

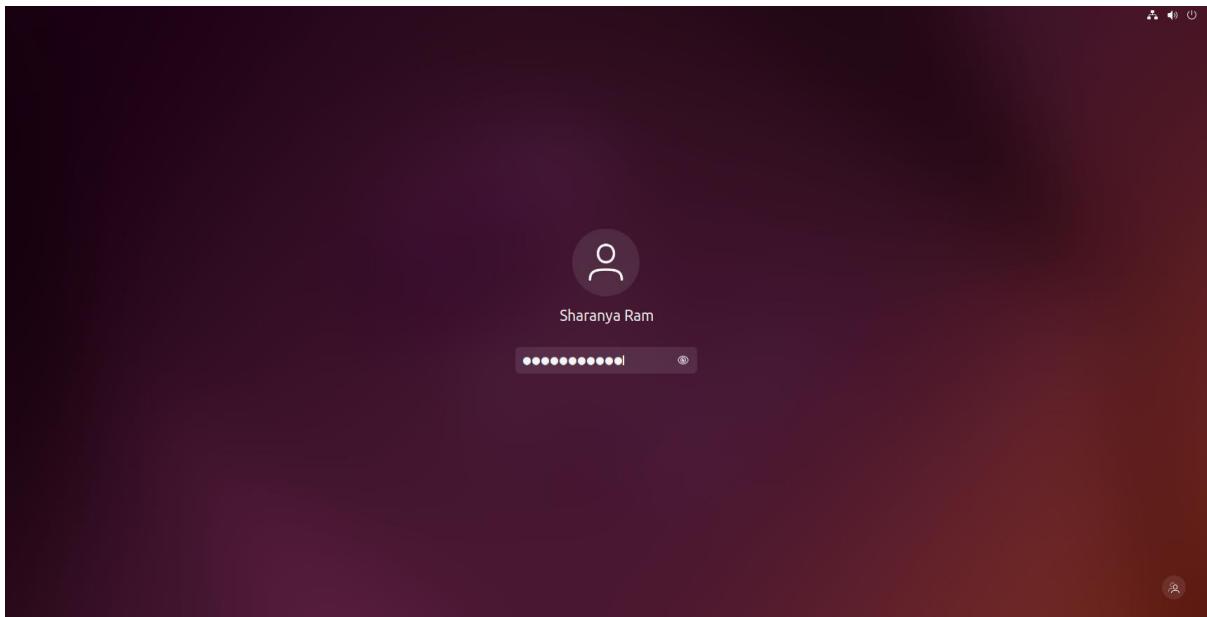
Graded Assignment

Quality, Requirements, Architecture, and Microservices.

Objective:

Implementing a microservice using the Python Flask framework on an Ubuntu virtual machine to serve a machine learning prediction model. To create a Docker image containing everything needed to run the application: the application code, libraries, tools, dependencies, and other files and to use the image to run the application in containers.

