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% title: OS Lab Assignment % author: Abhay Shanker Pathak

Installation of Linux OS using VM

If you want to use linux without making changes to your current windows system, you can use VM (virtual manager) to achieve this goal. There are several software which can be used to run *guest operating system*. Some of them are:

- Virtual Box
- VMWare
- QEMU

We'll focus on Virtual Box here.

VirtualBox is free and open source virtualization software from Oracle.

Requirments

- Good Internet Connection to download ISO(most of them are around size of **2GB**)
- Minimum RAM of around 4GB for windows(should have 8GB) although it'll depends on which distro you're trying to install
- Host system with atleast 8 - 10GB of disk space.
- Should enable hyper visualization from your **BIOS(UEFI)** setting

Steps

Here are the steps to install linux OS on vm

Download and Install VirtualBox

Go to the website of Oracle VirtualBox and get the latest stable version according to your host system.

Download the Linux ISO

Next, you need to download the ISO file of the linux distribution which you want from it's official website.

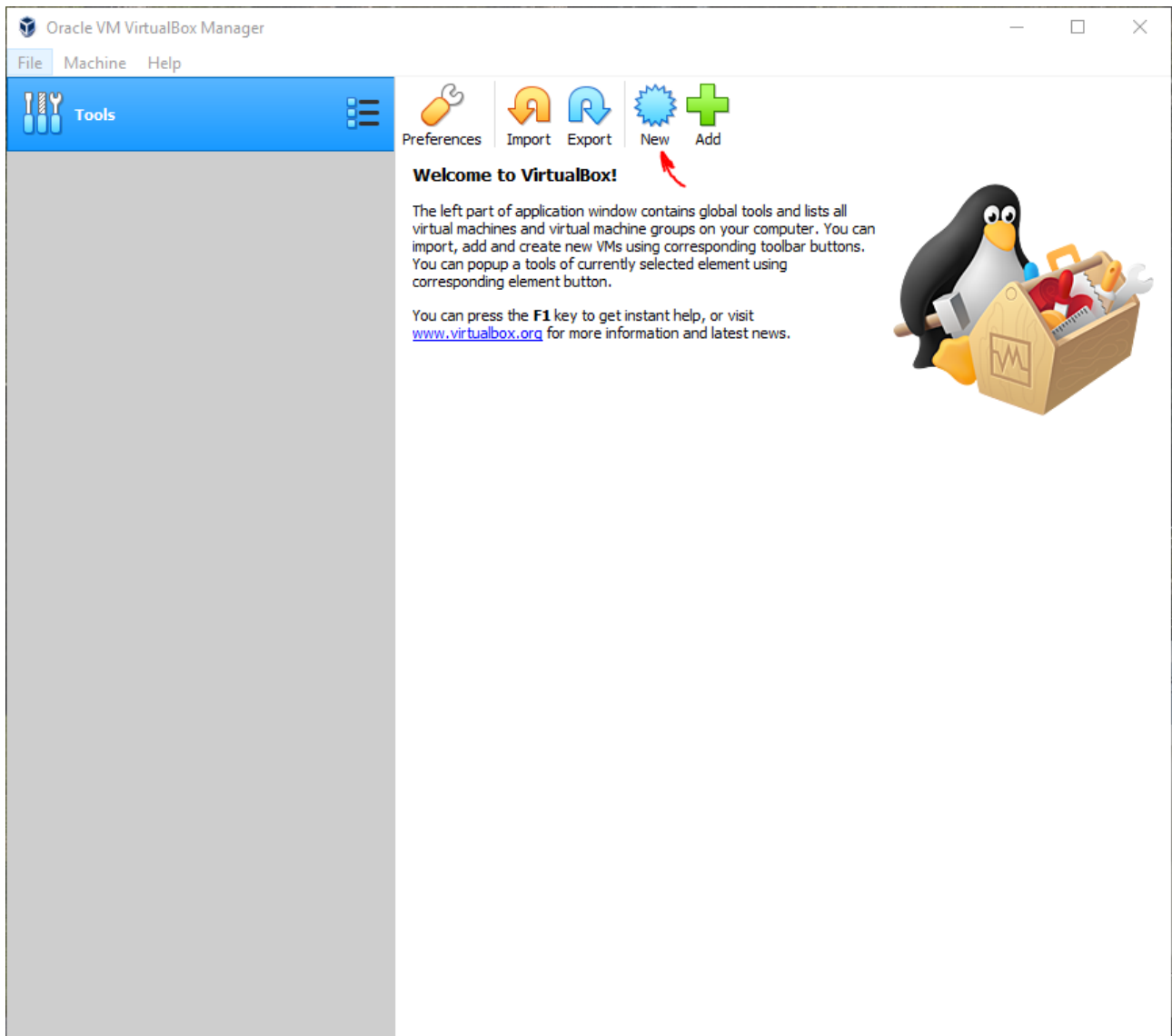
There are several types of linux/unix based distros out there, some are:

- Debian based
 - Debian
 - Ubutnu
 - Mint
 - Elementary
- Arch based
 - Arch
 - Manjaro
 - Void
 - Antergos
- NixOS
- Fedora
- RedHat
- OpenSuse
- Gentoo
- BSD
 - FreeBSD
 - OpenBSD etc.

I'm using **Debian** in here as example. Get it from the following link <https://www.debian.org/>

Whatever distribution you downloaded it's highly recommended to check its checksum(md5, sha256) etc.

Virtual Machine Creation



Click **New** button to create VM


← Create Virtual Machine

Name and operating system

Please choose a descriptive name and destination folder for the new virtual machine and select the type of operating system you intend to install on it. The name you choose will be used throughout VirtualBox to identify this machine.

Name:

Machine Folder:

Type: 

Version:

Expert Mode

Next

Cancel

Provide a **name** of your choice to the new VM and a **directory location** to store the related files. Also give type as **Linux** and type of **distro**.

← Create Virtual Machine

Memory size

Select the amount of memory (RAM) in megabytes to be allocated to the virtual machine.

