Get VirtualBox

Go to www.virtualbox.org and select Downloads.

Download the current release* of VirtualBox for the OS on which you will install VirtualBox. In these notes, that's Windows 7.

Note:

- the OS on which you will install VirtualBox is called the *host OS*.
- the OS you will install on VirtualBox (later) is called the *guest OS*.

In these notes, I have a Windows 7 host and a CentOS guest.

Download the VirtualBox Extension Pack.

* As of 8/26/2014, there seem to be "issues" with the latest release... I recommend using VirtualBox 4.3.10 for the present.



Begin the VirtualBox Installation

VirtualBox/CentOS Setup 2

Run the VirtualBox installer. The first few screens are typical and probably do not require you to make any changes to the default options:



ustom Setup Select the way you want features to be installed.	
Click on the icons in the tree below to change the v	way features will be installed.
VirtualBox Application VirtualBox USB Support VirtualBox Networking VirtualBox Networking VirtualBox NoteC VirtualBox NoteC VirtualBox Python 2.x S. virtualBox Python 2.x S.	Oracle VM VirtualBox 4.2.6 application.
Location: C:\Program Files\Oracle\VirtualBox\	Browse

Custom Setup Select the way you want features	to be installed.
Please choose from the options be	low:
Create a shortcut on the deskt	op
Create a shortcut in the Quick L	Launch Bar
	L3
Version 4.2.6	< Back Next > Cancel



Ready to Install	
The Setup Wizard is ready to	begin the Custom installation.
	lation. If you want to review or change any of your . Click Cancel to exit the wizard.
	C≱

Oracle VM VirtualBox 4.2	
Please wait while the Set take several minutes.	up Wizard installs Oracle VM VirtualBox 4.2.6. This may
Status: Validating insta	
	ν2



Computer Organization

Starting VirtualBox

When the installation completes, you can run VirtualBox for the first time:



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Computer Organization

Creating a Virtual Machine





Computer Organization

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VirtualBox/CentOS Setup 4

Configuring Memory for the VM

Specify the amount of memory you'll give the VM.

In this example, I'm installing on a host machine with 8GB of RAM; with less, I'd probably given the VM 1GB.

On my current working laptop, I have 10GB of RAM and gave my VM 4GB.





Computer Organization

Configuring a Virtual Hard Disk

In the next dialog, select the option to create a new virtual hard drive now.

Take the default hard drive file type in the next dialog unless you're concerned about being compatible with some other virtualization tool like VMWare.

Create Virtual Machine	Create Virtual Hard Drive	Create Virtual Hard Drive
Hard drive If you wish you can add a virtual hard drive to the new machine. You can either create a new hard drive file or select one from the list or from another location using the folder con. If you need a more complex storage set-up you can skip this step and make the changes to the machine settings once the machine is created. The recommended size of the hard drive is 8.00 GB . © Do not add a virtual hard drive © Create a virtual hard drive now © Lise an existing virtual hard drive file Ubuntu12-32.vdi (Normal, 32.00 GB) Create Cancel	Hard drive file type Please choose the type of file that you would like to use for the new virtual hard drive. If you do not need to use it with other virtualization software you can leave this setting unchanged. VDI (VirtualBox Disk Image) VMDK (Virtual Machine Disk) VHD (Virtual Hard Disk) HDD (Parallels Hard Disk) QED (QEMU enhanced disk) QCOW (QEMU Copy-On-Write)	Storage on physical hard drive Please choose whether the new virtual hard drive file should grow as it is used (dynamically allocated) or if it should be created at its maximum size (fixed size). A dynamically allocated hard drive file will only use space on your physical hard drive as it fills up (up to a maximum fixed size), although it will not shrink again automatically when space on it is freed. A fixed size hard drive file may take longer to create on some systems but is often faster to use. O Dynamically allocated Image: Fixed size
	Hide Description Next Cancel	Next Cancel

Next, I recommend choosing a fixed-size hard disk.



Configuring a Virtual Hard Disk

I generally make this 32GB, but make it smaller if you're short on space.







Computer Organization

An Empty VM

Now, you have an empty virtual machine (I already had another VM fully set up).

That is, a formatted (virtual) hard disk and no OS.





