4052520- CLOUD COMPUTING AND INTERNET OF THINGS PRACTICAL

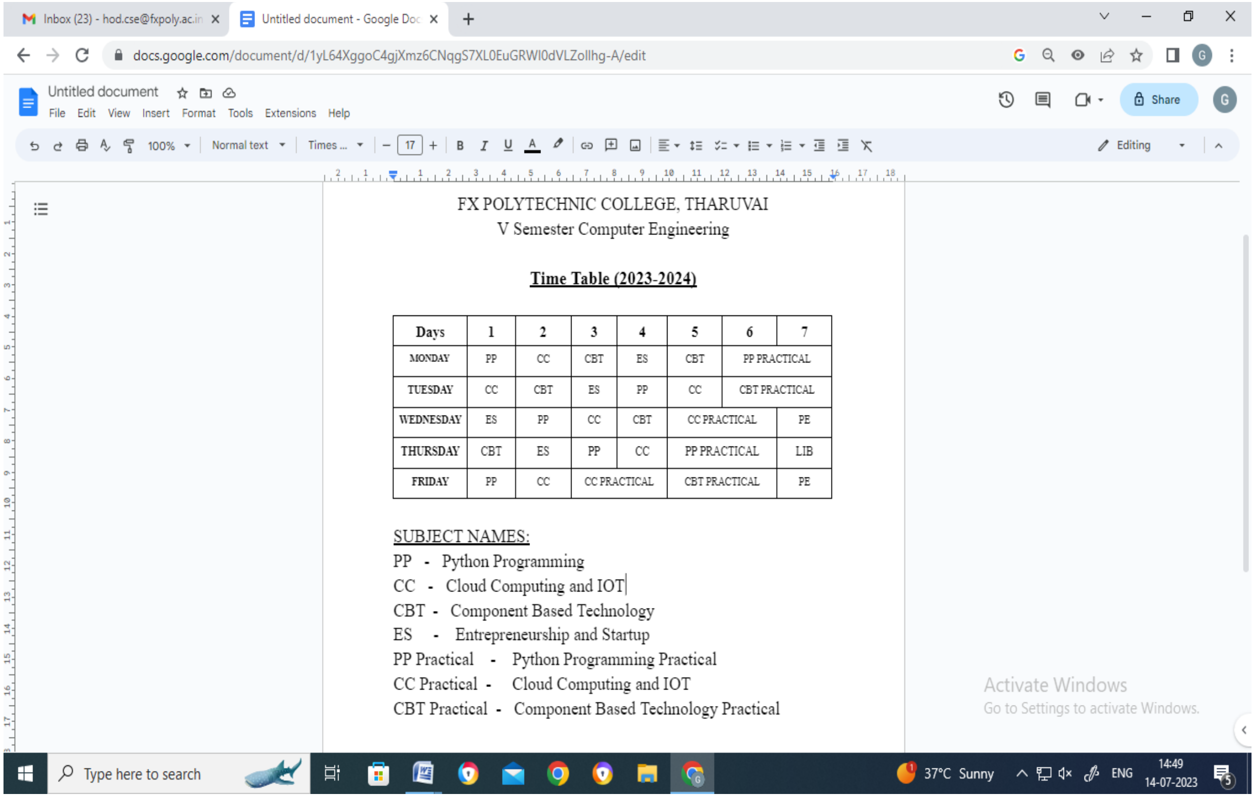
EX NO: 1

AIM: To implement program on SaaS to create a word document of your class time table and store locally and on cloud with doc and pdf format.

PROCEDURE:

1. Go to **http://Docs.Google.com** and log in. click the Google App icon on the top right.
2. Select google docs -> select blank document -> give name to your document for ex: timetable.
3. Select File-> Page Setup-> set the document as portrait or landscape, assign back ground color, adjust spacing etc.
4. Click->ok. Type the heading as XXX polytechnic college and give the required alignment using various formatting options.
5. Insert-> table, select the table template as you needed, and give the proper formatting for your table.
6. Select the table content give the proper formatting like bold, italic, underline, and color management.
7. Whatever you typed in the document is automatically saved on cloud (ie. Mydrive).
8. For creating a folder click on the main menu of google docs click drive, then click new then folder
9. Give name for that folder click create. Then move the file to that particular folder by clicking File->Move-> Third year then move.
10. By storing the contents locally File->Download-> Microsoft word or pdf.
11. To share your folder, right click your folder click share in the drop down menu then add people and group for whom you are going to share the folder.
12. Then click send the collaborator will receive the content you share.

OUTPUT:


Inbox (23) - hod.cse@fxpoly.ac.in
Untitled document - Google Doc
docs.google.com/document/d/1yL64XggoC4gjXmz6CNqgS7XL0EuGRWI0dVLZollhg-A/edit
Untitled document
File Edit View Insert Format Tools Extensions Help
Share
100%
Normal text
Times ...
17
Editing
Activate Windows
Go to Settings to activate Windows.
Type here to search
37°C Sunny
ENG
14:49
14-07-2023

FX POLYTECHNIC COLLEGE, THARUVAI
V Semester Computer Engineering

Time Table (2023-2024)

Days	1	2	3	4	5	6	7
MONDAY	PP	CC	CBT	ES	CBT	PP PRACTICAL	
TUESDAY	CC	CBT	ES	PP	CC	CBT PRACTICAL	
WEDNESDAY	ES	PP	CC	CBT	CC PRACTICAL		PE
THURSDAY	CBT	ES	PP	CC	PP PRACTICAL		LIB
FRIDAY	PP	CC	CC PRACTICAL		CBT PRACTICAL		PE

SUBJECT NAMES:

PP	-	Python Programming
CC	-	Cloud Computing and IOT
CBT	-	Component Based Technology
ES	-	Entrepreneurship and Startup
PP Practical	-	Python Programming Practical
CC Practical	-	Cloud Computing and IOT
CBT Practical	-	Component Based Technology Practical

RESULT:

Thus a SaaS to create a word document of class timetable is implemented and stored locally and on cloud with doc and pdf format.

EX NO: 2

AIM :

To implement program on SaaS to create a spreadsheet to generate a marksheet for student progress report

PROCEDURE:

A. Creating a Web based Spreadsheet

1. Go to http://Docs.Google.com and log in. Click on the Google App Icon on the top right. Click on the Sheet icon

2. Once logged in, you will see the Google sheet home page as shown.

3. in the home page of Google sheets, click on the Blank sheet under start a new Spreadsheet.

4. Title your spreadsheet. for eg. marksheet. Now marksheet.xlsx file is created.

B. Creating Data

Insert various records to the cells as shown in figure

C. Formatting

To change the Font, Font Style and Size:

--> Select the cells to modify

--> Apply required font and required size for the selected cell which are available in the tool bar

-->Apply text color if required

Aligning Data:

--> select cells to align the content

--> Apply **Format ->Alignment->Left or Center or Right** for the selected cell to align the contents

D. Using Formulas and Functions

Sum Functions

Allows us to add values in a data range

syntax: SUM(value1,value2.......value255)

steps for finding SUM

--> Select the Cell

--> click Function ICON in the tool bar

--> from the Dropdown menu, select the SUM option.

--> click and drag the K5 cell corner(+) pointer to apply the formula to the cells K6 to K9 as shown in the figure.

Average Function

The Average function returns the average of selected data range

syntax: AVERAGE(value1,value2.......value255) steps for finding AVERAGE for your data

--> Select the Cell

--> click Function ICON in the tool bar

--> from the Dropdown menu, select the Function option.

--> click and drag the K5 cell corner(+) pointer to apply the formula to the cells K6 to K9 as shown in the figure.

E. Finding the result using local function

steps to find the result of the student

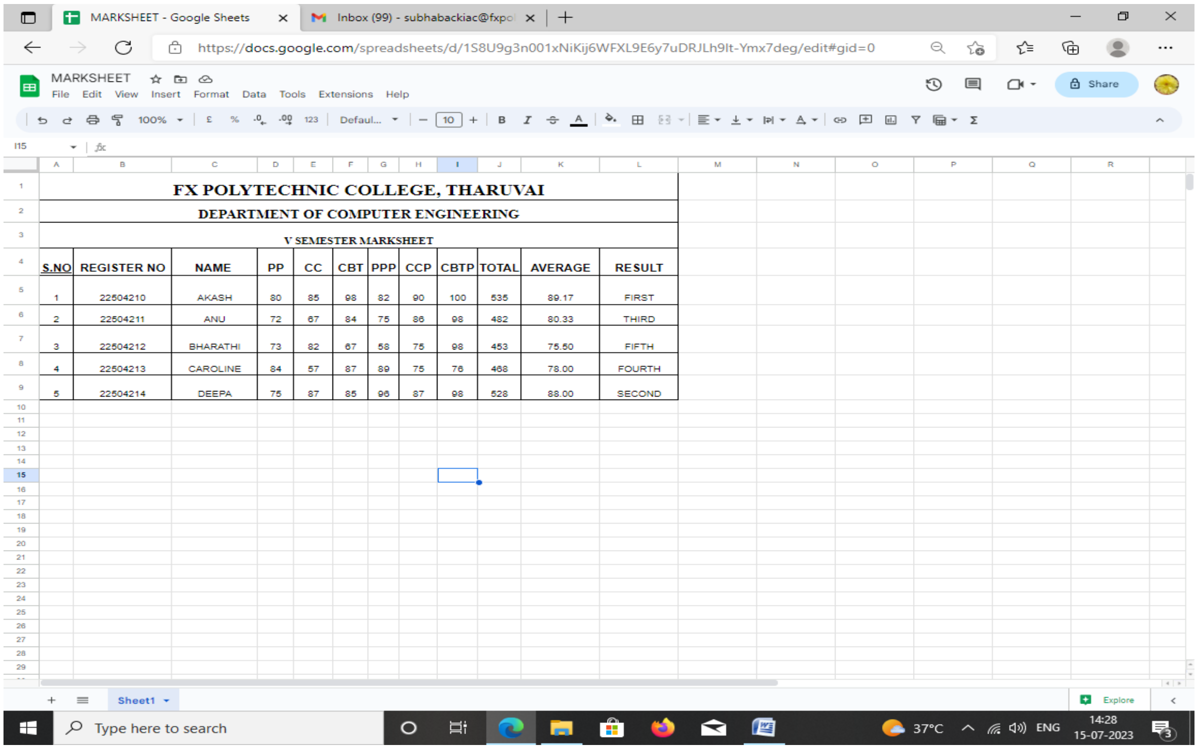
--> click the cell L% and enter the formula as

= IF (AND(D5>=40,E5>=40,F5>=40,G5>=50,H5>=%0,I5>=50,J5>=50), IF(L5>=75,"DISTINCTION",IF(L5>=60,"FIRST","PASS"),"FAIL")

--> to get the other student results in the cell L6 to L9 apply the same formula.

--> now click and drag down the mouse pointer to apply the Formula for the cells L5 to L9. All the cells will be filled with the result value.

OUTPUT:


MARKSHEET - Google Sheets
Inbox (99) - subhabackiac@fxpol
https://docs.google.com/spreadsheets/d/1S8U9g3n001xNiKij6WFXL9E6y7uDRJLh9lt-Ymx7deg/edit#gid=0
MARKSHEET
File Edit View Insert Format Data Tools Extensions Help
Share
100%
Defaul...
10
I15
Sheet1
Explore
Type here to search
37°C
ENG
14:28
15-07-2023

FX POLYTECHNIC COLLEGE, THARUVAI

DEPARTMENT OF COMPUTER ENGINEERING

V SEMESTER MARKSHEET

S.NO	REGISTER NO	NAME	PP	CC	CBT	PPP	CCP	CBTP	TOTAL	AVERAGE	RESULT
1	22504210	AKASH	80	85	98	82	90	100	535	89.17	FIRST
2	22504211	ANU	72	67	84	75	86	98	482	80.33	THIRD
3	22504212	BHARATHI	73	82	67	58	75	98	453	75.50	FIFTH
4	22504213	CAROLINE	84	57	87	89	75	76	468	78.00	FOURTH
5	22504214	DEEPA	75	87	85	96	87	98	528	88.00	SECOND

RESULT:

Thus a SaaS to create a Spreadsheet to generate a marksheet for student progress report is implemented.

EX NO: 3

AIM:

To implement web services by creating your Blogspot and Collaborating via Wikis.

PROCEDURE:

1. Implementing web services by creating your Blogspot

A. Creating your Blogspot

--> Visit **blogger.com.**

--> Login with your google account

--> Choose a name for your blog title Box appears. enter the name and click on next button.

--> Choose a URL for your Blog boX appears. Enter the Blog URL in the address line. and the SAVE button is highlighted

--> Click the SAVE Button. Now you have successfully created a Blogspot blog. **ie.MyFirstBlog**.

B. Changing theme on Blogspot

--> Click on the theme menu item on the Left side menu list.