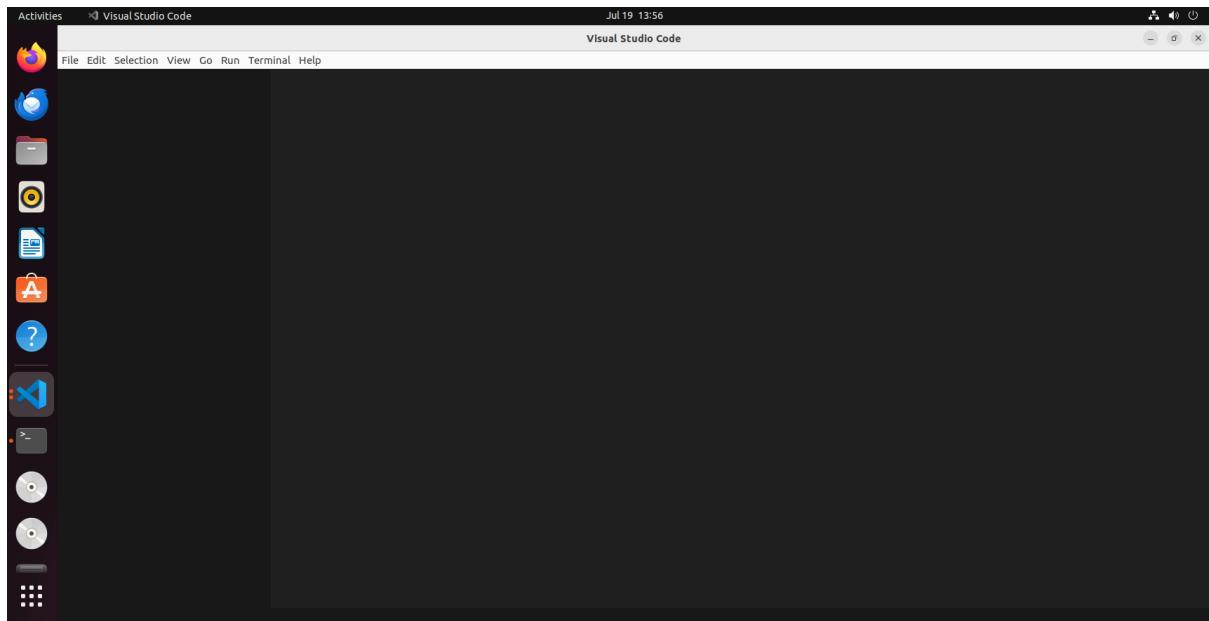
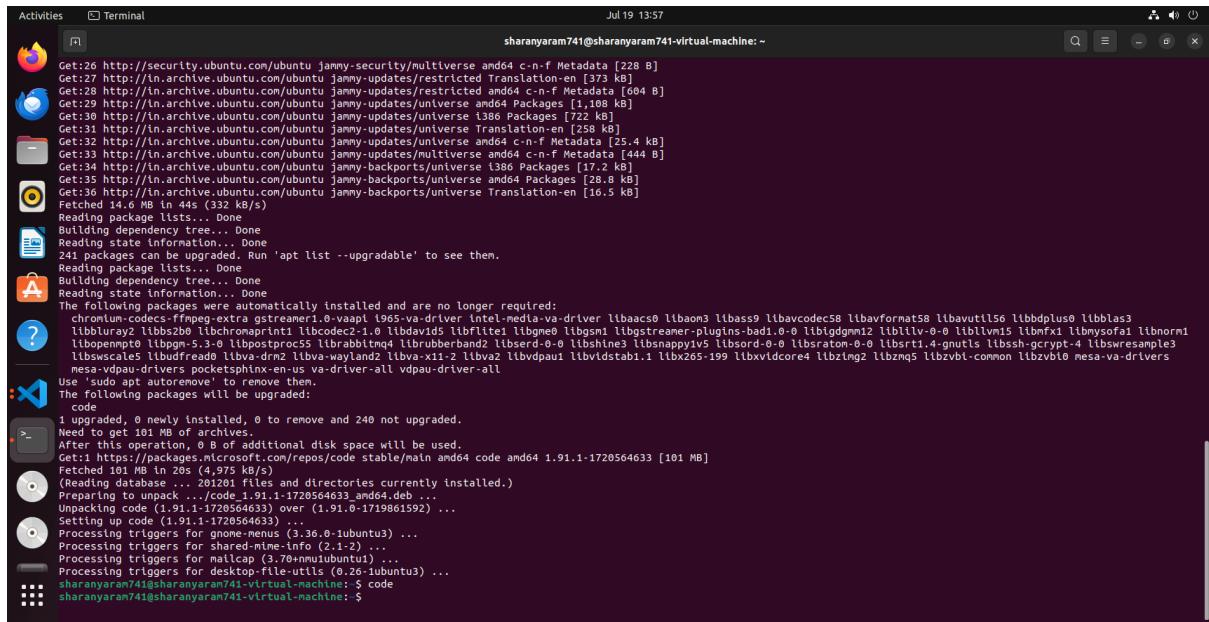
1.Host a Ubuntu Virtual Machine using Oracle VM Virtual Box. (5 marks)

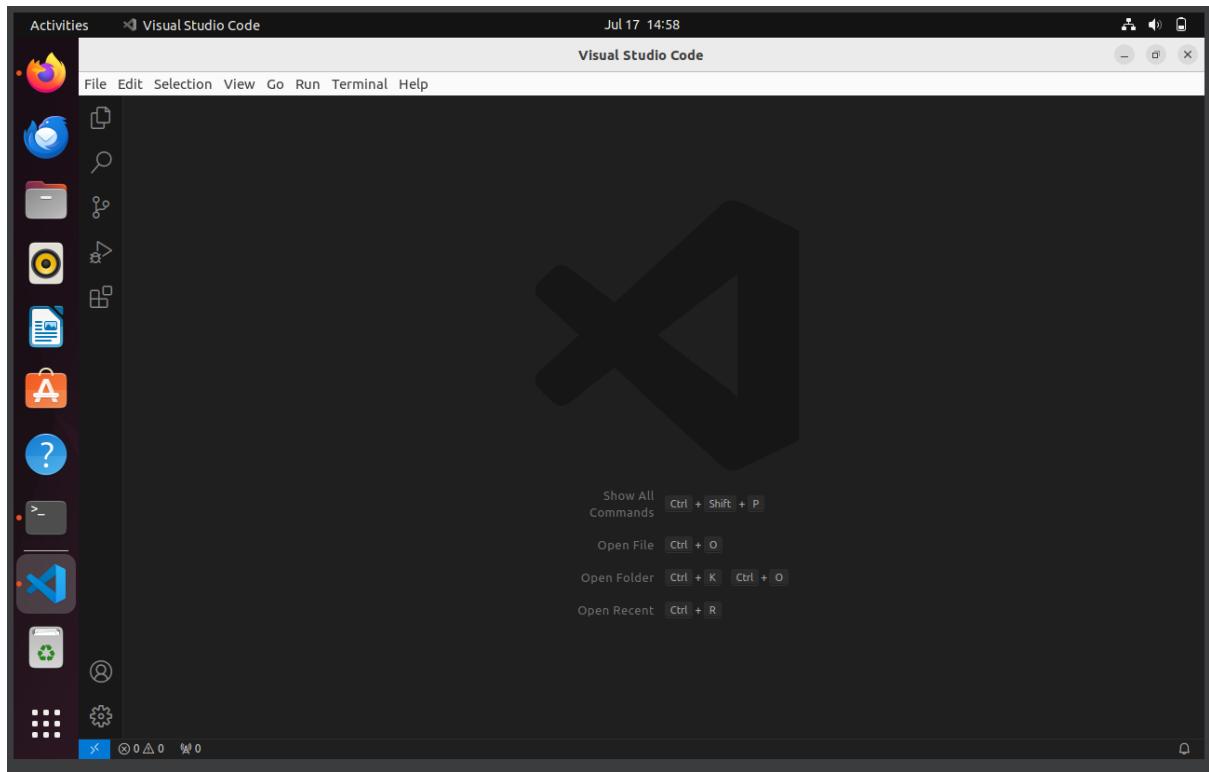


2.Set up Visual Studio code on Ubuntu VM.

```
Activities Terminal Jul 19 13:53
sharanyaram741@sharanyaram741-virtual-machine: ~ sudo apt update.
sharanyaram741@sharanyaram741-virtual-machine: ~ sudo apt install wget gpg
sharanyaram741@sharanyaram741-virtual-machine: ~ wget -qO - https://packages.microsoft.com/keys/microsoft.asc | gpg --dearmor
sharanyaram741@sharanyaram741-virtual-machine: ~ gpg --dearmor packages.microsoft.gpg sudo install -o root groot m 644 packages.microsoft.gpg /usr/share/keyrings/ubuntu-keyring.gpg
sharanyaram741@sharanyaram741-virtual-machine: ~ echo "deb [arch=amd64 signed-by=/usr/share/keyrings/packages.microsoft.gpg] https://packages.microsoft.com/repos/vscode stable main" > /etc/apt/sources.list.d/vscode.list
sharanyaram741@sharanyaram741-virtual-machine: ~ sudo apt install apt-transport-https
sharanyaram741@sharanyaram741-virtual-machine: ~ sudo apt update
sharanyaram741@sharanyaram741-virtual-machine: ~ sudo apt install code
sharanyaram741@sharanyaram741-virtual-machine: ~ E: Invalid operation update.
