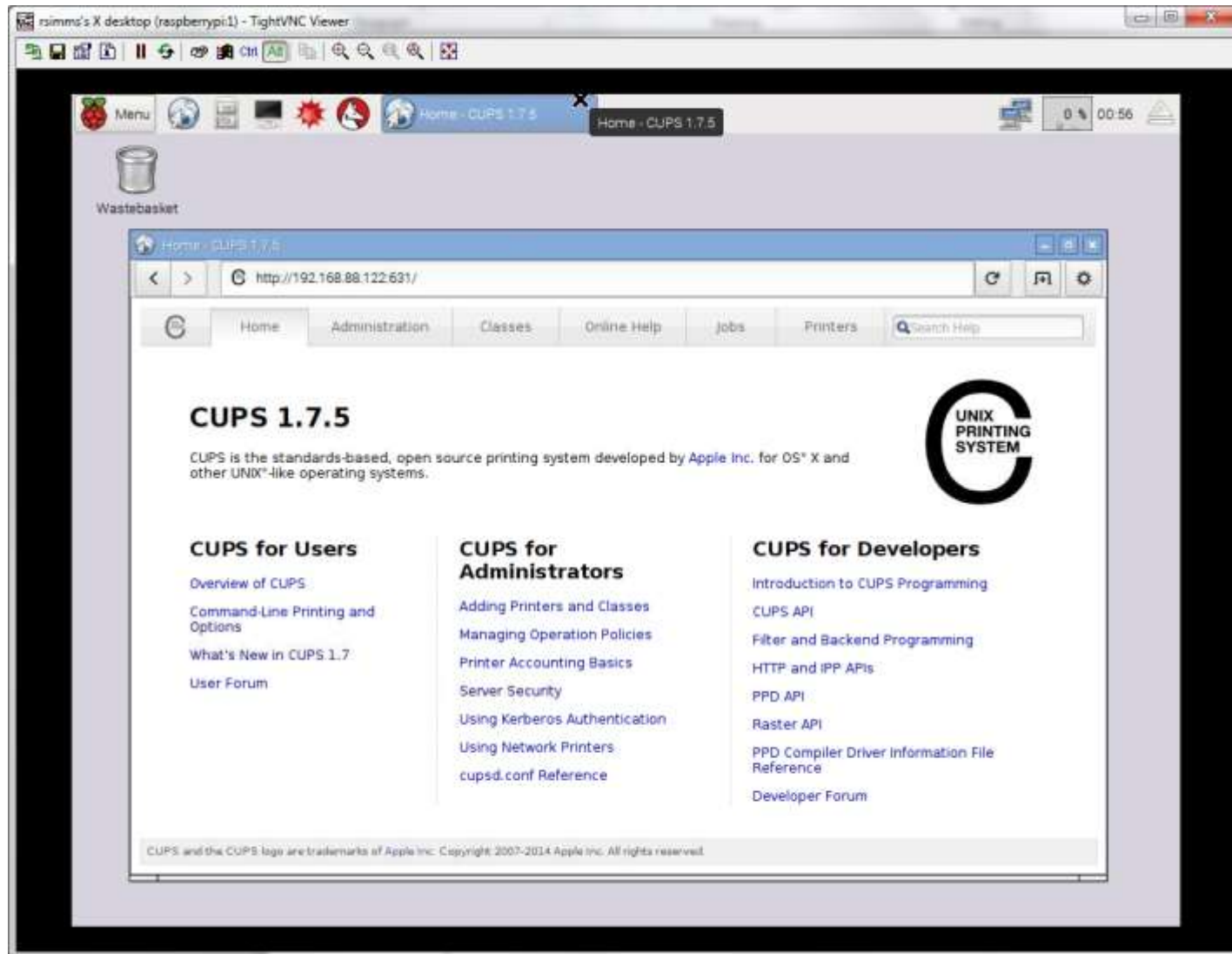


SSH access
over network

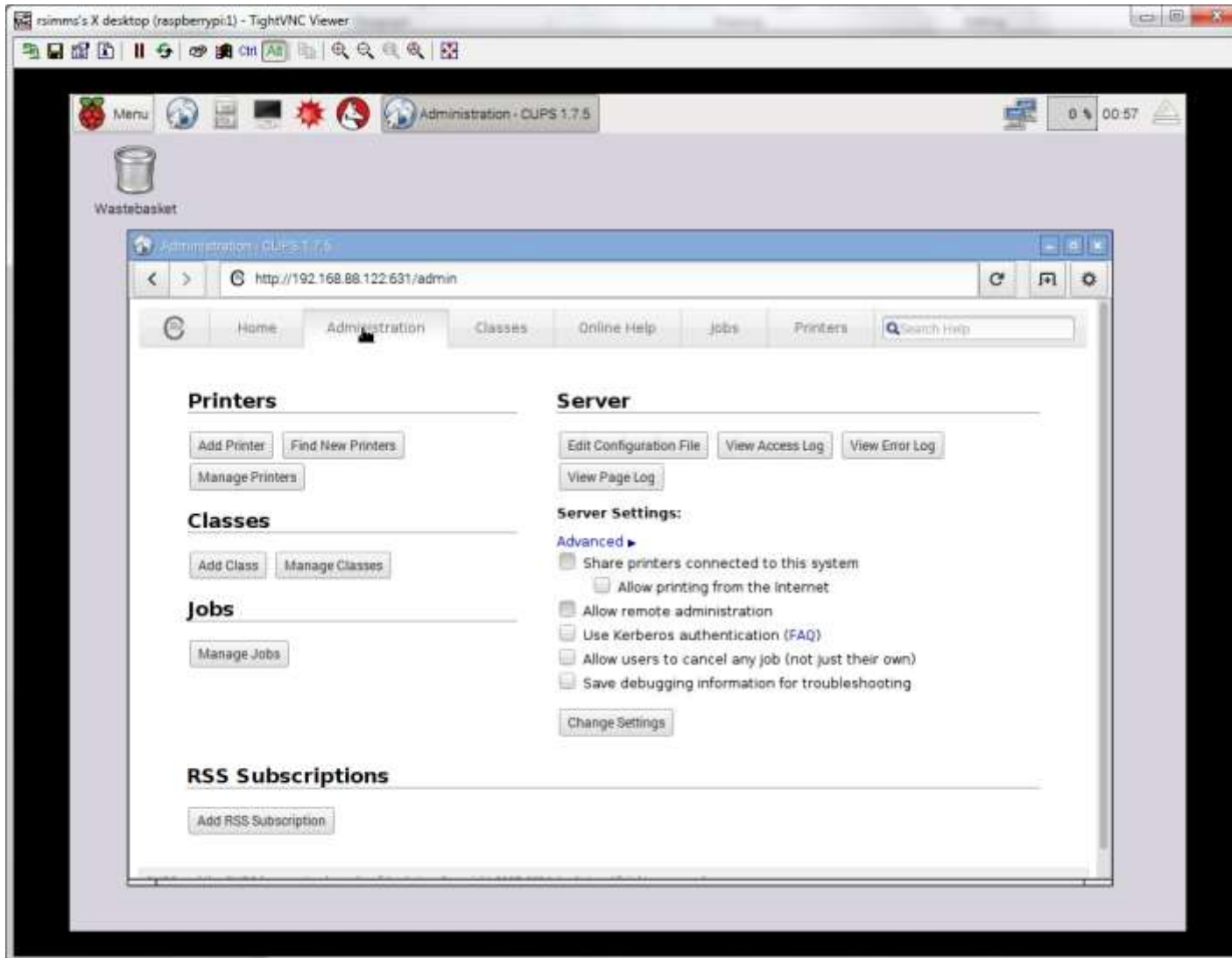