--> To change the theme, scroll down for eg. choose SOHO Light. Click Preview to preview the theme and then Click Apply.

C. Check whether your blog is visible to search engines.

--> Click on the **Settings menu** items on the left side bar

--> Scroll your page to the **Privacy** section.

--> The privacy toggle button **ie Visible to search engines** button should be **Green**.

D. Adding a Gadget on Blogspot

--> Click on the **Layout menu** items on the left side bar

--> click on Add a Gadget

--> Now a pop window appears

--> Click on the name of the Gadget to add a new gadget to your blog eg. List.

--> Configure Text List box appears. Fill up the required information and Click Save

E. Uploading a logo on blogspot blog.

--> Click on the **Layout menu** items on the left side bar

--> In the Header section , click on the edit pencil

--> Configure header Box Appears. choose a file from your computer or paste a an image URL to upload a logo on your blog

--> Click on the save button to make changes

F. Embedded YouTube Videos to a blog post.

--> Click on the insert video icon

--> Drop down will show the youtube option, Select it.

--> Now add a video box appears. select the search tab . Click magnifying glass button

--> Select a video from populated list.

--> Click on the Select button. The video will be added to your content.

G. Adding labels to a blog spot

--> Click on the label option from the Post Settings.

--> A box will appear to add label

--> Enter Label related to the post

2. Creating a Wiki

A. Creating a document

--> Ensure you have a Google account

--> go to https://sites.google.com/. Then click on create Button + to design your site

--> To do this, go to https://drive.google.com/. then, click on new button then google docs

--> Name it and click on save

--> share My First Wiki box appears.

--> Click setting. In the settings , For my First Wiki Box , two options are available , tick the required one

--> then click copy Link and cick Done.

B. Publishing Document

--> In Google Docs, click File->Share->Publish to web

--> Publish to the web box appears

--> again Publish to the web box appea4s with the link

--> go back to your Google site

--> At the right side window, click + to create a new page

--> Name this page as Page1 and click Done

--> click insert and click the required one

--> if required add Logo also

--> Go to your google docs and copy the URL

--> Give name and select which page . then click done

--> About SaaS link appears shown below

3. Collaborating Blogspot created via wikis

--> Go to your blog ie My First Blog. Click Share. Share box appears

--> Copy link

--> Go to your Google Site. select Home Page.

--> click Publish

-->now your website address is https://sites.google.com/view/myfirstsitepoly

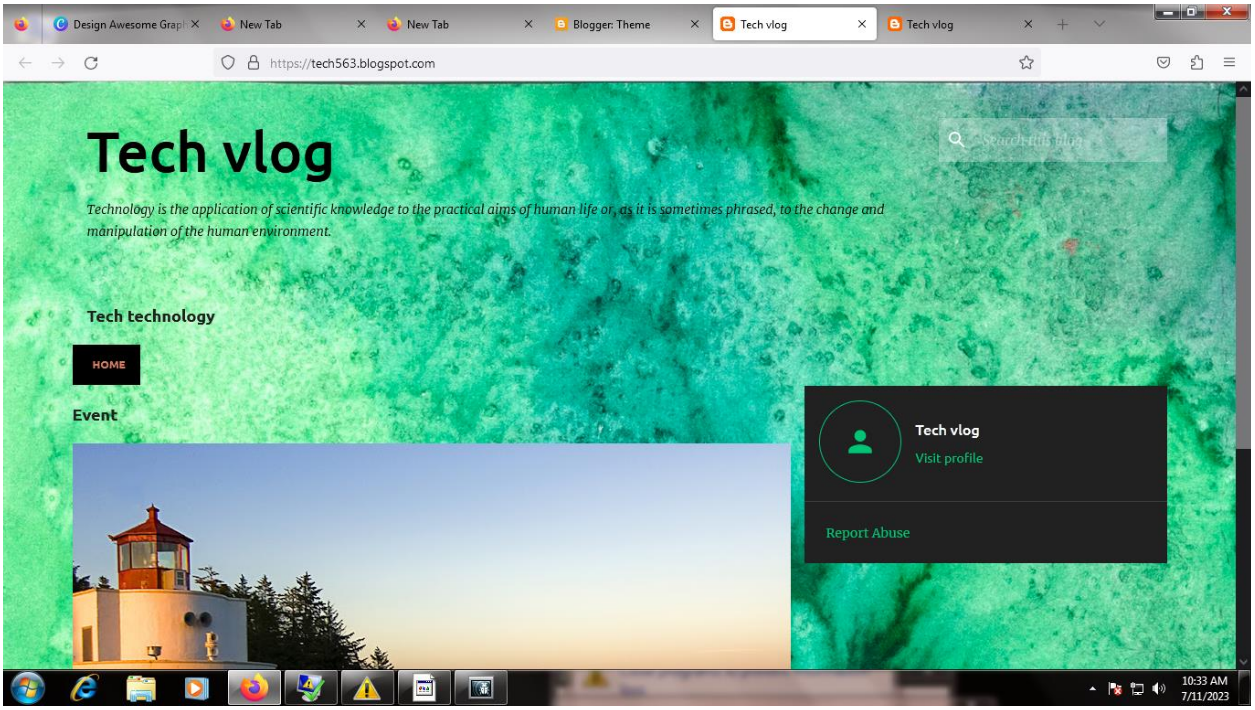
--> Click copy Published Site link at the top right side.

--> Published site link box appears. click copy link.

--> You can send this Link to anyone you wish to send

--> The person who received the link can view your site using this like and view and edit your blog spot.

OUTPUT:



Technology is the application of scientific knowledge to the practical aims of human life or, as it is sometimes phrased, to the change and manipulation of the human environment.

RESULT:

Thus a web service is implemented by creating a Blogspot and collaborating via wikis.

EX NO: 4

AIM:

To implement on PaaS to install Google App Engine, create a program to validate user, create a database login (username, password) in mysql and deploy to cloud.

PROCEDURE:

1. Go to cloud.google.com/sdk/docs/install. Install the gcloud CLI window appears.
2. Download GoogleCloudSDKInsaller by clicking Google Cloud CLI installer. Run the GoogleCloudSDKInstaller.
3. Welcome to Google Cloud CLI Setup window appears. Click Next.
4. Click I Agree. Select Single User and click next.

5. Click install, click Install, Click finish.
6. Now command Line Windows appears. Type 1 and press Enter.
7. Enter your choice as 1 or 2. For creating new project, enter the last choice. For opening existing project, type the required number.
8. Now type exit. It will come out of the command line window, click Console, Now you have entered into the Google Cloud platform.
9. Creating new project: If you want to create a new project, click near my project 97335. Click new project.
10. In the window appearing, give the new project name and click CREATE.
11. Now new project is created. Click Dashboard to get the project information.
12. Under resources, click APP Engine to go to Google App Engine.
13. To create application under App Engine, click CREATE APPLLICATION>
14. Select Region and click NEXT. Choose language as Python and environment as Standard.
15. To go to cloud shell terminal, click at the top right, Now cloud shell terminal appears.
16. To initialize your SDK, give the command as gcloud init.
17. Authorize Cloud Shell window appears. Click AUTHORIZE. To create a file, click open editor. Editor window appears now.
18. You can use the following menu bar to create a file or to open the file.

1. **Creating a program to validate user and deploying to cloud**

```
Import time

Complete = False

User = [[“username”, “password”],[“username2”,paaword2”]]

While not complete:

Username = input(“What is the username?”)

Password = input(“What is the password?”)

For n in len(user):

If username == user[n][0]:

Print(“Good!”)

If password == user[n][1]:
```

Print(“User has been identified, Welcome “,username)

Complete = true

Else: Break Print(“Input password again”)

If not complete: Print(“Input username again!”)

2. Create another file called app.yaml with the following contents. This app.yaml is a configuration file.

Runtime: python27

Api_version: 1

Threadsafe: false

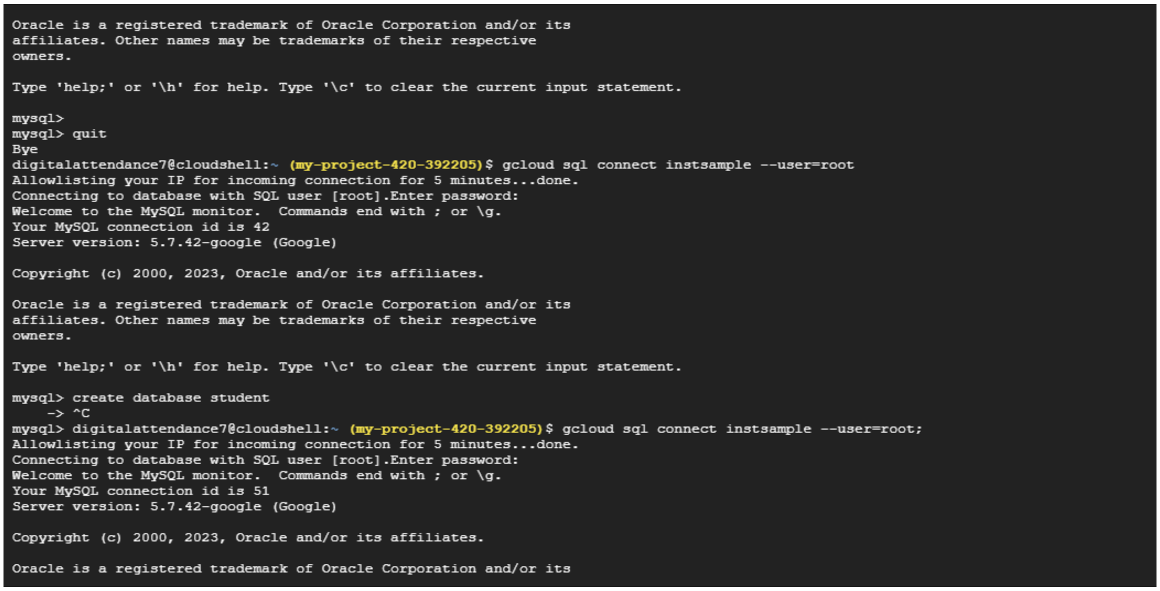
Handlers:

- url:/

Script: index.py

3. Open terminal. Run the application and deploy to cloud by giving the command gcloud app deploy.

OUTPUT:



```
Oracle is a registered trademark of Oracle Corporation and/or its
affiliates. Other names may be trademarks of their respective
owners.

Type 'help;' or '\h' for help. Type '\c' to clear the current input statement.

mysql>
mysql> quit
Bye
digitalattendance7@cloudshell:~ (my-project-420-392205)$ gcloud sql connect instsample --user=root
Allowlisting your IP for incoming connection for 5 minutes...done.
Connecting to database with SQL user [root].Enter password:
Welcome to the MySQL monitor.  Commands end with ; or \g.
Your MySQL connection id is 42
Server version: 5.7.42-google (Google)

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affiliates. Other names may be trademarks of their respective
owners.

Type 'help;' or '\h' for help. Type '\c' to clear the current input statement.

mysql> create database student
    -> ^C
mysql> digitalattendance7@cloudshell:~ (my-project-420-392205)$ gcloud sql connect instsample --user=root;
Allowlisting your IP for incoming connection for 5 minutes...done.
Connecting to database with SQL user [root].Enter password:
Welcome to the MySQL monitor.  Commands end with ; or \g.
Your MySQL connection id is 51
Server version: 5.7.42-google (Google)

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```

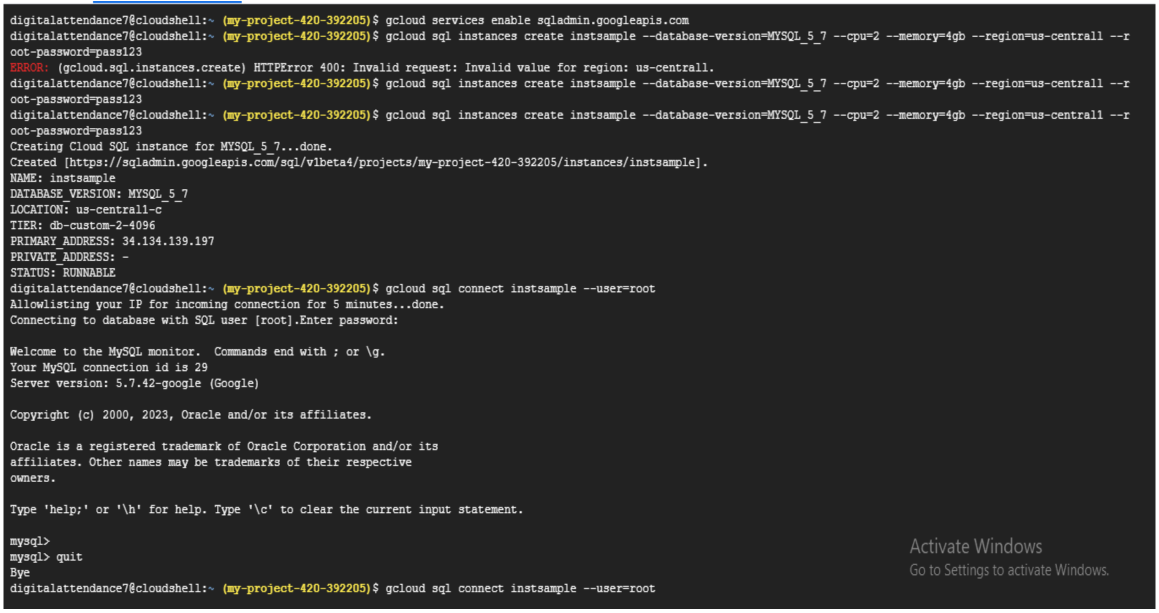

