

Cloud Computing Lab

**B. Tech (COMPUTER ENGINEERING)
Semester - VII**

Laboratory Manual



**Department of Computer Engineering
R. C. Patel Institute of Technology, Shirpur**

VISION&MISSION

Institute

Vision:

- To achieve excellence in engineering education with strong ethical values.

Mission:

To impart high quality Technical Education through:

- Innovative and Interactive learning process and high quality instructional programs.
- Fostering a scientific temper among students by means of a liaison with the Academia, Industries and Government.
- Preparing students from diverse backgrounds to have attitude for research and spirit of Professionalism.
- Inculcating in students a respect for fellow human beings and responsibility towards the society.

Computer Engineering Department

Vision:

- To provide prominent computer engineering education with socio-moral values.

Mission:

- To groom students to become professionally and ethically sound computer engineers to meet the growing needs of industry and society.



The Shirpur Education Society's

R. C. Patel Institute of Technology, Shirpur

CERTIFICATE

*This is to certify that Mr. / Miss. _____ of
Third Year Computer Engineering, Roll No. _____ has performed practical
work satisfactorily in the subject Computer Networks Lab, in the
Department of Computer Engineering during the academic year 2019-
2020.*

Date: / /2020

Subject Incharge

Place: Shirpur

Principal

Head of Department

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Laboratory Report

Experiment No - 1

Batch -

Date of Experiment: _____

Date of Submission: _____

Title: Demonstrate the use of map and reduce tasks

Evaluation

1) Attendance [2] -----

2) Lab Performance [2] -----

3) Oral [1] -----

Overall Marks [5] -----

Subject Incharge

Experiment No. 1

TITLE: Sketch out and analyze architecture of Moodle cloud portal and Moodle cloud site and create different entities dynamically

PREREQUISITE: Operating Systems

THEORY:

Introduction

Moodle recently announced a new, free Learning Management System (LMS) that offers easy setup. It's a great introduction to their open source LMS software.

The Free Moodle Cloud Overview:

- Not everyone is tech savvy and wants and easy way to create an LMS
- While many pieces of Moodle are easy, installing software on a server, managing it, upgrades and maintenance aren't for everyone
- This is geared towards small schools, companies or entrepreneurs that have small courses with a small audience with no budget
- They update the software for you to the latest version which allows all the safety security patches, features and flexibility available
- It's responsive out of the box
- It includes a free version of BigBlueButton their solution for full online conferencing, including video, audio, whiteboards and desktop sharing.

What Moodle Cloud Includes:

- 50 users maximum
- 200Mb disk space
- But, you can host your large files with Dropbox, Google Drive, iCloud or others
- You can host your videos with Youtube and it will automatically embed
- Core themes and plugins only
- One site per phone number
- In MoodleCloud the free BigBlueButton sessions are limited to 6 people, with no recordings, but we hope you'll find this perfect for small classes and even study groups. You can add a conferencing session to your course just like any other class activity.
- There are ads in the footer

moodle cloud - Google Search

Google

moodle cloud

All Books Images News Videos More Settings Tools

About 74,60,000 results (0.44 seconds)

[moodlecloud.com](#) MoodleCloud - Moodle hosting from the people that make ...
MoodleCloud - the cloud-hosted solution for your learning environment from the people that make Moodle. Free. Get it in minutes, keep it forever.

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People also ask

What is Moodle cloud?
Is Moodle cloud free?

Type here to search

17:39 ENG 01/09/2020

My new Moodle site

moodlecloud.com

Apps Gmail YouTube Maps

moodleCloud

Features Pricing Support Service Status

Login or Sign up

Moodle hosting from the people that make Moodle

Your learning environment with the world's leading open source learning platform Moodle, hosted in the cloud.

Get started for Free!

MoodleCloud is for...

Educators, trainers or anyone who needs an online learning environment to teach a class or facilitate learning in any situation.

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Type here to search

17:21 ENG 01/09/2020

The screenshot shows the MoodleCloud pricing page. At the top, there's a navigation bar with links for Features, Pricing, Support, Service Status, Portal, Account, and Logout. Below the navigation is a heading "Choose a plan that's right for you". A comparison chart follows, divided into three main sections: "Free Trial" (ideal for a single class), "Starter" (ideal for multiple classes), and "Moodle for School" (with Mini, Small, and Medium options). The chart includes columns for Annual price in AUD*, Max users, Max file storage, Latest Moodle version, Unlimited courses and activities, and Personalised site name. Buttons for "Get Started", "Sign up", and "Continue" are also present.

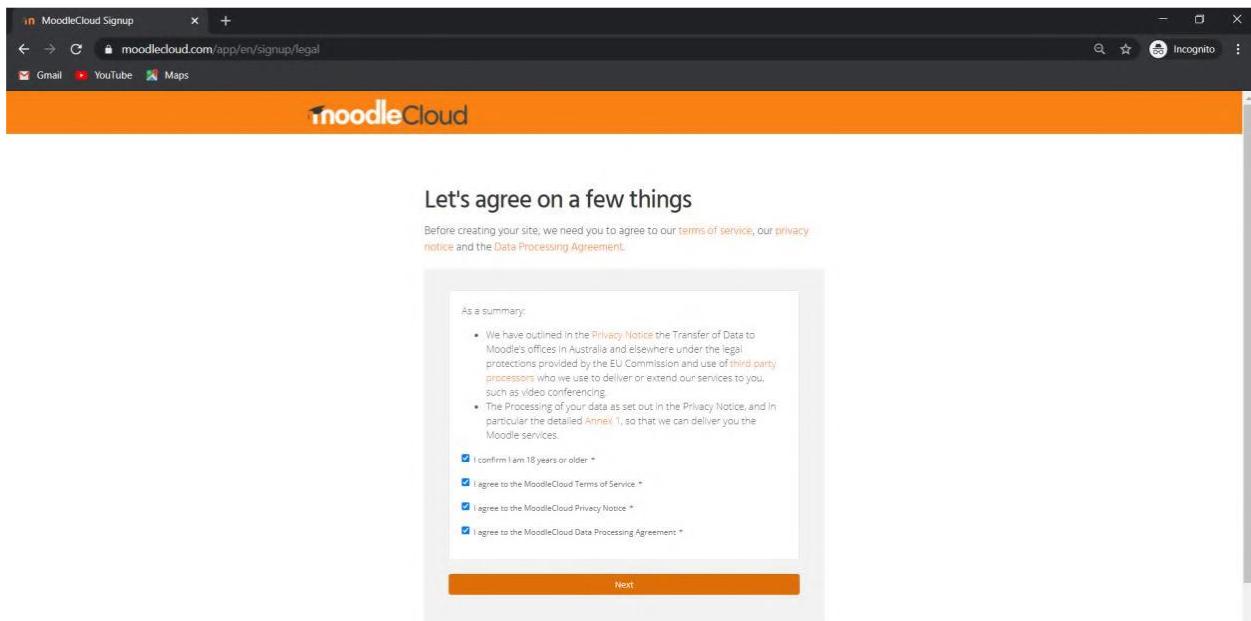
	Free Trial	Starter	Moodle for School		
Annual price in AUD*	\$0	\$80/year	\$250/year	\$500/year	\$1,000/year
Max users	200	50	100	200	500
Max file storage	400 MB	200 MB	200 MB	400 MB	1 GB
Latest Moodle version	✓	✓	✓	✓	✓
Unlimited courses and activities	✓	✓	✓	✓	✓
Personalised site name	✓	✓	✓	✓	✓

We use cookies to ensure you get the best experience on our website. Continue Learn more

The screenshot shows the MoodleCloud Signup page. It features three main sections: "New to Moodle?", "Ready to get started?", and "Already have an account?".

- New to Moodle?**: Encourages users to take a sneak peek at the live demo site. It includes a "Take me to the live demo" button.
- Ready to get started?**: Invites users to build their own MoodleCloud site with a "Create a new account" button.
- Already have an account?**: Provides a "Log in" button for existing users.

We use cookies to ensure you get the best experience on our website. Continue Learn more



Let's agree on a few things

Before creating your site, we need you to agree to our [terms of service](#), our [privacy notice](#) and the [Data Processing Agreement](#).

As a summary:

- We have outlined in the [Privacy Notice](#) the Transfer of Data to Moodle's offices in Australia and elsewhere under the legal protections provided by the EU Commission and use of [third party processors](#) who we use to deliver or extend our services to you.
- Such as video conferencing
- The Processing of your data as set out in the [Privacy Notice](#), and in particular the detailed [Annex 1](#), so that we can deliver you the Moodle services.

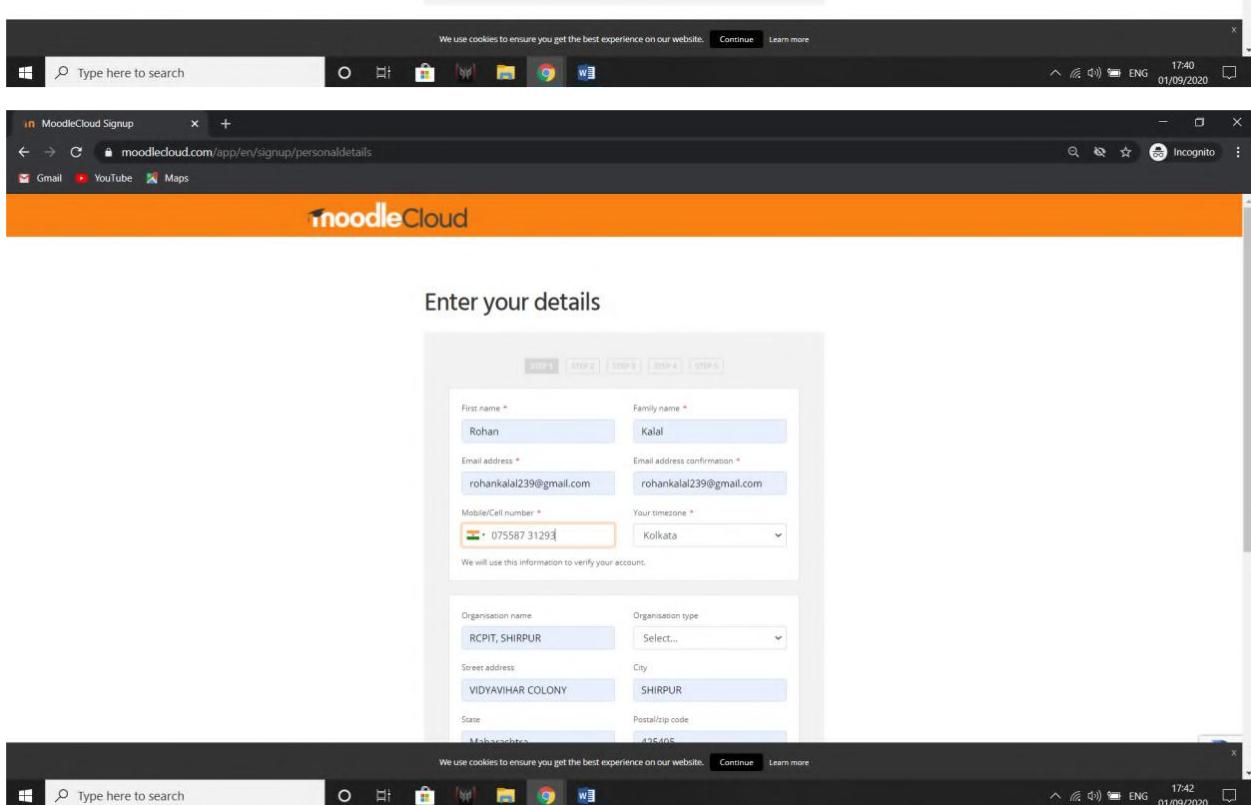
I confirm I am 18 years or older. *

I agree to the MoodleCloud Terms of Service. *

I agree to the MoodleCloud Privacy Notice *

I agree to the MoodleCloud Data Processing Agreement. *

Next

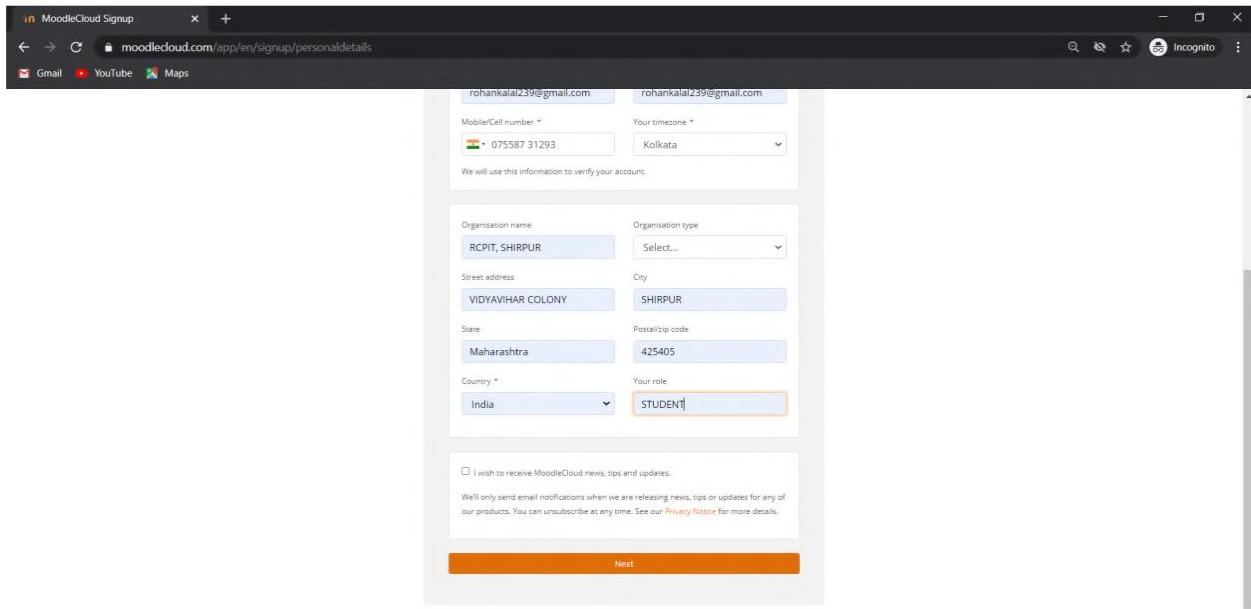


Enter your details

STEP 1 STEP 2 STEP 3 STEP 4 STEP 5

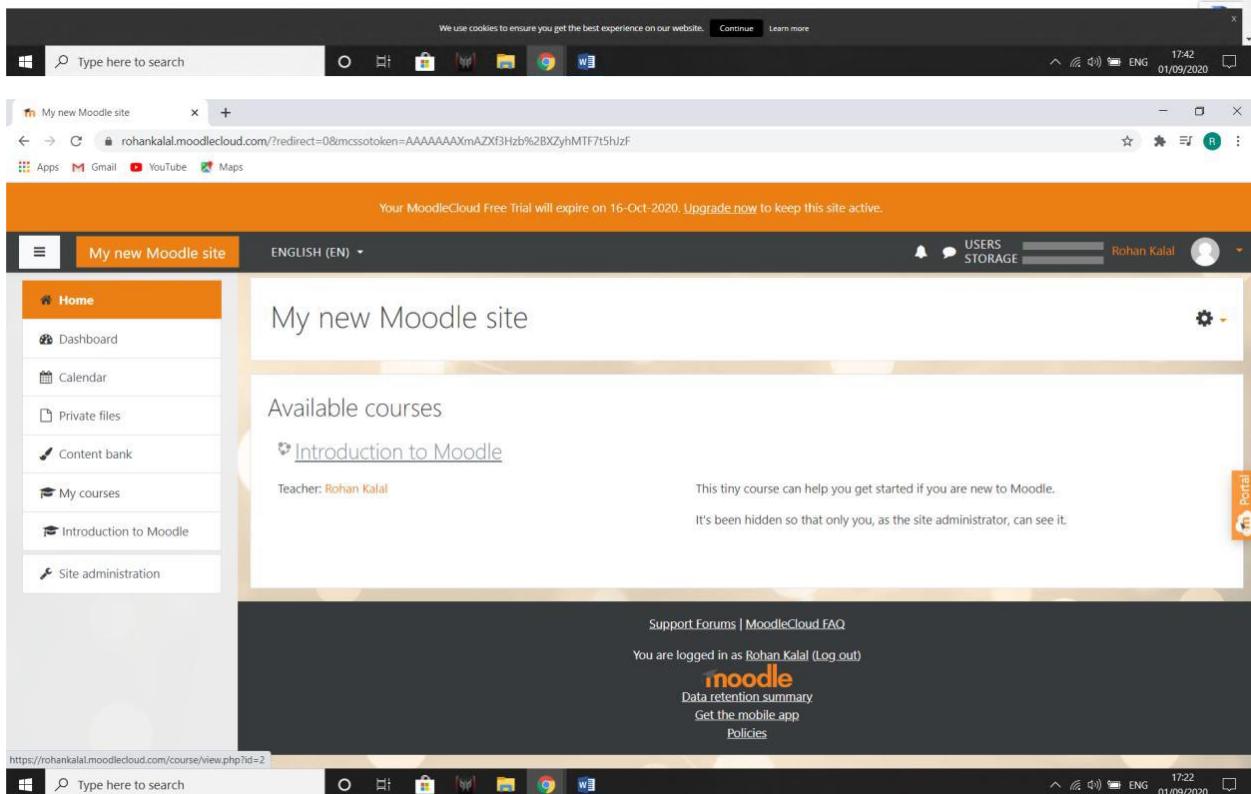
First name *	Family name *
Rohan	Kalal
Email address *	Email address confirmation *
rohankalal239@gmail.com	rohankalal239@gmail.com
Mobile/Cell number *	Your timezone *
075567 31293	Kolkata
We will use this information to verify your account.	
Organisation name	Organisation type
RCPIIT, SHIRPUR	Select...
Street address	City
VIDYAVIHAR COLONY	SHIRPUR
State	Postal/zip code
Maharashtra	415405

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The screenshot shows the 'MoodleCloud Signup' page. The URL is moodlecloud.com/app/en/signup/personaldetails. The form fields include:

- Email: rohankalal239@gmail.com
- Mobile/Cell number: 075587 31293
- Your timezone: Kolkata
- Organisation name: RCPI, SHIRPUR
- Organisation type: Select...
- Street address: VIDYAVIHAR COLONY
- City: SHIRPUR
- State: Maharashtra
- Postal/zip code: 425405
- Country: India
- Your role: STUDENT
- A checkbox for receiving news, tips, and updates is unchecked.
- A note states: "We'll only send email notifications when we are releasing news, tips or updates for any of our products. You can unsubscribe at any time. See our [Privacy Notice](#) for more details."
- A large orange 'Next' button is at the bottom.