VNC access
over network

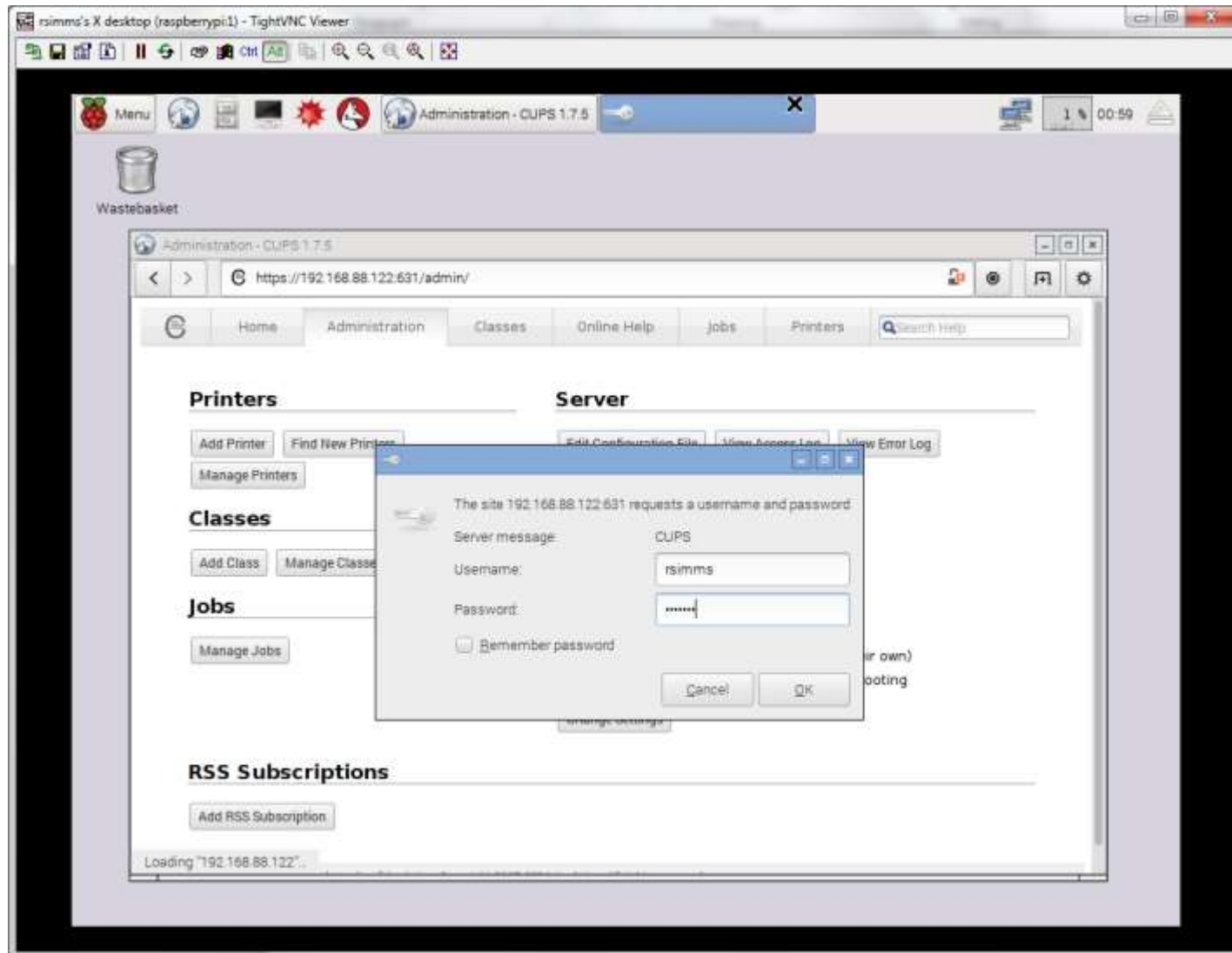
Browse to CUPS service at <server-ip-address>:631