```
digitalattendance7@cloudshell:~ (my-project-420-392205)$ gcloud services enable sqladmin.googleapis.com
digitalattendance7@cloudshell:~ (my-project-420-392205)$ gcloud sql instances create instsample --database-version=MYSQL_5_7 --cpu=2 --memory=4gb --region=us-centrall --r
oot-password=pass123
ERROR: (gcloud.sql.instances.create) HTTPError 400: Invalid request: Invalid value for region: us-centrall.
digitalattendance7@cloudshell:~ (my-project-420-392205)$ gcloud sql instances create instsample --database-version=MYSQL_5_7 --cpu=2 --memory=4gb --region=us-centrall --r
oot-password=pass123
digitalattendance7@cloudshell:~ (my-project-420-392205)$ gcloud sql instances create instsample --database-version=MYSQL_5_7 --cpu=2 --memory=4gb --region=us-central1 --r
oot-password=pass123
Creating Cloud SQL instance for MYSQL_5_7...done.
Created [https://sqladmin.googleapis.com/sql/v1beta4/projects/my-project-420-392205/instances/instsample].
NAME: instsample
DATABASE_VERSION: MYSQL_5_7
LOCATION: us-central1-c
TIER: db-custom-2-4096
PRIMARY_ADDRESS: 34.134.139.197
PRIVATE_ADDRESS: -
STATUS: RUNNABLE
digitalattendance7@cloudshell:~ (my-project-420-392205)$ gcloud sql connect instsample --user=root
Allowlisting your IP for incoming connection for 5 minutes...done.
Connecting to database with SQL user [root].Enter password:

Welcome to the MySQL monitor.  Commands end with ; or \g.
Your MySQL connection id is 29
Server version: 5.7.42-google (Google)

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affiliates. Other names may be trademarks of their respective
owners.

Type 'help;' or '\h' for help. Type '\c' to clear the current input statement.

mysql>
mysql> quit
Bye
digitalattendance7@cloudshell:~ (my-project-420-392205)$ gcloud sql connect instsample --user=root
```

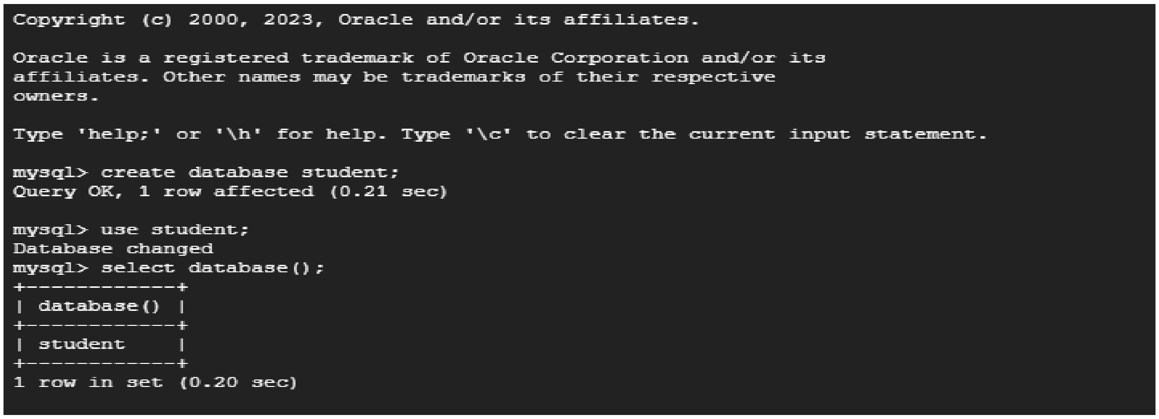

```
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affiliates. Other names may be trademarks of their respective
owners.

Type 'help;' or '\h' for help. Type '\c' to clear the current input statement.

mysql> create database student;
Query OK, 1 row affected (0.21 sec)