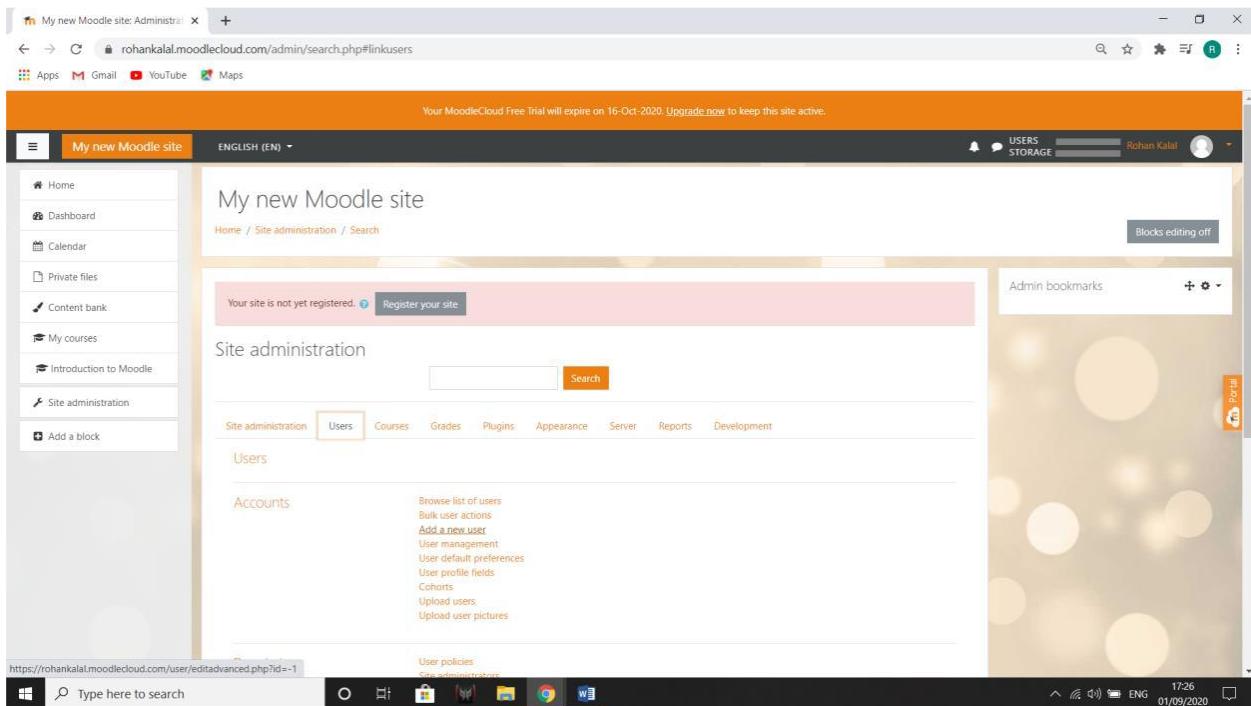


The screenshot shows the 'My new Moodle site' dashboard. The URL is rohankalal.moodlecloud.com/. The page displays:

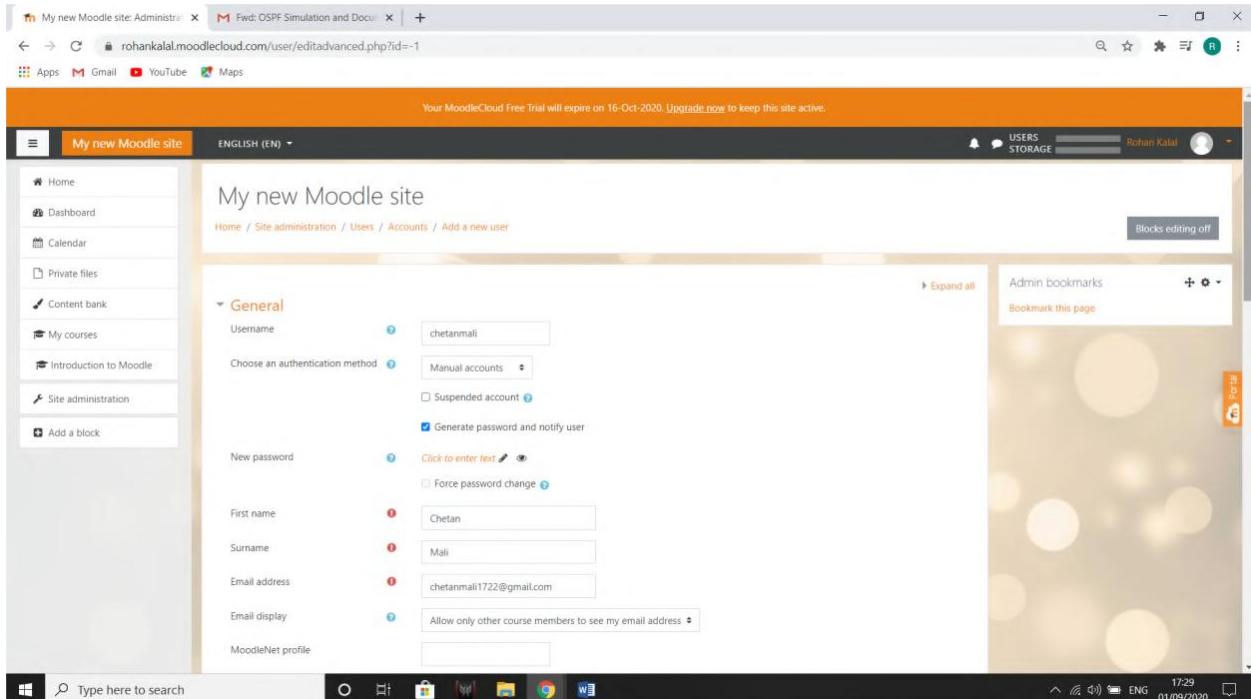
- A message: "Your MoodleCloud Free Trial will expire on 16-Oct-2020. Upgrade now to keep this site active."
- The title: "My new Moodle site"
- The sidebar menu includes: Home, Dashboard, Calendar, Private files, Content bank, My courses, Introduction to Moodle, and Site administration.
- The main content area shows "Available courses" with one listed: "Introduction to Moodle" by "Rohan Kalal". It says: "This tiny course can help you get started if you are new to Moodle. It's been hidden so that only you, as the site administrator, can see it."
- Footer links: Support Forums, MoodleCloud FAQ, You are logged in as Rohan Kalal (Log out), moodle logo, Data retention summary, Get the mobile app, Policies.
- The status bar at the bottom shows the URL: <https://rohankalal.moodlecloud.com/course/view.php?id=2>.

This screenshot shows the Moodle homepage titled "My new Moodle site". The left sidebar contains links for Home, Dashboard, Calendar, Private files, Content bank, My courses, Introduction to Moodle, and Site administration. The main content area displays "Available courses" with one course listed: "Cloud Computing L" by Rohan Kalal. Below the course listing, there is a brief description: "This tiny course can help you get started if you are new to Moodle. It's been hidden so that only you, as the site administrator, can see it." At the bottom of the page, there are links for Support Forums, MoodleCloud FAQ, and user information (You are logged in as Rohan Kalal). The status bar at the bottom shows system icons and the date/time: 01/09/2020, 17:25.

This screenshot shows the "Cloud Computing L" course page. The left sidebar lists course modules: Participants, Badges, Competencies, Grades, General, Topic 1, Topic 2, Topic 3, Topic 4, Home, Dashboard, Calendar, Private files, Content bank, and My courses. The main content area shows the course title "Cloud Computing L" and the navigation path "Home / Courses / CCL". Below the title, there is an "Announcements" section. The course structure is outlined under "Topic 1" as "Topic 2", "Topic 3", and "Topic 4". At the bottom of the page, there are links for Moodle Docs, Support Forums, and MoodleCloud FAQ. The status bar at the bottom shows system icons and the date/time: 01/09/2020, 17:25.



The screenshot shows a web browser window for 'My new Moodle site' at rohankalal.moodlecloud.com/admin/search.php?linkusers. The title bar indicates it's an administrator session. The main content area is titled 'Site administration' under 'Users'. A sub-menu 'Accounts' is open, showing options like 'Browse list of users', 'Add a new user', and 'User management'. A pink banner at the top left says 'Your site is not yet registered.' with a link to 'Register your site'. The top right shows user information for 'Rohan Kalal'.



The second screenshot shows the same browser window now on the 'Add a new user' page. The URL is <https://rohankalal.moodlecloud.com/user/editadvanced.php?id=-1>. The form fields include 'Username' (chetanmali), 'Choose an authentication method' (set to 'Manual accounts'), 'New password' (clickable text field), 'First name' (Chetan), 'Surname' (Mali), 'Email address' (chetanmali1722@gmail.com), and 'Email display' (checkbox for 'Allow only other course members to see my email address'). The top right still shows 'Rohan Kalal'.

First name / Surname	Email address	City/town	Country	Last access	Edit
Chetan Mali	chetanmali1722@gmail.com	Shirpur	India	Never	
Ganesh Desale	ganeshdesale789@gmail.com	Shirpur	India	Never	
Jaydip Nere	jaydpnere.123@gmail.com	Shirpur	India	Never	
Nitin Kulreja	nkukreja25@gmail.com	Shirpur	India	Never	
Rohan Kalal	rohankalal239@gmail.com	Shirpur	India	49 secs	
Shruti More	moreshruti132@gmail.com	Shirpur	India	Never	
Vinay Vaidya	realvinay31099@gmail.com	Shirpur	India	Never	

First name / Surname	Email address	City/town	Country	Last access	Edit
Chetan Mali	chetanmali1722@gmail.com	Shirpur	India	13 mins 21 secs	
Ganesh Desale	ganeshdesale789@gmail.com	Shirpur	India	Never	
Jaydip Nere	jaydpnere.123@gmail.com	Shirpur	India	Never	
Nitin Kulreja	nkukreja25@gmail.com	Shirpur	India	Never	
Rohan Kalal	rohankalal239@gmail.com	Shirpur	India	1 sec	
Shruti More	moreshruti132@gmail.com	Shirpur	India	9 mins 29 secs	
Vinay Vaidya	realvinay31099@gmail.com	Shirpur	India	Never	

CONCLUSION / RESULT:

In this Experiment, we created Moodle cloud site and create different entities dynamically.



Laboratory Report

Experiment No - 2

Batch -

Date of Experiment: _____

Date of Submission: _____

Title: Create a scenario in wordpress for Social Marketing, Search engine and Sharing Tools.

Evaluation

1) Attendance [2] -----

2) Lab Performance [2] -----

3) Oral [1] -----

Overall Marks [5] -----

Subject Incharge

Experiment No. 2

TITLE: Create a scenario in wordpress for Social Marketing, Search engine and Sharing Tools.

PREREQUISITE: Operating Systems, Computer Networks

THEORY:

Whether you want to share your ideas, start a business, or run a store, you can do it all on WordPress.com.

Step 1: Choose Your Identity

Choosing a name for your site is an important decision because it immediately tells visitors what your site is about. Once you decide on the perfect name, make it your Site Title by going to My Site → Manage → Settings.

By signing up, you already have a site address like yourgroovysite.wordpress.com but you can register your very own domain like yourgroovydomain.com. Your domain is free for the first year with any WordPress.com plan.

The screenshot shows a search interface for domain names. The search bar at the top contains the query "my-groovy-site". Below the search bar is a row of filter buttons: "More Extensions ▾", ".site", ".com", ".net", ".org", ".blog", and ".club".

The search results are displayed in two columns:

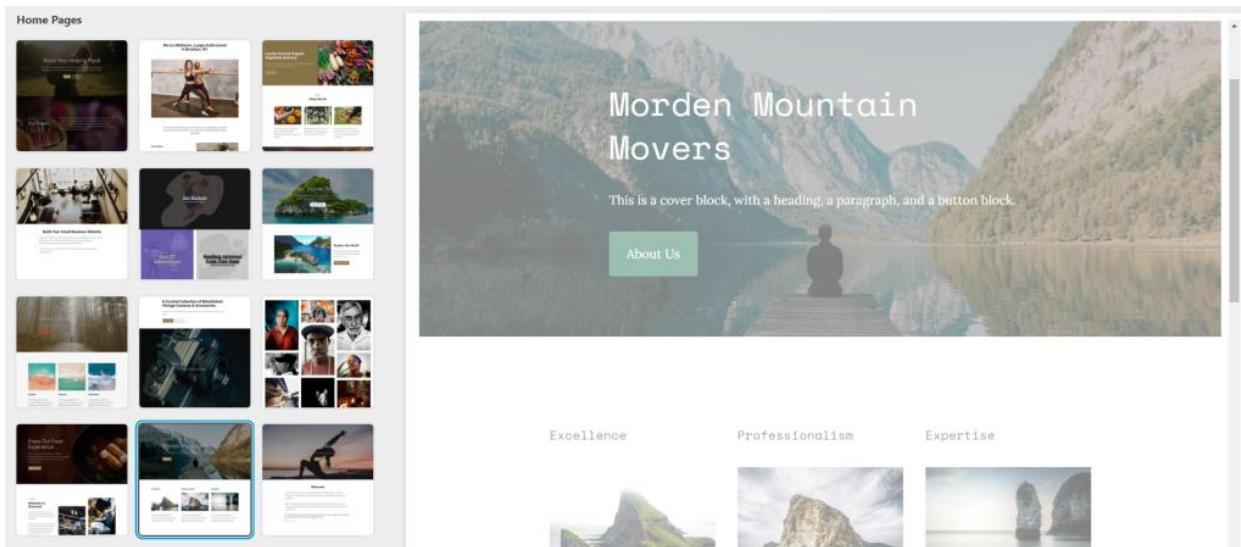
- Left Column:** "mygroovy.site" is listed as a "Best Match". It is described as "First year free with your plan" and has a renewal cost of "€26,00 /year". It includes a note that ".site" matches the query and is a common extension. A large red "Select" button is present.
- Right Column:** "mygroovysite.com" is listed as a "Best Alternative". It is described as "First year free with your plan" and has a renewal cost of "€18,00 /year". It includes a note that ".com" is the most common extension. A standard "Select" button is present.

Below these, there are two more rows of results:

- "mygroovysite.shopping" with a "Select" button.
- "mygroovysite.blog" with a "Select" button.

Step 2: Design Your Homepage

To make a great first impression, think about the most important elements you want people to see when they first visit your site. You can start with a blank page, or you can use one of our pre-built page layouts to create a beautiful homepage in seconds. You can load any of these gorgeous designs and then change, add, or remove any elements to make it your own.



Step 3: Create More Pages

Now it's time to add more pages. The most common pages you'll find on a website are an About page and a Contact page. Go to My Site → Site → Pages → Add New Page to get started. When you created your homepage in Step Two, you had your first introduction to "blocks" — these are the building blocks of your website. You can use blocks to add virtually anything to your pages: images, galleries, columns, videos, payment buttons, and much more.

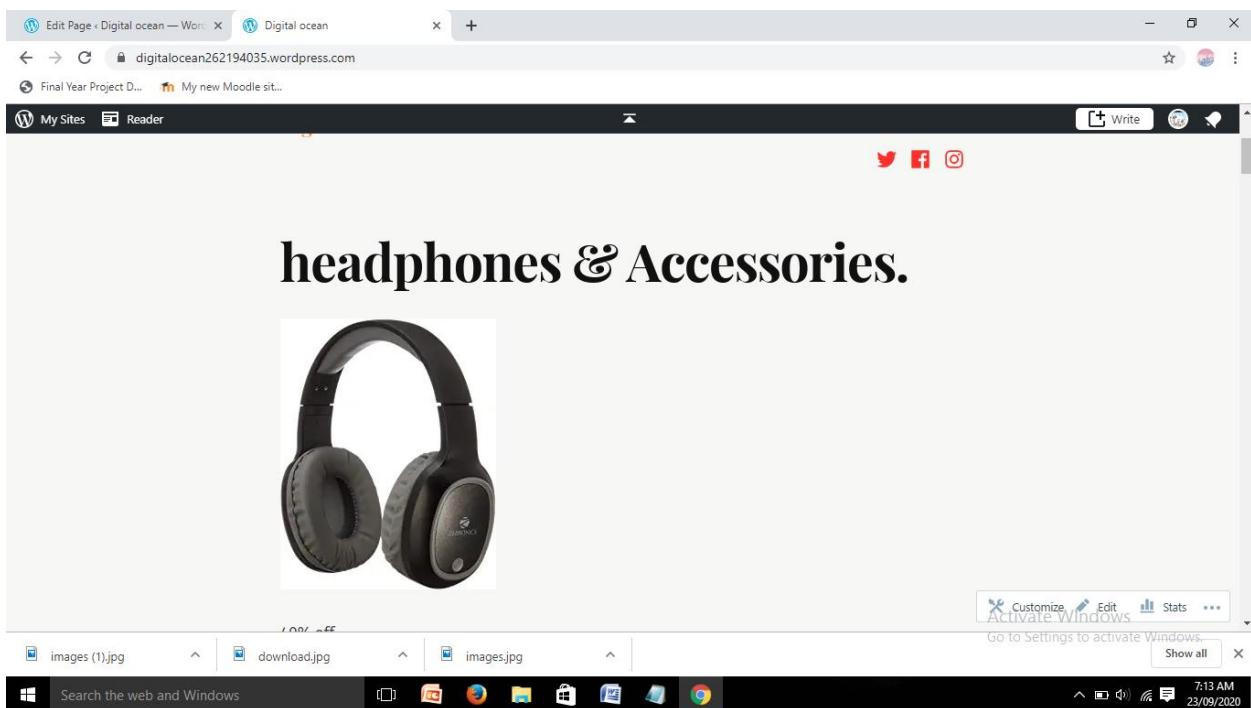
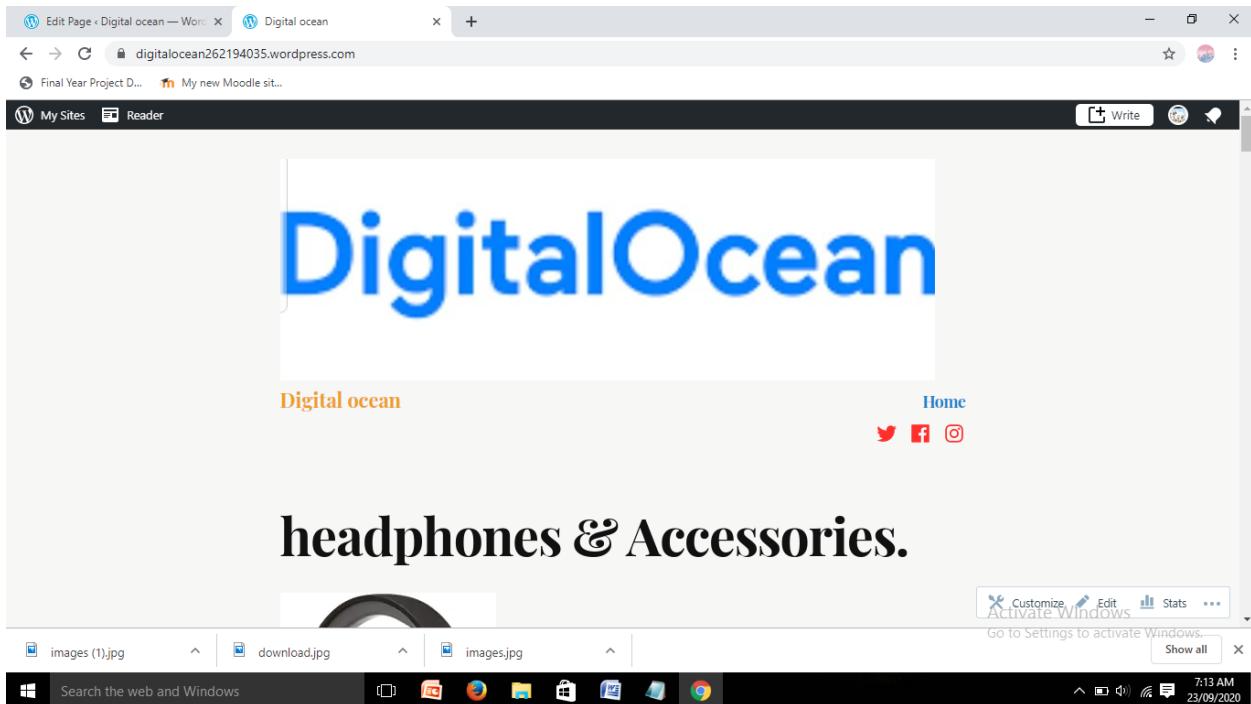
Step 4: Add Your Social Media Presence