Computer Organization

VM Settings

There are a couple of crucial VM settings; right-click on your VM and bring up the Settings dialog:

CentOS 6.4 64-bit -	General Basic Advanced Description Snapshot Folder: C:\Users\in\VirtualBox VMs\CentOS 6.4 64-bit\Sn Shared Clipboard: Bidirectional Drag'n'Drop: Host To Guest	apshots -	Under Display, enable 3D Acceleration.
 Serial Ports USB Shared Folders 	Removable Media: Image: Remember Runtime Changes Mini ToolBar: Image: Show In Fullscreen/Seamless Image: Show At Top Of Screen Show At Top Of Screen Select a settings category from the list on the left-hand side and move the item to get more information. OK	CentOS 6.4 64-bit - S General System Display Storage Audio Audio Network Serial Ports USB Shared Folders	Display Video Remote Display Video Memory: 1MB 1MB 1MB 1MB 1MB 1 64 Extended Features: Imable 3D Acceleration Enable 2D Video Acceleration
make the	eneral/Advanced, e shared clipboard onal, and enable Orop.		Select a settings category from the list on the left-hand side and move the mouse over a settings item to get more information.

Install the VirtualBox Extensions

Find the file for the VirtualBox Extensions you downloaded earlier.

It should be associated with VirtualBox now.

Double-click on it and the Extensions should be installed.





CentOS matches the department's servers, including the rlogin cluster, so that is what you should install.

You'll have to select a 32-bit or a 64-bit version.

A 64-bit version gives you a few more options, but either will be sufficient for most of the assignments in CS 2505.

If you install a 32-bit version, you won't be able to run any 64-bit code on it.

If you install a 64-bit version, you won't be able to build any 32-bit executables on it unless you install some additional packages.

Whatever you choose, download an ISO file (CD or DVD). You don't need to burn a physical disk.

Disclaimer: the following notes illustrate one session installing a particular distribution of Linux on VirtualBox 4.2.6, running on Windows 7 Enterprise, on a particular underlying hardware system. YMMV. Mine certainly has...



Preparation

Go to centos.org, use the Get CentOS link at the top of the page, and then scroll down and select the link for older versions.



Preparation

Go to the list of download mirrors and select one to begin your download.

The list will change from time to time; here's an example for the US as of August 2014:

US	FL	Mojohost	http://mirror.mojohost.com/centos/	ftp://mirror.mojohost.com/centos/
US	ТХ	Geeks at Work Solutions	http://mirrors.gawsolutions.us/centos	
US	UT	Fast Speed Test	http://fastspeedtest.net/mirrors/centos/	



Beginning the Installation

VirtualBox/CentOS Setup 14

Select the VM and click Start:





Computer Organization

Selecting Installation Media

VirtualBox will recognize the empty system and prompt you to select an installation disk.

Click the folder icon and select your CentOS ISO file.





Computer Organization

Running the Installation Code

VirtualBox/CentOS Setup 16

The remaining screen shots will vary considerably depending on which distro you chose to install, but the general procedure will be similar.

Virt	ualBox - Information
1	The virtual machine window is optimized to work in 32 bit color mode but the virtual display is currently set to 24 bit .
	Please open the display properties dialog of the guest OS and select a 32 bit color mode, if it is available, for best possible performance of the virtual video subsystem.
	Note . Some operating systems, like OS/2, may actually work in 32 bit mode but report it as 24 bit (16 million colors). You may try to select a different color mode to see if this message disappears or you can simply disable the message now if you are sure the required color mode (32 bit) is not available in the guest OS.
	Do not show this message again
	OK

I got these three dialogs when installing CentOS... eventually I'll sort out the color depth and the mouse pointer integration.

	VirtualBox - Information	?	×	J
	The Virtual Machine reguest OS does not sup pointer integration video mode. You need the mouse (by dicking display or pressing the order to use the mous guest OS. Do not show this m	port m in the to capt over th host k e inside	iouse current ture ne VM ey) in e the	
tualBox - Inf	ormation		?	×
pressed the host n currently s	clicked the mouse inside the Virtual ne host key. This will cause the Virtua nouse pointer (only if the mouse pointe supported by the guest OS) and the ke n unavailable to other applications run	al Machir er integr eyboard	ation is no , which wi	ture t
and mous currently of the Virt together	ress the host key at any time to unc e (if it is captured) and return them to assigned host key is shown on the stat ual Machine window, next to the via with the mouse icon placed nearby, ind and mouse capture state.	normal o tus bar a con. This	operation. at the bott s icon,	The
	ey is currently defined as Right Ctrl .	ĥ	5	
Do no	t show this message again Capture Cancel			



Computer Organization

Running the Installation Code

Here is the CentOS start screen:





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VirtualBox/CentOS Setup 17

Initial Options

CentOS starts with some basic language and keyboard configuration:

fachine View Devices Help	General	4	
	CentOS 6.4 64-bit [Running] - Oracle VM VirtualBox		
What language would you like to use during the installation process?	Machine View Devices Help Select the appropriate keyboard for the system.		
Arabic (العربية) Assamese (অসমীয়া)	Italian		
Bengali (বাংলা)	Italian (IBM)		
engali(India) (বাংলা (ভারত))	Italian (it2)		
ulgarian (Български)	Japanese		
atalan (Català)	Korean		
hinese(Simplified) (中文(简体))	Latin American Macedonian		
hinese(Traditional) (中文(正體))	Norwegian		
roatian (Hrvatski)	Polish		
zech (Čeština)	Portuguese		
anish (Dansk)	Romanian		
utch (Nederlands)	Russian		
nglish (English)	Serbian		
stonian (eesti keel)	Serbian (latin)		
nnish (suomi)	Slovak (gwerty)		
ench (Français)	Slovenian	*	
erman (Deutsch)	Spanish		
reek (Ελληνικά)	Swedish		
ujarati (ગુજરાતી)	Swiss French		
(עברית) אפרית)	Swiss French (latin1)	63	
ndi (हिन्दी)	Swiss German		
ungarian (Magyar)	Swiss German (latin1)		
elandic (Icelandic)	Turkish		
ko (Iloko)	U.S. English		
donesian (Indonesia)	U.S. International		
	Ukrainian		
	United Kingdom		
			▲ <u>B</u> ack
	=		
			😂 💿 🖉 🗗 🛄 💟 🖉 💽 Right

Computer Organization

Initial Options

VirtualBox/CentOS Setup 19

You're installing on the virtual drive, not your actual hard drive, so don't be alarmed by the second dialog.

CentOS 6.4 64-bit [Running] - Oracle VM VirtualBox		
Machine View Devices Help		
 Machine View Devices Help What type of devices will your installation involve? Basic Storage Devices Installs or upgrades to typical types of storage devices. If you're not this is probably it. Specialized Storage Devices Installs or upgrades to enterprise devices such as Storage Area Net you to add FCOE / ISCSI / zFCP disks and to filter out devices the installation of the storage of the stora		
	a Back	<u>▶</u> Next
	9008900	🕜 💽 Right Ctrl

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Basic Settings

VirtualBox/CentOS Setup 20

Name your install, select your time zone and set the password for root:



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Storage Configuration

VirtualBox/CentOS Setup 21





Computer Organization

Installation Type

Select the general type of system you want... probably Software Development.

You can add additional packages later.

achine View Devices Help	
The default installation of CentOS is a minimum install. You can optionally select different set of software now.	a
O Desktop	
O Minimal Desktop	
O Minimal	
O Basic Server	
O Database Server	×
O Web Server	*
O Virtual Host	
 Software Development Workstation 	
	ation.
	ation.
CentOS CentOS Add additional software repositories Modify repository You can further customize the software selection now, or after install via the software application.	
You can further customize the software selection now, or after install via the software management application.	



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First Completion...

Things should proceed automatically until a restart is needed:





Computer Organization

Initial Setup

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Initial Setup

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Continuing Setup

VirtualBox/CentOS Setup 26

Set data/time information; I'd take the default Kdump settings:

CentOS 6.4 64-bit [Running] - Oracl Machine View Devices Help Welcome License Information Create User	Date and Time			
> Date and Time Kdump	Date and jime Current date and time: Mon 22 Jul 2013 02:20:55 PM EDT	Information Create User Date and Time inva Kdump Kdump Jota Kdur Usat Adva # C # T # k # t # t # t # t	New Section 2. The section of the s	
				Back Finish



Computer Organization

Booting up the VM

VirtualBox/CentOS Setup 27





Computer Organization

CentOS VM Desktop

VirtualBox/CentOS Setup 28





Computer Organization

Enable CentOS Network

If you install CentOS from a DVD or ISO (as we did), networking is not enabled by default.

Right-click on the networking icon and select Edit Connections:

Wed Aug 28, 2:30 PM Enable Networking Connection Information Edit Connections About Select eth0 and Edit Network Connections Network Connections Viried System eth0 3 minutes ago Delete Check the box to Connection automatically	Editing System eth0 Connection name: System eth0 ✓ Connect automatically ✓ Available to all users Wired 802.1x Security IPv4 Settings IPv6 Settings Device MAC address: 08:00:27:B9:C3:01 Cloned MAC address: Image: Cloned matrix is automatic MTU: automatic MTU: Automatic Image: Apply
--	--



Computer Organization

OS Updates

I recommend running any OS updates next.

You can select the update tool from the CentOS menu bar:

It is likely that a lot of updates will be offered. It's probably OK to just accept all of them.