The recommended memory size is **1024 MB**.



Next

Cancel

Give a memory size to your VM. Minimum for debian is around 512GB, also you shouldn't allocate more than half of RAM size what the host have.

← Create Virtual Hard Disk

Hard disk file type

Please choose the type of file that you would like to use for the new virtual hard disk. If you do not need to use it with other virtualization software you can leave this setting unchanged.

- ☒ VDI (VirtualBox Disk Image)
- ☐ VHD (Virtual Hard Disk)
- ☐ VMDK (Virtual Machine Disk)

Expert Mode

Next

Cancel

Choose **Create a virtual hard disk now** option and click **Create**.

← Create Virtual Machine


Hard disk

If you wish you can add a virtual hard disk to the new machine. You can either create a new hard disk file or select one from the list or from another location using the folder icon.

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 disk is **8.00 GB**.

- ☐ Do not add a virtual hard disk
- ☒ Create a virtual hard disk now
- ☐ Use an existing virtual hard disk file

Empty 

Create

Cancel

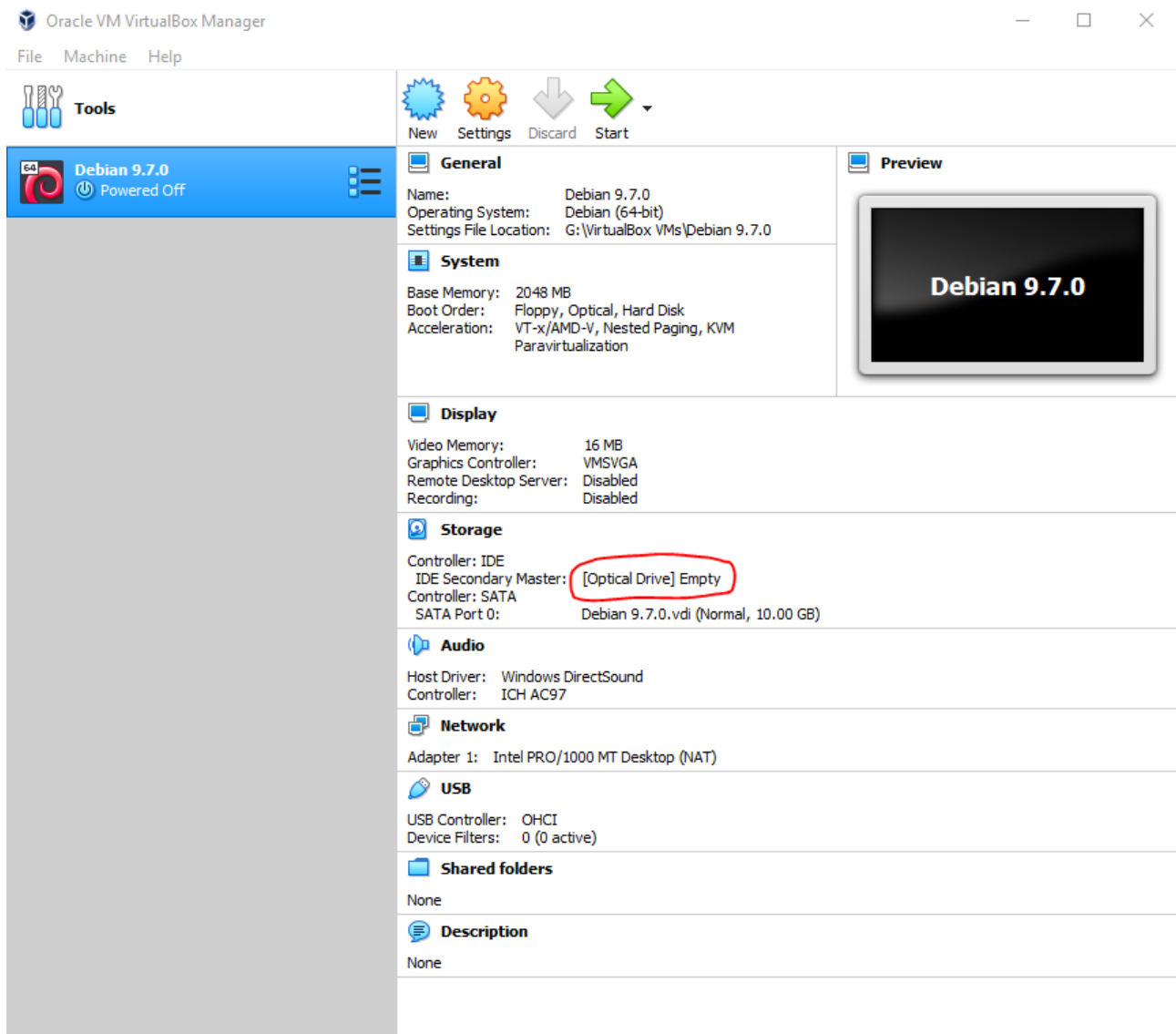
Choose **VDI** option and click **Next**.

Choose **Dynamically Allocated** option and click **Next**.