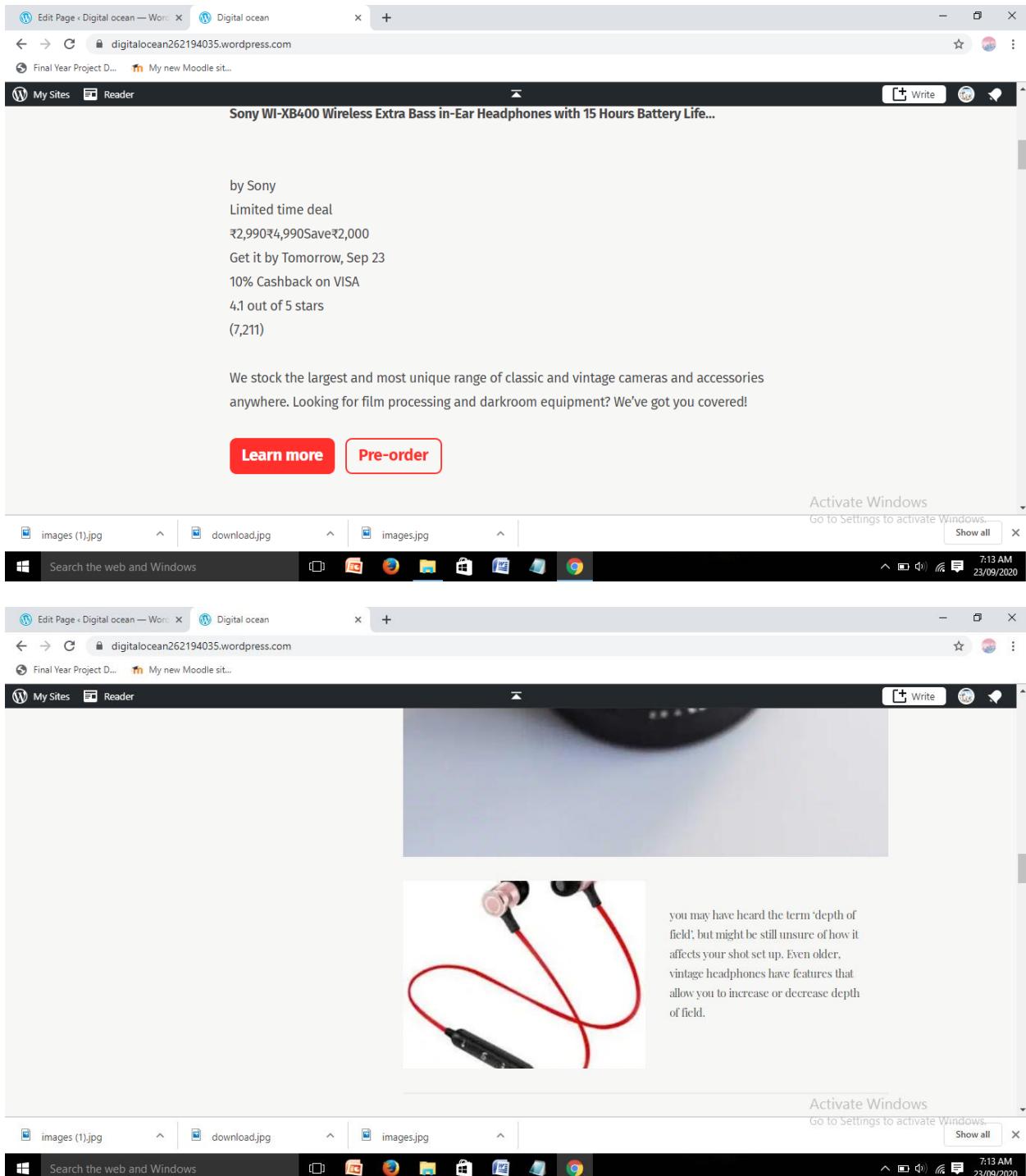
If you have a social media presence, your website is the perfect place to promote it. It's common to see social media icons similar to this:

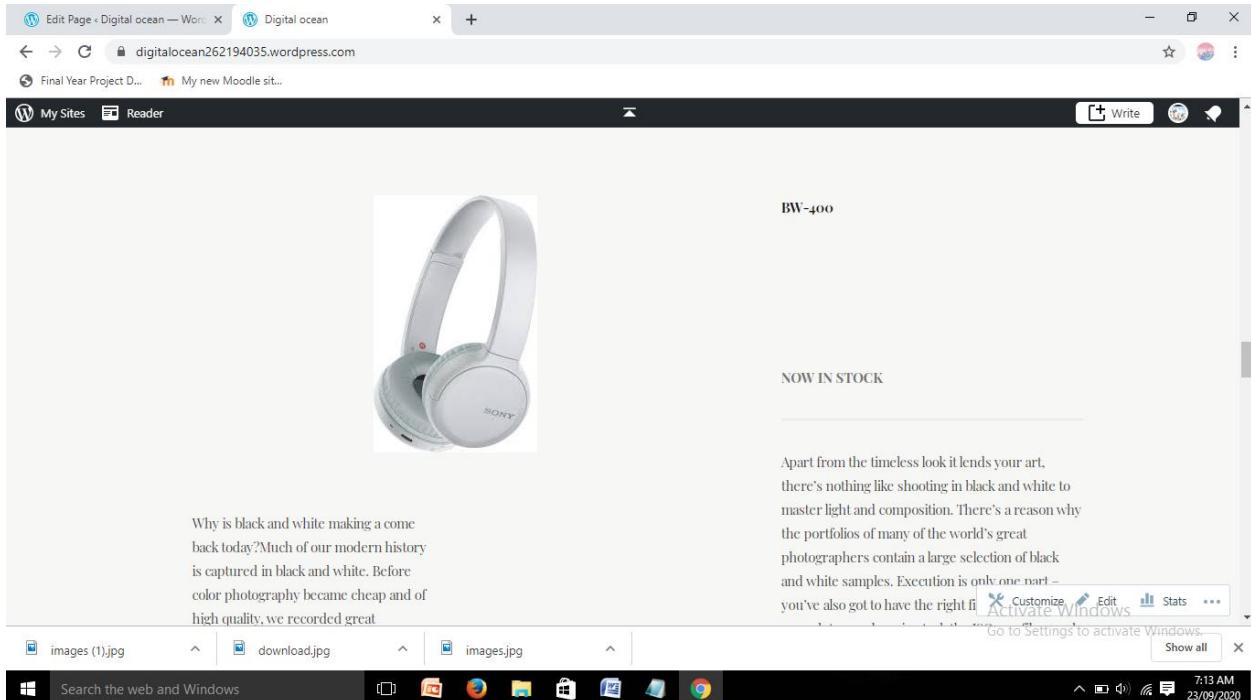


You can add these icons to your site's menu using the Social Links menu or to the content of any page using the Social Links block. All major social media services are

supported.







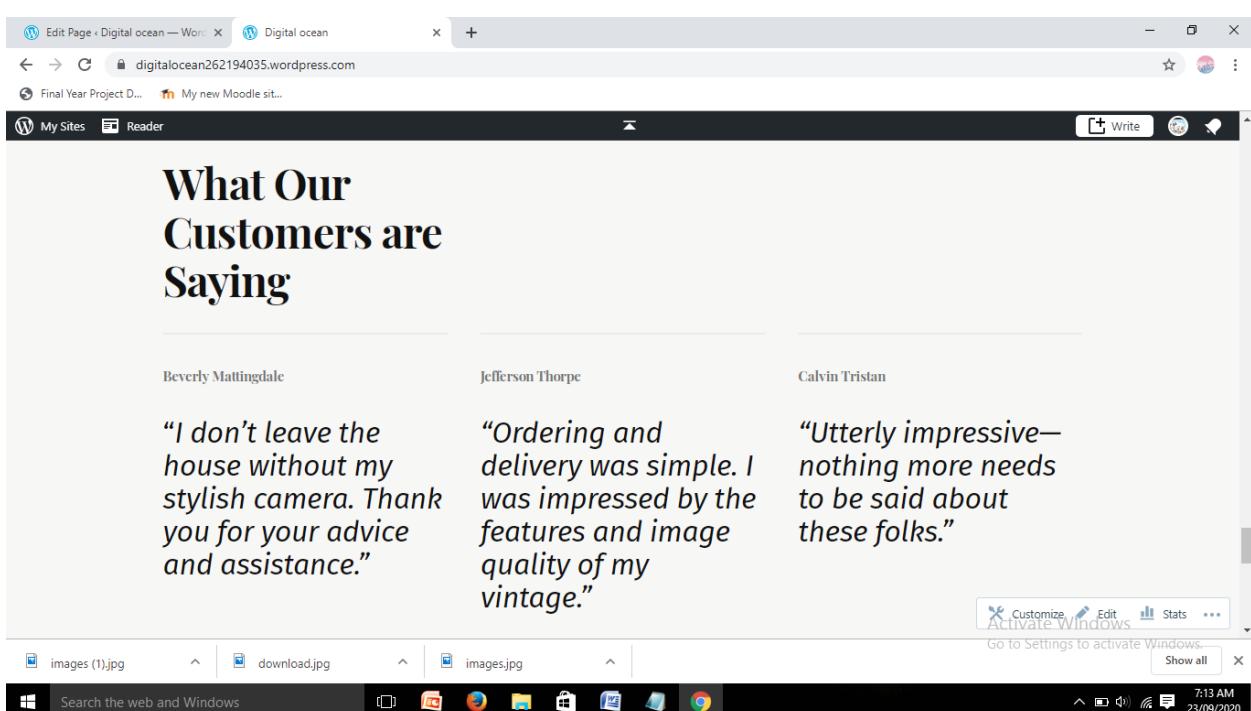
Apart from the timeless look it lends your art, there's nothing like shooting in black and white to master light and composition. There's a reason why the portfolios of many of the world's great photographers contain a large selection of black and white samples. Execution is only one part – you've also got to have the right fit.

[Customize Windows](#) [Edit](#) [Stats](#) [...](#)

Go to Settings to activate Windows.

Show all

7:13 AM 23/09/2020



Beverly Mattingdale

"I don't leave the house without my stylish camera. Thank you for your advice and assistance."

Jefferson Thorpe

"Ordering and delivery was simple. I was impressed by the features and image quality of my vintage."

Calvin Tristan

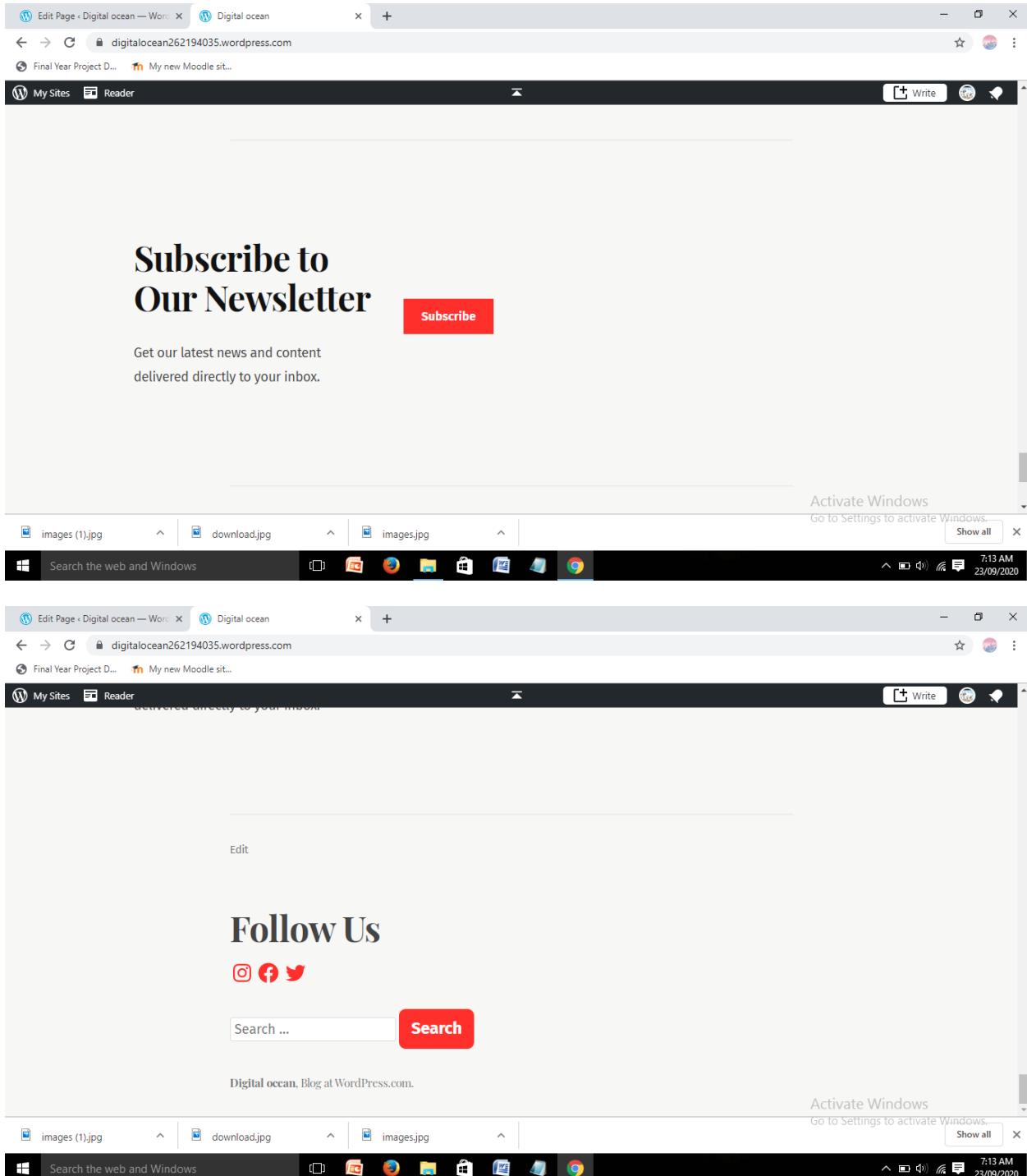
"Utterly impressive—nothing more needs to be said about these folks."

[Customize Windows](#) [Edit](#) [Stats](#) [...](#)

Go to Settings to activate Windows.

Show all

7:13 AM 23/09/2020



CONCLUSION / RESULT:

In this Experiment, we have created a scenario in wordpress for Social Marketing, Search engine and Sharing Tools.



Laboratory Report

Experiment No - 3

Batch -

Date of Experiment: _____

Date of Submission: _____

Title: Working in Cloud9/Codenvy to demonstrate different language Evaluation

1) Attendance [2] -----

2) Lab Performance [2] -----

3) Oral [1] -----

Overall Marks [5] -----

Subject Incharge

Experiment No. 3

TITLE: Working in Cloud9/Codenvy to demonstrate different language Evaluation

PREREQUISITE: Operating Systems

THEORY:

Introduction

Codenvy's power comes from the unique Eclipse Che workspaces which are portable and shareable because they are composed of projects (source files) and environments (runtimes).

Workspace Activation

1. Create a workspace with a production runtime

- A Docker image or a “recipe”, for example a Dockerfile / Composefile
- Runtimes can inherit from other kinds of “machines” such as SSH
- Images are built, if necessary, and run with additional run + volume mount parameters
- We provide numerous “stacks” with pre-defined Docker compose and image runtimes.