mysql> use student;
Database changed
mysql> select database();
+------------+
| database() |
+------------+
| student    |
+------------+
1 row in set (0.20 sec)
```

RESULT:

Thus Google App Engine is installed as PaaS and a program is created to validate user deployed to cloud.

EX NO: 5

AIM:

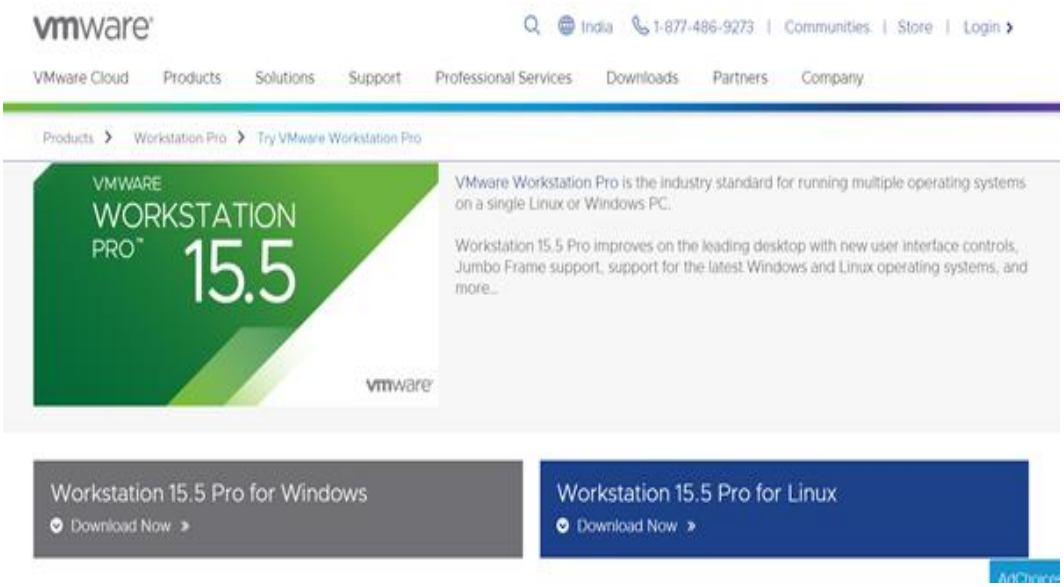
To install VMware workstation with Windows on the top of windows 8.

PROCEDURE:

A. Installing VMware workstation on the top of windows 8

1**.** Installing VMware Workstation from given below link. There are two options for downloading one is Windows and other for Linux. My Base Operating System is Windows8, So I choose for VMware for Windows. If Your Base OS is Linux go and choose VMware for Linux Link.

https://www.vmware.com/in/products/workstation-pro/workstation-pro-evaluation.html

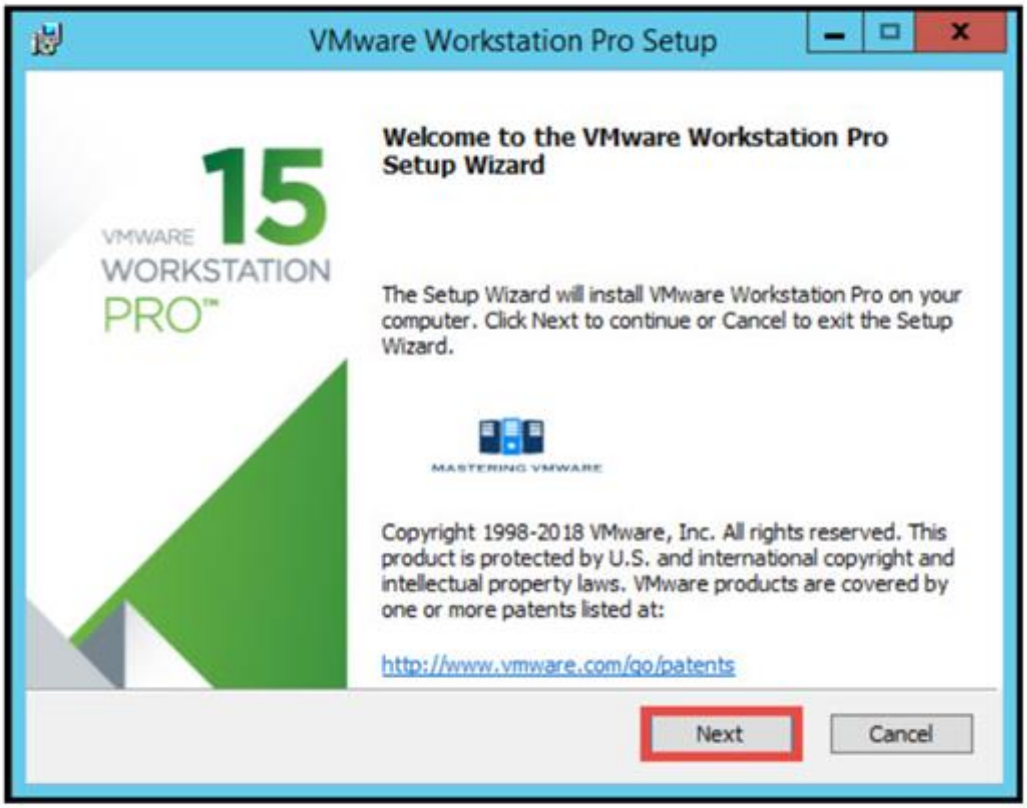

vmware
India
1-877-486-9273 | Communities | Store | Login
VMware Cloud
Products
Solutions
Support
Professional Services
Downloads
Partners
Company
Products
Workstation Pro
Try VMware Workstation Pro
VMWARE WORKSTATION PRO™ 15.5
vmware
Workstation 15.5 Pro for Windows
Download Now
Workstation 15.5 Pro for Linux
Download Now
AdChoices

VMware Workstation Pro is the industry standard for running multiple operating systems on a single Linux or Windows PC.

Workstation 15.5 Pro improves on the leading desktop with new user interface controls, Jumbo Frame support, support for the latest Windows and Linux operating systems, and more...

2. Go to Download Folder. Click the VMware downloaded File and Install it. Click on VMware Software and click and choose "**Pin to Taskbar".**

3. Click on VMware Software and Click on Next to the Installation wizard.



VMware Workstation Pro Setup

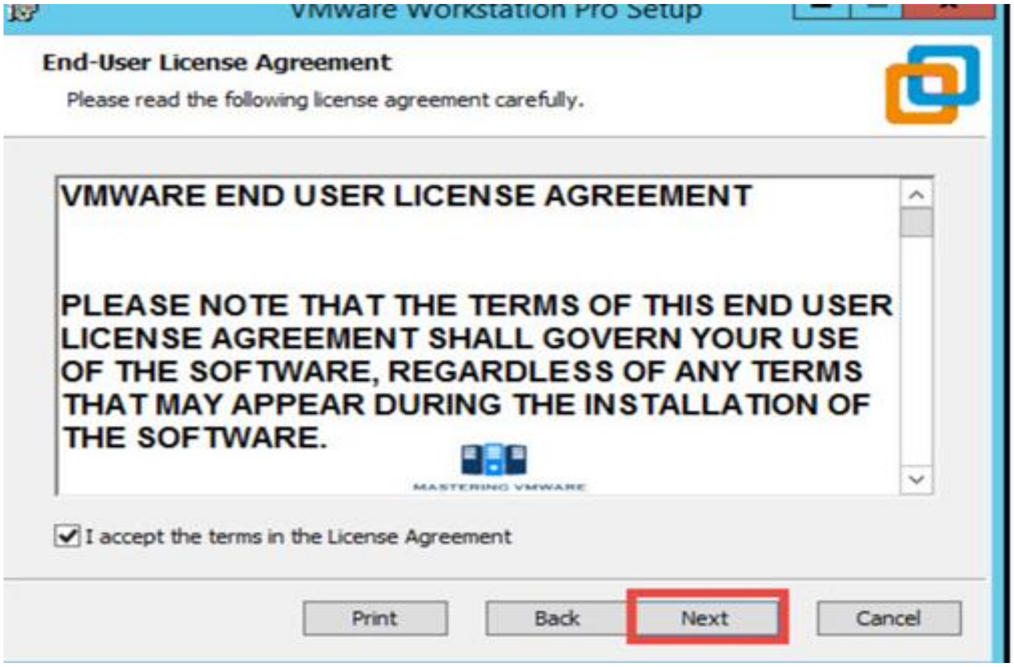
Welcome to the VMware Workstation Pro Setup Wizard

The Setup Wizard will install VMware Workstation Pro on your computer. Click Next to continue or Cancel to exit the Setup Wizard.

Copyright 1998-2018 VMware, Inc. All rights reserved. This product is protected by U.S. and international copyright and intellectual property laws. VMware products are covered by one or more patents listed at:

http://www.vmware.com/go/patents

4. Read and Accept the VMware End User license agreement. Click Next to Continue.



VMware Workstation Pro Setup

End-User License Agreement

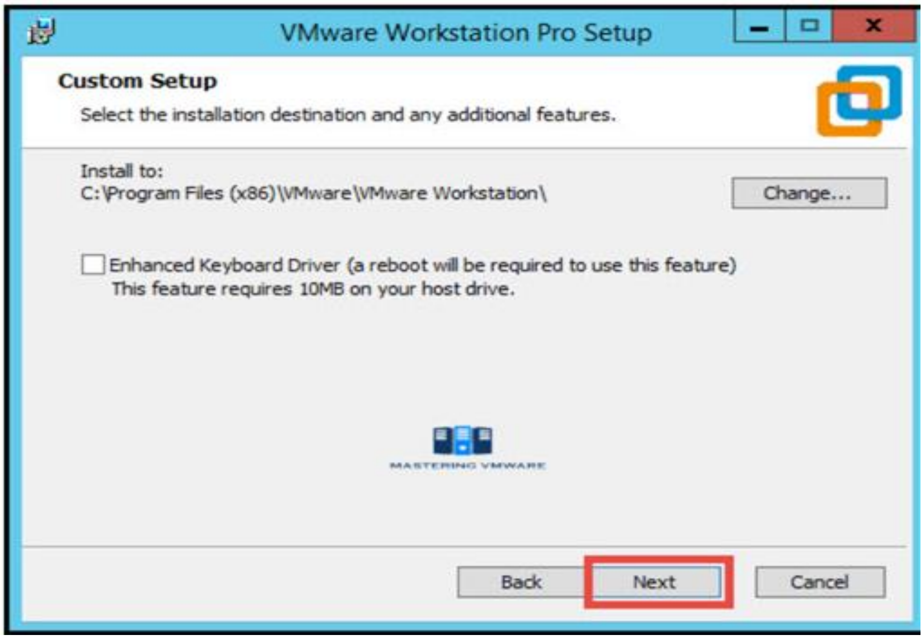
Please read the following license agreement carefully.

VMWARE END USER LICENSE AGREEMENT

PLEASE NOTE THAT THE TERMS OF THIS END USER LICENSE AGREEMENT SHALL GOVERN YOUR USE OF THE SOFTWARE, REGARDLESS OF ANY TERMS THAT MAY APPEAR DURING THE INSTALLATION OF THE SOFTWARE.

☑ I accept the terms in the License Agreement

5. Specify the Installation directory. You can also enable Enhance keyboard driver here. Click Next to continue.



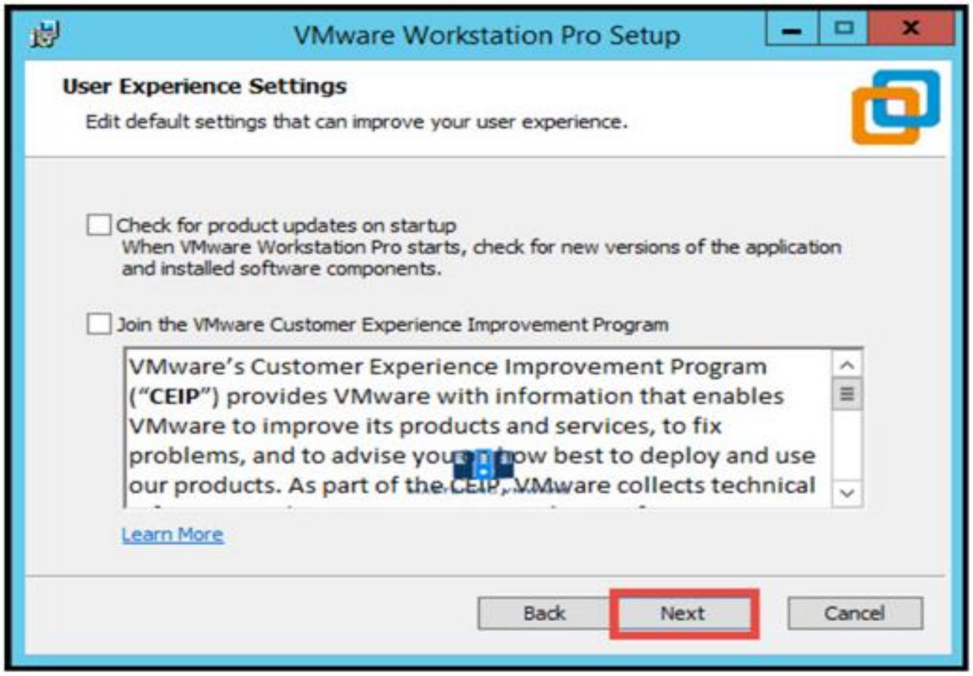
Custom Setup

Select the installation destination and any additional features.

Install to:
C:\Program Files (x86)\VMware\VMware Workstation\

□ Enhanced Keyboard Driver (a reboot will be required to use this feature)
This feature requires 10MB on your host drive.

6. You can enable product startup and join the VMware Customer experience Improvement program here. Click Next to Continue.



User Experience Settings

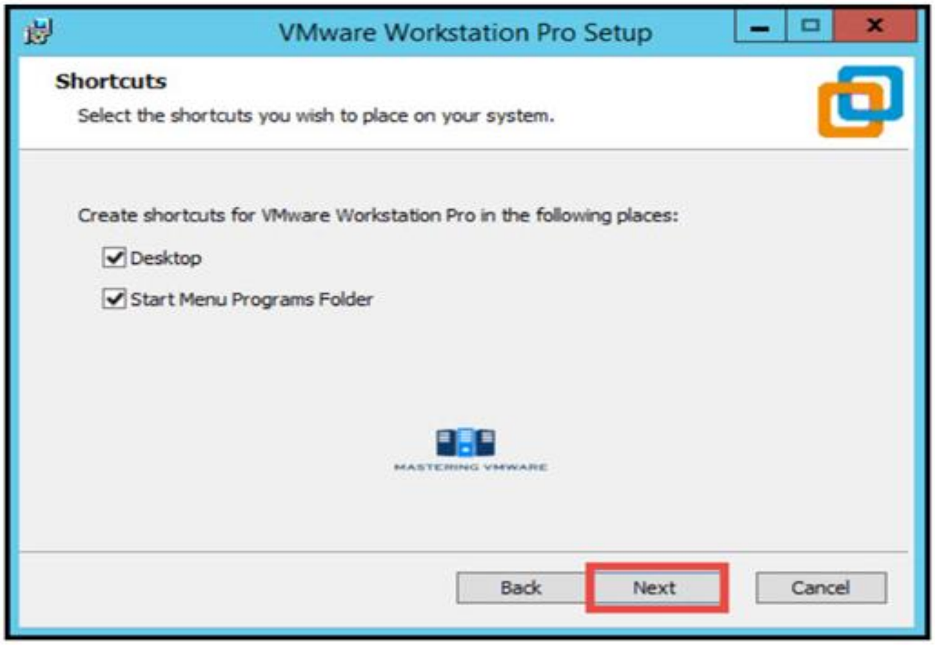
Edit default settings that can improve your user experience.

□ Check for product updates on startup
When VMware Workstation Pro starts, check for new versions of the application and installed software components.

□ Join the VMware Customer Experience Improvement Program

VMware's Customer Experience Improvement Program ("**CEIP**") provides VMware with information that enables VMware to improve its products and services, to fix problems, and to advise you on how best to deploy and use our products. As part of the CEIP, VMware collects technical

7. Select the shortcuts you want to create for easy access to VMware Workstation. Click Next to Continue.



VMware Workstation Pro Setup

Shortcuts

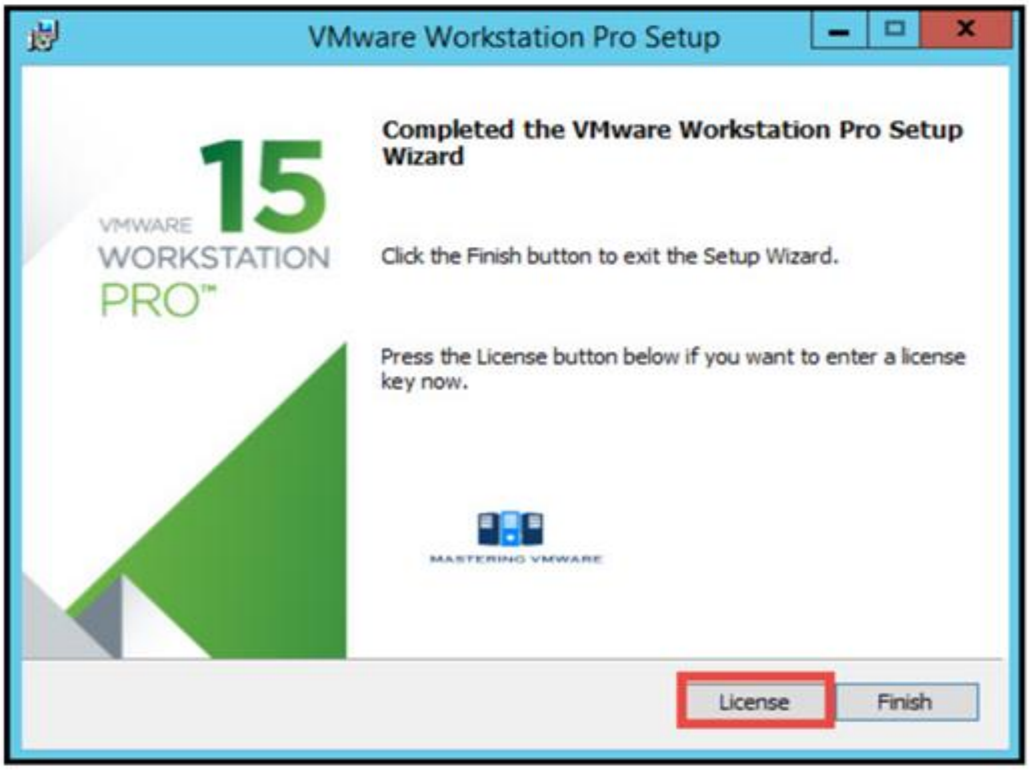
Select the shortcuts you wish to place on your system.

Create shortcuts for VMware Workstation Pro in the following places:

☑ Desktop

☑ Start Menu Programs Folder

8. Click Install button to start the installation. Installation will take just few seconds to complete. If you have license-key then click on License to enter the license or you can also click Finish to exit the Installer.



VMware Workstation Pro Setup