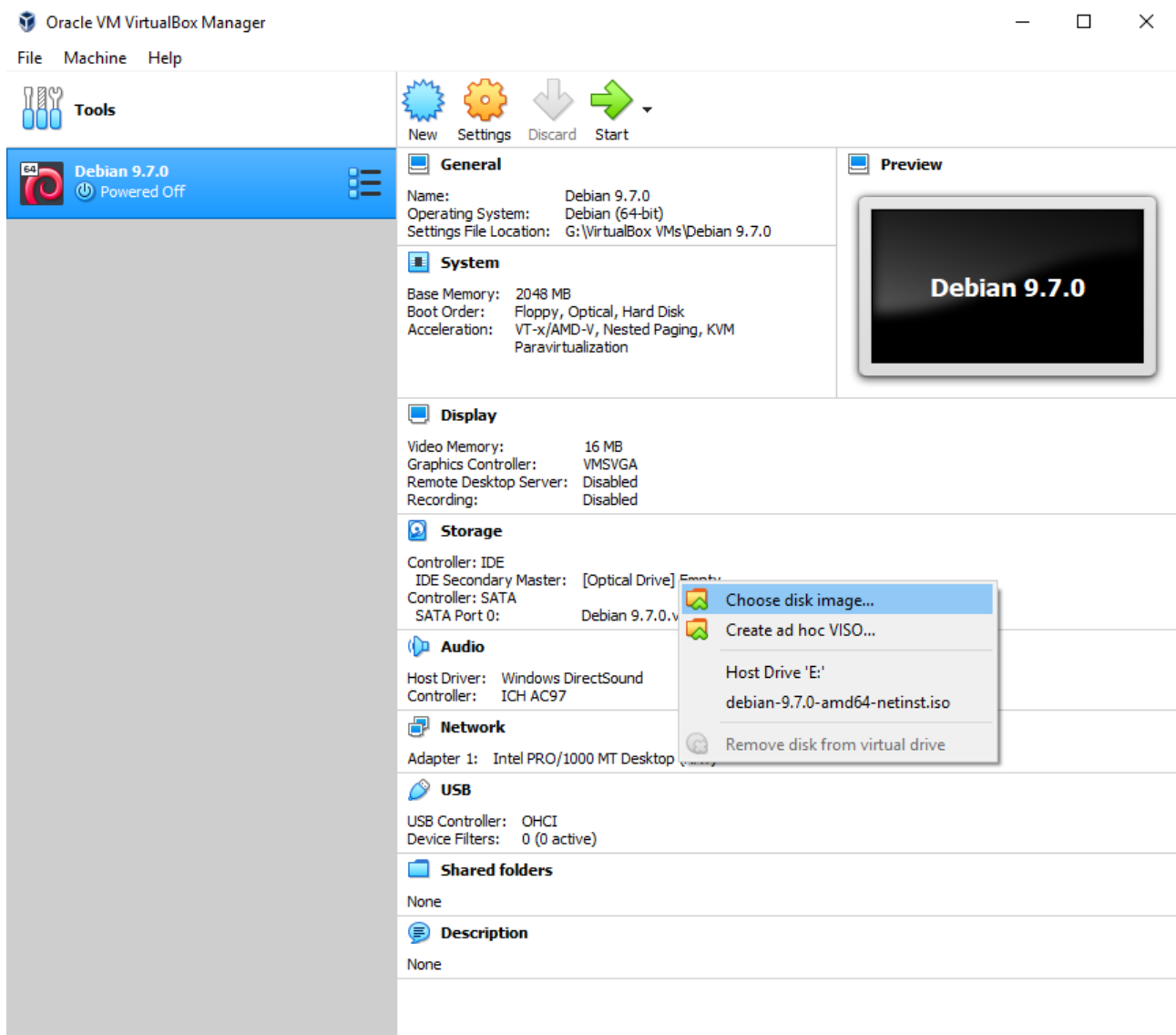
Provide a **Hard Disk size** for your VM and click **Create**.

Debian Installation

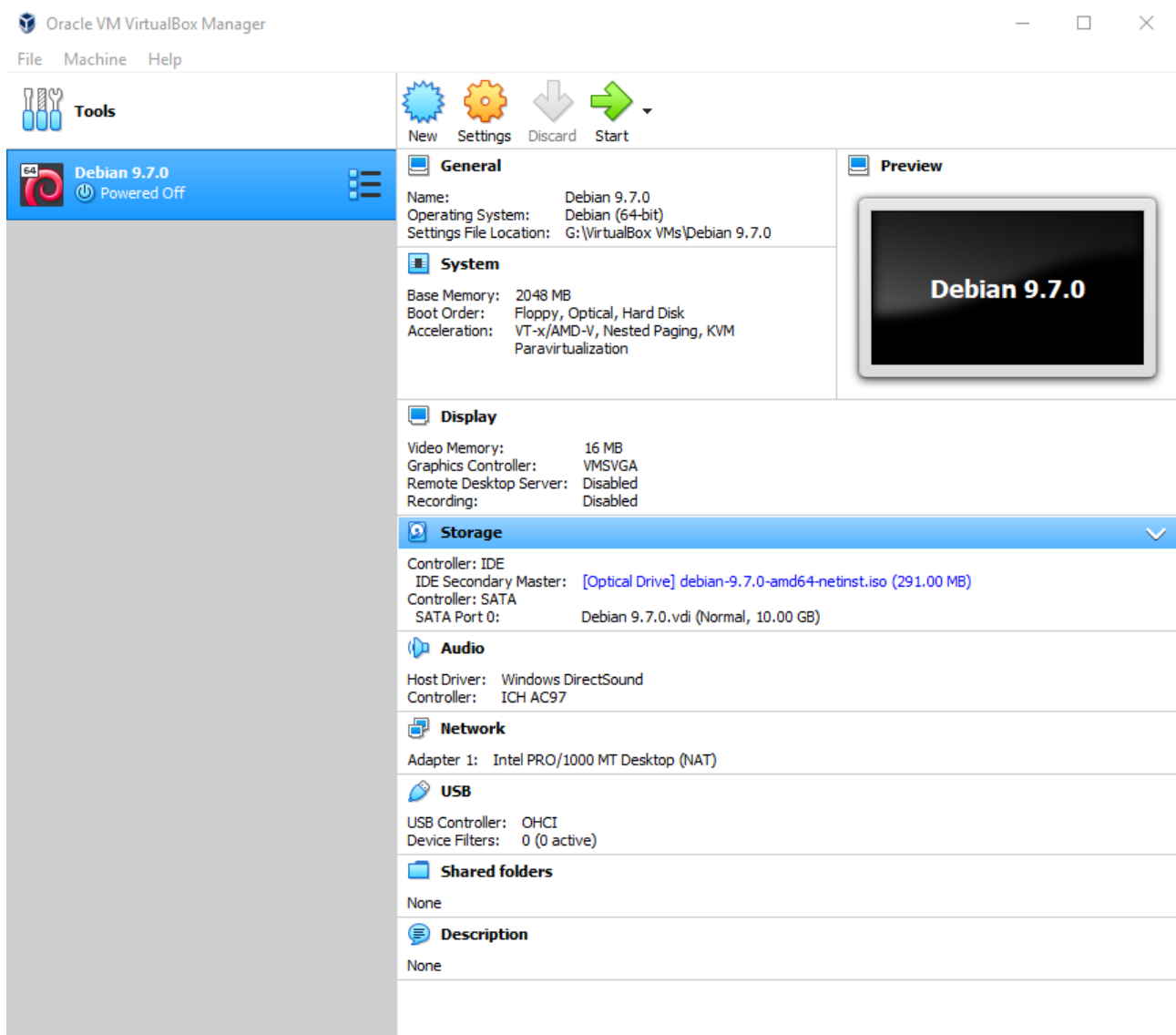
Provide the downloaded Debian ISO image to the newly created VM.