2. “Dev Mode” The Workspace

- Agents ⇒ ZIP package of bash software to be installed + started in the runtime (sshd, intellisense, sync)
- Agents ⇒ Can be added during workspace boot, or after it has started triggered by a developer activity
- Agents ⇒ Added through either a volume mount or HTTP download from the Che server - depending upon config
- Terminal Agent ⇒ Special purpose agent to provide web-based terminal
- WS Agent ⇒ Special purpose agent that must exist in one container providing Che APIs for Che server & browser clients
- Debuggers ⇒ Processes with special ports to be exposed, which allow debugger clients to connect

3. Import Projects From Version Control

- Clone ⇒ Users can clone repos from remote locations

- Mount ⇒ Source code is volume mounted to the local server host for long term storage
- Rsync ⇒ Distributed workspaces with Codenvy rsync project code from long term storage to a workspace runtime during boot

4. IDEs Connect To Workspace Endpoint

- Use our cloud IDE or your desktop IDE
- Sync ⇒ Users can use a che-sync docker container to unison sync workspace files to localhost

1. C PROGRAM (Sorting array) :

```
#include <stdio.h>
int main()
{
int arr[10],i,j,temp;
printf("Enter the array elements to be sorted ");
for(i=0; i< 10; i++){
scanf("%d ",&arr[i]);
}
printf("Given array is \n");
for(i=0; i< 10; i++){
printf("%d ", arr[i]);
}
for ( i = 0; i < 10; i++) {
for ( j = i+1; j < 10; j++) {
if(arr[i] > arr[j]) {
temp = arr[i];
arr[i] = arr[j];
arr[j] = temp;
}
}
}
printf("\n");
printf("sorted array is \n");
for(i=0; i< 10; i++){
printf("%d ", arr[i]);
}
return 0;
}
```

The screenshot shows the Eclipse Che IDE interface. The code editor displays a C program named 'sorting.c' which sorts an array of integers. The terminal window below shows the execution of the program, including user input for the array elements and the resulting sorted array.

```
#include <iostream>
using namespace std;
int main()
{
int a=5, b=10;
cout<<"Before swap a= "<<a<<" b= "<<b<<endl;
a=a+b; //a=15 (5+10)
b=a-b; //b=5 (15-10)
a=a-b; //a=10 (15-5)
cout<<"After swap a= "<<a<<" b= "<<b<<endl;
return 0;
}
```

```
bash-4.2 /projects $ gcc sorting.c -o sorting
bash-4.2 /projects $ ./sorting
Enter the array elements to be sorted
56 89 12 34 90 66 43 23 11 98

clear
Given array is
56 89 12 34 90 66 43 23 11 98
sorted array is
11 12 23 34 43 56 66 89 98 bash-4.2 /projects $
```

2. CPP PROGRAM (Swapping without 3rd variable) :

```
#include <iostream>
using namespace std;
int main()
{
int a=5, b=10;
cout<<"Before swap a= "<<a<<" b= "<<b<<endl;
a=a+b; //a=15 (5+10)
b=a-b; //b=5 (15-10)
a=a-b; //a=10 (15-5)
cout<<"After swap a= "<<a<<" b= "<<b<<endl;
return 0;
}
```

The screenshot shows the Eclipse Che IDE interface. In the center, there is a code editor window titled 'Eclipse Che' containing a C++ program named 'swap.cpp'. The code swaps the values of variables 'a' and 'b'. Below the code editor is a terminal window showing the execution of the program. The terminal output is as follows:

```

bash-4.2 /projects $ g++ swap.cpp -o swap
bash-4.2 /projects $ ./swap
Before swap a= 5 b= 10
After swap a= 10 b= 5
bash-4.2 /projects $

```

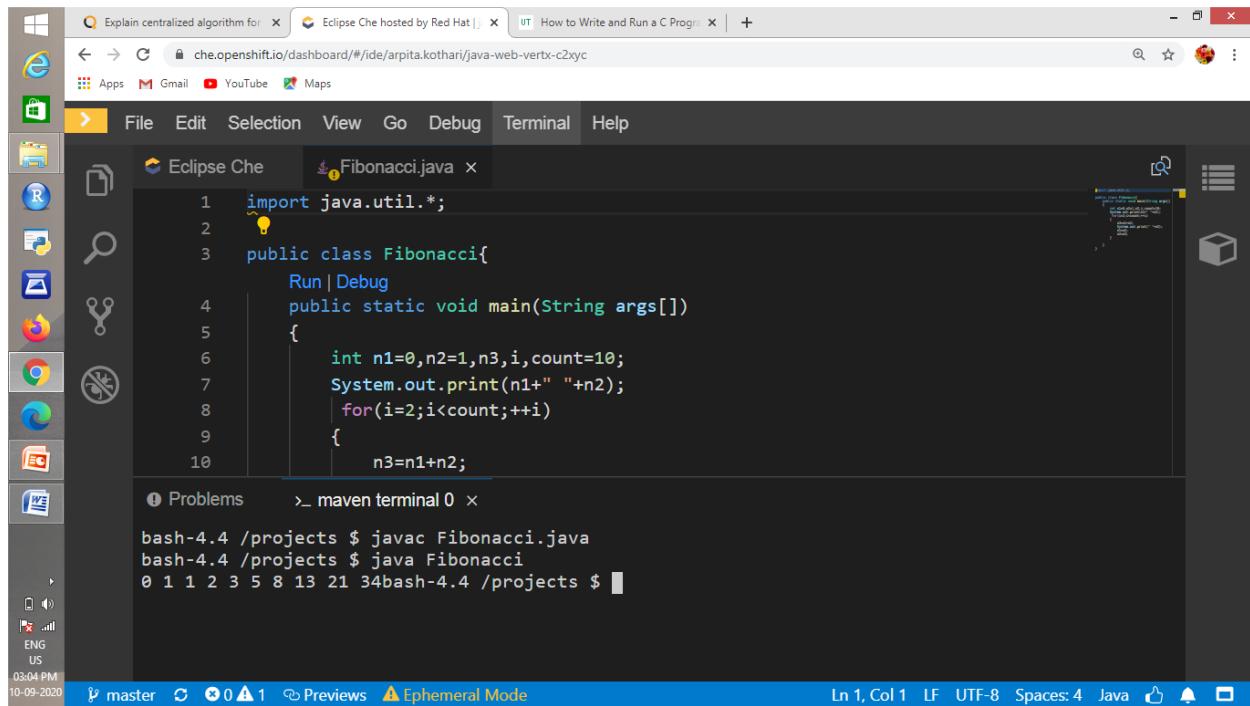
The terminal window also displays status information at the bottom: master, clangd: idle, Previews, Ephemeral Mode, Ln 13, Col 1, LF, UTF-8, Spaces: 4, C++, ▲ 3.

3. JAVA PROGRAM (Fibonacci Series) :

```

public class Fibonacci{
public static void main(String args[])
{
int n1=0,n2=1,n3,i,count=10;
System.out.print(n1+" "+n2);
for(i=2;i<count;++i)
{
n3=n1+n2;
System.out.print(" "+n3);
n1=n2;
n2=n3;
}
}
}

```



4. Python (Prime Number in Given Range) :

```
start = 11  
end = 25  
for i in range(start,end):  
    for j in range(2,i):  
        if(i % j==0):  
            break  
    else:  
        print(i)
```

```
1 start = 11
2 end = 25
3
4 for i in range(start,end):
5     for j in range(2,i):
6         if(i % j==0):
7             break
8     else:
9         print(i)
10
11
12
13
14
15
16
17
18
19
20
21
22
23
```

Problems python terminal 0 vscode-pythonn40 terminal 1

The screenshot shows a web-based C compiler environment. The top bar includes tabs for "Online C Compiler - Online C Edi" and "C Program to check if number is". The URL is "tutorialspoint.com/compile_c_online.php". The main area has a "codingground SIMPLY EASY CODING" logo and a title "Compile and Execute C Online (GNU GCC v7.1.1)". On the left, there's a code editor with tabs for "main.c" and "STDIN", containing the following C code:

```
1 #include<stdio.h>
2
3 int main()
4 {
5     int n;
6
7     printf("Enter an integer: ");
8     scanf("%d",&n);
9
10    if ( n & 1)
11        printf("%d is an odd number", n);
12    else
13        printf("%d is an even number", n);
14
15    return 0;
16 }
```

On the right, the "Result" panel shows the command used: "\$gcc -o main *.c", the output of the program, and the user's input: "Enter an integer: 0". The output text "0 is an even number" is displayed below the prompt.

2. Java Program example

The screenshot shows an online Java compiler interface. The code in the editor is:

```

1 public class GfG {
2     public static void main(String[] args) {
3         int x = 100, y = 200;
4         System.out.println("Before Swap");
5         System.out.println("x = " + x);
6         System.out.println("y = " + y);
7         int temp = x;
8         x = y;
9         y = temp;
10        System.out.println("After swap");
11        System.out.println("x = " + x);
12        System.out.println("y = " + y);
13    }
14 }

```

The result window shows the output of the Java command:

```

$javac GfG.java
$java -Xmx128M -Xms16M GfG
Before Swap
x = 100
y = 200
After swap
x = 200
y = 100

```

3. Python program

The screenshot shows an online Python compiler interface. The code in the editor is:

```

1 num=7
2 factorial = 1
3
4 # check if the number is negative, positive or zero
5 if num < 0:
6     print("Sorry, factorial does not exist for negative numbers")
7 elif num == 0:
8     print("The factorial of 0 is 1")
9 else:
10    for i in range(1,num + 1):
11        factorial = factorial*i
12    print("The factorial of",num,"is",factorial)

```

The result window shows the output of the Python command:

```

$python main.py
('The factorial of', 7, 'is', 5040)

```

4. R program example

The screenshot shows the Cloud9 IDE interface. The left pane displays an R script named 'main.r' with the following code:

```

1 n=123
2 rev_number=function(n){
3   m=strsplit(as.character(n),"")
4   if (m==rev(m)) print("reversed number")
5 }

```

The right pane shows the 'Result' output: '\$Rscript main.r'. Below the interface is a Windows taskbar with various icons.

5. jsp example

The screenshot shows the Cloud9 IDE interface. The left pane displays a JSP script named 'index.jsp' with the following code:

```

1 <%@ page language="java" contentType="text/html; charset=US-ASCII"
2   pageEncoding="US-ASCII"%>
3 <!DOCTYPE html PUBLIC "-//IETF//DTD HTML 4.01 Transitional//EN" "https://www.w3.org/TR/html4/loose.dtd">
4 <html>
5 <head>
6 <meta http-equiv="Content-Type" content="text/html; charset=US-ASCII">
7 <title>Test Jsp</title>
8 </head>
9 <body>
10 Test JSP Page inside WEB-INF folder.<br>
11 Init Param "test" value =<%=config.getInitParameter("test") %><br>
12 HashCode of this object=<%=this.hashCode() %>
13 </body>
14 </html>

```

The right pane shows the 'Result' output: 'Test JSP Page inside WEB-INF folder.
Init Param "test" value =null
HashCode of this object=1007170608'. Below the interface is a Windows taskbar with various icons.

CONCLUSION / RESULT:

In this Experiment, we demonstrate Cloud9/Codenvy for different language Evaluation.



Laboratory Report

Experiment No - 4

Batch -

Date of Experiment: _____

Date of Submission: _____

Title: Installation and configuration of virtual machine with guest OS

1) Attendance [2] -----

2) Lab Performance [2] -----

3) Oral [1] -----

Overall Marks [5] -----

Subject Incharge

Experiment No. 4

TITLE: Installation and configuration of virtual machine with guest OS

PREREQUISITE: Operating Systems

THEORY:

Introduction

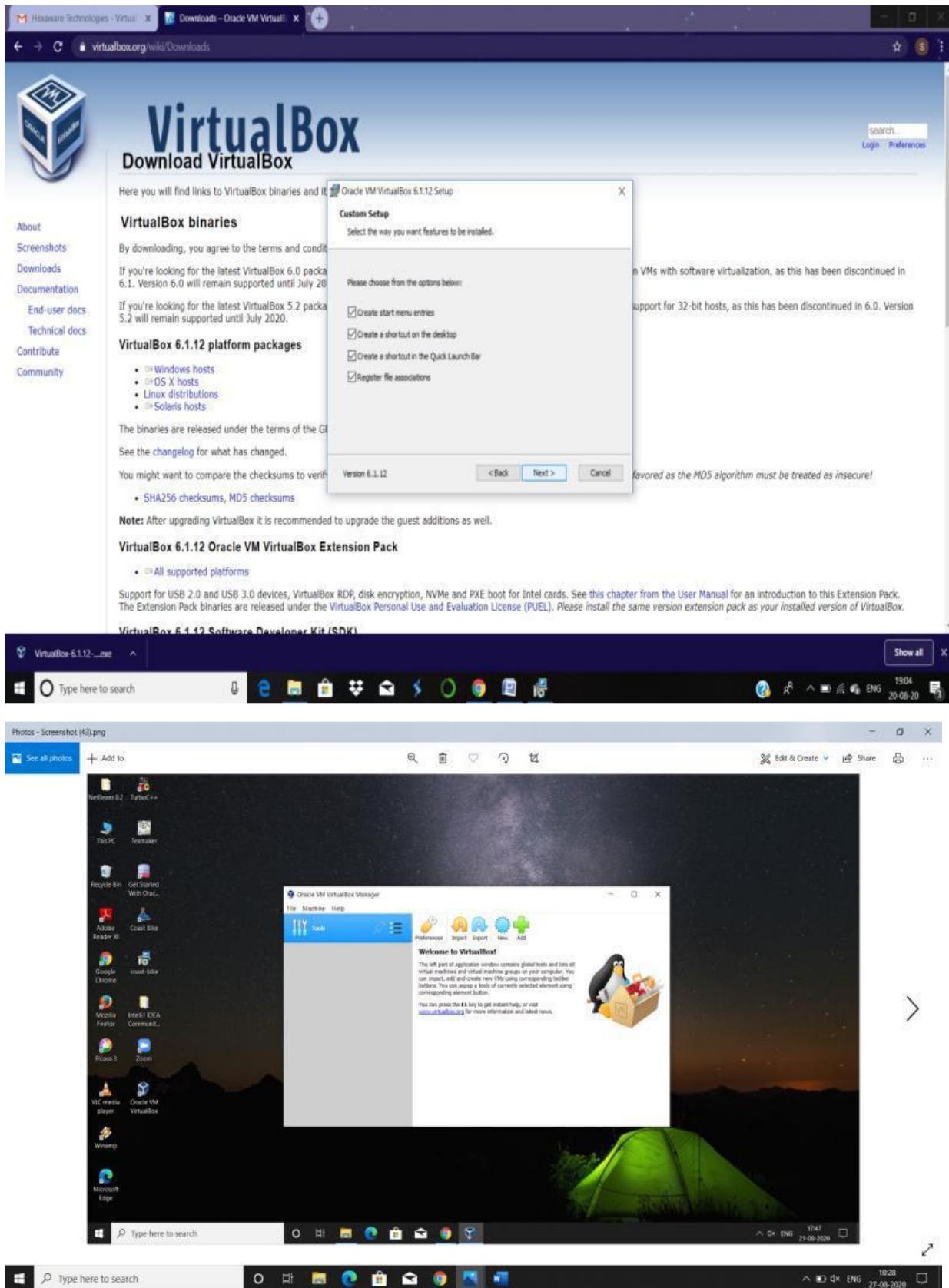
In computing, a **virtual machine (VM)** is an emulation of a computer system. Virtual machines are based on computer architectures and provide functionality of a physical computer. Their implementations may involve specialized hardware, software, or a combination.

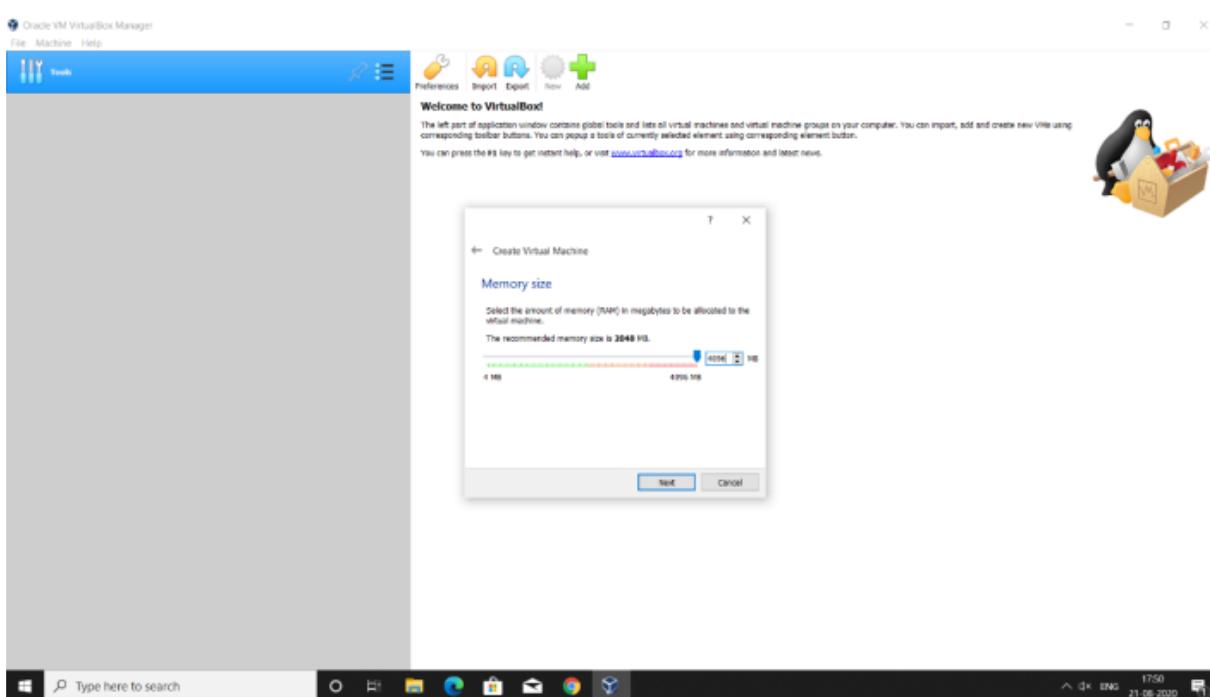
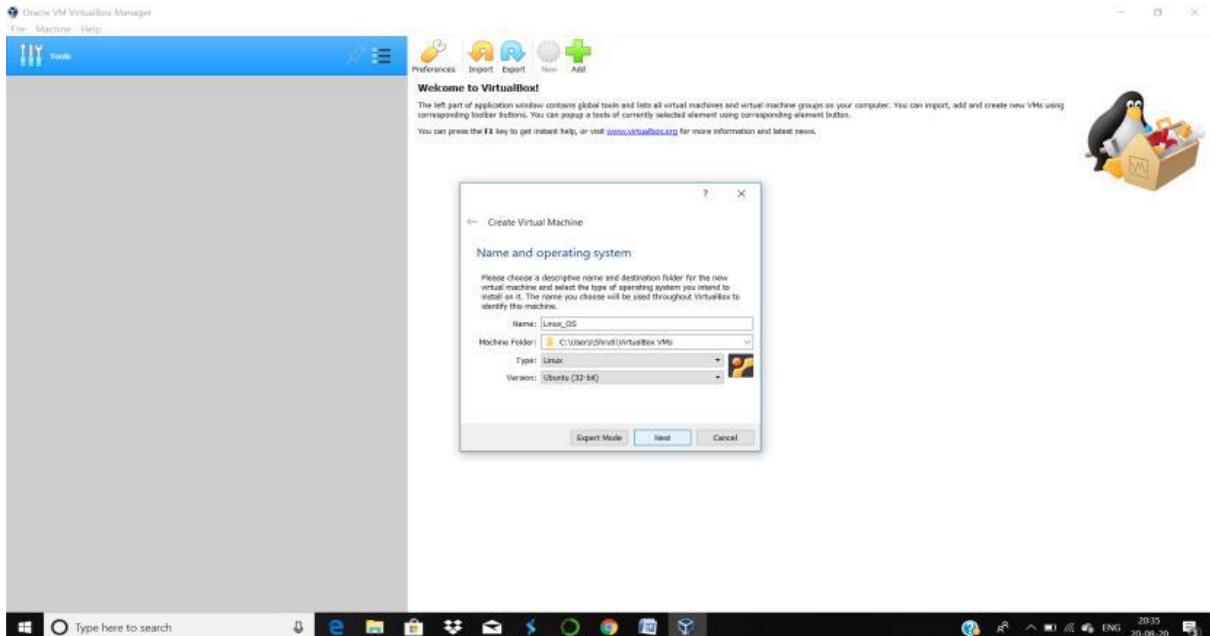
There are different kinds of virtual machines, each with different functions:

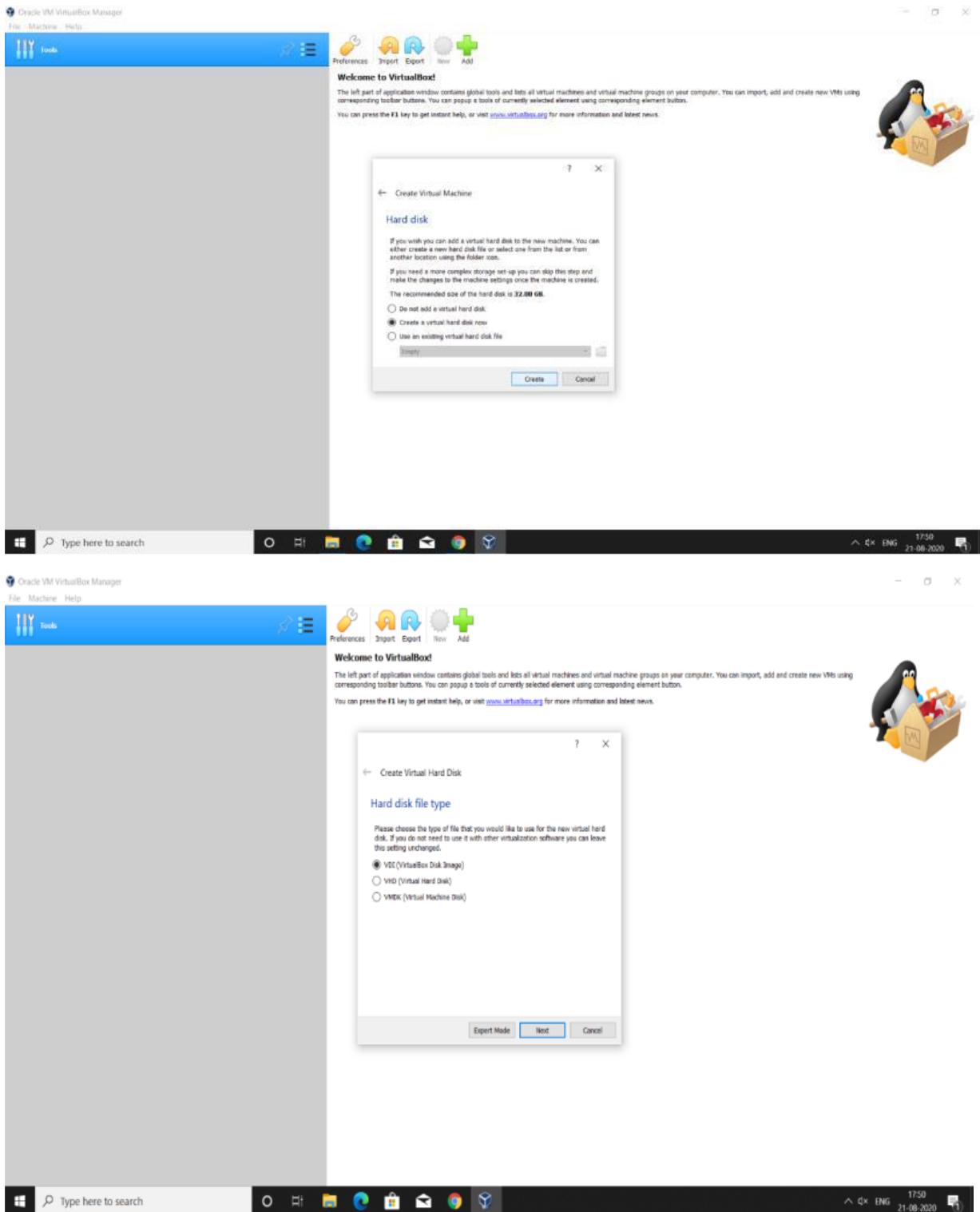
- **System virtual machines** (also termed full virtualization VMs) provide a substitute for a real machine. They provide functionality needed to execute entire operating systems. A hypervisor uses native execution to share and manage hardware, allowing for multiple environments, which are isolated from one another, yet exist on the same physical machine. Modern hypervisors use hardware-assisted virtualization, virtualization-specific hardware, primarily from the host CPUs.
- **Process virtual machines** are designed to execute computer programs in a platform-independent environment.

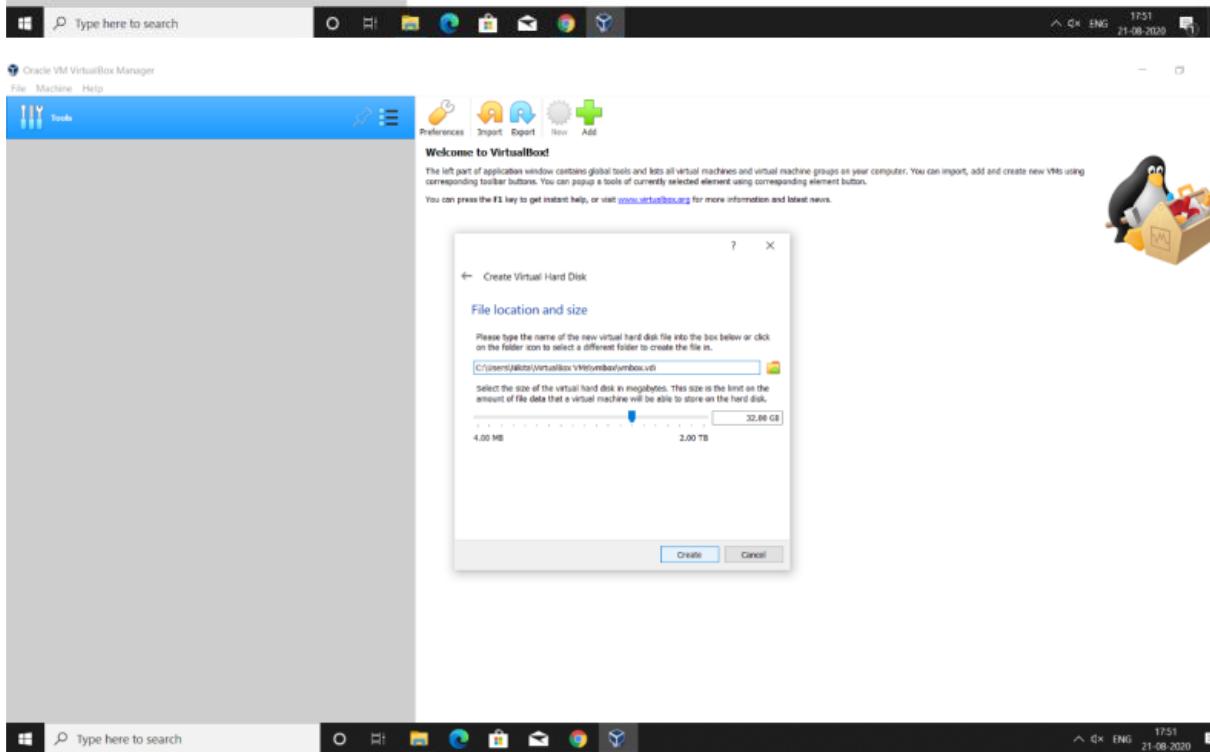
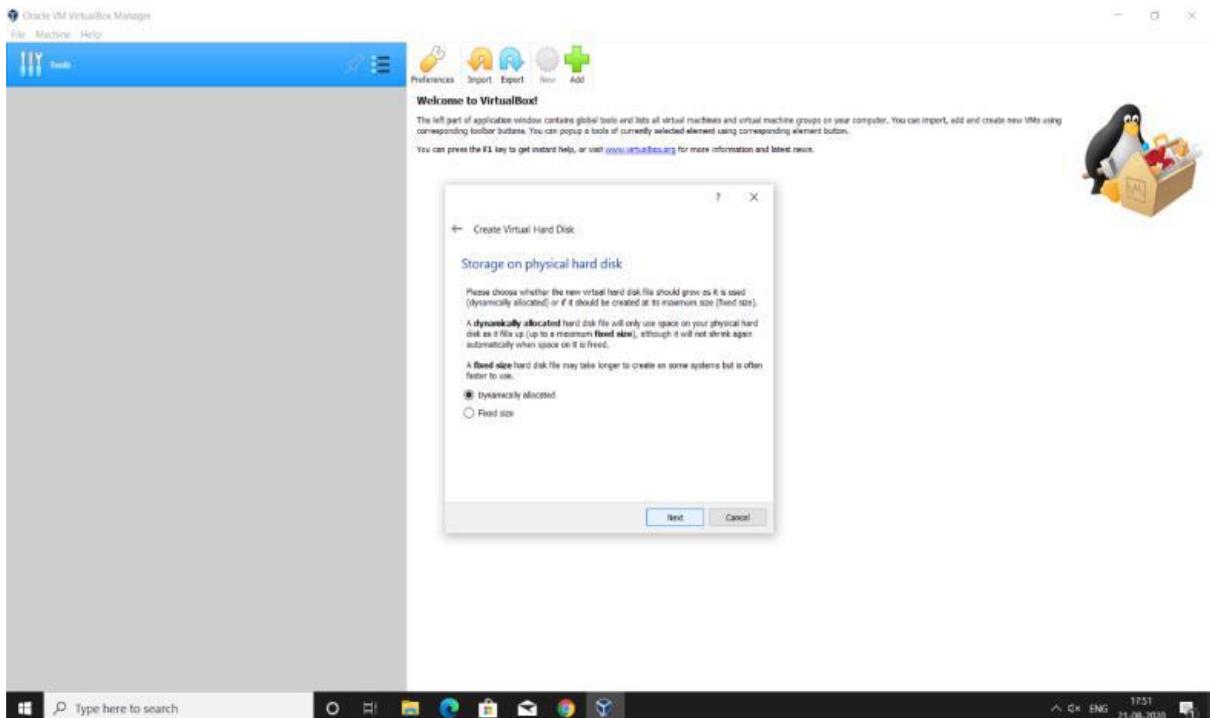
Google Search results for "vm virtualbox". The top result is the official Oracle VM VirtualBox website. The page shows the VirtualBox logo, a screenshot of a Windows guest OS, and links for Downloads, User Manual, Community, Documentation, and End-user docs.

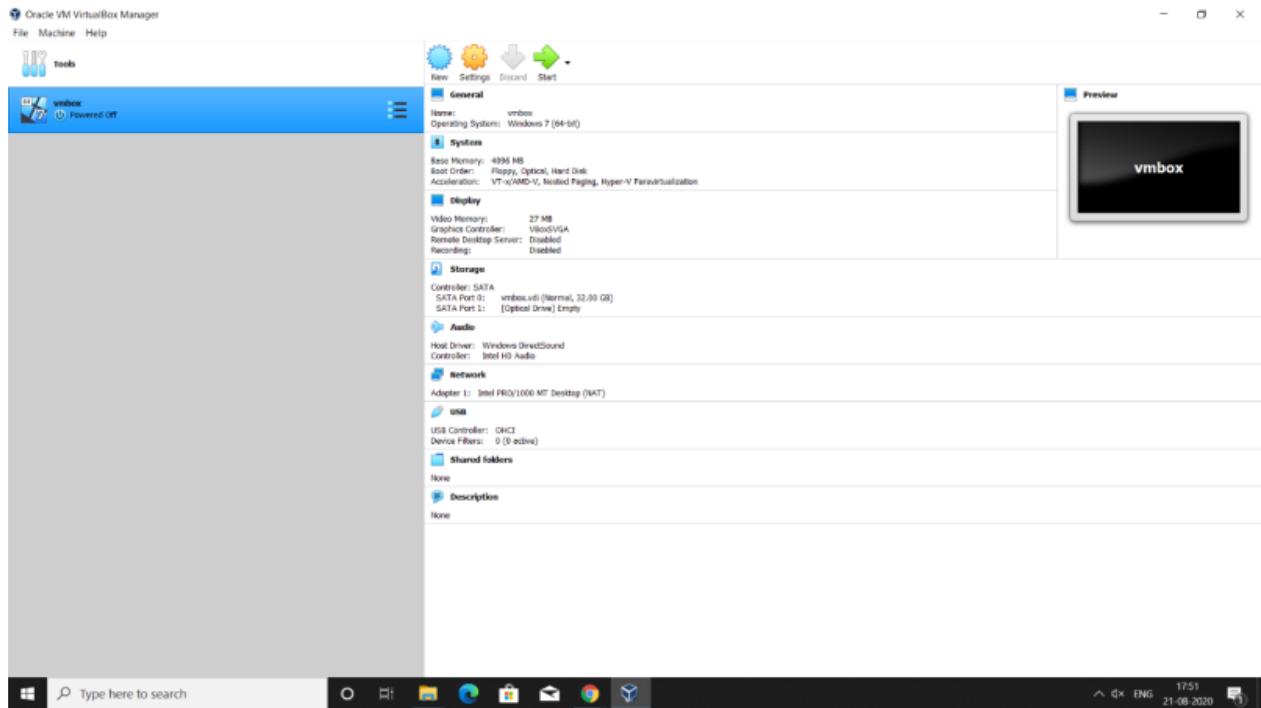
The VirtualBox.org homepage. It features a large blue button to "Download VirtualBox 6.1". To the right is a "News Flash" sidebar listing several recent releases. The main content area includes a "Welcome to VirtualBox.org!" message, information about the product's capabilities, and a sidebar with links to About, Screenshots, Downloads, Documentation, End-user docs, Technical docs, Contribute, and Community.











CONCLUSION / RESULT:

In this Experiment, we studied installation and configuration of virtual machine with guest OS



Laboratory Report

Experiment No - 5

Batch -

Date of Experiment: _____

Date of Submission: _____

Title: Demonstrate the use of map and reduce tasks

Evaluation

1) Attendance [2] -----

2) Lab Performance [2] -----

3) Oral [1] -----

Overall Marks [5] -----

Subject Incharge

Experiment No. 5

TITLE: Demonstrate the use of map and reduce tasks.

PREREQUISITE: Operating Systems, Computer Networks, Java

THEORY:

Introduction

Hadoop is a Java-based programming framework that supports the processing and storage of extremely large datasets on a cluster of inexpensive machines. It was the first major open source project in the big data playing field and is sponsored by the Apache Software Foundation. Hadoop 2.7 is comprised of four main layers: Hadoop Common is the collection of utilities and libraries that support other Hadoop modules.

- HDFS, which stands for Hadoop Distributed File System, is responsible for persisting data to disk.
- YARN, short for Yet Another Resource Negotiator, is the “operating system” for HDFS.
- MapReduce is the original processing model for Hadoop clusters. It distributes work within the cluster or map, then organizes and reduces the results from the nodes into a response to a query. Many other processing models are available for the 2.x version of Hadoop.

Step 1 — Installing Java

To get started, we'll update our package list:

```
sudo apt-get update
```

Next, we'll install OpenJDK, the default Java Development Kit on Ubuntu 16.04.

```
sudo apt-get install default-jdk
```

Once the installation is complete, let's check the version.

```
java -version
```

Output

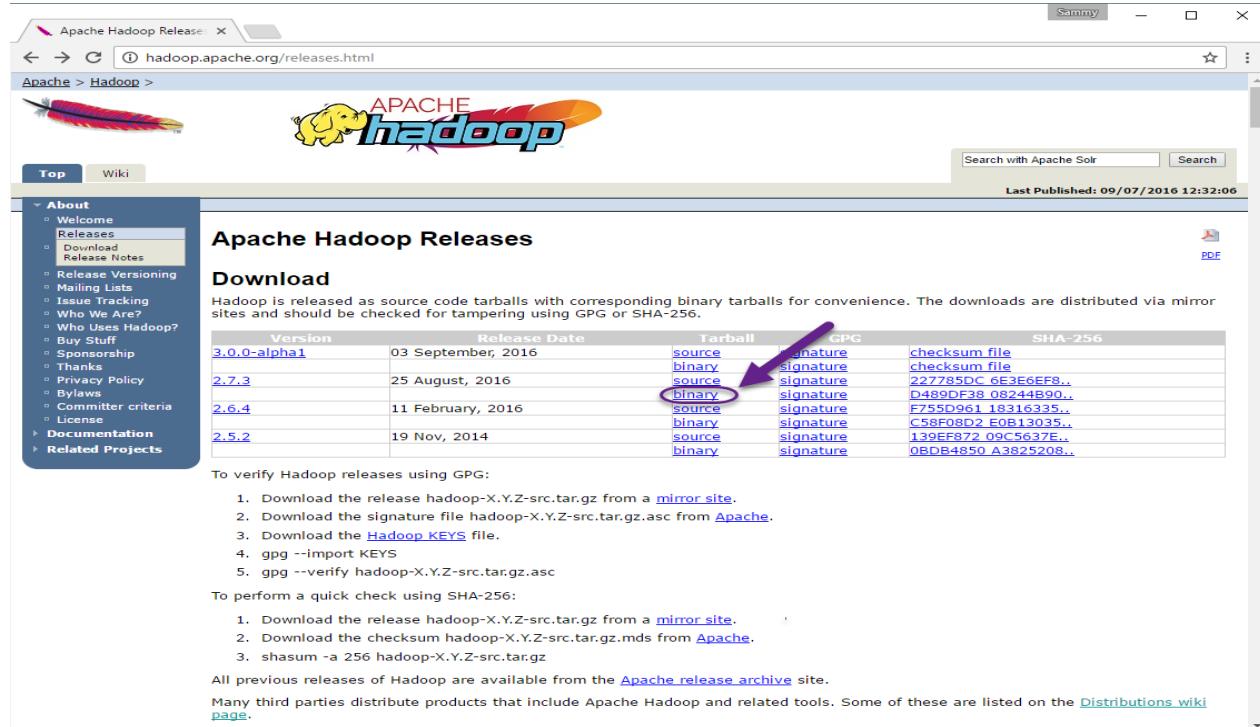
```
openjdk version "1.8.0_91"
```

```
OpenJDK Runtime Environment (build 1.8.0_91-8u91-b14-3ubuntu1~16.04.1-b14)
```

```
OpenJDK 64-Bit Server VM (build 25.91-b14, mixed mode)
```

Step 2 — Installing Hadoop

With Java in place, we'll visit the Apache Hadoop Releases page to find the most recent stable release. Follow the binary for the current release:



The screenshot shows a web browser window with the URL hadoop.apache.org/releases.html. The page title is "Apache Hadoop Releases". On the left, there's a sidebar with links like "About", "Welcome", "Releases", "Download", etc. The main content area has a heading "Download" with a sub-instruction: "Hadoop is released as source code tarballs with corresponding binary tarballs for convenience. The downloads are distributed via mirror sites and should be checked for tampering using GPG or SHA-256." Below this is a table of releases:

Version	Release Date	Tarball	GPG	SHA-256
3.0.0-alpha1	03 September, 2016	source binary	signature	checksum file checksum file
2.7.3	25 August, 2016	source binary	signature	2277050C_6E3F5FF0.. D489DF38_08244B90..
2.6.4	11 February, 2016	source binary	signature	F759D961_18316335.. C58F0BD2_E0B13035..
2.5.2	19 Nov, 2014	source binary	signature	139F872_09C5637E.. 0DBB4850_A3825208..

Below the table, there are instructions for verifying releases using GPG and performing a quick check using SHA-256.

Step 3 — Configuring Hadoop's Java Home

Hadoop requires that you set the path to Java, either as an environment variable or in the Hadoop configuration file. The path to Java, `/usr/bin/java` is a symlink to `/etc/alternatives/java`, which is in turn a symlink to default Java binary. We will use `readlink` with the `-f` flag to follow every symlink in every part of the path, recursively. Then, we'll use `sed` to trim `bin/java` from the output to give us the correct value for `JAVA_HOME`. To find the default Java path

```
readlink -f /usr/bin/java | sed "s:bin/java::"
```

Output

```
/usr/lib/jvm/java-8-openjdk-amd64/jre/
```

You can copy this output to set Hadoop's Java home to this specific version, which ensures that if the default Java changes, this value will not. Alternatively, you can use the `readlink` command dynamically in the file so that Hadoop will automatically use

whatever Java version is set as the system default.