sharanyaram741@sharanyaram741-virtual-machine: ~ Reading package lists... Done
sharanyaram741@sharanyaram741-virtual-machine: ~ Building dependency tree... Done
sharanyaram741@sharanyaram741-virtual-machine: ~ Reading state information... Done
sharanyaram741@sharanyaram741-virtual-machine: ~ gpg ls already the newest version (2.2.27-3ubuntu2.1).
sharanyaram741@sharanyaram741-virtual-machine: ~ wget is already the newest version (1.21.2-2ubuntu1.1).
sharanyaram741@sharanyaram741-virtual-machine: ~ The following packages were automatically installed and are no longer required:
sharanyaram741@sharanyaram741-virtual-machine: ~ chromium-codecs-ffmpeg-extra gstreamer1.0-vaapi_1.605-va-driver intel-media-va-driver libvaacs0 libbaon3 libbass9 libbavcdec58 libbavformat58 libbutil56 libbbplus0 libbias3 libbbplus2 libbbz2 libchromaprint1 libcodec2_1.0 libdavidis libfb1 libgme0 libgsm1 libgstbridge-plugins-bad1.0-0 libigdgmm12 libl11v-0-0 libl11v15 liblfx1 libmsysfa1 libnorm1 libopempm1 libpmmp-5.3-0 libpostproc5 librabitmq1 librubberband2 librsord-0-0 libshn3 libsnappy1v5 libtbsord-0-0 libsratom-0-0 libsr1t4-gnutls libssh-gcrypt-4 libswresample3 libswscale1 libvulnfreadd libvba-drm2 libvba-wayland2 libvba-x11-2 libvba libvdpau libvidstab1.1 libv265-199 libvividcore4 libzimg2 libzmq5 libzbv1-common libzbvb0 mesa-va-drivers mesa-vdpau-drivers pocketsphinx-en-us va-driver-all vdpau-driver-all
sharanyaram741@sharanyaram741-virtual-machine: ~ Use 'sudo apt autoremove' to remove them.
sharanyaram741@sharanyaram741-virtual-machine: ~ 0 upgraded, 0 newly installed, 0 to remove and 221 not upgraded.
sharanyaram741@sharanyaram741-virtual-machine: ~ gpg:dearmor: command not found
sharanyaram741@sharanyaram741-virtual-machine: ~ Reading package lists... Done
sharanyaram741@sharanyaram741-virtual-machine: ~ Building dependency tree... Done
sharanyaram741@sharanyaram741-virtual-machine: ~ Reading state information... Done
sharanyaram741@sharanyaram741-virtual-machine: ~ The following packages were automatically installed and are no longer required:
sharanyaram741@sharanyaram741-virtual-machine: ~ chromium-codecs-ffmpeg-extra gstreamer1.0-vaapi_1.605-va-driver intel-media-va-driver libvaacs0 libbaon3 libbass9 libbavcdec58 libbavformat58 libbutil56 libbbplus0 libbias3 libbbplus2 libbbz2 libchromaprint1 libcodec2_1.0 libdavidis libfb1 libgme0 libgsm1 libgstbridge-plugins-bad1.0-0 libigdgmm12 libl11v-0-0 libl11v15 liblfx1 libmsysfa1 libnorm1 libopempm1 libpmmp-5.3-0 libpostproc5 librabitmq1 librubberband2 librsord-0-0 libshn3 libsnappy1v5 libtbsord-0-0 libsratom-0-0 libsr1t4-gnutls libssh-gcrypt-4 libswresample3 libswscale1 libvulnfreadd libvba-drm2 libvba-wayland2 libvba-x11-2 libvba libvdpau libvidstab1.1 libv265-199 libvividcore4 libzimg2 libzmq5 libzbv1-common libzbvb0 mesa-va-drivers mesa-vdpau-drivers pocketsphinx-en-us va-driver-all vdpau-driver-all
sharanyaram741@sharanyaram741-virtual-machine: ~ Use 'sudo apt autoremove' to remove them.