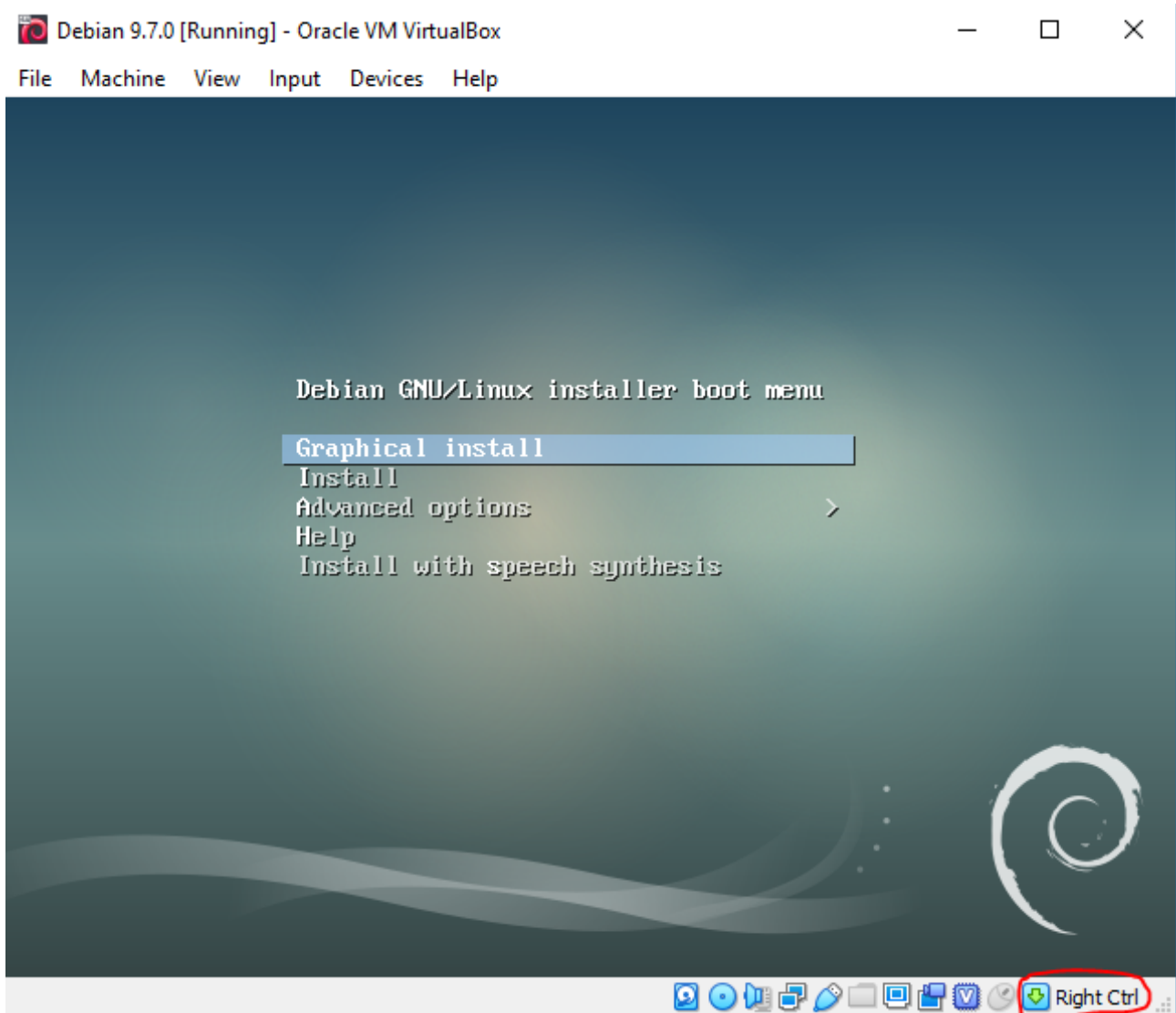
Now, click on [Optical Drive] Empty



Select **Choose disk image...** and give it you ISO location



Now things will look like this. Click **start** button to start your VM.



This here is `grub` menu from here, you can start to install your linux os on VM.

Refer to this website '<https://medium.com/platform-engineer/how-to-install-debian-linux-on-virtualbox-with-guest-additions-778afa0ee7e0>' for more info.