To begin, open hadoop-env.sh:

```
sudo nano /usr/local/hadoop/etc/hadoop/hadoop-env.sh
```

Then, choose one of the following options:

Option 1: Set a Static Value

```
/usr/local/hadoop/etc/hadoop/hadoop-env.sh

...
#export JAVA_HOME=${JAVA_HOME}
export JAVA_HOME=/usr/lib/jvm/java-8-openjdk-amd64/jre
...
```

Copy

Option 2: Use Readlink to Set the Value Dynamically

```
/usr/local/hadoop/etc/hadoop/hadoop-env.sh

...
#export JAVA_HOME=${JAVA_HOME}
export JAVA_HOME=$(readlink -f /usr/bin/java | sed "s:bin/java::")
```

Step 4 — Running Hadoop

Now we should be able to run Hadoop:

```
/usr/local/hadoop/bin/hadoop

Output
Usage: hadoop [--config confdir] [COMMAND | CLASSNAME]
  CLASSNAME      run the class named CLASSNAME
or
  where COMMAND is one of:
    fs            run a generic filesystem user client
    version       print the version
    jar <jar>     run a jar file
                  note: please use "yarn jar" to launch
                  YARN applications, not this command.
    checknative [-a|-h]  check native hadoop and compression libraries availability
```

```

distcp <srcurl> <desturl> copy file or directories recursively
archive -archiveName NAME -p <parent path> <src>* <dest> create a hadoop archive
classpath      prints the class path needed to get the
credential     interact with credential providers
                Hadoop jar and the required libraries
daemonlog      get/set the log level for each daemon

```

The help means we've successfully configured Hadoop to run in stand-alone mode. We'll ensure that it is functioning properly by running the example MapReduce program it ships with. To do so, create a directory called input in our home directory and copy Hadoop's configuration files into it to use those files as our data.

```

mkdir ~/input
cp /usr/local/hadoop/etc/hadoop/*.xml ~/input

```

Next, we can use the following command to run the MapReduce hadoop-mapreduce-examples program, a Java archive with several options. We'll invoke its grep program, one of many examples included in hadoop-mapreduce-examples, followed by the input directory, input and the output directory grep_example. The MapReduce grep program will count the matches of a literal word or regular expression. Finally, we'll supply a regular expression to find occurrences of the word principal within or at the end of a declarative sentence. The expression is case-sensitive, so we wouldn't find the word if it were capitalized at the beginning of a sentence:

```
/usr/local/hadoop/bin/hadoop jar /usr/local/hadoop/share/hadoop/mapreduce/hadoop-mapreduce-examples-2.7.3.jar grep ~/input ~/grep_example 'principal[.]*' 
```

When the task completes, it provides a summary of what has been processed and errors it has encountered, but this doesn't contain the actual results.

STANDARD INPUT AND OUTPUT:

Output

...

File System Counters

```
FILE: Number of bytes read=1247674
FILE: Number of bytes written=2324248
FILE: Number of read operations=0
FILE: Number of large read operations=0
FILE: Number of write operations=0

Map-Reduce Framework
  Map input records=2
  Map output records=2
  Map output bytes=37
  Map output materialized bytes=47
  Input split bytes=114
  Combine input records=0
  Combine output records=0
  Reduce input groups=2
  Reduce shuffle bytes=47
  Reduce input records=2
  Reduce output records=2
  Spilled Records=4
  Shuffled Maps =1
  Failed Shuffles=0
  Merged Map outputs=1
  GC time elapsed (ms)=61
  Total committed heap usage (bytes)=263520256

Shuffle Errors
  BAD_ID=0
  CONNECTION=0
  IO_ERROR=0
  WRONG_LENGTH=0
  WRONG_MAP=0
  WRONG_REDUCE=0

File Input Format Counters
  Bytes Read=151
File Output Format Counters
  Bytes Written=37
```

CONCLUSION / RESULT:

In this Experiment, we have demonstrated the use of map and reduce tasks using Hadoop.



Laboratory Report

Experiment No - 6

Batch -

Date of Experiment: _____

Date of Submission: _____

Title: Design and analyze architecture of Aneka identify different entities to understand the structure

Evaluation

1) Attendance [2] -----

2) Lab Performance [2] -----

3) Oral [1] -----

Overall Marks [5] -----

Subject Incharge

Experiment No. 6

TITLE: Design and analyze architecture of Aneka identify different entities to understand the structure of it

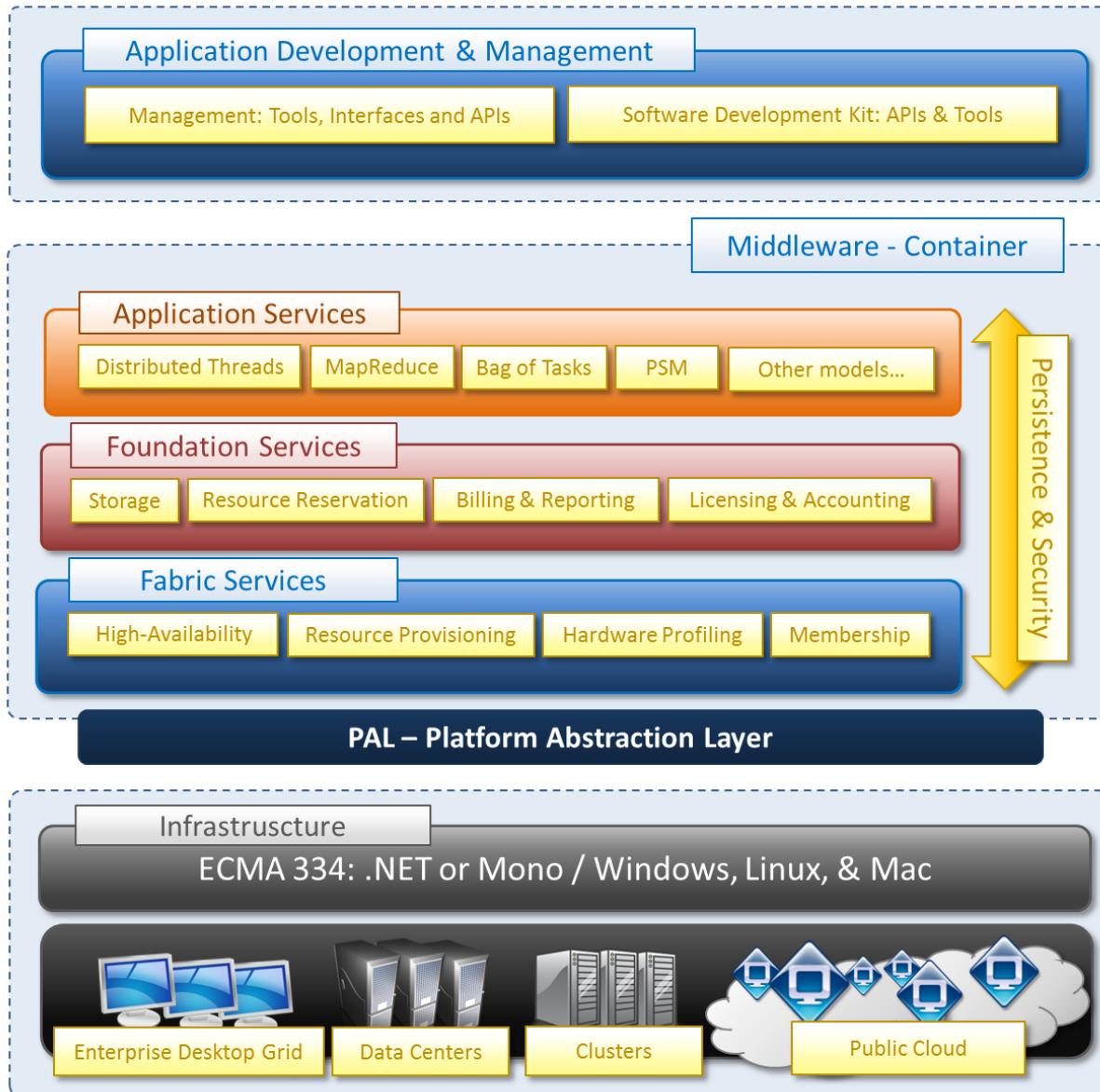
PREREQUISITE: Operating Systems, Computer networks

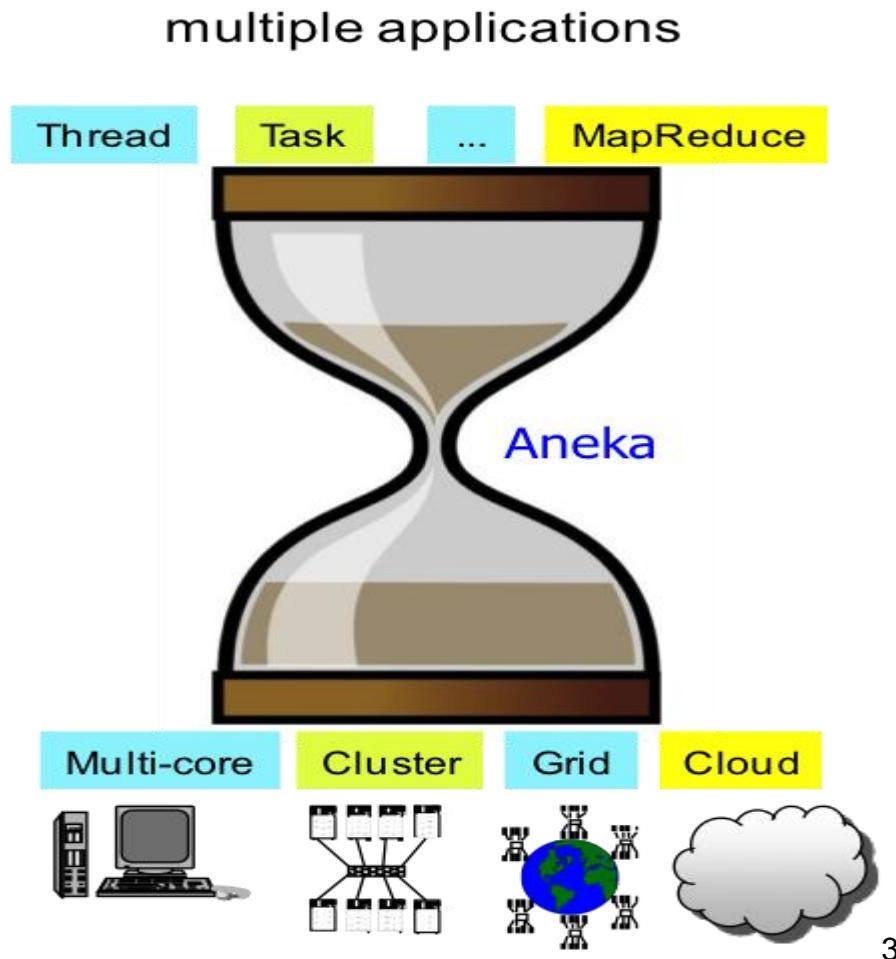
THEORY:

Aneka Architecture

Aneka is a platform and a framework for developing distributed applications on the Cloud. It harnesses the spare CPU cycles of a heterogeneous network of desktop PCs and servers or datacenters on demand. Aneka provides developers with a rich set of APIs for transparently exploiting such resources and expressing the business logic of applications by using the preferred programming abstractions. System administrators can leverage on a collection of tools to monitor and control the deployed infrastructure. This can be a public cloud available to anyone through the Internet, or a private cloud constituted by a set of nodes with restricted access.

The Aneka based computing cloud is a collection of physical and virtualized resources connected through a network, which are either the Internet or a private intranet. Each of these resources hosts an instance of the Aneka Container representing the runtime environment where the distributed applications are executed. The container provides the basic management features of the single node and leverages all the other operations on the services that it is hosting. The services are broken up into fabric, foundation, and execution services. Fabric services directly interact with the node through the Platform Abstraction Layer (PAL) and perform hardware profiling and dynamic resource provisioning. Foundation services identify the core system of the Aneka middleware, providing a set of basic features to enable Aneka containers to perform specialized and specific sets of tasks. Execution services directly deal with the scheduling and execution of applications in the Cloud.





3

One of the key features of Aneka is the ability of providing different ways for expressing distributed applications by offering different programming models; execution services are mostly concerned with providing the middleware with an implementation for these models. Additional services such as persistence and security are transversal to the entire stack of services that are hosted by the Container. At the application level, a set of different components and tools are provided to:

- 1) simplify the development of applications (SDK);
- 2) porting existing applications to the Cloud; and
- 3) monitoring and managing the Aneka Cloud.

A common deployment of Aneka is presented at the side. An Aneka based Cloud is constituted by a set of interconnected resources that are dynamically modified according to the user needs by using resource virtualization or by harnessing the spare CPU cycles of desktop machines. If the deployment identifies a private Cloud all the

resources are in house, for example within the enterprise. This deployment is extended by adding publicly available resources on demand or by interacting with other Aneka public clouds providing computing resources connected over the Internet.

CONCLUSION / RESULT:

In this Experiment, we have analyzed the architecture of Aneka and identified different entities to understand the structure of it



Laboratory Report

Experiment No - 7

Batch -

Date of Experiment: _____

Date of Submission: _____

Title: Installation and configuration of Aneka master node and execution of Convolution imaging application

Evaluation

1) Attendance [2] -----

2) Lab Performance [2] -----

3) Oral [1] -----

Overall Marks [5] -----

Subject Incharge

Experiment No. 7

TITLE: Installation and configuration of Aneka master node and execution of Convolution imaging application

PREREQUISITE: Operating Systems, Computer Networks

THEORY:

Aneka is a Cloud Application Development Platform for developing and running compute and data intensive applications. As a platform it provides users with both a runtime environment for executing applications developed using any of the three supported programming models, and a set of APIs and tools that allow you to build new applications or run existing legacy code. The purpose of this document is to help you through the process of installing and setting up an Aneka Cloud environment. This document will cover everything from helping you to understand your existing infrastructure, different deployment options, installing the Management Studio, configuring Aneka Daemons and Containers, and finally running some of the samples to test your environment.

An Aneka Cloud is composed of a collection of services deployed on top of an infrastructure. This infrastructure can include both physical and virtual machines located in your local area network or Data Centre. Aneka services are hosted on Aneka Containers which are managed by Aneka Daemons. An Aneka Daemon is a background service that runs on a machine and helps you to install, start, stop, update and reconfigure Containers.

A key component of the Aneka platform is the Aneka Management Studio, a portal for managing your infrastructure and clouds. Administrators use the Aneka Management Studio to define their infrastructure, deploy Aneka Daemons, and install and configure Aneka Containers. The figure below shows a high-level representation of an Aneka Cloud, composed of a Master Container that is responsible for scheduling jobs to Workers, and a group of Worker Containers that execute the jobs. Each machine is typically configured with a single instance of the Aneka Daemon and a single instance of the Aneka Container.

Installation

This section assumes that you have a copy of the Aneka distribution with you. If you do not have a copy already, you can download the latest version from Manjrasoft's Website.

Installing Aneka Cloud Management Studio

Aneka installation begins with installing Aneka Cloud Management Studio. The Cloud Management Studio is your portal for creating, configuring and managing Aneka Clouds. Installing Aneka using the distributed Microsoft Installer Package (MSI) is a quick process involving three steps as described below.

Step 1 – Run the installer package to start the Setup Wizard

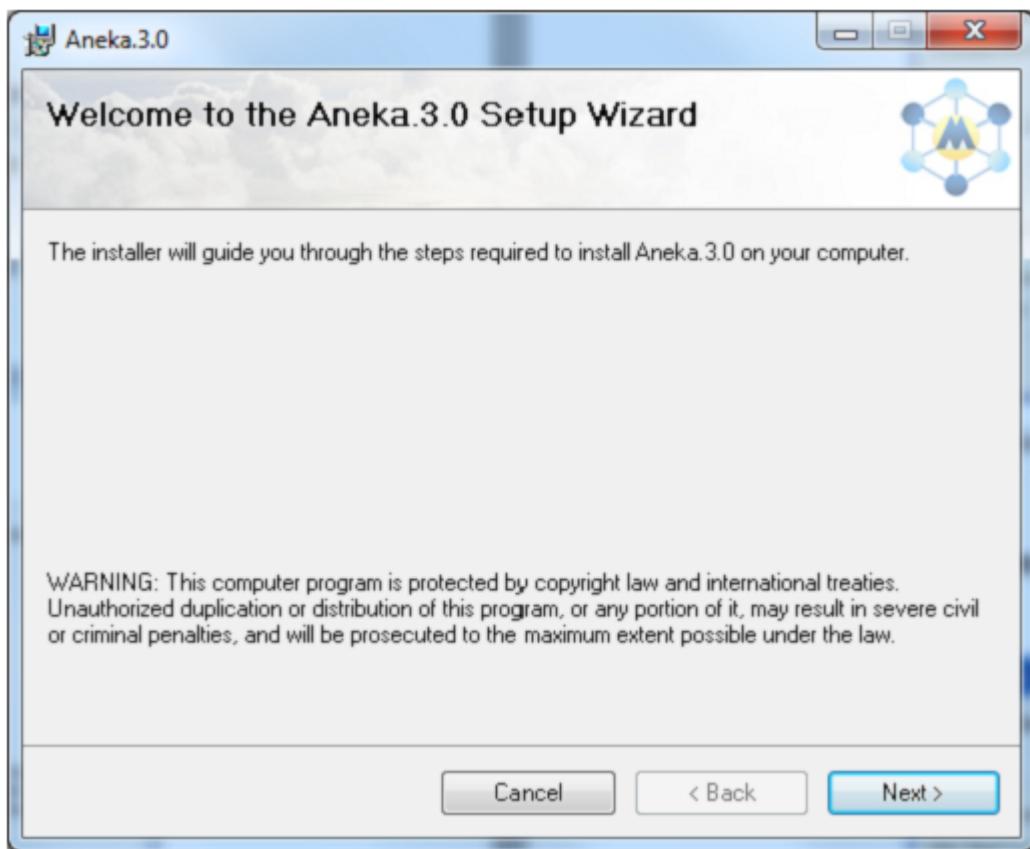


Figure - Welcome Page

The Welcome Page is self-explanatory and you can proceed by clicking next.

Step 2 – Specifying the installation folder

In Step 2 you specify the installation folder. By default Aneka is installed in C:\Program Files\Manjrasoft\Aneka.3.0.