sharanyaram741@sharanyaram741-virtual-machine: ~ The following NEW packages will be installed:
sharanyaram741@sharanyaram741-virtual-machine: ~     apt-transport-https
sharanyaram741@sharanyaram741-virtual-machine: ~ 0 upgraded, 1 newly installed, 0 to remove and 221 not upgraded.
sharanyaram741@sharanyaram741-virtual-machine: ~ Need to get 1,510 B of archives.
sharanyaram741@sharanyaram741-virtual-machine: ~ After this operation, approximately 0 B additional disk space will be used.
sharanyaram741@sharanyaram741-virtual-machine: ~ Get:1 http://in.archive.ubuntu.com/ubuntu jammy-updates/universe amd64 apt-transport-https all 2.4.12 [1,510 B]
sharanyaram741@sharanyaram741-virtual-machine: ~ Fetched 1,510 B in 0s (3,768 B/s)
sharanyaram741@sharanyaram741-virtual-machine: ~ Selecting previously unselected package apt-transport-https.
sharanyaram741@sharanyaram741-virtual-machine: ~ (Reading database... 201997 files and directories currently installed.)
sharanyaram741@sharanyaram741-virtual-machine: ~ Preparing to unpack .../apt-transport-https_2.4.12_all.deb ...
sharanyaram741@sharanyaram741-virtual-machine: ~ Unpacking apt-transport-https (2.4.12) ...
sharanyaram741@sharanyaram741-virtual-machine: ~ Setting up apt-transport-https (2.4.12) ...
```

```
Activities Terminal Jul 19 13:54 sharanyaram741@sharanyaram741-virtual-machine:~  
Setting up apt-transport-https (2.4.12) ...  
Hit:1 http://in.archive.ubuntu.com/ubuntu jammy InRelease  
Get:2 http://in.archive.ubuntu.com/ubuntu jammy-updates InRelease [128 kB]  
Get:3 https://security.ubuntu.com/ubuntu jammy-security InRelease [129 kB]  
Hit:4 https://ppa.launchpadcontent.net/deadsnakes/ppa/ubuntu jammy InRelease  
Get:5 https://packages.microsoft.com/repos/code_stable InRelease [3,598 B]  
Get:6 http://in.archive.ubuntu.com/ubuntu jammy-backports InRelease [127 kB]  
Get:7 http://security.ubuntu.com/ubuntu jammy-security/main amd64 Packages [1,600 kB]  
Get:8 http://security.ubuntu.com/ubuntu jammy-security/main i386 Packages [174 kB]  
Get:9 https://packages.microsoft.com/repos/code_stable/main amd64 Packages [18.0 kB]  
Get:10 https://packages.microsoft.com/repos/code_stable/main armhf Packages [18.0 kB]  
Get:11 https://security.ubuntu.com/ubuntu jammy-security/main i386 Packages [508 kB]  
Get:12 https://security.ubuntu.com/ubuntu jammy-security/main Translation-en [276 kB]  
Get:13 http://in.archive.ubuntu.com/ubuntu jammy-updates/main amd64 Packages [1,848 kB]  
Get:14 https://security.ubuntu.com/ubuntu jammy-security/main amd64 c-n-f Metadata [13.0 kB]  
Get:15 https://security.ubuntu.com/ubuntu jammy-security/restricted amd64 Packages [2,120 kB]  
Get:16 https://security.ubuntu.com/ubuntu jammy-security/restricted Translation-en [363 kB]  
Get:17 https://security.ubuntu.com/ubuntu jammy-security/restricted amd64 c-n-f Metadata [572 B]  