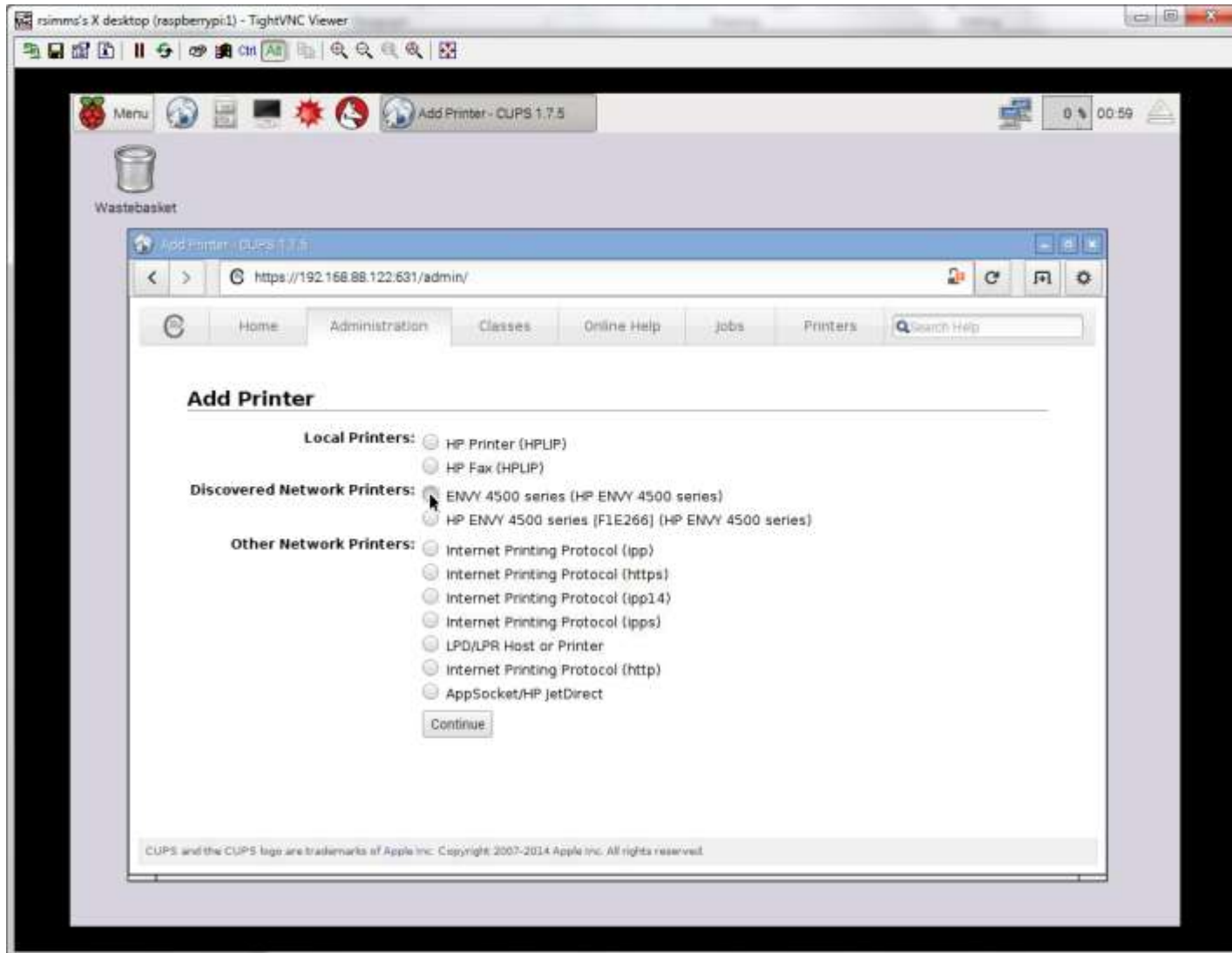
Select Administration tab



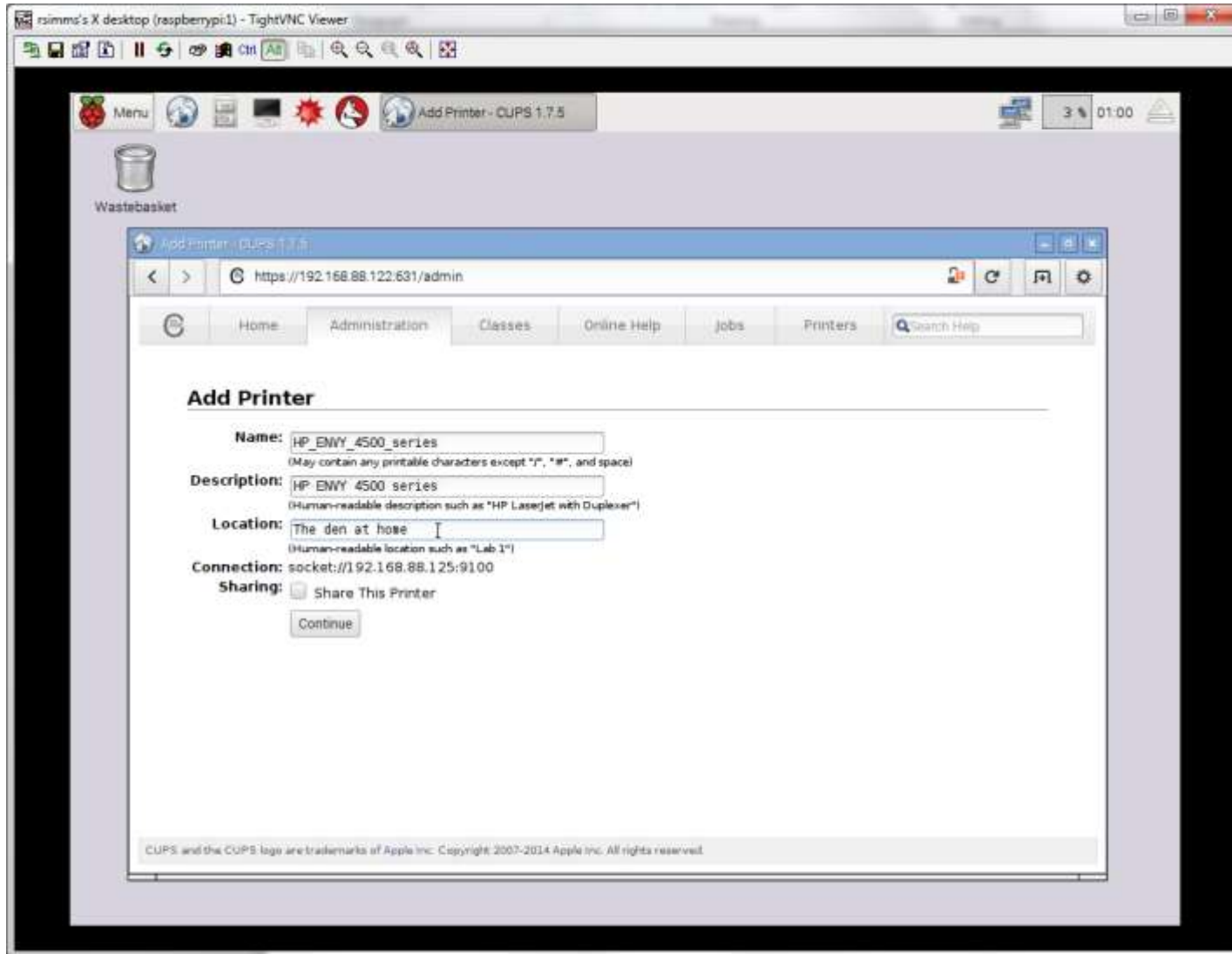
Click Add Printer button and authenticate with user belonging to lpadadmin group