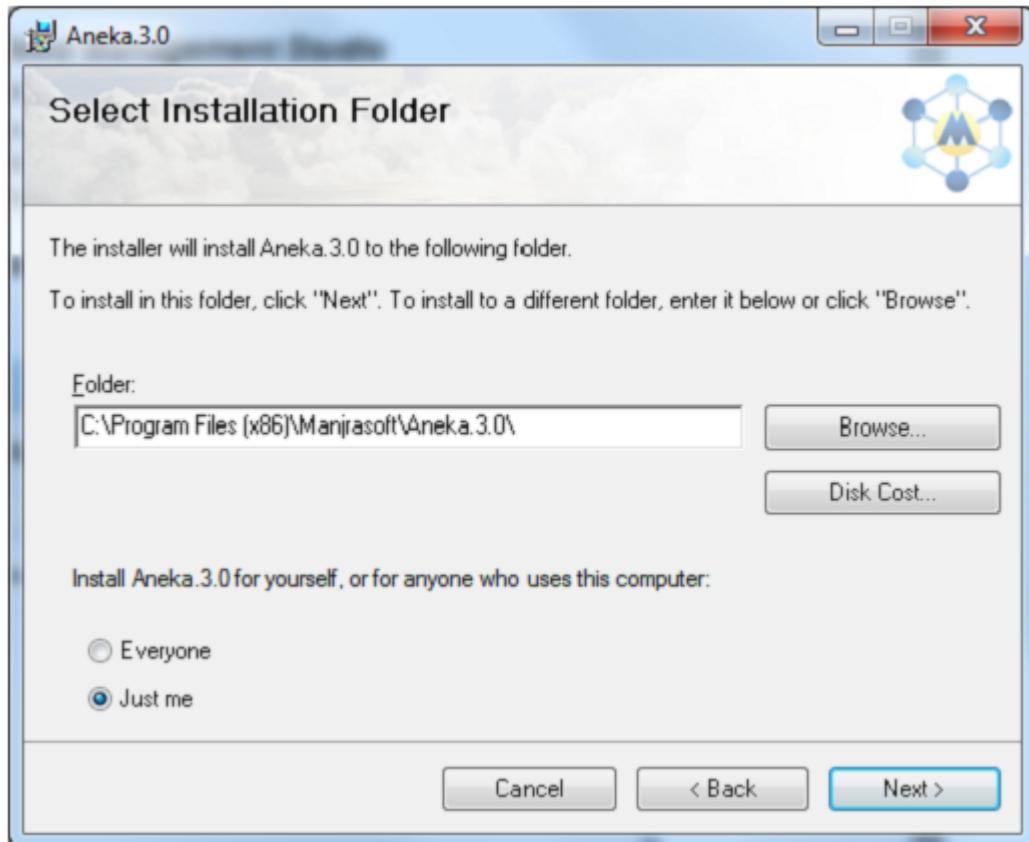


Figure - Specifying the installation folder

Step 3 – Confirm and start the installation

At this point you are ready to begin the installation. Click —"Next" to start the installation or —"Back" to change your installation folder.

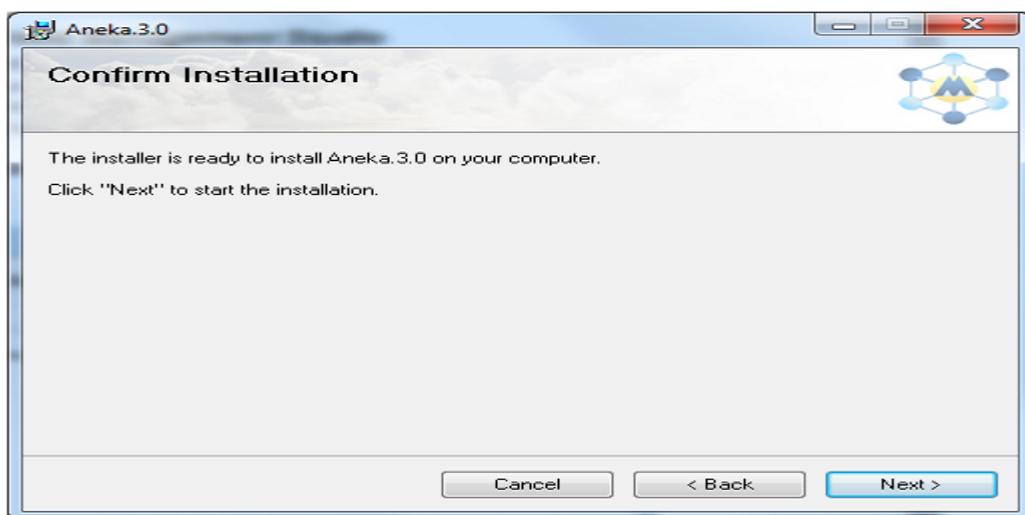


Figure - Confirm Installation

Once the installation is complete, close the wizard and launch Aneka Management Studio from the start menu.

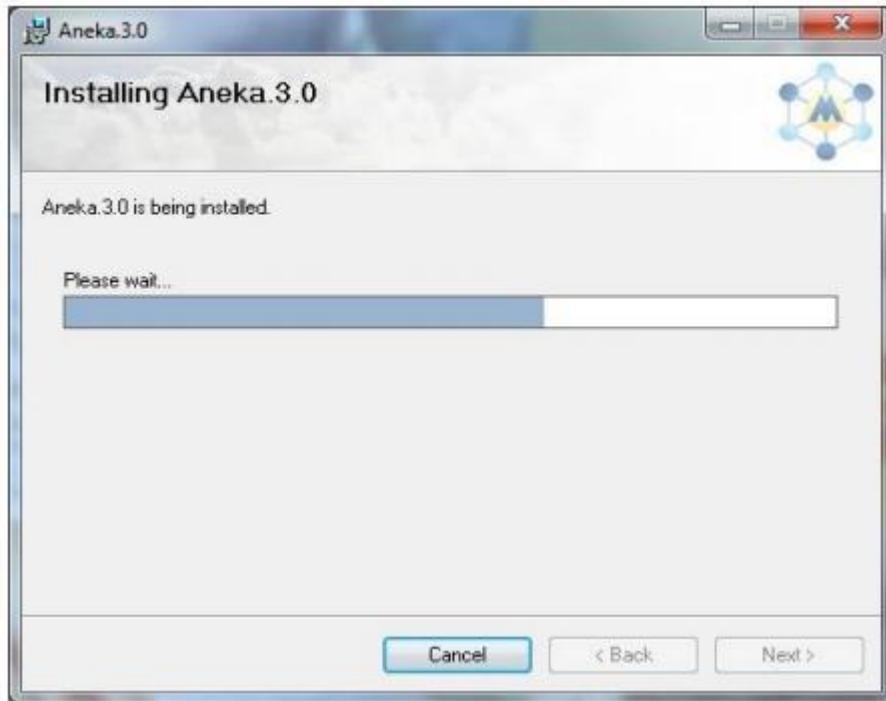


Figure - Installation Progress

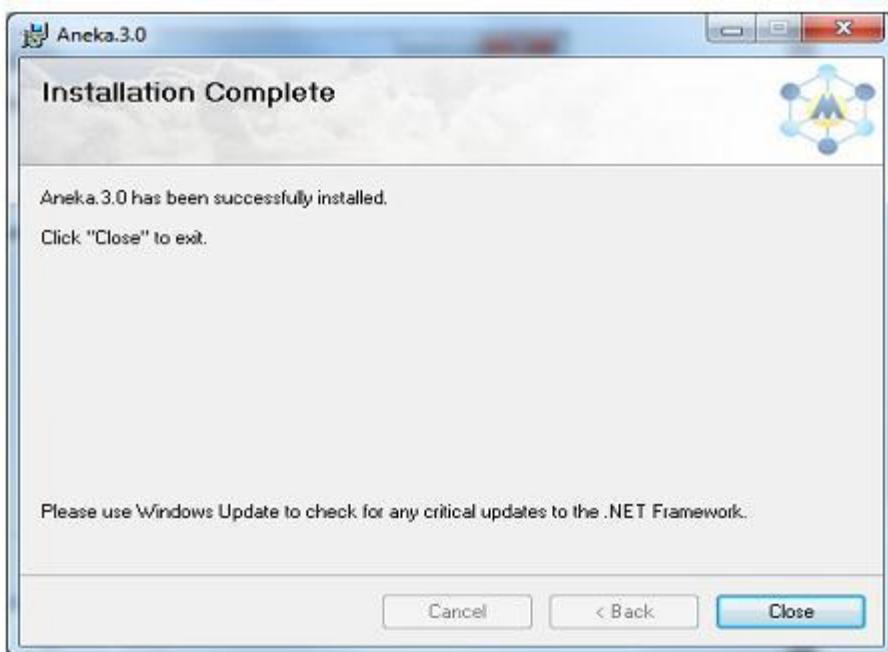


Figure - Installation Complete

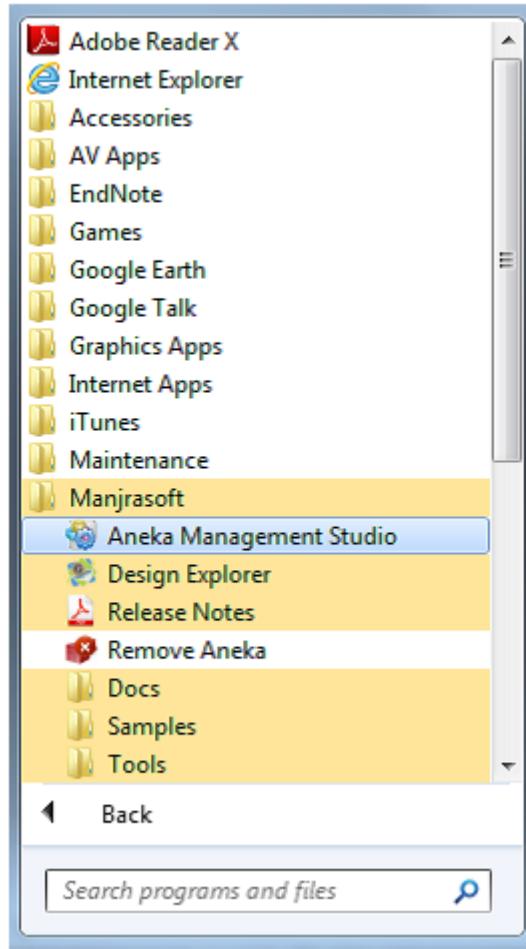


Figure - Start Menu

Aneka Cloud Management Studio

The Aneka Cloud Management Studio is your portal for managing your infrastructure and clouds. It provides facilities for defining your underlying cloud infrastructure and creating one or more Aneka Clouds on top. It lets you create and manage Aneka user accounts, monitor the overall performance of your Cloud, obtain detailed reporting information on resource usage, data transfers, billing and application (job) execution. It also provides facilities for troubleshooting your deployments by allowing you to access and examine remote logs.

Starting up Management Studio

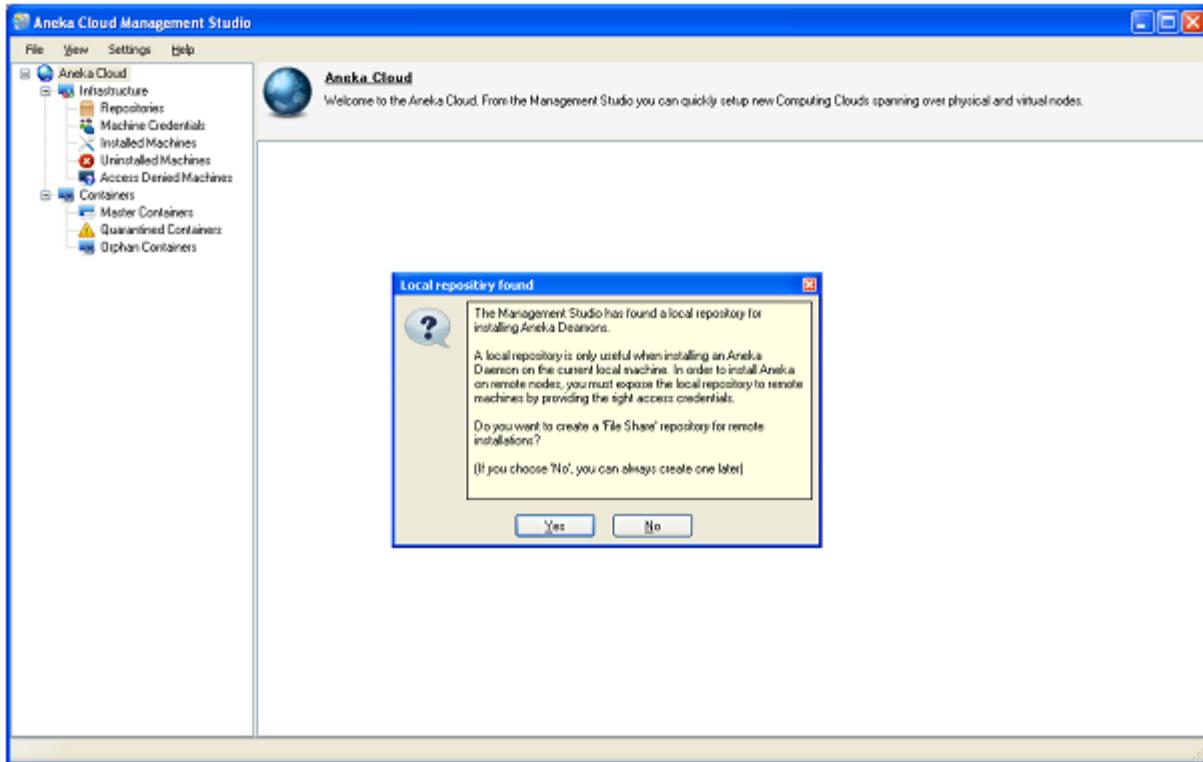


Figure - Starting Aneka Cloud Management Studio for the first time.

When Aneka Cloud Management Studio is started up for the first time you'll be asked to create a Remote Repository for performing remote installations. Setting up a Remote Repository requires selecting a suitable repository type and supplying valid credentials which remote machines can use to connect and download required files. You may however choose to create this repository at a late time before making remote installations. If no repository is defined, you will be restricted to making local installations only.

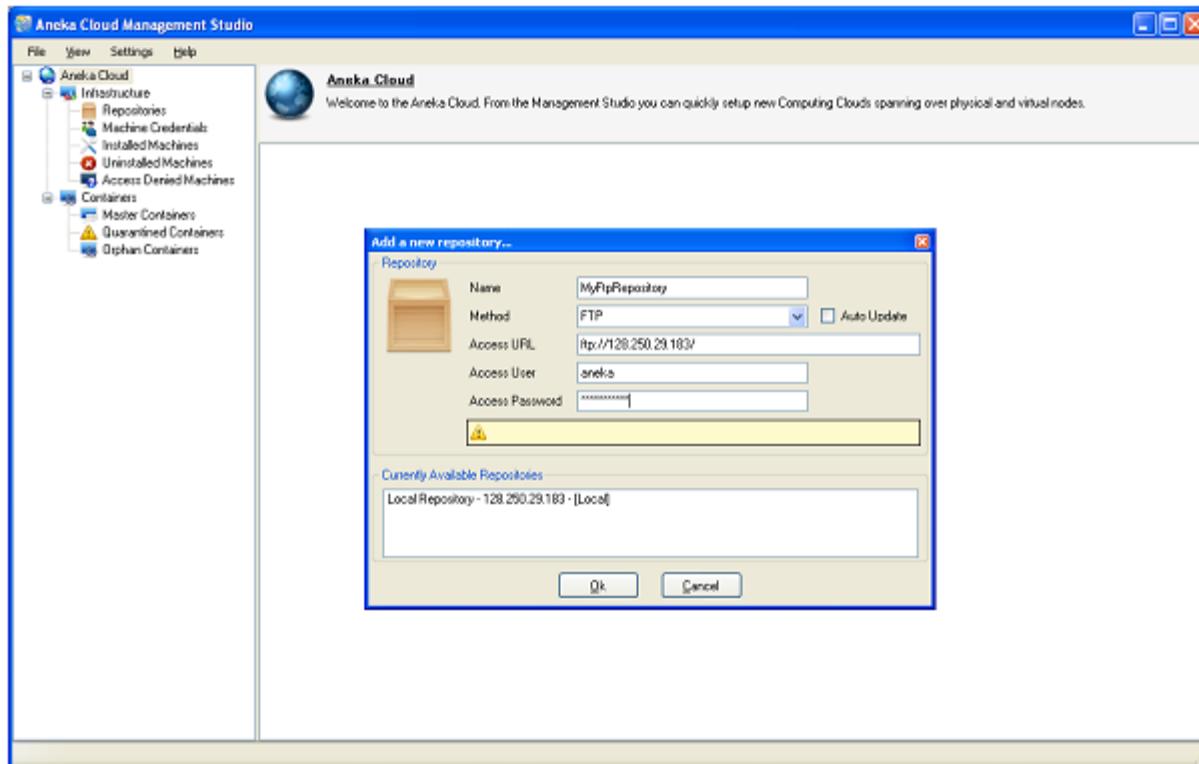


Figure - Creating a repository for remote installations

Shutting down Aneka Management Studio

When attempting to shut down Aneka Management Studio, you will be given the choice of saving all configuration data from the current session. It is highly recommended that you save this information and restore it the next time you start using the Management Studio.

The Configuration File

The configuration file, `ManagementStudio.config`, contains all information that describes your infrastructure, your Clouds, the machine credentials, repositories and authentication keys (see section on installing the Master Container) that you defined when using Aneka Management Studio. It is recommended that you save this information when you exit Management Studio so that you can restore it at a later session, and get up-to-speed with your Cloud management without having to redefine all settings again. Some configuration information, such as authentication keys, must be maintained safely if you are to add new Containers to your existing Cloud. Losing an authentication key however, is not detrimental as you will be able to reconfigure your clouds with a new key.

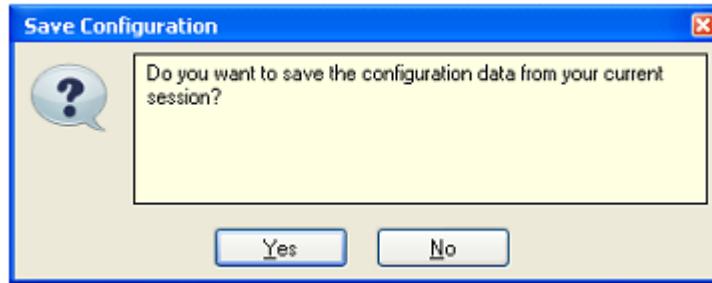


Figure - Request to save configuration data when closing Management Studio
The configuration file is always encrypted before being written to disk for security reasons. When saving configuration data you will be required to specify a password as shown in Figure.



Figure - Password to encrypt configuration data

When starting up Aneka Management Studio at a later session, you will be given the choice of restoring your configuration data. If you choose to do so, you must re-enter the same password you used when saving.

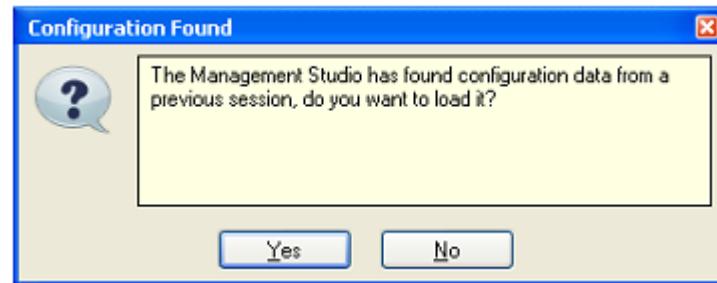


Figure - Request to restore configuration data

CONCLUSION / RESULT:

In this Experiment, we have Installed and configured Aneka master node and executed Convolution imaging application.



Laboratory Report

Experiment No - 8

Batch -

Date of Experiment: _____

Date of Submission: _____

Title: Implementation of matrix multiplication using python in Google Colab

1) Attendance [2] -----

2) Lab Performance [2] -----

3) Oral [1] -----

Overall Marks [5] -----

Subject Incharge

Experiment No. 8

TITLE: Implementation of matrix multiplication using python in Google Colab

PREREQUISITE: Operating Systems

THEORY:

Introduction

Colaboratory, or "Colab" for short, allows you to write and execute Python in your browser, with

- Zero configuration required
- Free access to GPUs
- Easy sharing

Whether you're a **student**, a **data scientist** or an **AI researcher**, Colab can make your work easier. Watch Introduction to Colab to learn more, or just get started below!