Practicing Linux Commands

Introduction

- All the linux commands are run in terminal(exceptions are there.)
- There are several types of terminal in linux, like:
 - termit
 - alacritty
 - konsole
 - gnome-terminal
 - xterm
 - urxvt
 - kitty
 - terminator etc.
- Linux commands are *case-sensitive*.
- The terminal can be used to accomplish all administrative tasks. This includes:
 - Package Installation
 - File editing
 - File manipulation
 - User and group management and many other things

General Commands

I'm going to give some screenshots of general commands (acc. to the syllabus). These commands are:

- **date** - displays the current system date and time
- **cal** - display calendar of a specific month or a whole year
- **clear** - used to clear the terminal
- **who** - displays the information about all currently logged in user on the system
- **whoami** - display the username of current user
- **exit** - exits the shell/terminal
- **history** - displays the previously executed commands
- **bc** - start command line calculator
- **alias** - used to give user defined name to a command or sequence of commands
- **shutdown** - used to shutdown the system
- **reboot** - restart or reboot the system
- **banner** - prints string in large ascii character set

File Related Commands

- **mkdir** - used to create directory/ies
- **rmdir** - used to remove blank directory
- **cat** - display content of file, also used to overwrite or append content of file
- **ls** - used to list files and directory/ies
- **rm** - used to remove files from system
- **pwd** - prints current working directory
- **find** - finds different types of files and directories in system
- **gzip** - compresses file/s in .gz format
- **gunzip** - uncompress the .gz format
- **wc** - used to count letters, words and line from file or stdin
- **cd** - used to change directory
- **mv** - used to move files/directories, same as cut in windows

Here, are few screenshots of the above mentioned commands:

raytracer ~/.cache/temp

master M date

Sun 17 May 2020 09:33:30 AM IST

raytracer ~/.cache/temp

master M cal

May 2020

Su	Mo	Tu	We	Th	Fr	Sa
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31						

raytracer ~/.cache/temp

master M cal 5 2020

May 2020

Su	Mo	Tu	We	Th	Fr	Sa
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31						

raytracer ~/.cache/temp

master M

raytracer ~/.cache/temp

master M cal 2020

NORM

January							February							March						
Su	Mo	Tu	We	Th	Fr	Sa	Su	Mo	Tu	We	Th	Fr	Sa	Su	Mo	Tu	We	Th	Fr	Sa
			1	2	3	4						1		1	2	3	4	5	6	7
5	6	7	8	9	10	11	2	3	4	5	6	7	8	8	9	10	11	12	13	14
12	13	14	15	16	17	18	9	10	11	12	13	14	15	15	16	17	18	19	20	21
19	20	21	22	23	24	25	16	17	18	19	20	21	22	22	23	24	25	26	27	28
26	27	28	29	30	31		23	24	25	26	27	28	29	29	30	31				

April							May							June						
Su	Mo	Tu	We	Th	Fr	Sa	Su	Mo	Tu	We	Th	Fr	Sa	Su	Mo	Tu	We	Th	Fr	Sa
			1	2	3	4						1	2	1	2	3	4	5	6	
5	6	7	8	9	10	11	3	4	5	6	7	8	9	7	8	9	10	11	12	13
12	13	14	15	16	17	18	10	11	12	13	14	15	16	14	15	16	17	18	19	20
19	20	21	22	23	24	25	17	18	19	20	21	22	23	21	22	23	24	25	26	27
26	27	28	29	30			24	25	26	27	28	29	30	28	29	30				
							31													

July							August							September						
Su	Mo	Tu	We	Th	Fr	Sa	Su	Mo	Tu	We	Th	Fr	Sa	Su	Mo	Tu	We	Th	Fr	Sa
			1	2	3	4						1		1	2	3	4	5		
5	6	7	8	9	10	11	2	3	4	5	6	7	8	6	7	8	9	10	11	12
12	13	14	15	16	17	18	9	10	11	12	13	14	15	13	14	15	16	17	18	19
19	20	21	22	23	24	25	16	17	18	19	20	21	22	20	21	22	23	24	25	26
26	27	28	29	30	31		23	24	25	26	27	28	29	27	28	29	30			
							30	31												

October							November							December						
Su	Mo	Tu	We	Th	Fr	Sa	Su	Mo	Tu	We	Th	Fr	Sa	Su	Mo	Tu	We	Th	Fr	Sa
			1	2	3							1	2	1	2	3	4	5		
4	5	6	7	8	9	10	8	9	10	11	12	13	14	6	7	8	9	10	11	12
11	12	13	14	15	16	17	15	16	17	18	19	20	21	13	14	15	16	17	18	19
18	19	20	21	22	23	24	22	23	24	25	26	27	28	20	21	22	23	24	25	26
25	26	27	28	29	30	31	29	30						27	28	29	30	31		

```

raytracer ~/.cache/temp  1 master M  who                                INS
raytracer tty7            2020-05-16 09:36 (:0)
raytracer ~/.cache/temp  1 master M  whoami                            INS
raytracer
raytracer ~/.cache/temp  1 master M  history | head                    INS
4997 bspc node -t \~fullscreen
4998 v /home/raytracer/.config/sxhkd/sxhkdrc
5000 ranger
5009 pandoc -V geometry:margin=1in -o os_assign.pdf os_assign.md
5010 zathura os_assign.pdf
5012 who am i
5016 fg
5017 ~/.cache/temp
5018 date
5019 cal
raytracer ~/.cache/temp  1 master M  bc                                INS
bc 1.07.1
Copyright 1991-1994, 1997, 1998, 2000, 2004, 2006, 2008, 2012-2017 Free Software Foundation, Inc.
This is free software with ABSOLUTELY NO WARRANTY.
For details type `warranty'.
quit
raytracer ~/.cache/temp  1 master M  please                            INS

This is why nobody likes you.

zsh: command not found: please
zsh: exit 127  please
raytracer ~/.cache/temp  1 master M  alias please=pwd                  127 INS
raytracer ~/.cache/temp  1 master M  please                            INS
/home/raytracer/.cache/temp
raytracer ~/.cache/temp  1 master M  []                                INS

```

```

raytracer ~/.cache/temp  1 master M  banner linux                      INS

**
*   *
*
*   **   * * * *   *   *   *
*   *   **   *   *   *   *   *
*   *   *   *   *   *   *   **
*   *   *   *   *   *   **
*   *   *   *   *   **   *   *
***** ***** *   *   * * * *