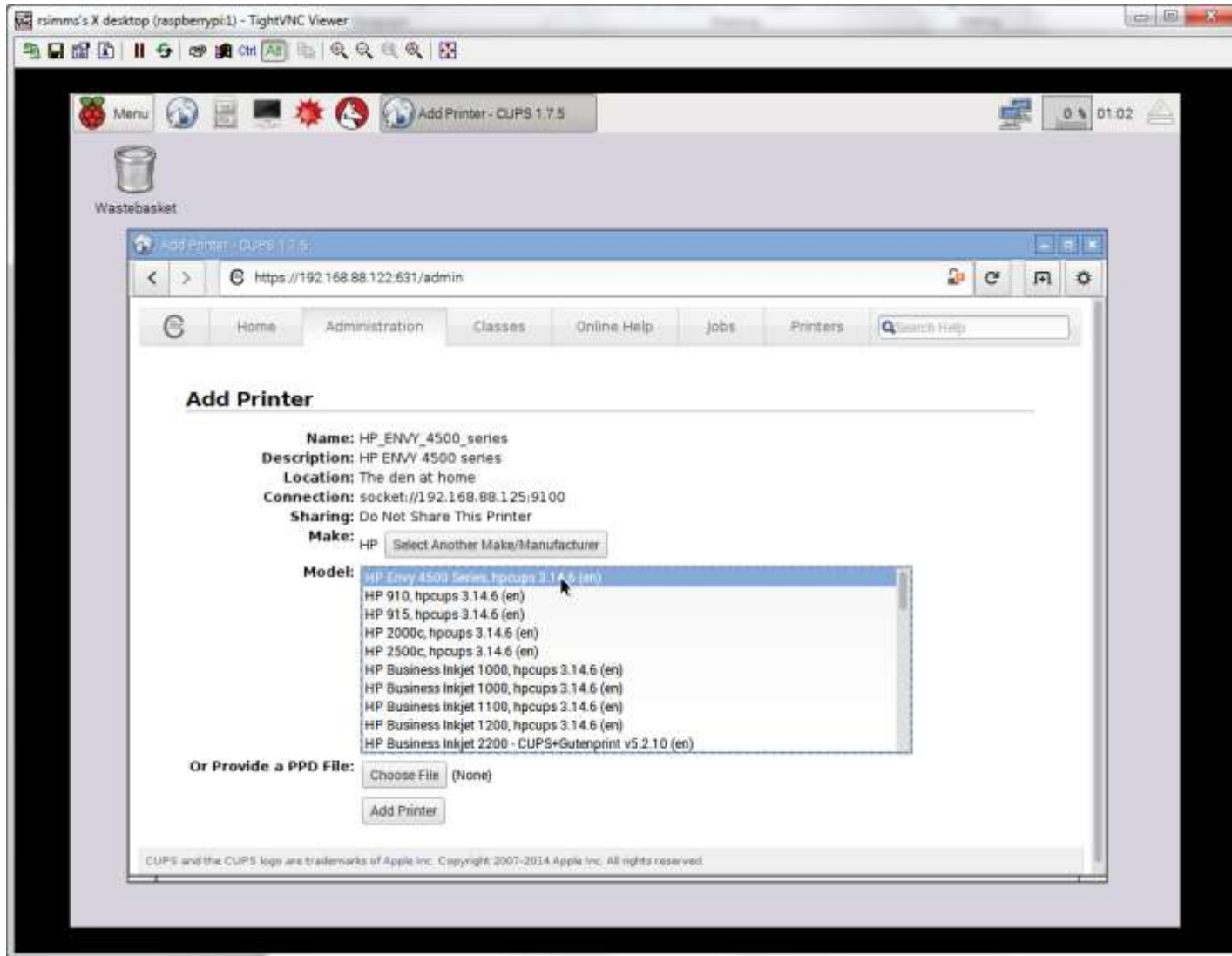
CUPS discovers and displays printers found on network. Select the printer to install.