Getting started

The document you are reading is not a static web page, but an interactive environment called a **Colab notebook** that lets you write and execute code.

For example, here is a **code cell** with a short Python script that computes a value, stores it in a variable, and prints the result:

```
seconds_in_a_day = 24 * 60 * 60  
seconds_in_a_day
```

86400

Colab notebooks allow you to combine **executable code** and **rich text** in a single document, along with **images**, **HTML**, **LaTeX** and more. When you create your own Colab notebooks, they are stored in your Google Drive account. You can easily share your Colab notebooks with co-workers or friends, allowing them to comment on your notebooks or even edit them. To learn more, see Overview of Colab. To create a new Colab notebook you can use the File menu above, or use the following link: create a new Colab notebook.

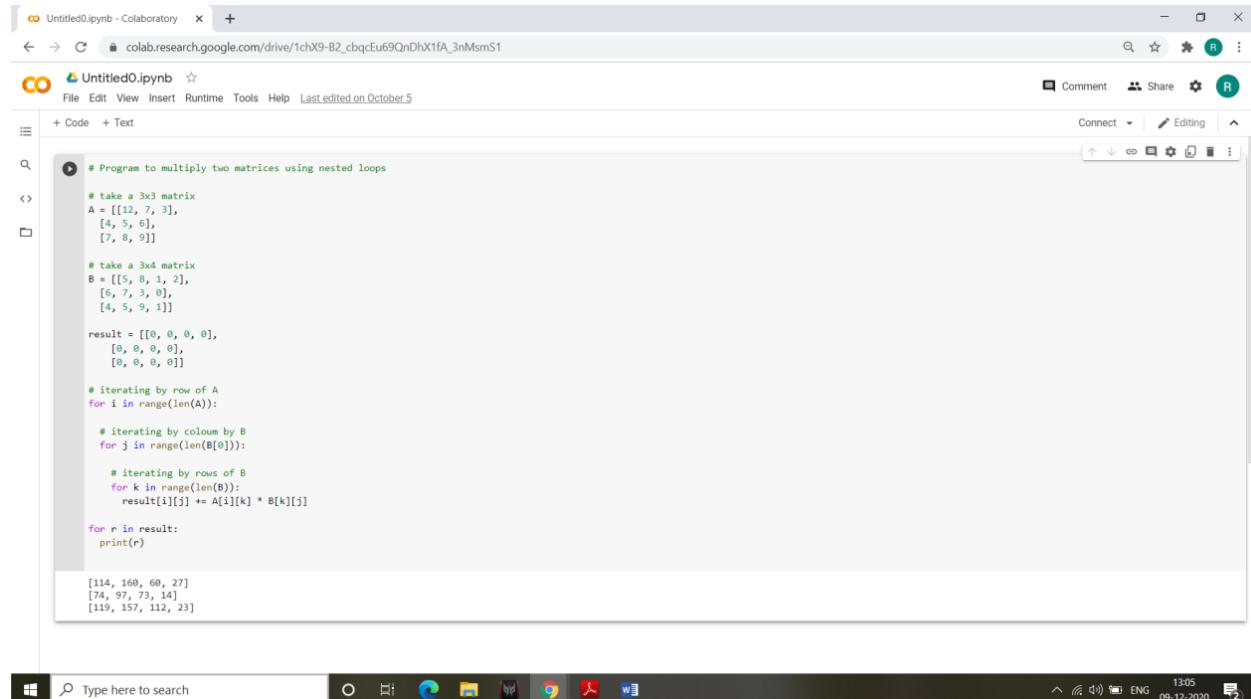
Colab notebooks are Jupyter notebooks that are hosted by Colab. To learn more about the Jupyter project, see jupyter.org.

Program:

```

X = [[12,7,3],
[4 ,5,6],
[7 ,8,9]]
Y = [[5,8,1,2],
[6,7,3,0],
[4,5,9,1]]
result = [[0,0,0,0],
[0,0,0,0],
[0,0,0,0]]
for i in range(len(X)):
    # iterate through columns of Y
    for j in range(len(Y[0])):
        # iterate through rows of Y
        for k in range(len(Y)):
            result[i][j] += X[i][k] * Y[k][j]
for r in result:
    print(r)

```



The screenshot shows a Google Colab notebook titled "Untitled0.ipynb - Colaboratory". The code cell contains Python code for matrix multiplication using nested loops. The output cell shows the resulting matrix:

```

[[114, 160, 60, 27],
 [74, 97, 73, 14],
 [119, 157, 112, 23]]

```

CONCLUSION / RESULT:

In this Experiment, we demonstrate matrix multiplication using python in Google Colab.



Laboratory Report

Experiment No - 9

Batch -

Date of Experiment: _____

Date of Submission: _____

Title: Implementation of machine learning application using Google Colab.

1) Attendance [2] -----

2) Lab Performance [2] -----

3) Oral [1] -----

Overall Marks [5] -----

Subject Incharge

Experiment No. 9

TITLE: Implementation of machine learning application using Google Colab.

PREREQUISITE: Operating Systems

THEORY:

Introduction

Colaboratory, or "Colab" for short, allows you to write and execute Python in your browser, with

- Zero configuration required
- Free access to GPUs
- Easy sharing

Whether you're a **student**, a **data scientist** or an **AI researcher**, Colab can make your work easier. Watch Introduction to Colab to learn more, or just get started below!

Getting started

The document you are reading is not a static web page, but an interactive environment called a **Colab notebook** that lets you write and execute code.

For example, here is a **code cell** with a short Python script that computes a value, stores it in a variable, and prints the result:

```
seconds_in_a_day = 24 * 60 * 60  
seconds_in_a_day
```

86400

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Program:

```
%matplotlib inline  
import numpy as np
```

```
import pandas as pd
import matplotlib.pyplot as plt
plt.rcParams['figure.figsize'] = (20.0, 10.0)

# Reading Data
data = pd.read_csv('headbrain.csv')
data.head()

# Collecting X and Y
X = data['Head Size(cm^3)'].values
Y = data['Brain Weight(grams)'].values

# Calculating coefficient
# Mean X and Y
mean_x = np.mean(X)
mean_y = np.mean(Y)
print(mean_x)
print(mean_y)

# Total number of values
n = len(X)
print(n)

# Using the formula to calculate b1 and b0
numer = 0
denom = 0
for i in range(n):
    numer += (X[i] - mean_x) * (Y[i] - mean_y)
    denom += (X[i] - mean_x) ** 2
b1 = numer / denom #slope
b0 = mean_y - (b1 * mean_x) #intercept
# Printing coefficients
print(b1, b0)

# Ploting Scatter Points
plt.scatter(X, Y, c='ef5423', label='Scatter Plot')
plt.xlabel('Head Size in cm3')
plt.ylabel('Brain Weight in grams')
plt.legend()
plt.show()

max_x = np.max(X)+100
min_x = np.min(X)-100

# Calculating line values x and y
x = np.linspace(min_x,max_x,1000)
y = b0 + b1 * x

# Plotting Values and Regression Line
plt.scatter(X, Y, c='ef5423', label='Scatter Plot')
# Ploting Line
plt.plot(x, y, color='#58b970', label='Regression Line')

# Calculating Root Mean Squares Error
rmse = 0
```

```

for i in range(n):
    y_pred = b0 + b1 * X[i]
    rmse += (Y[i] - y_pred) ** 2
rmse = np.sqrt(rmse/n)
print(rmse)

# Calculating R2 Score
ss_tot = 0
ss_res = 0
for i in range(n):
    y_pred = b0 + b1 * X[i]
    ss_tot += (Y[i] - mean_y) ** 2
    ss_res += (Y[i] - y_pred) ** 2
r2 = 1 - (ss_res/ss_tot)
print(r2)

```

The screenshot shows a Jupyter Notebook interface with the following content:

- Import required libraries:**

```
[8]: import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
from sklearn import linear_model
```

- Read the CSV file:**

```
[12]: data = pd.read_csv("fuel.csv")
data.head()
```

MODELYEAR	MAKE	MODEL	VEHICLECLASS	ENGINESIZE	CYLINDERS	TRANSMISSION	FUELTYPE	FUELCONSUMPTION_CITY	FUELCONSUMPTION_Hwy	FUELCONSUMPTION_Comb	FULEC
0	2014	ACURA	ILX	COMPACT	2.0	4	AS5	2	9.8	6.7	8.5
1	2014	ACURA	ILX	COMPACT	2.4	4	M6	2	11.2	7.7	9.5
2	2014	ACURA	ILX	COMPACT	1.5	4	AV7	2	6.0	5.5	5.9
3	2014	ACURA	MDX	SUV : SMALL	3.5	6	AS6	2	12.7	9.1	11.1

Figure 1:-Import libraries and Read CSV

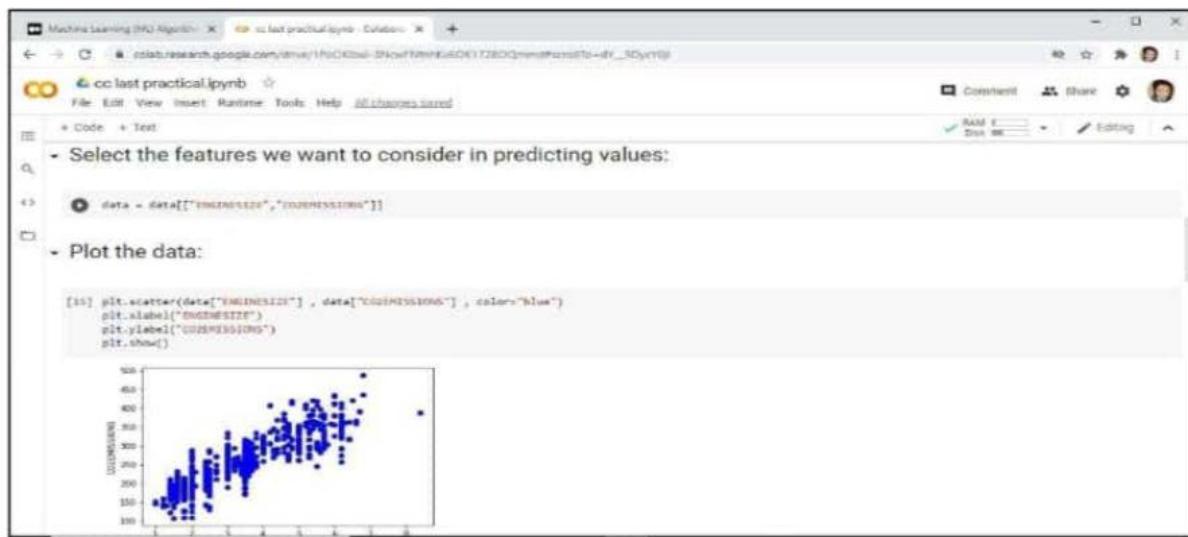


Figure 2: - Select the features and Plot the data

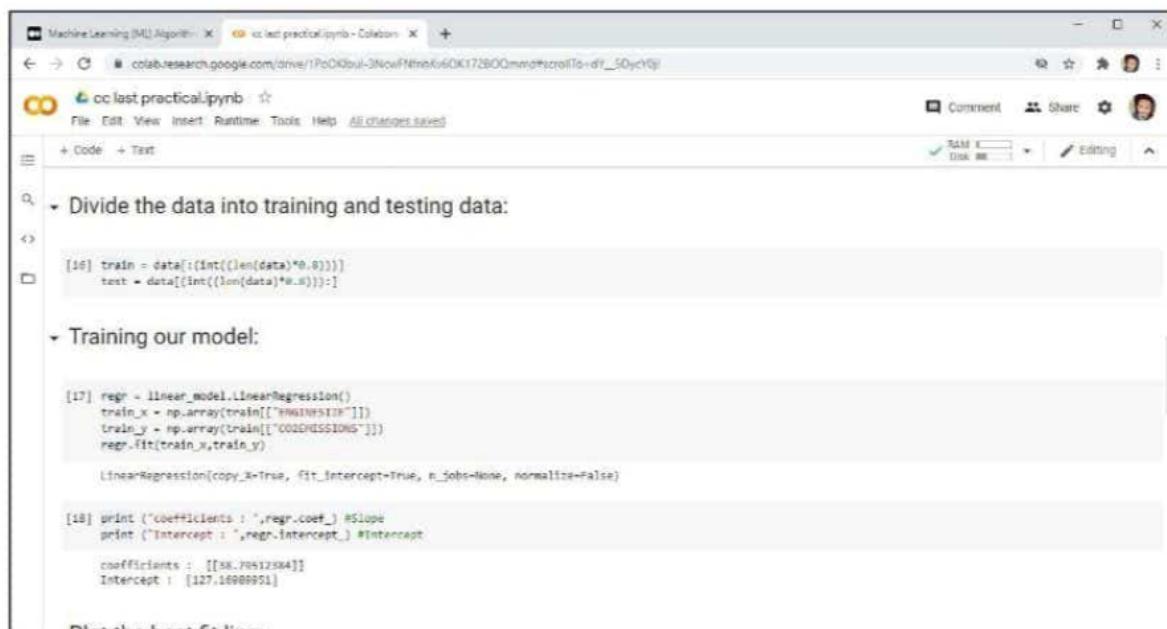


Figure 3: -Divide data and Training data

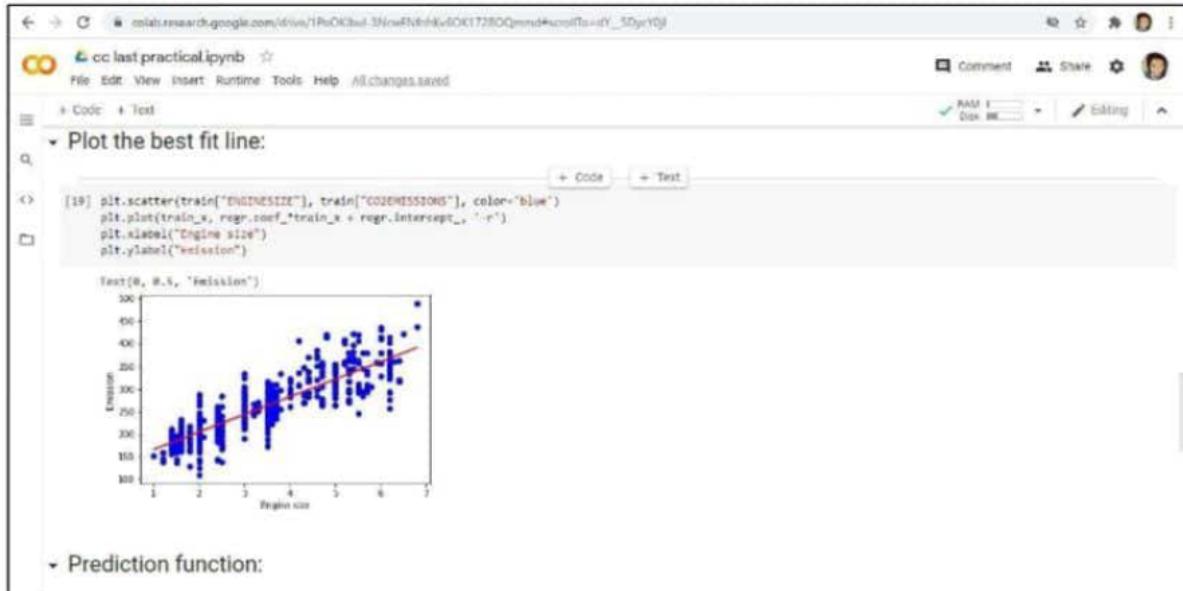


Figure 4: - Plot Best fit line

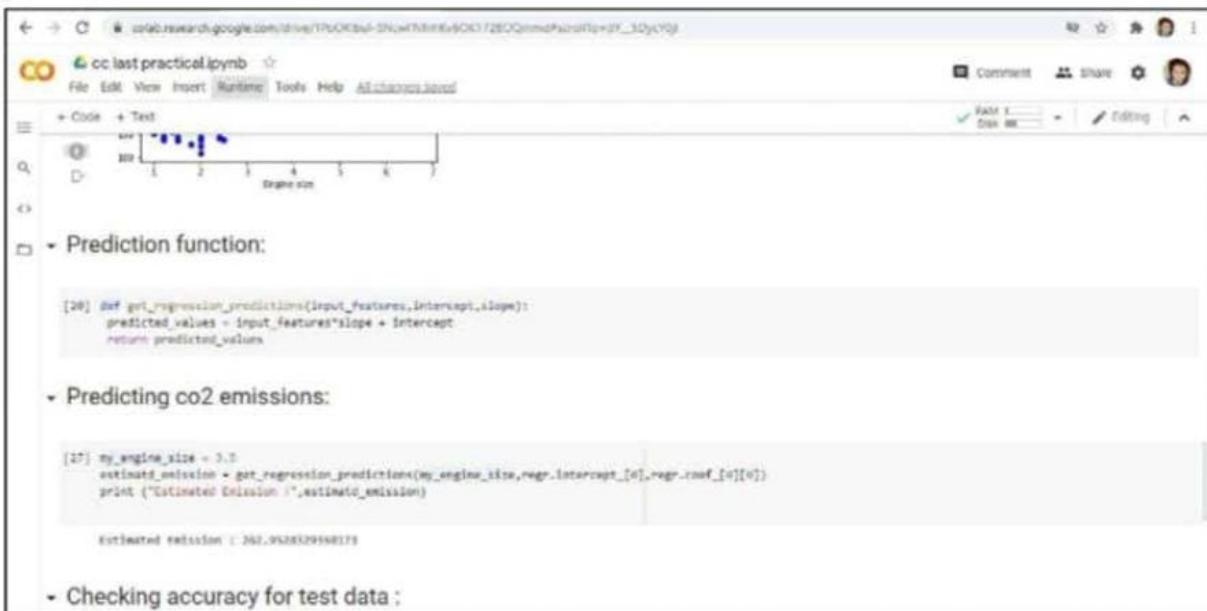


Figure 5: - Prediction Function



The screenshot shows a Google Colab notebook titled "cc last practical.ipynb". The code cell at the bottom contains Python code for calculating accuracy metrics. The output shows Mean absolute error, Mean sum of squares (MSE), and R2-score.

```
[10]: from sklearn.metrics import r2_score
test_x = np.array(test[['ENG100size']])
test_y = np.array(test[['commissions']])
test_y_ = regr.predict(test_x)
print("Mean absolute error: %.2f" % np.mean(np.absolute((test_y_) - test_y)))
print("Mean sum of squares (MSE): %.2f" % np.mean((test_y_) - test_y)**2))
print("R2-score: %.2f" % r2_score(test_y_, test_y))
```

Mean absolute error: 20.00
Mean sum of squares (MSE): 746.49
R2-score: 0.71

Figure 6: -Accuracy test for data

CONCLUSION / RESULT:

In this Experiment, we demonstrate Machine Learning Application using python in Google Colab.