```

```

raytracer ~/.cache/temp  1 master M  mkdir A                            INS
raytracer ~/.cache/temp  1 master M  mkdir X Y Z                        INS
raytracer ~/.cache/temp  1 master M  ls | grep /                        INS
A/
assignment-march2020/
learn_awk/
wd_hw/
X/
Y/
Z/
raytracer ~/.cache/temp  1 master M  mkdir -p D/E/F                    INS
raytracer ~/.cache/temp  1 master M  ls -r                              INS
Z/          ques7.py          hello.download.png
V/          python_ictiitk.html hello.download-removebg-preview.png
X/          play_url.txt      hello.blurred.png
wd_hw/      msu               hello.587508.png
learn_awk/  ls_usr_bin.txt    hello.2020-04-13-063935_1134x302_scrot.png
D/          list_pack1.txt    hello.6n7h9uS.png*
assignment-march2020/ list_pack.txt getcolor.txt
A/          john-abraham_5461341.jpg first.md

```

```

raytracer ~/.cache/temp  master M  ls -R D  INS
E/

D/E:
F/

D/E/F:
raytracer ~/.cache/temp  master M  cat "hello" > abc.txt  INS
cat: hello: No such file or directory
zsh: exit 1  cat "hello" > abc.txt
raytracer ~/.cache/temp  master M  touch abc.txt  1 INS
raytracer ~/.cache/temp  master M  cat "hello" > abc.txt  1 INS
cat: hello: No such file or directory
zsh: exit 1  cat "hello" > abc.txt
raytracer ~/.cache/temp  master M  cat > abc.txt  1 INS
raytracer ~/.cache/temp  master M  cat > abc.txt  1 INS
Hey, this is linux
^C
zsh: interrupt cat > abc.txt
raytracer ~/.cache/temp  master M  cat abc.txt  130 INS
Hey, this is linux
raytracer ~/.cache/temp  master M  cat >> abc.txt  INS
Name of the shell is zsh.
raytracer ~/.cache/temp  master M  cat abc.txt  NORM
Hey, this is linux
Name of the shell is zsh.
raytracer ~/.cache/temp  master M  cat > abc.txt  INS
I'm abhay
raytracer ~/.cache/temp  master M  cat abc.txt  NORM
I'm abhay
raytracer ~/.cache/temp  master M  1 INS

```

```

raytracer ~/.cache/temp  master M  find _ -type d -iname 'D'
./D
raytracer ~/.cache/temp  master M  find ~/Documents/nhtml -type f -iname '*html*' | head
/home/raytracer/Documents/nhtml/multiple_file3.html
/home/raytracer/Documents/nhtml/multiple_file.html
/home/raytracer/Documents/nhtml/first.html
/home/raytracer/Documents/nhtml/live_class/id-selector.html
/home/raytracer/Documents/nhtml/live_class/2020-05-11(1).html
/home/raytracer/Documents/nhtml/live_class/2020-05-14(2).html
/home/raytracer/Documents/nhtml/live_class/loop_js.html
/home/raytracer/Documents/nhtml/live_class/2020-05-07.html
/home/raytracer/Documents/nhtml/live_class/2020-05-04.html
/home/raytracer/Documents/nhtml/live_class/2020-04-30.html
zsh: broken pipe find ~/Documents/nhtml -type f -iname '*html*' |
zsh: done head
raytracer ~/.cache/temp  master M  find ~/Documents/nhtml -type f -iname '*html*' | wc -l
96

```

```

raytracer ~/.cache/temp  master M  gzip -N a.out  INS
raytracer ~/.cache/temp  master M  ls | grep gz  INS
a.out.gz*
raytracer ~/.cache/temp  master M  gzip -d a.out.gz  INS
raytracer ~/.cache/temp  master M  ls | grep .out  INS
a.out*
raytracer ~/.cache/temp  master M  cd D  INS
E/
raytracer ~/.cache/temp/D  master M  cd E  INS
F/
raytracer ~/.cache/temp/D/E  master M  cd ../..  INS
A/
assignment-march2020/  first.md  info.txt  Untitled-1.yaml
D/  getcolor.txt  john-abraham__546134.jpg*  wificard_info.txt
D/  hello.6n7h9uS.png*  john-abraham__5461341.jpg  x.sh*
learn-awk/  hello.2020-04-13-063935_1134x302_sctrot.png  list_pack.txt  y.sh*
wd_hw/  hello.587508.png  list_pack1.txt
X/  hello.blurred.png  ls_usr_bin.txt
Y/  hello.download-removebg-preview.png  msu
Z/  hello.download.png  play_url.txt
3+calc.sh  hello.images-removebg-preview.png  python_ictiitk.html
671965.jpg*  hello.images.png  ques7.py
a.out*  hello.john-abraham-wallpapers-hd-67491-9249295.png*  ques11.py
character_counting.c  hello.lock-xxl.png  send_to_ayush.txt
compiler.sh*  hello.lock2-removebg-preview.png  shcheck.sh*
cssassignment.zip  hello.lock2.png  st-copyurl-20190202-3be4cf1.diff
diff_cron_norm_env.txt  hello.new_image.png  test.rb
equal_stack_hackerrank.c  hello.wallpaper.png  trial*
fact.py*  hello.yellow-and-gray-padlock-vector-art-png-clip-art.png  trial.c
raytracer ~/.cache/temp  master M  cd D/E  INS
F/
raytracer ~/.cache/temp/D/E  master M  cd ~  INS
Documents/ Downloads/ go/ Music/ Pictures/ R/ Templates/ Videos/ vimwiki/ yay/ canyonbottom README.md
raytracer ~  master M ?? 1 INS

```

```

raytracer ~ ↳ master M ?? cd -
~/.cache/temp/D/E
F/
raytracer ~/.cache/temp/D/E ↳ master M mv F ../
raytracer ~/.cache/temp/D/E ↳ master M ls
raytracer ~/.cache/temp/D/E ↳ master M ..
E/ F/
raytracer ~/.cache/temp/D ↳ master M █