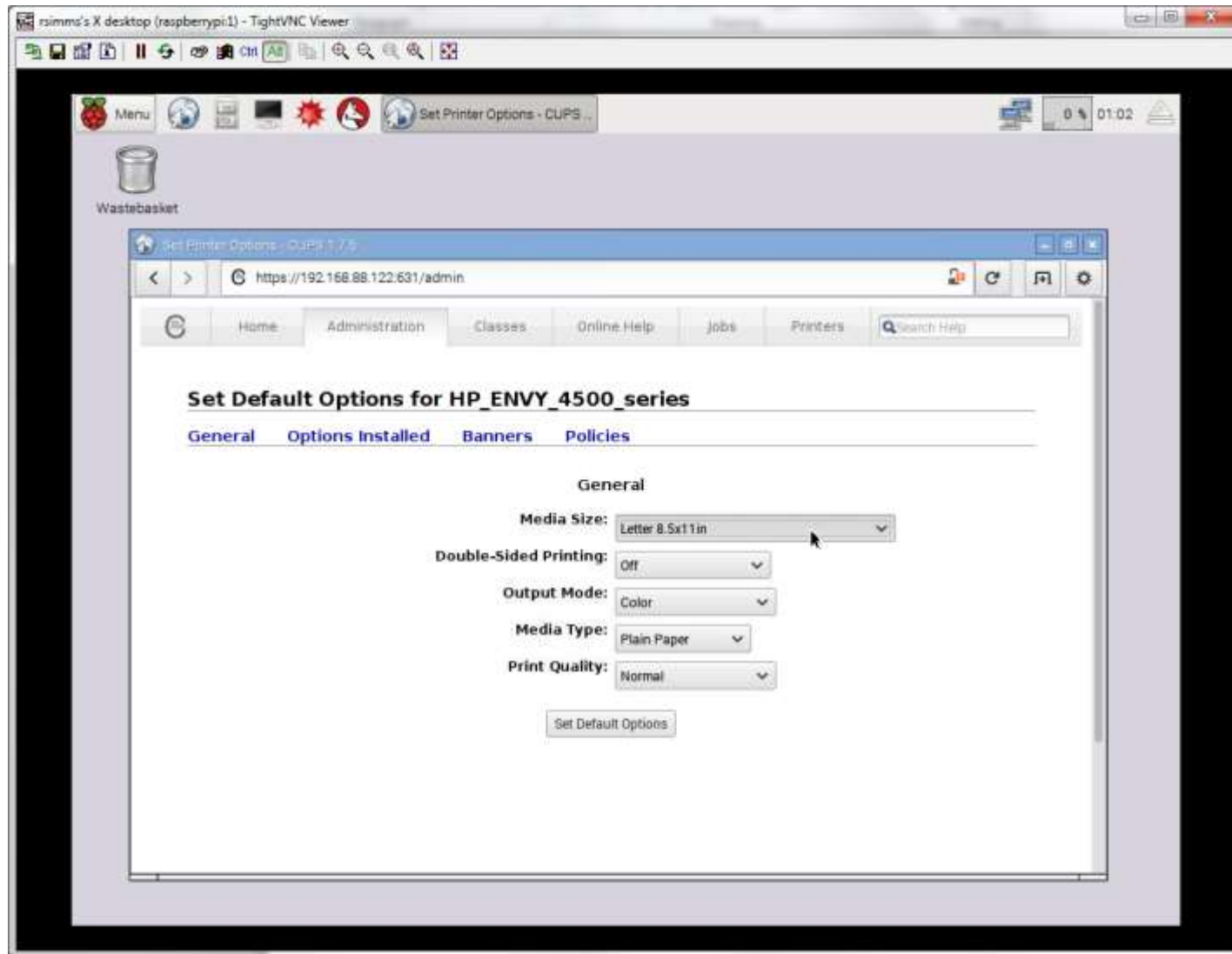
Add some information about the printer



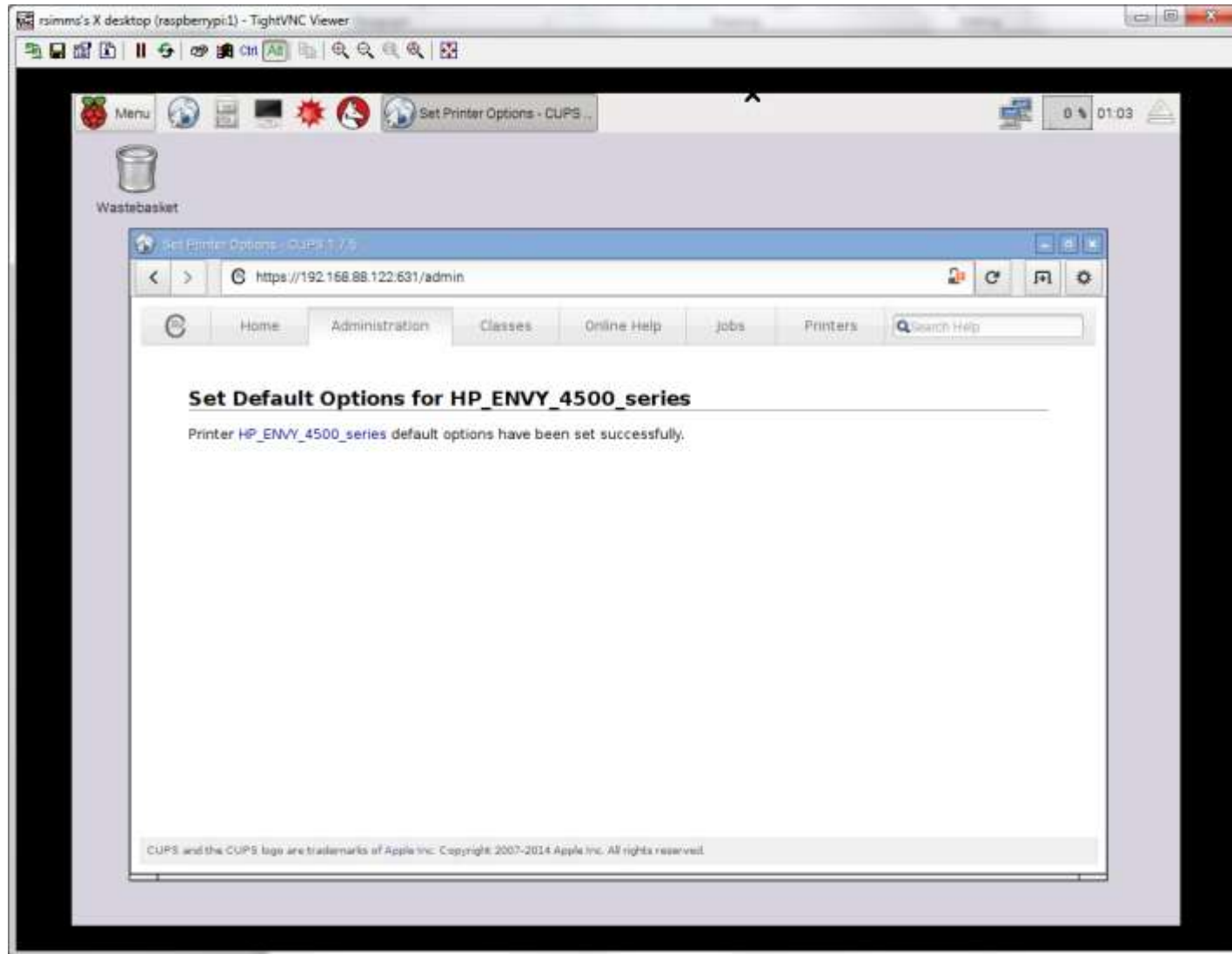
Add the printer



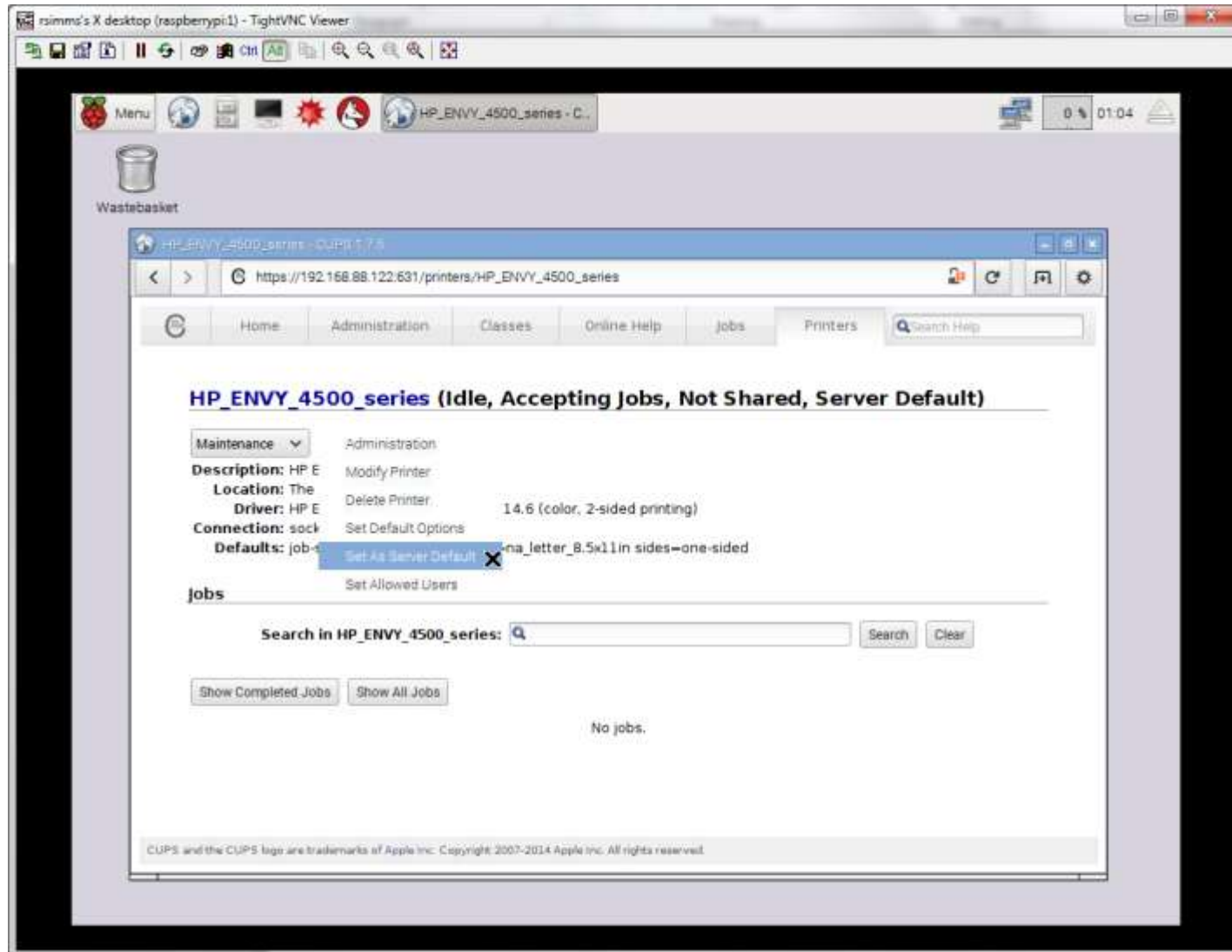
Set printing defaults



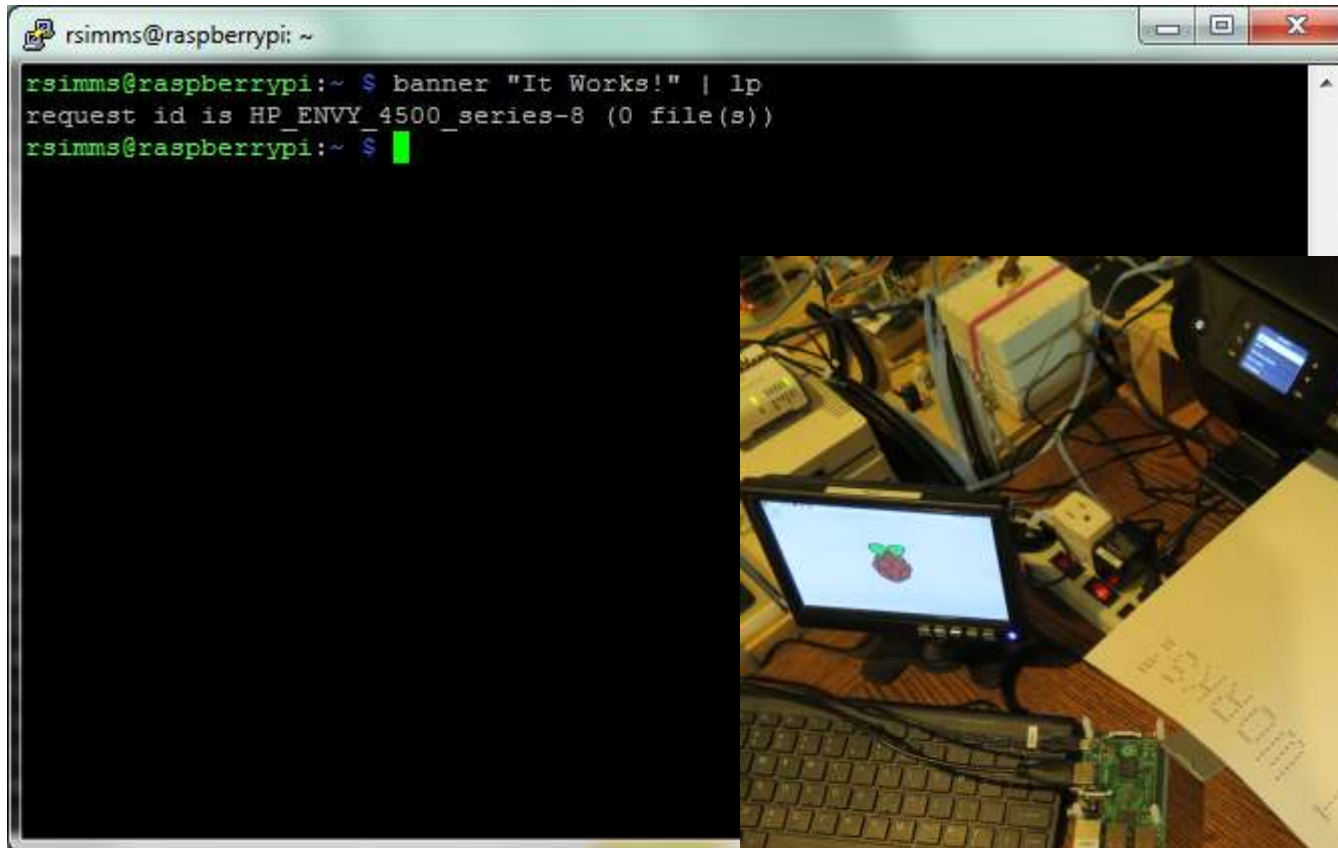
Printer added and ready!



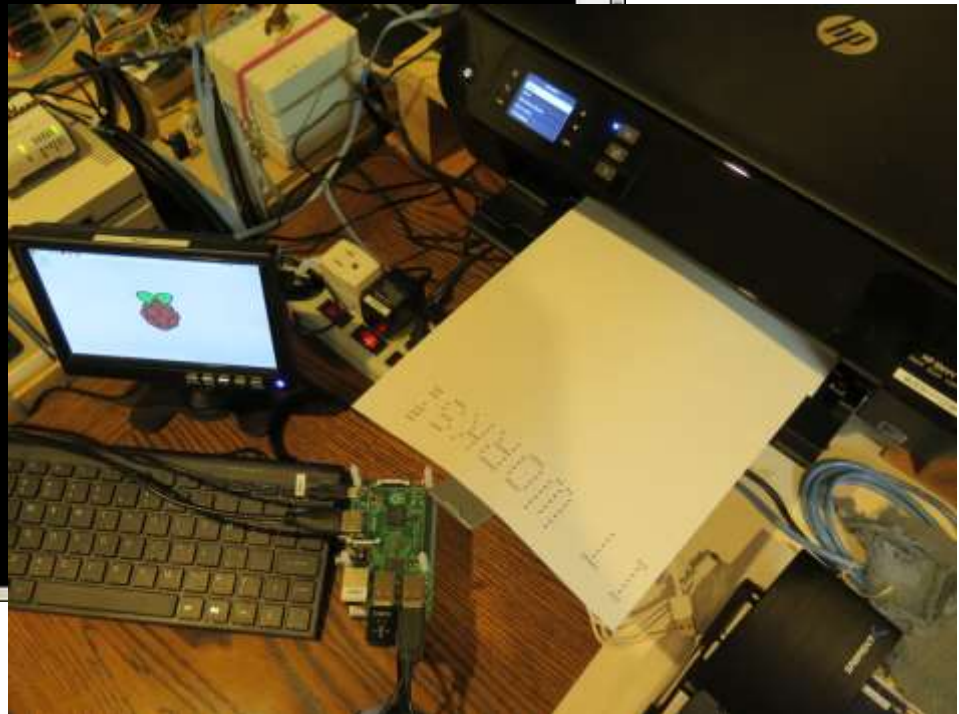
Make it the default printer



Test from the command line to verify it works



```
rsimms@raspberrypi: ~  
rsimms@raspberrypi:~ $ banner "It Works!" | lp  
request id is HP_ENVY_4500_series-8 (0 file(s))  
rsimms@raspberrypi:~ $
```



Printing in Linux

Printing Commands

The ATT System V way

- lp (to print)
- lpstat (queue management)
- cancel (to remove jobs)

The BSD (Berkeley Software Distribution) way

- lpr (to print)
- lpq (queue management)
- lprm (to remove jobs)

BSD is a branch of UNIX that was developed at the University of California, Berkeley

And now CUPS ...

- Provides both System V and Berkeley based command-line interfaces
- Supports new Internet Printing Protocol
- Works with Samba

CUPS

lpstat command

Syntax: **lpstat** [*options*]

```
rsimms@hugo:~$ lpstat -p
```

```
printer HP_LaserJet_1320_series is idle.  enabled since Tue 08 May  
2012 08:46:45 PM PDT
```

*The -p option will show the
available printers*

```
rsimms@hugo:~$ lpstat -p -d
```

```
printer HP_LaserJet_1320_series is idle.  enabled since Tue 08 May  
2012 08:46:45 PM PDT
```

```
system default destination: HP_LaserJet_1320_series
```

*The -d option will identify
the default printer*



CUPS

lpstat command

On Opus

What printers are available on Opus?