Get:18 http://archive.ubuntu.com/ubuntu jammy-security/universe Translation-en [600 kB]  
Get:19 https://security.ubuntu.com/ubuntu jammy-security/universe i386 Packages [1618 kB]  
Get:20 http://in.archive.ubuntu.com/ubuntu jammy-updates/main Translation-en [333 kB]  
Get:21 https://security.ubuntu.com/ubuntu jammy-security/universe amd64 Packages [885 kB]  
Get:22 http://in.archive.ubuntu.com/ubuntu jammy-updates/main amd64 c-n-f Metadata [17.7 kB]  
Get:23 https://security.ubuntu.com/ubuntu jammy-security/universe Translation-en [173 kB]  
Get:24 http://in.archive.ubuntu.com/ubuntu jammy-updates/restricted amd64 Packages [2,177 kB]  
Get:25 http://security.ubuntu.com/ubuntu jammy-security/universe amd64 c-n-f Metadata [18.9 kB]  
Get:26 https://security.ubuntu.com/ubuntu jammy-security/multiverse amd64 c-n-f Metadata [228 B]  
Get:27 https://in.archive.ubuntu.com/ubuntu jammy-updates/restricted Translation-en [373 kB]  
Get:28 https://in.archive.ubuntu.com/ubuntu jammy-updates/multiverse amd64 c-n-f Metadata [604 B]  
Get:29 http://in.archive.ubuntu.com/ubuntu jammy-updates/universe amd64 Packages [1,198 kB]  
Get:30 https://in.archive.ubuntu.com/ubuntu jammy-updates/universe i386 Packages [722 kB]  
Get:31 http://in.archive.ubuntu.com/ubuntu jammy-updates/universe Translation-en [258 kB]  
Get:32 https://in.archive.ubuntu.com/ubuntu jammy-updates/universe amd64 c-n-f Metadata [25.4 kB]  
Get:33 https://in.archive.ubuntu.com/ubuntu jammy-updates/multiverse amd64 c-n-f Metadata [444 B]  
Get:34 https://in.archive.ubuntu.com/ubuntu jammy-backports/universe i386 Packages [17.2 kB]  
Get:35 https://in.archive.ubuntu.com/ubuntu jammy-backports/universe amd64 Packages [28.8 kB]  
Get:36 https://in.archive.ubuntu.com/ubuntu jammy-backports/universe Translation-en [16.5 kB]  
Fetched 14,404 MB in 44s (332 kB/s)  
Reading package lists... Done  
Building dependency tree... Done  
Reading state information... Done  
241 packages can be upgraded. Run 'apt list --upgradable' to see them.  
Reading package lists... Done  
Building dependency tree... Done
```





3. Set up Python.

```
Activities Terminal Jul 19 14:07
sharanyaram741@sharanyaram741-virtual-machine:~$ sudo apt update
[sudo] password for sharanyaram741:
Hit:1 https://packages.microsoft.com/repos/code stable InRelease
Hit:2 http://security.ubuntu.com/ubuntu jammy-security InRelease
Hit:3 http://archive.ubuntu.com/ubuntu jammy InRelease
Hit:4 http://archive.ubuntu.com/ubuntu jammy-updates InRelease
Hit:5 http://archive.ubuntu.com/ubuntu jammy-backports InRelease
Hit:6 https://ppa.launchpadcontent.net/deadsnakes/ppa/ubuntu jammy InRelease
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
240 packages can be upgraded. Run 'apt list --upgradable' to see them.
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
python3 is already the newest version (3.10.6-1-22.04).
python3 set to manually installed.