Completed the VMware Workstation Pro Setup Wizard

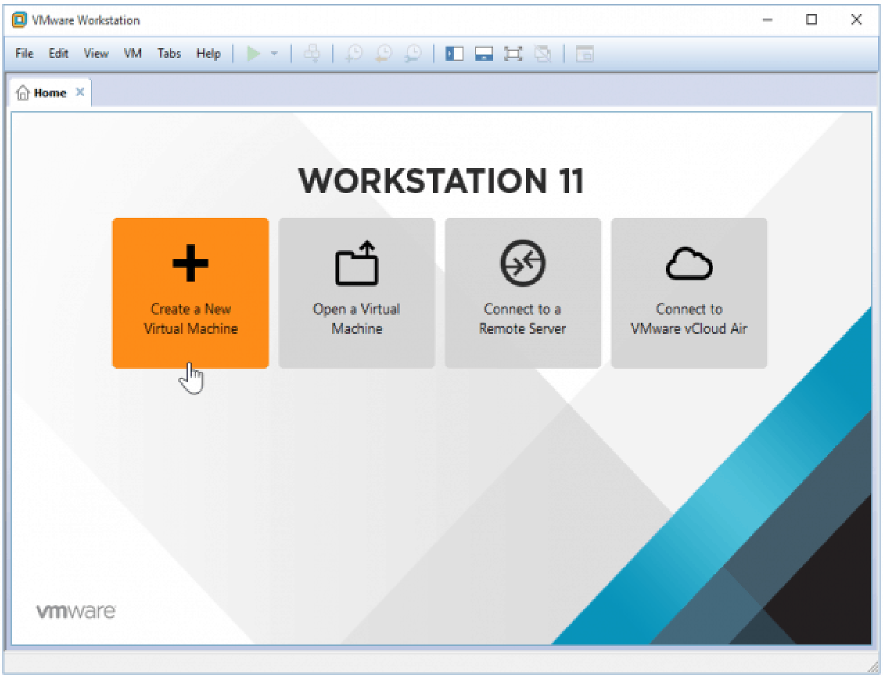
Click the Finish button to exit the Setup Wizard.

Press the License button below if you want to enter a license key now.

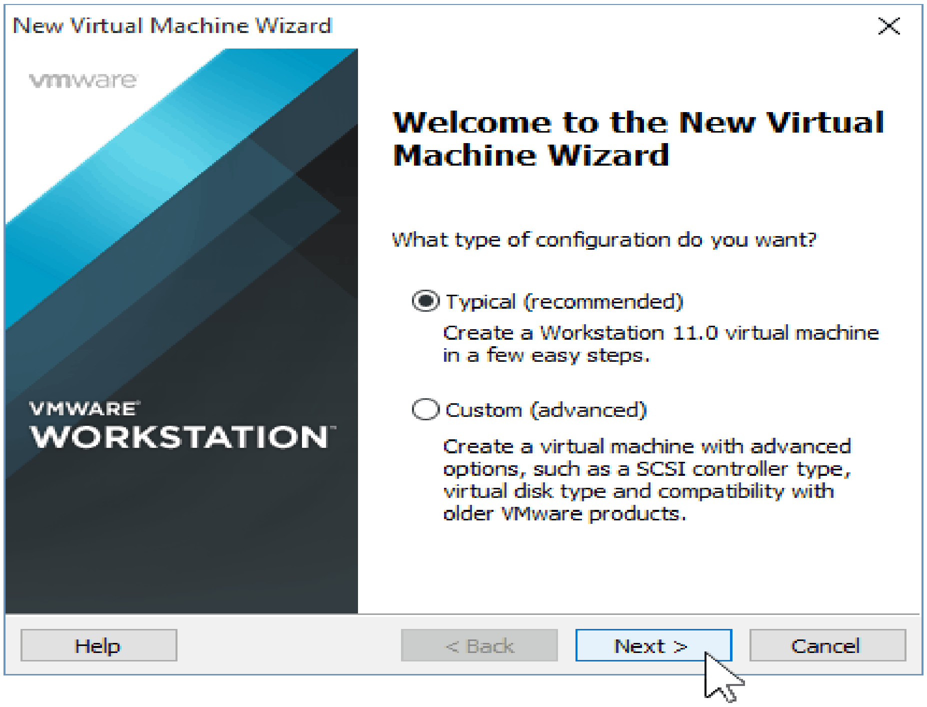
9. Provide the License Key for VMware Workstation Pro. Press Enter to continue. Click Finish to exit the wizard. Now you can start the VMware Workstation Pro by clicking on the shortcut on Desktop.

A. Installing windows Os on VMware workstation

1. Set up a VMware Virtual Machine
2. Start by opening VMware and selecting "Create a New Virtual Machine"


VMware Workstation
File Edit View VM Tabs Help
Home
WORKSTATION 11
Create a New Virtual Machine
Open a Virtual Machine
Connect to a Remote Server
Connect to VMware vCloud Air
vmware

3. We'll go with a **Typical configuration**. If you're feeling fancy and really want to tweak the parameters, you can pick a Custom one, but we won't be going through a full Custom setup in this tutorial.



New Virtual Machine Wizard

Welcome to the New Virtual Machine Wizard

What type of configuration do you want?

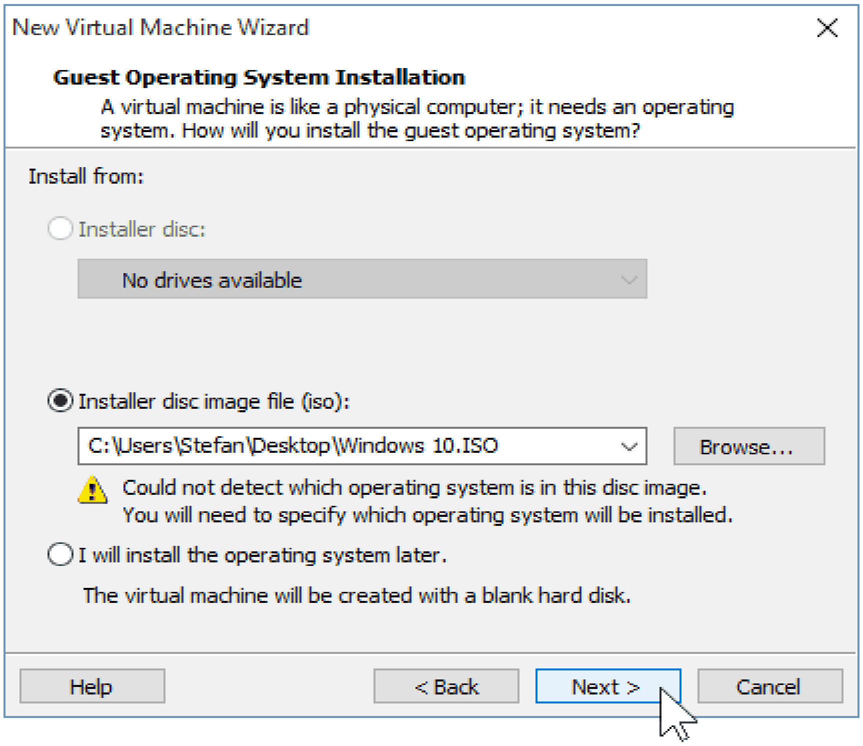
● Typical (recommended)

Create a Workstation 11.0 virtual machine in a few easy steps.

○ Custom (advanced)

Create a virtual machine with advanced options, such as a SCSI controller type, virtual disk type and compatibility with older VMware products.

4. You will now need to show VMWare the **path to your Windows 10 ISO**. If you don’t have one, here’s how to get it.



New Virtual Machine Wizard

Guest Operating System Installation

A virtual machine is like a physical computer; it needs an operating system. How will you install the guest operating system?

Install from:

○ Installer disc:

No drives available

● Installer disc image file (iso):

C:\Users\Stefan\Desktop\Windows 10.ISO

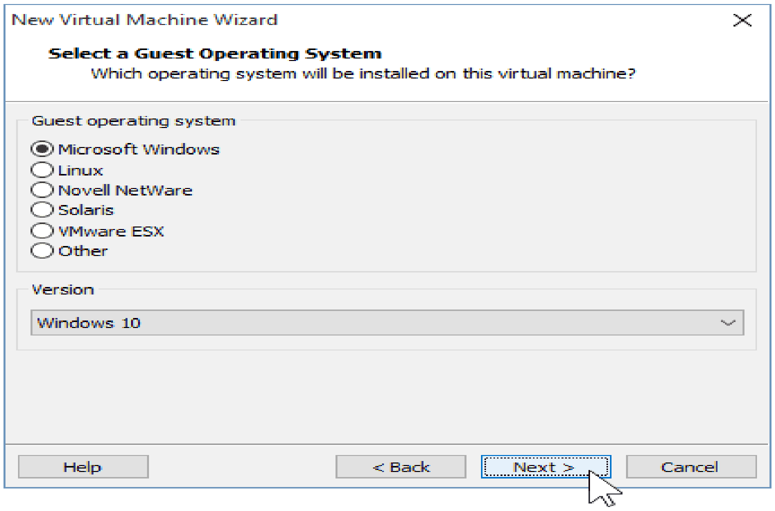
⚠ Could not detect which operating system is in this disc image. You will need to specify which operating system will be installed.

○ I will install the operating system later.

The virtual machine will be created with a blank hard disk.

5. If VMware doesn’t automatically detect the OS from the ISO, you’ll need to select it manually. You’ll have the option to pick between **32 and 64-bit** versions of Windows OS.

6. **Tip:** If you don’t have a lot of RAM and CPU to spare, I’d advise you to go with the 32-bit variant.



New Virtual Machine Wizard

Select a Guest Operating System

Which operating system will be installed on this virtual machine?

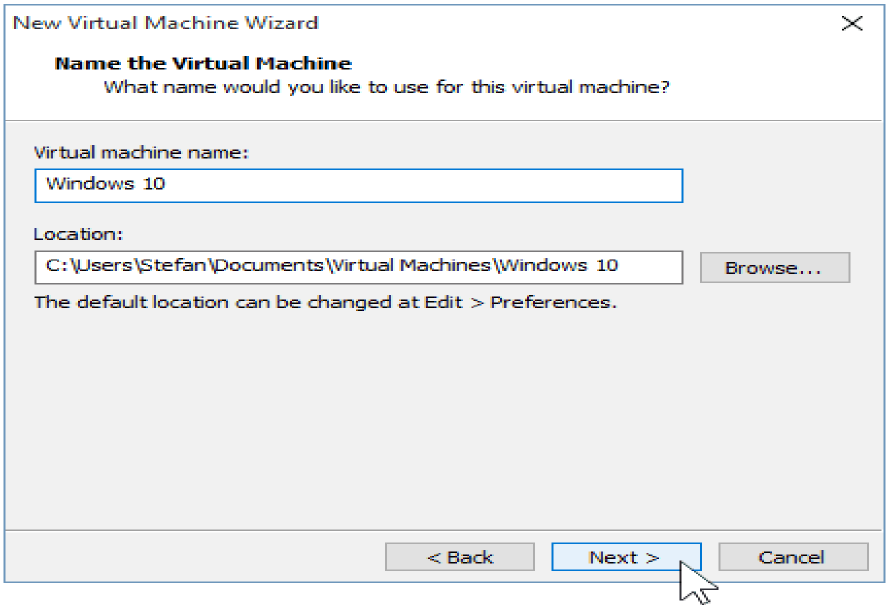
Guest operating system

● Microsoft Windows
○ Linux
○ Novell NetWare
○ Solaris
○ VMware ESX
○ Other

Version

Windows 10

7. **Choose a name for your Virtual Machine** as well as **a location where it will be stored**. I stuck with the defaults here.



New Virtual Machine Wizard

Name the Virtual Machine

What name would you like to use for this virtual machine?

Virtual machine name:

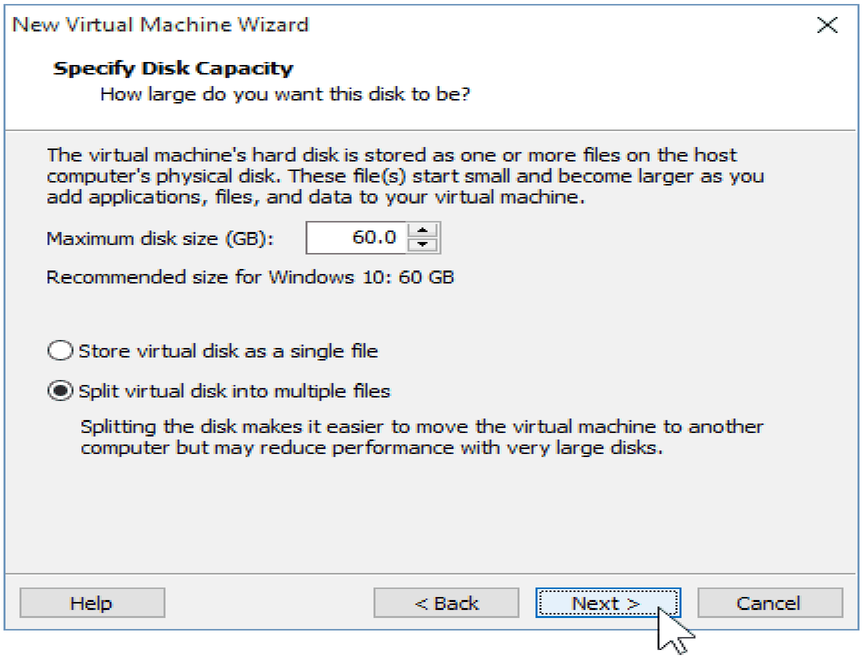
Windows 10

Location:

C:\Users\Stefan\Documents\Virtual Machines\Windows 10

The default location can be changed at Edit > Preferences.

8. Next up is creating your virtual disk**.** The advised **maximum limit is 60 GB, which is okay**. I advise you to stay with the **“Split virtual disk into multiple files”** option; otherwise, VMware will immediately allocate the space on your hard drive.



New Virtual Machine Wizard

Specify Disk Capacity

How large do you want this disk to be?

The virtual machine's hard disk is stored as one or more files on the host computer's physical disk. These file(s) start small and become larger as you add applications, files, and data to your virtual machine.

Maximum disk size (GB): 60.0

Recommended size for Windows 10: 60 GB

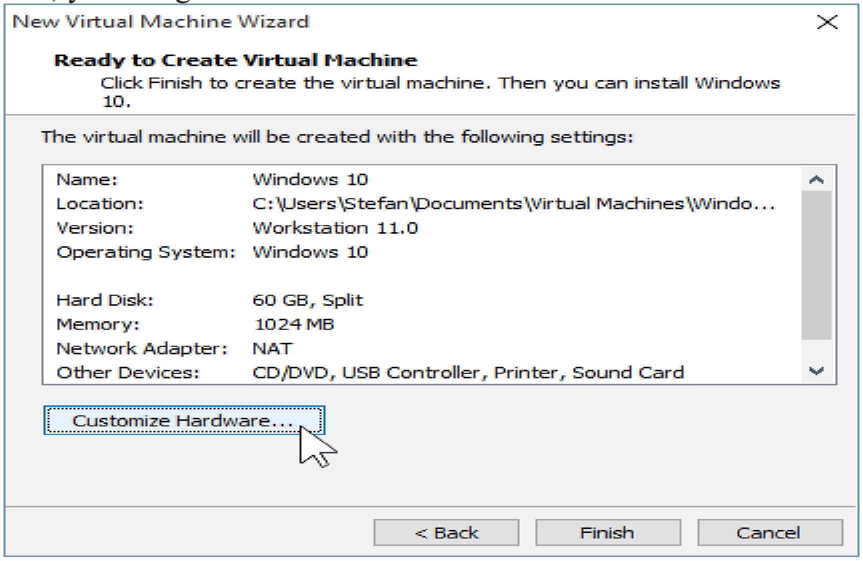
○ Store virtual disk as a single file

● Split virtual disk into multiple files

Splitting the disk makes it easier to move the virtual machine to another computer but may reduce performance with very large disks.

9. **Step 2: Customizing the Virtual Machine Hardware (optional)**

10. If you want to get fancy, **you can customize the hardware that your VM will use**. I’ll go ahead and do this to show you some of the options you can change, but if you’re okay with the VMware defaults, you can go ahead and select “Finish.”



New Virtual Machine Wizard

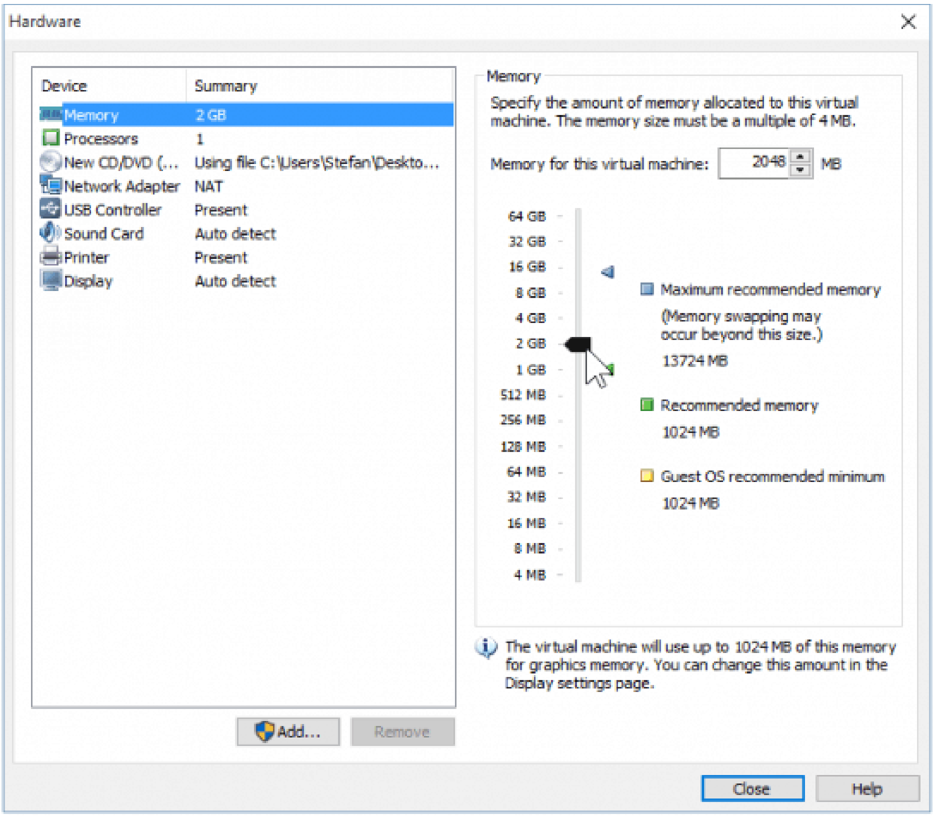
Ready to Create Virtual Machine

Click Finish to create the virtual machine. Then you can install Windows 10.