Install		ere are 35 updates available			
Install	Sof				
Install		tware updates correct errors, eliminate			
Install	sec	curity vulnerabilities and provide new features.			
		Software 🗸	Status	Size	^
🌞 I		Libraries used by the BIND DNS packages bind-libs-32:9.8.2-0.17.rc1.el6_4.6 (x86_64)		878.5 KB	-
🌞 G		Utilities for querying DNS name servers bind-utils-32:9.8.2-0.17.rc1.el6_4.6 (x86_64)		182.2 KB	
🌞 G		Statically linked binary providing simplified versions busybox-1:1.15.1-16.el6_4 (x86_64)		610.6 KB	
🌞 G		CPU frequency adjusting daemon cpuspeed-1:1.5-20.el6_4 (x86_64)		36.7 KB	
👋 (✓	Gcore extension module for the crash utility		37.0 KB	~
The dev	elop	per logs will be shown as no description is available for this update	:		<u>^</u>
2013-0	8-1	4 Tomas Hozza <thozza@redhat.com> 32:9.8.2-0.17.rc1.6</thozza@redhat.com>			
• Fix gs	sapi	ctx memory leak (#996955)			Ξ
2013-0	7-2	8 Tomas Hozza <thozza@redhat.com> 32:9.8.2-0.17.rc1.5</thozza@redhat.com>			
 fix CVI 	'E-20	013-4854			
2013-0	3-2	7 Adam Tkac <atkac com="" redhat=""> 32:9.8.2-0.17.rc1.4</atkac>			
 fix CV 	/E-2	013-2266			
 ship di 	lns/r	rl.h in -devel subpkg			
2013-0	2-0	8 Adam Tkac <atkac com="" redhat=""> 32:9.8.2-0.17.rc1.3</atkac>			
• romou	10.01	no house file from /use/share/dag_introduced by PPI patch			~
		35 upc	lates select	ted (56.9 M	(B)
He	elp	Quit	Inst	tall Update	s



VirtualBox Guest Additions

The VirtualBox Guest Additions provide additional functionality for your VM.



One note: until you install the VirtualBox Extension Pack (slide 10) and the Guest Additions, some things like mouse capture and scaled displays may not work.

Another note: if you run the system updater or install other software on your VM, you may have to reinstall the Guest Additions.



VirtualBox Guest Additions

Pay attention to the console window during the installation.

If there are error messages, the Guest Addition may not have been installed.



Verifying archive integrity... All good. Uncompressing VirtualBox 4.2.6 Guest Additions for Linux...... VirtualBox Guest Additions installer Removing existing VirtualBox non-DKMS kernel modules ...done. Building the VirtualBox Guest Additions kernel modules The headers for the current running kernel were not found. If the following module compilation fails then this could be the reason.

Building the main Guest Additions module



As you use your CentOS system, you'll probably discover new tools you'd like that are not included by default.

In most cases, if you know the name of the software package you'd like to install, you can do so by running the yum tool. yum has many options and you should skim its man page.

For instance, we can use yum to determine what version of a package is installed:

```
wdm@Centos65 ~]$ yum list installed gcc
Loaded plugins: fastestmirror, refresh-packagekit, security
Determining fastest mirrors
 * base: mirror.trouble-free.net
 * extras: mirrors.einstein.yu.edu
 * updates: mirrors.advancedhosters.com
                                                          00:00
                                               3.7 kB
base
                                              3.4 kB
                                                          00:00
extras
                                              | 3.4 kB
                                                          00:00
updates
Installed Packages
gcc.x86_64 4.4.7-4.el6 @anaconda-CentOS-201311272149.x86_64/6.5
[wdm@Centos65 ~]$
```



```
We can use yum to install or update a package:
      [wdm@Centos65 ~]$ yum install tree
                                                         You need to be
                                                         root to install or
     You need to be root to perform this command.
     [wdm@Centos65 ~]$ su
                                                         update a package:
     Password:
                                                         Now I am root
      [root@Centos65 wdm] # yum install tree
                                                         bwa ha ha!
     Setting up Install Process
     Resolving Dependencies
     --> Running transaction check
     ---> Package tree.x86_64 0:1.5.3-2.el6 will be installed
     --> Finished Dependency Resolution
      . . .
     Transaction Summary
     Install
                  1 Package(s)
                                                  yum has determined what
      Total download size: 36 k
                                                  needs to be installed,
     Installed size: 65 k
                                                  shown me that info, and
     Is this ok [y/N]: y
                                                  now wants confirmation...
      . . .
```



```
We can use yum to install or update a package:
```

```
. . .
Downloading Packages:
tree-1.5.3-2.el6.x86_64.rpm
   36 kB
             00:00
Running rpm_check_debug
Running Transaction Test
Transaction Test Succeeded
Running Transaction
  Installing : tree-1.5.3-2.el6.x86_64
1/1
 Verifying : tree-1.5.3-2.el6.x86_64
1/1
Installed:
  tree.x86 64 0:1.5.3-2.el6
Complete!
[root@Centos65 wdm] # exit
                                          Now I will cease to be root ....
exit
                                          that much privilege can be
[wdm@Centos65 ~]$
```

yum triggers the installation..



dangerous.