Which is the default printer?

Write your answers in the chat window

CUPS

lp and lpr commands

*Use **lp** (or **lpr**) to print files*

```
/home/cis90/simben $ lp lab10  
request id is hplaser-5 (1 file(s))
```

```
/home/cis90/simben $ lp -d hplaser lab10  
request id is hplaser-6 (1 file(s))
```

*With **lp**, use the **-d** option to manually select the printer*

```
/home/cis90/simben $ lpr lab10
```

```
/home/cis90/simben $ lpr -P hplaser lab10
```

*With **lpr**, use the **-P** option to manually select a printer*

CUPS

lp and lpr commands

```
/home/cis90/simben $ echo "Print Me Quietly" | lpr -P hplaser  
/home/cis90/simben $
```

Note that both lp and lpr will read from stdin.

This allows output from another command to be piped in



CUPS

Practice Printing

On Opus, print your lab10 and letter files

```
lp lab10  
lpstat
```

```
lpr letter  
lpstat
```

```
echo "Print Me Quietly" | lpr -P hplaser  
lpstat
```

When finished type "done" in the chat window



Managing Print Jobs

CUPS

Showing jobs waiting to print

```
[root@benji ~]# lpq
```

```
hp7550 is not ready
```

Rank	Owner	Job	File(s)
Total Size			
1st	root	22	myfile
1024 bytes			
2nd	root	23	myfile
1024 bytes			
3rd	root	24	myfile
1024 bytes			
4th	root	25	myfile
1024 bytes			

*Use **lpq** or **lpstat** with
no options to show
spooled print jobs*

```
[root@benji ~]# lpstat
```

hp7550-22	root	1024	Sat
15 Nov 2008 12:20:23 PM	PST		
hp7550-23	root	1024	Sat
15 Nov 2008 12:20:28 PM	PST		
hp7550-24	root	1024	Sat
15 Nov 2008 12:20:31 PM	PST		
hp7550-25	root	1024	Sat
15 Nov 2008 12:20:34 PM	PST		

CUPS

Removing/canceling pending print jobs

```
[root@benji ~]# lpq
hp7550 is not ready
Rank      Owner    Job      File(s)
Total Size
1st       root     22       myfile
1024 bytes
2nd       root     23       myfile
1024 bytes
3rd       root     24       myfile
1024 bytes
4th       root     25       myfile
1024 bytes
```

```
[root@benji ~]# cancel 22
[root@benji ~]# cancel 23
[root@benji ~]# lprm 24
[root@benji ~]# lprm 25
```

*Use **cancel** or **lprm**
to remove print jobs*

```
[root@benji ~]# lpq
hp7550 is not ready
no entries
```

```
[root@benji ~]# lpstat
[root@benji ~]#
```

CUPS

Practice Printing

On Opus

```
lpq  
lpstat
```

```
cancel <print job number>  
lpq
```



```
lprm <print job number>  
lpq
```

When finished type "done" in the chat window

Assignment



Start your project!

CIS 90 Final Project

Developing a bash script
Fall 2015

Final Project

For the final project you will be writing custom front-ends to your favorite Linux commands. To do this you will write a shell script that interacts with the user to get input, then use that input to call a Linux command. You will start with a template that you can modify and extend.

Forum

Use the forum to brainstorm script ideas, clarify requirements, and get help if you are stuck. When you have tested your script and think it is bug free then use the forum to ask others to test it some more. Post any valuable tips or lessons learned as well. Forum is at: <http://oslab.cis.cabrillo.edu/forum/>

Commands

.	echo	lpstat	sort
at	env	ls	spell
banner	exit	mail	su
bash	export	man	tail
bc	file	msg	tee
cal	find	mkdir	touch
cancel	finger	more	type
cat	grep	mv	umask
cd	head	passwd	uname
chgrp	history	ps	unset
chmod	id	pwd	vi
chown	jobs	rm	wc
clear	kill	rmdir	who
cp	ln	set	write
date	lp/lpr	sleep	xxd

Start early and finish on time!

A full-page background image showing a sunset over a beach. The sky is filled with vibrant orange, pink, and purple clouds. The sun is low on the horizon, casting a warm glow. To the right, a dark, silhouetted cliff rises from the beach. The foreground shows the wet sand of the beach reflecting the colors of the sky.

Wrap up

Commands:

lp, lpr
cancel, lprm
lpq, lpstat

- Linux print command
- cancel print job
- Show print queue

Web:

<http://hostname:631>
<http://hostname:9100>

- CUPS web based management utility
- HP JetDirect printer

Next Class

Assignment: Check Calendar Page on web site to see what is due next week.

No Quiz
No Lab due

Work on final project - due in two weeks!

Optional extra credit labs

Project Workshop

- See if you can get one “starter” task scripted and working before leaving class today.
- Grade your starter script using the Final Project rubric

Implementing all five tasks (6 points each):

- Requirements for each task:
 - Minimum of 10 “original” script command lines
 - Has one or more non-generic comments to explain what it is doing
 - Has user interaction

You don't have to do all of these but do at least five:

- Redirecting stdin (5 points)
- Redirecting stdout (5 points)
- Redirecting stderr (5 points)
- Use of permissions (5 points)
- Use of filename expansion characters (5 points)
- Use of absolute path (5 points)
- Use of relative path (5 points)
- Use of a PID (5 points)
- Use of inodes (5 points)
- Use of links (5 points)
- Use of scheduling (5 points)
- Use of a GID or group (5 points)
- Use of a UID or user (5 points)
- Use of a /dev/tty device (5 points)
- Use of a signal (5 points)
- Use of piping (5 points)
- Use of an environment variable (5 points)
- Use of /bin/mail (5 points)
- Use of a conditional (5 points)

The maximum for this section is 25 points.



Backup