The virtual machine will be created with the following settings:

Name:	Windows 10
Location:	C:\Users\Stefan\Documents\Virtual Machines\Windo...
Version:	Workstation 11.0
Operating System:	Windows 10
Hard Disk:	60 GB, Split
Memory:	1024 MB
Network Adapter:	NAT
Other Devices:	CD/DVD, USB Controller, Printer, Sound Card

11. Selecting the Memory option, I can **increase or decrease the available RAM** for this VM. I'll go for 2GB instead of the default 1GB.



Hardware

Device	Summary
Memory	2 GB
Processors	1
New CD/DVD (...	Using file C:\Users\Stefan\Deskto...
Network Adapter	NAT
USB Controller	Present
Sound Card	Auto detect
Printer	Present
Display	Auto detect

Memory

Specify the amount of memory allocated to this virtual machine. The memory size must be a multiple of 4 MB.

Memory for this virtual machine: 2048 MB

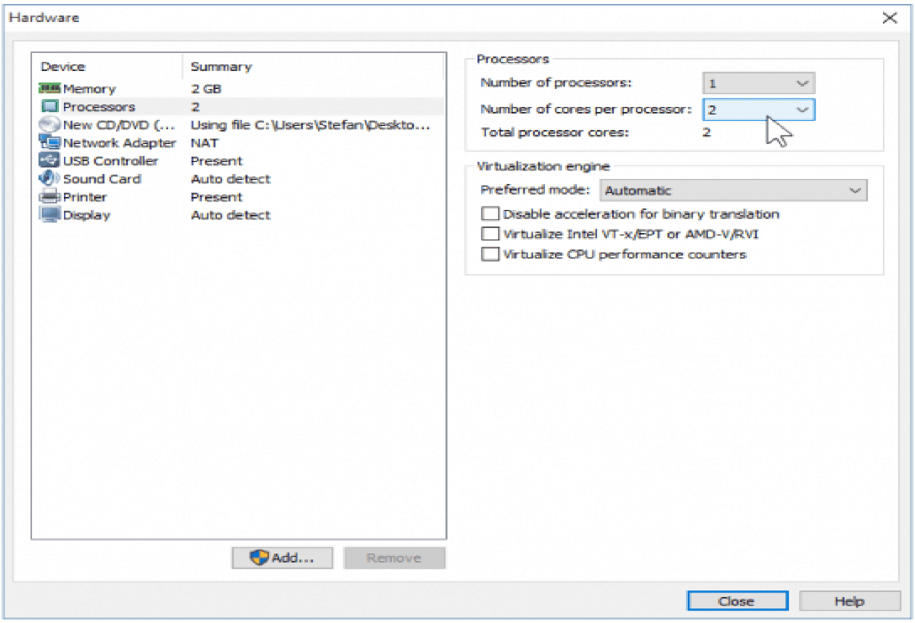
🟦 Maximum recommended memory
(Memory swapping may occur beyond this size.)
13724 MB

🟩 Recommended memory
1024 MB

🟨 Guest OS recommended minimum
1024 MB

The virtual machine will use up to 1024 MB of this memory for graphics memory. You can change this amount in the Display settings page.

12. I'll also give my VM **some extra CPU power** by allowing it to use two cores instead of one.



Hardware

Device	Summary
Memory	2 GB
Processors	2
New CD/DVD (...	Using file C:\Users\Stefan\Deskto...
Network Adapter	NAT
USB Controller	Present
Sound Card	Auto detect
Printer	Present
Display	Auto detect

Processors

Number of processors: 1

Number of cores per processor: 2

Total processor cores: 2

Virtualization engine

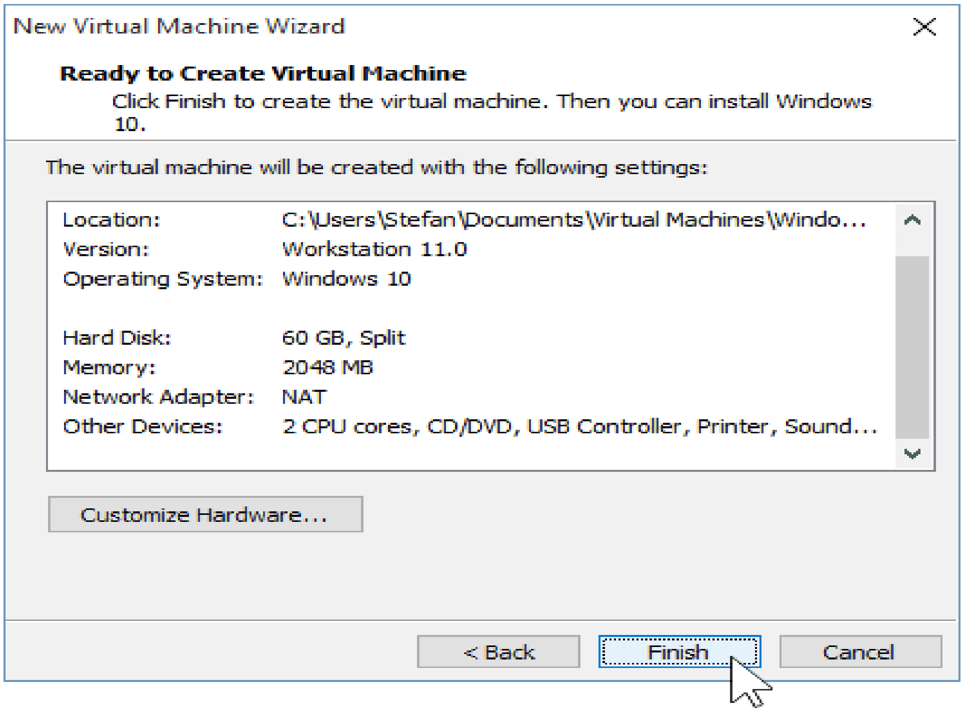
Preferred mode: Automatic

□ Disable acceleration for binary translation

□ Virtualize Intel VT-x/EPT or AMD-V/RVI

□ Virtualize CPU performance counters

13. When you’re done tweaking the hardware, you can close the windows and **click “Finish” on the New VM Wizard**.



New Virtual Machine Wizard

Ready to Create Virtual Machine

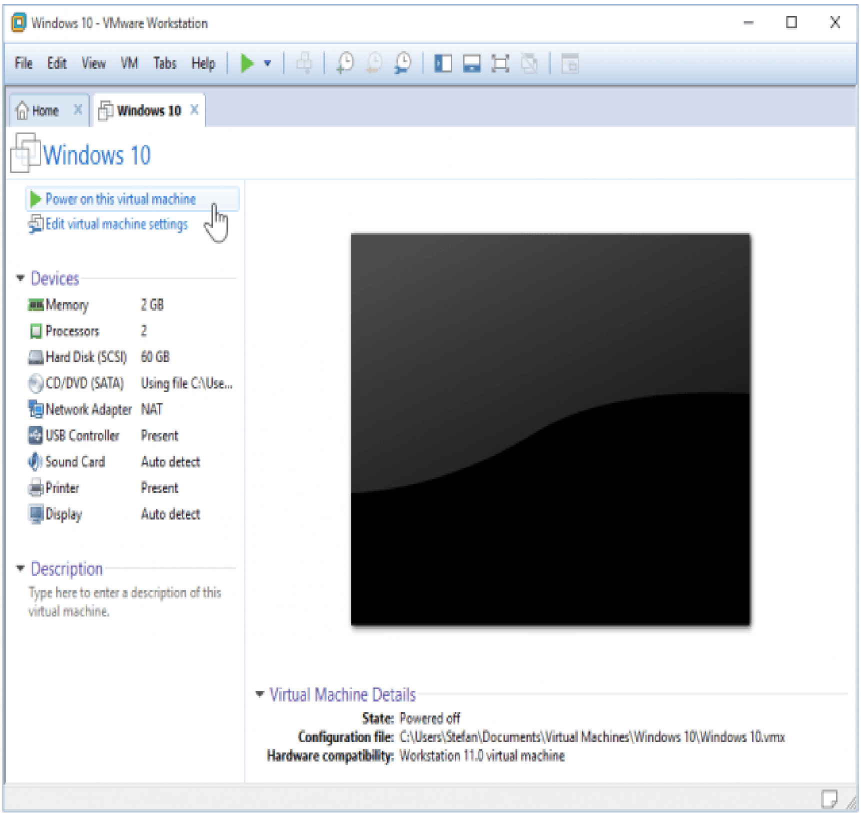
Click Finish to create the virtual machine. Then you can install Windows 10.

The virtual machine will be created with the following settings:

Location:	C:\Users\Stefan\Documents\Virtual Machines\Windo...
Version:	Workstation 11.0
Operating System:	Windows 10
Hard Disk:	60 GB, Split
Memory:	2048 MB
Network Adapter:	NAT
Other Devices:	2 CPU cores, CD/DVD, USB Controller, Printer, Sound...

14. Step 3: Installing Windows 10

15. Once you’re ready to begin installing, **click on “Power on this virtual machine.”** From here on, the install should begin.


Windows 10 - VMware Workstation
File
Edit
View
VM
Tabs
Help
Home
Windows 10
Power on this virtual machine
Edit virtual machine settings

Windows 10

Devices

Memory	2 GB
Processors	2
Hard Disk (SCSI)	60 GB
CD/DVD (SATA)	Using file C:\Use...
Network Adapter	NAT
USB Controller	Present
Sound Card	Auto detect
Printer	Present
Display	Auto detect

Description

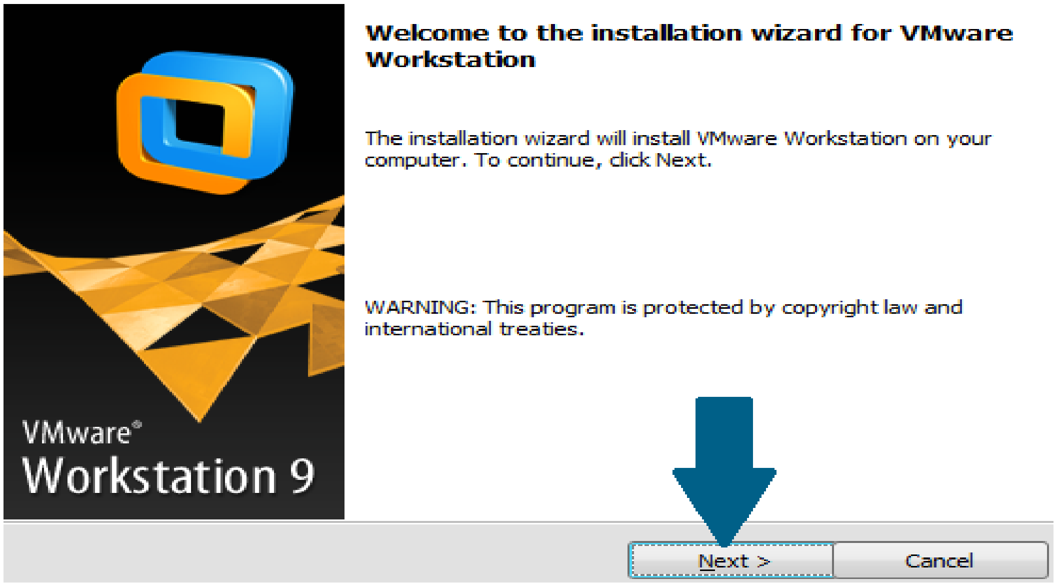
Type here to enter a description of this virtual machine.

Virtual Machine Details

State: Powered off
Configuration file: C:\Users\Stefan\Documents\Virtual Machines\Windows 10\Windows 10.vmx
Hardware compatibility: Workstation 11.0 virtual machine

16. Installing Windows as a virtual machine is no different from making a clean install of Windows.

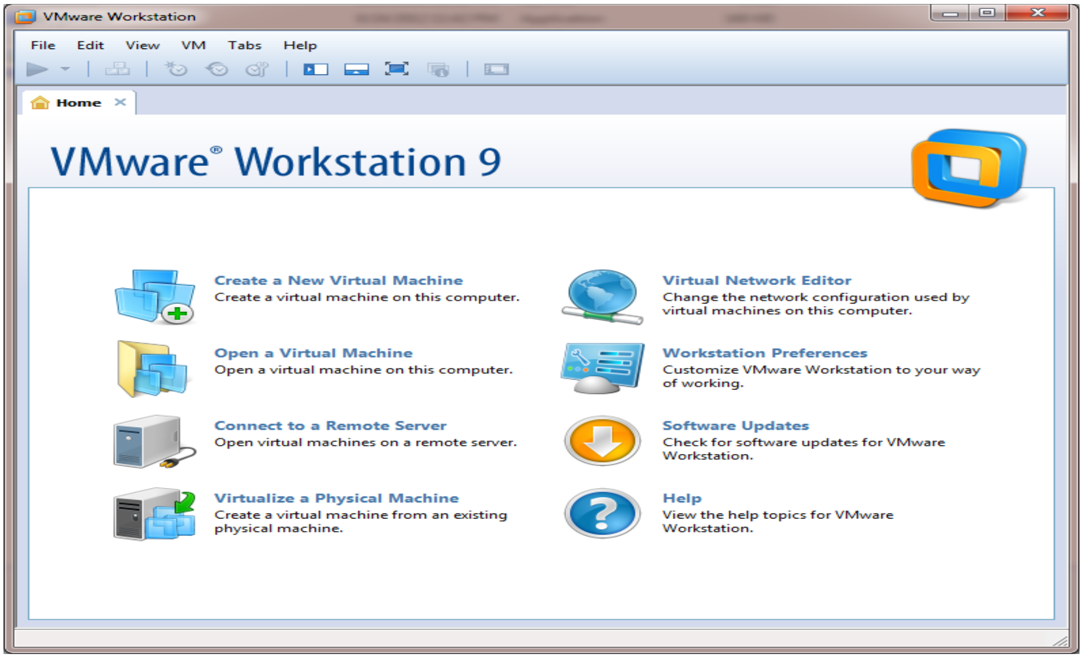
OUTPUT:



Welcome to the installation wizard for VMware Workstation

The installation wizard will install VMware Workstation on your computer. To continue, click Next.

WARNING: This program is protected by copyright law and international treaties.



Create a New Virtual Machine
Create a virtual machine on this computer.

Open a Virtual Machine
Open a virtual machine on this computer.

Connect to a Remote Server
Open virtual machines on a remote server.

Virtualize a Physical Machine
Create a virtual machine from an existing physical machine.

Virtual Network Editor
Change the network configuration used by virtual machines on this computer.

Workstation Preferences
Customize VMware Workstation to your way of working.

Software Updates
Check for software updates for VMware Workstation.

Help
View the help topics for VMware Workstation.

RESULT:

Thus VMware workstation is installed with Windows OS on top of windows 8.

EX NO: 6

AIM:

To install OpenStack and use it as Infrastructure as a Service and use technology own Cloud.

1. Update and Upgrade the system

Log into your Ubuntu 18.04 system. Then update and upgrade system repositories using following command.