```

There are several arguments, options and flags in almost every linux command. To know more you can do:

```

find(1)
FIND(1)                                     General Commands Manual                                     FIND(1)

NAME
    find - search for files in a directory hierarchy

SYNOPSIS
    find [-H] [-L] [-P] [-D debugopts] [-Olevel] [starting-point...] [expression]

DESCRIPTION
    This manual page documents the GNU version of find. GNU find searches the directory tree rooted at each given starting-point by evaluating the given expression from left to right, according to the rules of precedence (see section OPERATORS), until the outcome is known (the left hand side is false for and operations, true for or), at which point find moves on to the next file name. If no starting-point is specified, '.' is assumed.

    If you are using find in an environment where security is important (for example if you are using it to search directories that are writable by other users), you should read the 'Security Considerations' chapter of the findutils documentation, which is called Finding Files and comes with findutils. That document also includes a lot more detail and discussion than this manual page, so you may find it a more useful source of information.

OPTIONS
    The -H, -L and -P options control the treatment of symbolic links. Command-line arguments following these are taken to be names of files or directories to be examined, up to the first argument that begins with '-', or the argument '(' or '!'. That argument and any following arguments are taken to be the expression describing what is to be searched for. If no paths are given, the current directory is used. If no expression is given, the expression -print is used (but you should probably consider using -print0 instead, anyway).

    This manual page talks about 'options' within the expression list. These options control the behaviour of find but are specified immediately after the last path name. The five 'real' options -H, -L, -P, -D and -O must appear before the first path name, if at all. A double dash -- can also be used to signal that any remaining arguments are not options (though ensuring that all start points begin with either './' or '/' is generally safer if you use wildcards in the list of start points).

NORM [1] ↳ master man://find(1) [-] █ [man] 0 32:0x20 1% ↳ 13:1132 {1}

```

```

$ man find # this will give manual of find command
$ man man # manual of man command

```


Implementing Shell Scripting on Linux

Need of Shell Scripting

Sometimes, we want to execute a bunch of commands routinely, so we have to type in all commands each time in terminal. As shell can also take commands as input from file we can write commands in a file and can execute them in shell to avoid this repetitive work.

Introduction

- Shell scripts are also known as **Shell Programs** or **Shell Procedures**.
- Shell script file means, a file contains a set of commands within it. If any file contains commands, then it can be used as executable file (after making executable.)
- Shell scripts are similar to the **"batch file"** in windows environment.
- It can be useful to execute the set of commands at a single moment of time, we will get our required outputs and those can also be saved under a file.
- Executing commands separately will consume more time, using shell scripts we can reduce this time to greater extent.
- Shell scripts can also take arguments, which are known as command line arguments.

Steps to execute shell scripts

- Write a shell script in a file in your editor and save it.
- It isn't necessary to save file with **.sh** extension, because in linux every these files can be identified as scripts with there shebang.

```
#!/usr/bin/env sh
```

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

- Add an executable permission to the script file

```
$ chmod u+rx file1.sh
```

```
$ chmod +x file2.sh
```

```
$ chmod 754 file3.sh
```

- Execute the file with in your shell environment

```
$ ./file2.sh
```

```
$ dash file.sh
```

```
$ sh file3.sh
```

Types of Shell Scripts

1. Static Scripts(Non-Interactive Scripts)
2. Dynamic Scripts(Interactive Shell Scripts)

Static Scripts

It does not require any input from the user once the execution has started

Program-1: Write a static script using the cat command to execute the following commands- **ls**, **date**, **cal**, **who**

```
$ cat > script1.sh
```

```
ls
```

```
date
```

```
cal
```

```
who # press ctrl-d
```

```
$
```

```
$ chmod u+x script1.sh
```

```

$ ./script1.sh
os_assign.html
os_assign.md
os_assignment.aux
os_assignment.fdb_latexmk
os_assignment.flx
os_assignment.lof
os_assignment.log
os_assignment.lot
os_assignment.md
os_assignment.pdf
os_assignment.tex
os_assignment.toc
os_assign.pdf
oslab_images
Sun 17 May 2020 11:16:10 AM IST
    May 2020
Su Mo Tu We Th Fr Sa
           1  2
 3  4  5  6  7  8  9
10 11 12 13 14 15 16
17 18 19 20 21 22 23
24 25 26 27 28 29 30
31
raytracer tty7          2020-05-16 09:36 (:0)
$

```

Program-2:: Write a static script using the cat command to execute the following commands- `ls`, `date`, `cal`, `whoami` along with separator and appropriate messages

```

$ cat > script2.sh
echo "-----"
ls
echo "-----"
echo "The date is $(date)"
echo "-----"
cal
echo "-----"
printf "%s" "I'm $(whoami)"
echo "-----"
$
$ chmod 754 script2.sh
$ ./script2.sh
-----
bullet_style.tex
chap_breaks.tex
listings_setup.tex
os_assign.md
oslab_images
pdf_property.tex
-----
The date is Sun 17 May 2020 01:33:39 PM IST
-----
    May 2020
Su Mo Tu We Th Fr Sa
           1  2
 3  4  5  6  7  8  9
10 11 12 13 14 15 16
17 18 19 20 21 22 23
24 25 26 27 28 29 30
31
-----

```

raytracer

Student Task: Write a static script using cat command to execute the following commands- whoami, cal 2020, banner <Your Name> with appropriate titles

whoami done above

```
$ cat > student1.sh
echo "Calender of this year"
cal
echo "My name is: "
banner Abhay
figlet -f /usr/share/figlet/fonts/3D\ Diagonal.flf 'Abhay'
$
$ chmod +x student1.sh
$ ./student1.sh
Calender of this year
```

2020

January							February							March						
Su	Mo	Tu	We	Th	Fr	Sa	Su	Mo	Tu	We	Th	Fr	Sa	Su	Mo	Tu	We	Th	Fr	Sa
			1	2	3	4							1	1	2	3	4	5	6	7
5	6	7	8	9	10	11	2	3	4	5	6	7	8	8	9	10	11	12	13	14
12	13	14	15	16	17	18	9	10	11	12	13	14	15	15	16	17	18	19	20	21
19	20	21	22	23	24	25	16	17	18	19	20	21	22	22	23	24	25	26	27	28
26	27	28	29	30	31		23	24	25	26	27	28	29	29	30	31				