Sometimes yum cannot find a package:

It's possible to direct yum to search additional repositories. See a good Linux reference or the man pages for more information.



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p	driver.c - /home/wdm/2506/CSet/code - Geany	_ 0
File Edit Search View Docume	ent Project Build Tools Help	
🢁 🗸 🖨 🖌 🖄 🗐 🛛 🗞	> 🗙 \Rightarrow 🍪 💊 🗸 🐉 题 🥂 👍 🛃 🚺 🚽 🐴 🚽	
Symbols Documents	driver.c 🗶	
7 Punctions	<pre>1 #include <stdio.h> 2 #include <stdiot.h> 3 #include <inttypes.h> 4 #include <stdiot.h> 5 #include <stdiot.h> 6 #include <stdlib.h> 7 8 #include "CSet.h" 9 #include "TestCSet.h" 10 11 void CSet_Display(const CSet* const pSet, FILE* Out); 12 13 = int main(int argc, char** argv) { 14 FILE* Log = NULL; 16 unsigned int Seed; 17 18 = if (argc > 1) { 18 = seed = (unsigned int) time(NULL); 19 Seed = (unsigned int) time(NULL); 19 FILE* fp = fopen("Seed.txt", "w"); 20 FILE* fp = fopen("Seed.txt", "w"); 21 fclose(fp); 22 Log = fopen("profSummary.txt", "w"); 23 Log = fopen("profSummary.txt", "w"); 24 else {</stdlib.h></stdiot.h></stdiot.h></inttypes.h></stdiot.h></stdio.h></pre>	

geany is a programmer-oriented editor:

It's my (current) favorite text editor for programming on Linux.

It's also available for Windows.

geany can be installed by downloading the correct package from geany.org:



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Choose the correct version, 32-bit (i686) or 64-bit (x86-64) for your system:

ile <u>E</u> dit <u>V</u> iew History <u>B</u> ookmarks <u>T</u> ools <u>H</u> elp)				
e Geany : Third Party Packages 🕒					
www.geany.org/Download/ThirdPartyPackag	es#centos_rhel	☆ ✔ 🔊 🔣 Google	😤 🕹 🖀		
	Centos and RHEL				
	Frank Cox has has built Geany packages for Centos and RHEL at <u>http://www.melvilletheatre.com/articles/el5/index.html</u> and <u>http://el6/index.html</u>	5 and 6. The packages are available ://www.melvilletheatre.com/articles			
	Source Mage		1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		
	To install Geany, just run the following command:				
	cast geany				
	FreeBSD				
	Just use the ports tree to install Geany. For example, type the for	llowing:			
	portinstall devel/geany	¥			
	NetBSD 💿	Assorted RPMS for Centos	6 - Mozilla Firefox		-
	To install Geany, Eile Edit View History Bookmarks Tools Help				
	devel/geany				
	www.melvilletheatre.com/articles/el6/index.h	ml		☆ ✔ 🗭 🚺 🚼 ✔ Google	M
	OpenBSD				
	To install Geany, Geany (homepage)				
	devel/geany		the second second		
			Contraction of the second	and the second	C.C.
	The state				
	Geany is a CTK2 based programmer's edito		S.K.S.	ASAR /	
	Geany is a CTK2 based programmer's edito Download geany for Centos 6 i686				N.
		5	Any		S.
	Download geany for Centos 6 i686	>	Y >		Y.
	Download geany for Centos 6 1686 Download geany for Centos 6 x86 64	>			Y
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	Download geany for Centos 6 1686 Download geany for Centos 6 x86 64 Download geany source rpm gLabels (homepage)				No. State
	Download geany for Centos 6 1686 Download geany for Centos 6 x86 64 Download geany source rpm gLabels (homepage)	by labels and business cards for the GNO	ME desktop environment. I	t is designed to work with various la	sser/ink-jet peel-o
	Download geany for Centos 6 1686 Download geany for Centos 6 x86 64 Download geany source rpm gLabels (homepage)	by labels and business cards for the GNO	ME desktop environment. I	t is designed to work with various la	sser/ink-jet peel-co

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