```
Apt update –y && upgrade –y
```

Next reboot the system using the following command.

```
Sudo reboot
```

2. Create stack user and assign sudo privilege.

Add a new user called “stack” And assign sudo privileges to the user

```
Echo “stack ALL=(ALL) nopasswd: ALL” [sudo tee /etc/sudoers.d/stack
```

3. Install git and download DevStack

After creating the user ‘stack’ and assigning sudo privileges, change to the user using the command.

```
Su – stack
```

Next install git by running the following command.

```
Sudo apt install git –y
```

Using git, clone devstack's git repository as given below.

```
Git clone http://git.openstack.org/openstack-dev/devstack
```

4. Create devstack configuration file

Next goto devstack directory.

```
Cd devstack
```

Then create a local.conf configuration file.

```
Vl local.conf
```

Paste the following content in the local.conf file

```
[[local][localrc]]

ADMIN_PASSWORD=computer

DATABASE_PASSWORD=computer

Rabbit-password=computer

SERVICE_PASSWORD=computer

Host_IP=your IP address
```

Save and exit the text editor.

5. Install OpenStack with Devstack

Run the script below contained in devstack directory to install OpenStack.

```
./stack.sh
```

The following will be installed:

1. Horizon – OpenStack Dashboard
2. Nova – Compute Service
3. Glance – Image Service
4. Neutron – Network Service
5. Keystone – Identity Service
6. Cinder – Block Storage Service
7. Placement – Placement API

The installation takes place around 30 to 45 minutes depending on the speed of your system and internet connection.

6. Accessing OpenStack on a web browser

To access OpenStack via a web browser, browse your Ubuntu's IP address as shown. http://server-ip/dashboard. This directs you to a login page as shown.

Enter the details and click "sign In". You should be able to see the Management console dashboard.

RESULT:

Thus Openstack is installed and used as Infrastructure as a Service and technology own cloud.

EX NO: 7

AIM:

To do case study on any one Open source and commercial Cloud-Microsoft Azure, Eucalyptus, Amazon EC2.

A. Case study on Open Source Cloud (OpenStack);

- Incarta is an Australian-based technology consulting company.
- It provides a high-reliability private cloud platform that runs on OpenStack.
- Incarta was founded in 1998.
- It provides technology consulting service to the health and small to medium enterprise sectors.
- Incarta develops custom hardware and software solutions for collation, management, and analysis of complex data.
- The company has specific interests in critical care medicine, real-time monitoring of patients, and clinically focused augmented intelligence.
- This organization launched the first OpenStack deployment in 2019.
- Incarta to provide support and management services for OpenStack made partnership with Sardina Systems.
- The healthcare sector can now scale the stored data and provide data analysis in real-time, saving lives.

B. Case Study on Commercial Cloud (Amazon EC2):

- Teachers and students worldwide use Blackboard, now part of Anthology, to advance education.
- Blackboard’s tools are now an important part of the education for both teachers and students.

- When the COVID-19 pandemic halted in-person learning worldwide, Blackboard saw concurrent usage of Blackboard Collaborate increase by 45times within 4 weeks.
- This experienced a 4800 percent increase in usage compared to 2019.
- In the long term, the company needed a more cost-efficient solution. Blackboard developed this solution by making smart use of Amazon Web Services (AWS), including automatic scaling groups and predictive scaling.
- The company also optimized its use of Amazon Elastic Compute Cloud (Amazon EC2) by switching its preference to instances powered by AMD processors.
- Using AMD –powered instances and Spot instances, Blackboard brought Blackboard Collaborate to millions of students and teachers worldwide with minimal disruption and managed its costs in the process.
- AWS provides the following benefits to Blackboard,
    - Supported a 4800% increase in video conferencing usage.
    - Improved media processing performance by 10%.
    - Enabled more precise provisioning by using predictive scaling.
    - Saved 28% on total media processing and batch recording costs.

RESULT:

Thus a case study on open source cloud OpenStack and commercial cloud Amazon EC2 are done.

EX NO: 8

AIM:

To implement LED blink and LED pattern with Arduino.

COMPONENTS REQUIRED:

1. Arduino UNO – 1 No
2. LED – 10 Nos
3. 220 Ω resistor – 12 Nos
4. Breadboad – 1 No
5. USB A to B cable – 1 No
6. Jumper wires – 13 Nos

SOFTWARE REQUIRED:

Arduino IDE

a) LED Blink

PROCEDURE:

1. Follow the connection diagram and hook up the components on the breadboard.
2. Connect a 220Ω resistor in series with the positive terminal of an LED. Connect the resistor to the Digital pin 13 of Arduino board using jumper wire.
3. Connect the negative terminalof the LED to the GND pin of Arduino board using jumper wire.
4. Using USB A to B cable, connect the Arduino board with the computer system.
5. Open the Arduino IDE and write the following code.

PROGRAM:

```
Void setup() {

pinMode(13, OUTPUT);

}

Void loop() {

digitalWrite(13, HIGH);

delay(1000);

digitalWrite(13, LOW);

delay(1000);
}
```

6. Save the code.
7. Verify the code for errors.
8. Once the errors are corrected, upload the code.
9. After the code is uploaded, LED stars blinking.

b) LED pattern display

PROCEDURE:

1. Follow the connection diagram and hook up the components on the breadboard.
2. Connect the 10 resistors of 220Ω resistor in series with the 10 LEDs. Connect the resistor to the Digital pins with numbers from 4 to 13 of Arduino board using jumper wire.
3. Connect the negative terminalof the 10 LEDs to the GND pin of Arduino board using jumper wire.
4. Using USB A to B cable, connect the Arduino board with the computer system.
5. Open the Arduino IDE and write the following code.

PROGRAM:

```
Void setup()
{
For(int i=4; i<=13; i++)
pinMode(I, OUTPUT);
}
Void loop()
For(int i=0; i<=5; i++) {
Pat1 ();}
For(int i=0; i<=5; i++) {
Pat2(); }
```