April							May							June						
Su	Mo	Tu	We	Th	Fr	Sa	Su	Mo	Tu	We	Th	Fr	Sa	Su	Mo	Tu	We	Th	Fr	Sa
			1	2	3	4						1	2		1	2	3	4	5	6
5	6	7	8	9	10	11	3	4	5	6	7	8	9	7	8	9	10	11	12	13
12	13	14	15	16	17	18	10	11	12	13	14	15	16	14	15	16	17	18	19	20
19	20	21	22	23	24	25	17	18	19	20	21	22	23	21	22	23	24	25	26	27
26	27	28	29	30			24	25	26	27	28	29	30	28	29	30				

July							August							September						
Su	Mo	Tu	We	Th	Fr	Sa	Su	Mo	Tu	We	Th	Fr	Sa	Su	Mo	Tu	We	Th	Fr	Sa
			1	2	3	4							1			1	2	3	4	5
5	6	7	8	9	10	11	2	3	4	5	6	7	8	6	7	8	9	10	11	12
12	13	14	15	16	17	18	9	10	11	12	13	14	15	13	14	15	16	17	18	19
19	20	21	22	23	24	25	16	17	18	19	20	21	22	20	21	22	23	24	25	26
26	27	28	29	30	31		23	24	25	26	27	28	29	27	28	29	30			

October							November							December						
Su	Mo	Tu	We	Th	Fr	Sa	Su	Mo	Tu	We	Th	Fr	Sa	Su	Mo	Tu	We	Th	Fr	Sa
				1	2	3	1	2	3	4	5	6	7			1	2	3	4	5
4	5	6	7	8	9	10	8	9	10	11	12	13	14	6	7	8	9	10	11	12
11	12	13	14	15	16	17	15	16	17	18	19	20	21	13	14	15	16	17	18	19
18	19	20	21	22	23	24	22	23	24	25	26	27	28	20	21	22	23	24	25	26
25	26	27	28	29	30	31	29	30						27	28	29	30	31		

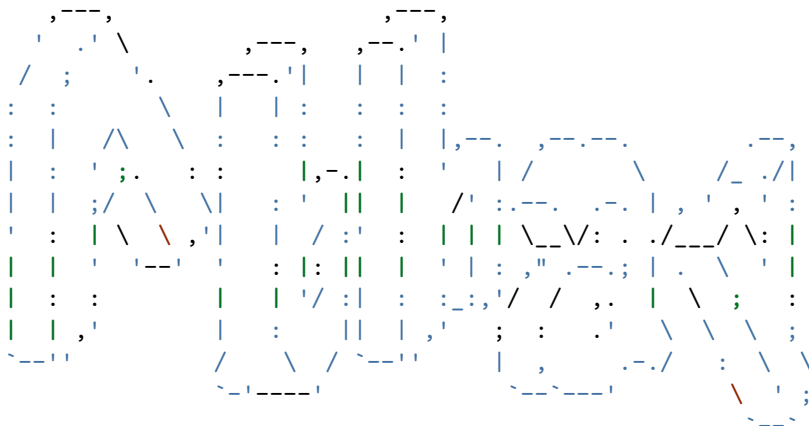
My name is:

```
  **      *      *
*  *      *      *
*  *      *      *
*  *  *  *  *  *  *  *  *  *
*  *  *  *  *  *  *  *  *  *
***** *  *  *  *  *  *  *  *
*  *  *  *  *  *  *  *  *  *
*  *  *  *  *  *  *  *  *  *
*  *  *  *  *  *  *  *  *  *
```

```

*      *
****

```



Dynamic Script

It requires input from the user once the execution has started

Program-3: Write a dynamic script to find list of the files or directories from a given directory

```

cat > give_list.sh
# taking path
echo "list of the files/directories are:"
echo
ls "$1"
$
$ chmod +x give_list.sh
$ ./give_list.sh "$HOME"
list of the files/directories are:

```

```

canyonbottom
Documents
Downloads
go
Music
Pictures
R
README.md
Templates
Videos
vimwiki
yay
$

```

Student Task Write a dynamic script to take month number and year number and display it's cal

```

$ cat > show_cal.sh
echo "Enter month and year"
read month
read year
cal "${month}" "${year}"
$
$ chmod u+x show_cal.sh
$ ./show_cal.sh
Enter month and year
12
2004
December 2004

```

```

Su Mo Tu We Th Fr Sa
          1  2  3  4
 5  6  7  8  9 10 11
12 13 14 15 16 17 18
19 20 21 22 23 24 25
26 27 28 29 30 31
$

```

Program-4: Write a dynamic script to arithmetic calculations of given values

```

$ cat > calculation.sh
echo "Enter two numbers"
read -r fnum
read -r snum
echo "You entered:"
printf "%s\n%s\n" "first num: ${fnum}" "second num: ${snum}"
printf "Addition: %s\n" $(( fnum + snum ))
printf "Substraction: %s\n" $(( fnum - snum ))
printf "Multiplication: %s\n" $(( fnum * snum ))
printf "Division: %s\n" $(( fnum / snum ))
printf "Remainder: %s\n" $(( fnum % snum ))
$
$ chmod 740 calculation.sh
$ ./calculation.sh
Enter two numbers
5
4
You entered:
first num: 5
second num: 4
Addition: 9
Substraction: 1
Multiplication: 20
Division: 1
Remainder: 1

```

Program-5: Write a dynamic script to compare whether the two strings are equal or not

```

$ cat compare.sh
echo "Enter 2 names"
read fname
read sname
echo "You entered:"
printf "%s\n%s\n" "first name: ${fname}" "second name: ${sname}"
echo "String comparision result is: `expr $fname = $sname`"
$
$ chmod u+x compare.sh
$ ./compare.sh
Enter 2 names
Ram
Shyam
You entered:
first name: Ram
second name: Shyam
String comparision result is:0

```