```
Void pat1()
{
For(int i=4; i<=13; i++)
{
digitalWrite(i,HIGH);
delay(timedelay);
digitalWrite(I,LOW);
}
For(int i=12; i>=5; i--)
{
digitalWrite(i,HIGH);
delay(timedelay);
digitalWrite(I,LOW);
}
Void pat2()
{
For(int i=4; i<=13; i+2)
{
digitalWrite(i,HIGH);
delay(timedelay);
digitalWrite(i,LOW);
}
For(int i=13; i>=4; i-2)
{
digitalWrite(i,HIGH);
delay(timedelay);
digitalWrite(i,LOW);
}
}
```

6. Save the code.
7. Verify the code of errors.
8. Once the errors are corrected, upload the codes.
9. After the code is uploaded, two LED patterns are repeatedly displayed with the delay specified.

RESULT:

Thus LED blink and LED pattern are implemented using Arduino board and Arduino software.

EX NO: 9

LED PATTERN WITH PUSH BUTTON CONTROL

AIM:

To implement LED pattern with Push Button Control with Arduino.

COMPONENT REQUIRED:

1. Arduino UNO – 1 No
2. Push Button – 1 No
3. LED – 10 Nos
4. 220 Ω resistor – 12 Nos
5. Breadboad – 1 No
6. USB A to B cable – 1 No
7. Jumper wires – 13 Nos

SOFTWARE REQUIRED:

Arduino IDE

PROCEDURE:

1. Follow the connection diagram and hookup the components on the breadboard.
2. Connect the 10 resistors of 220 Ω in series with the 10LED's. Connect the resistors to the digital pin with numbers from 2 to 11 of Arduino using jumper wires.
3. Connect the negative terminal of the 10 LEDs to the GND pin of Arduino board using jumper wire.
4. Connect push button as shown in the connection diagram.
5. Using USB A to B cable, connect the Arduino board with the computer system.
6. Open the Arduino IDE and write the following code.

PROGRAM:

```
Void setup() {
for(int i=2; i <= 11; i++) {
pinMode(I, OUTPUT);
}
pinMode(13, INPUT);
}
Void loop() {
If(digitalRead(13) == HIGH) {
For(int i=0; i<=5; i++) {
Pat1(); }
}
If(digitalRead(13) ==LOW)
{
For(int i=0; i<=5; i++) {
Pat2(); }
}
```

7. Save the code.
8. Verify the code for errors.
9. Once the errors are corrected, upload the code.
10. After the code is uploaded, LED pattern is displayed and for every push on the push button, LED pattern changes.

RESULT:

Thus LED pattern with push button control is implemented using Arduino.

EX NO: 10

AIM:

To display “Hello World” in LCD 16*2 display with Arduino.

COMPONENT REQUIRED:

1. Arduino UNO board – 1 No
2. 16*2 LCD screen – 1 No
3. Pin headers to solder to the LCD display pins.
    - 10 KΩ potentiometer – 1 No
    - 220Ω resistor – 1 No
    - Juniper wires – 16 Nos
    - Breadboard

SOFWARE REQUIRED:

Arduino IDE

PROCEDURE:

1. Before connecting the LCD screen to the Arduino board, solder a pin header strip to the 16 pin count connector of the LCD screen.
2. Follow the connection diagram and hook up the components on the breadboard.
3. To connect the LCD screen to the Arduino board, connect the following pins;
    - LCD RS to digital pin 12
    - LCD Enable pin to digital pin 11

- LCD D4 pin to digital pin 5
- LCD D5 pin to digital pin 4
- LCD D6 pin to digital pin 3
- LCD D7 pin to digital Pin 2
- LCD R/W pin to GND
- LCD Vss pin to GND
- LCD Vcc pin to 5V
- LCD LED+ to %V through a 220Ω resistor
- LCD LED- to GND

4. Additionally connect a 10 ΩK potentiometer to +5V and GND with its output to LCD screen's V0 pin (pin 3).
5. Using USB A to B cable, connect the Arduino board with the computer system.
6. Open the Arduino IDE and write the following code.

PROGRAM:

```
#include <LiquidCrystal.h>

Const int rs =12, en =11,  d4  = 5, d5 = 4, d6 = 3, d7 = 2;

LiquidCrystal lcd(rs, en, d4, d5, d6, d7);

Lcd.begin(16,2);

}

Void loop() {

Lcd.setCursor(0,1);

Lcd.print(millis() / 1000);

}
```

7. Save the code.
8. Verify the code errors.
9. Once the errors are corrected, upload the code.
10. After the code is uploaded, "Hello World" message is displayed on the LCD screen.

RESULT:

Thus the message “Hello World” is displaued in 16*2 LCD display using Arduino.

EX NO: 11

AIM: To implement the servo motor control with Arduino.

COMPONENTS REQUIRED:

1. Arduino UNO Board – 1 No
2. Servo motor – 1 No
3. Jumper wires – 3 Nos
4. Breadboard – 1 No
5. USB B to B cable – 1 No

SOFTWARE REQUIREMENT:

Arduino IDE

PROCEDURE:

1. Connect the servo motor with Arduino like this
   - Signal cable (Orange one) => D9 on Arduino
   - Power cable (Red one) => 5V pin or Arduino
   - Ground cable (Black or Brown one) => Ground pin on Arduino
2. Using USB A to B cable connect the Arduino board with the computer system.
3. Open the Arduino IDE and write the following code.

PROGRAM:

```
#include <Servo.h>

Servo myservo;

Int pos = 0;

void setup()

{

Myservo.attach(9);

}
```

```
void loop()
{
for (pos = 0; pos <= 180; pos += 1)
{
myservo.write(pos);
delay(15);
}
for (pos = 180; pos >= 0; pos -= 1)
{
myservo.write(pos);
delay(15);
}
}
```

4. Save the Code.
5. Verify the code errors.
6. Once the errors are corrected, upload the code.
7. After the code is uploaded, servo motor rotatesfrom 0 to 180 in steps of 1 and goes from 180 to 0.

RESULT:

Thus the servo motor control is implemented with Arduino.

EX NO: 12

AIM: To implement and monitor the LM35 Temperature sensor and Ultrasonic distance measurement with Arduino.

COMPONENTS REQUIRED:

1. Arduino UNO Board – 1 No

2. LM35 Temperature sensor – 1 No
3. Jumper wires – 4 Nos
4. Breadboard – 1 No
5. USB A to B cable – 1 No
6. Ultrasonic sensor – 1 No

SOFTWARE REQUIREMENT:

Arduino IDE

a) Implementing and monitoring the LM35 temperature sensor

PROCEDURE:

1. Hook up LM35 temperature sensor on the board. The flat surface of the sensor should face you.
2. Connect the positive terminal to +5v pin of Arduino using jumper wire.
3. Connect the Ground pin of the sensor to the GND pin of Arduino using jumper wire.
4. Connect the Vout pin of the sensor to the Analog input A0 of the Arduini using jumper wire.
5. Using USB A to B cable, connect the arduino board with the computer system.
6. Open the Arduino IDE and write the following code.

PROGRAM:

```
int val;

int tempPin = A0;

void setup()

{

Serial.begin(9600);

}

Void loop()

{

Val = analogRead(tempPin);
Float mv = (val/1024.0)*5000;

Float cel = mv/10;

Serial.println(cel);

Delay(1000);

}
```

7. Save the code.
8. Verify the code for errors.
9. Once the errors are corrected, upload the code.
10. After the code is uploaded the temperature sensor senses the surrounding temperature and the sensed temperature in Celsius is displayed in the monitor.

b) Ultrasonic Distance Measurement with Arduino

PROCEDURE:

1. Hookup ultrasonic sensor on the breadboard.
2. Connect Ultrasonic sensor with Arduino like the following

   Vcc – 5v pin on Arduino

   GND – GND pin on Arduino

   TRIG – D10 pin on Arduino

   ECHO – D10 pin on Arduino
3. Using USB A to B cable connect the Arduino board with the computer.
4. Open the Arduino IDE and write the following code.

PROGRAM:

```
In ttrigPin = 9;

Int echoPin = 10;

Float duration_us, distance_cm;

Void setup()

Serial.begin (9600);
```

```
pinMode(trigPin, OUTPUT);
pinMode(echoPin, INPUT);
}
Void loop()
{
digitalWrite(trigPin, HIGH);
delayMicroseconds(10);
digitalWrite(trigPin, LOW);
duration_us = pulseIn(echoPin, HIGH);
distance_cm = 0.017 * duration_us;
serial.Print("distance:");
serial.Print(distance_cm);
Serial.println("cm);
delay(500);
}
```

5. Save the code
6. Verify the code for errors.
7. Once the errors are corrected, upload the code.
8. After the code is uploaded ultrasonic sensor measures the distance of an object placed in front of it and measurement data is displayed using serial monitor.

RESULT:

Thus the LM 35 temperature sensor monitoring and ultrasonic distance measurement with Arduino are implemented.

EX NO: 13

AIM:

}

To implement the IR sensor analog input with Arduino.

COMPONENTS REQUIRED:

1. Arduino UNO Board – 1 No
2. IR sensor – 1 No
3. Jumper wires – 3 Nos
4. Breadboard – 1 No
5. USB A to B cable – 1 No

PROCEDURE:

1. Hook up the IR sensor module on the breadboard.
2. Connect Vcc of IR sensor module to the 5V pin of Arduino board.
3. Connect the GND pin or IR sensor module to the Groun pin of Arduino board.
4. Connect the Vout pin of IR sensor module to the Analog pin A0 of Arduino board.
5. Using USB A to B cable connect the Arduino board with the computer system.
6. Open the Arduino IDE write the following code.

PROGRAM:

```
#define IR A0

int reading;

void setup()

{

Serial.begin(9600);

}

Void loop()

{

Reading=analogRead(IR);

Serial.Println(reading);

Delay(500);

}
```

7. Save the code.
8. Verify the code for errors.
9. Once the errors are corrected upload the code.
10. After the code is uploaded, when there is an obstacle in the serial monitor, we get a high value of around 1021 and when there is no obstacle, we get a low value of around 21 which is shown.

RESULT:

Thus the IR sensor analog input with Arduino is implemented.

EX NO: 14

AIM:

To monitor Temperature sensor with NodeMCU using ThingSpeak cloud.

COMPONENTS REQUIRED:

1. NodeMCU Board – 1 No
2. DHT11 Temperature and Humidity sensor – 1 No
3. Jumper wires(Male to Female) – 3 Nos
4. Breadboard – 1 No
5. Micro USB A to B cable – 1 No

SOFTWARE REQUIRED:

Arduino IDE

CLOUD REQUIRED:

ThingSpeak

PROCEDURE:

1. Hookup DHT11 temperature and Humidity sensor on the breadboard.
2. Connect the positive terminal of the sensor to Vin pin of NodeMCU using jumper wire.
3. Connect the GND pin of the sensor to the GND pin of NodeMCU using jumper wire.
4. Connect the vout pin of the sensor to the D2 pin of NodeMCU using jumper wire.
5. Using micro USB cable connect the NodeMCU with the computer system.

6. To send data to ThingSpeak we need a unique API key, which we will use in our code to upload the temperature and Humidity of Thingspeak. Now copy your “Write API Key” we will use this API key in our code.
7. Also note down your Wi-Fi name and password.
8. Now open the Arduino IDE and write the following code.

PROGRAM:

```
#include <ESP8266WiFi.h>
#include “DHT.h”
String apiKey = “Your Write API Key”;
Const char *ssid = “WiFi name”;
Const char *pass = “Password of Wi-Fi”;
Const char *server = “api.thingspeak.com”;
DHT dht(D2, DHT11);
WifiClient client;
Void setup()
{
Serial.begin(9600);
delay(10);
dht.begin();
WiFi.begin(ssid, pass);
While(WiFi.status() != WL_CONNECTED) {
Delay(500);
Serial.print(“.”);
}
Serial.println(“);
Serial.println(“WiFi connected”);
```

```
}
Void loop()
Float h = dht.readHumidity();
Float t = dht.readTemperature();
If(isnan(h) || isnan(t)) {
Serial.println(“Failed to read from DHT sensor!”);
Return;
}
If (client.connect(server, 80)) {
String ps = apiKey;
Ps += “&field1=;
Ps +=String(t);
Ps +=“&field2=;
Ps +=String(h);
Ps +=”\r\n\r\n”;
Client.print(“POST /update HTTP/1.1\n”);
Client.print(“Host: api.thingspeak.com\n);
Client.print(“Connection: close\n”);
Client.print(“X-THINGSPEAKAPIKEY: “+apiKey + “\n”);
Client.print(“Content-Type: application/x-www-form-urlencoded\n”);
Client.print(“Content-Length: “);
Client.print(ps.length());
Client.print(“\n\n”);
Client.print(ps);
Serial.print(“Temperature:”);
Serial.print(t);
Serial.print(“\t”);
Serial.print(“Humidity:”);
Serial.println(h);
}
Client.stop();
Delay(100);
}
```

9. Save the code.
10. Verify the code for errors.
11. Once the errors are corrected upload the code in ESP8266 NodeMCU.
12. After the code is uploaded in the serial monitor you can see the surrounding temperature and humidity sensed by the DHT11 sensor.
13. Navigate to your ThingSpeak page and open your channel in ThingSpeak you can see the output as a chart with date as X-axis and temperature as y-axis.

RESULT:

Thus the temperature sensor is monitored with NodeMCU using ThingSpeak cloud.