The following packages were automatically installed and are no longer required:
chromium-codecs-ffmpeg-extra gstreamer1.0-vaapi i965-va-driver intel-media-va-driver libaaacs0 libao3 libass9 libavcodec58 libavformat58 libavutil56 libbdplus0 libblas3
libblu-ray2 libbszbd libchromaprint libcodecs2-1.0 libdavids libflite1 libgme0 libgsml libgstreamer-plugins-bad1.0-0 libigdmm012 liblivilv-0-0 liblilmv15 libmxsi libmysofai libnorni
libopenmp10 libppm-5.3-0 libpsprocs librabitmq4 librubberband2 libserd-0-0 libshinie3 libsnappy1v5 libsr0-0 libsrat0n-0-0 libsr1t4-gnutls libssh-gcrypt-4 libswresample3
libtiff5 libvdpau1 libwayland2 libva-x11-2 libva2 libvpd1 libvdstab1.1 libx265-199 libxvidcore4 libzimg2 libzmq5 libzvbi-common libzvbi0 mesa-va-drivers
mesa-vdpau-drivers pocketphinx-en-us va-driver-all vdpau-driver-all
Use 'sudo apt autoremove' to remove them.
The following additional packages will be installed:
binutils binutils-common binutils-x86_64-linux-gnu build-essential dpkg-dev fakeroot g++-11 gcc gcc-11 javascript-common libalgorithm-diff-perl libalgorithm-diff-xs-perl
libalgorithm-merge-perl libasano libbinutils libbc-dev-bin libbc1-0 libbcrypt-dev libbcf0 libdpkg-perl libexpat1-dev libfakeroot
libfile-fcntllock-perl libgcc-11-dev libitm1 libjs-jquery libjs-sphinxdoc libjsunderscore liblsan0 libnsl-dev libpython3-dev libpython3.10-dev libquadmath0 libstdc++-11-dev
libtirpc-dev libtsan0 libubsan1 linux-lbc-dev lto-disabled-list make manpages-dev python3-dev python3-setuptools python3-wheel python3.10-dev rpcsvc-proto zlib1g zlib1g-dev
Suggested packages:
binutils-doc debian-keyring g++-multilib g++-11-doc gcc-multilib autoconf automake libltdl flex bison gcc-doc gcc-11-multilib gcc-11-locales apache2 | lighttpd
libgl1 libgbm1 libbz2 libfontconfig libfreetype6 libgcc1 libgcc1-doc python-setuptools-doc
The following NEW packages will be installed:
binutils binutils-common binutils-x86_64-linux-gnu build-essential dpkg-dev fakeroot g++-11 gcc gcc-11 javascript-common libalgorithm-diff-perl libalgorithm-diff-xs-perl
libalgorithm-merge-perl libasano libbinutils libbc-dev-bin libbc-dev-tools libbc1-0 libcrypt-dev libbcf0 libdpkg-perl libexpat1-dev libfakeroot
libfile-fcntllock-perl libgcc-11-dev libitm1 libjs-jquery libjs-sphinxdoc libjsunderscore liblsan0 libnsl-dev libpython3-dev libpython3.10-dev libquadmath0 libstdc++-11-dev
libtirpc-dev libtsan0 libubsan1 linux-lbc-dev lto-disabled-list make manpages-dev python3-dev python3-pip python3-setuptools python3-wheel python3.10-dev rpcsvc-proto
zlib1g-dev
The following packages will be upgraded:
zlib1g
1 upgraded, 52 newly installed, 0 to remove and 239 not upgraded.
Need to get 61.9 MB/62.2 MB of archives.
After this operation, 220 MB of additional disk space will be used.
```

```
Activities Terminal Jul 19 14:08
sharanyaram741@sharanyaram741-virtual-machine:~
```

Need to get 61.9 MB/62.2 MB of archives.
After this operation, 220 MB of additional disk space will be used.

```
Get:1 http://in.archive.ubuntu.com/ubuntu jammy-updates/main amd64 binutils-common amd64 2.38-4ubuntu2.6 [222 kB]
Get:2 http://in.archive.ubuntu.com/ubuntu jammy-updates/main amd64 libbinutils-amd64 2.38-4ubuntu2.6 [662 kB]
Get:3 http://in.archive.ubuntu.com/ubuntu jammy-updates/main amd64 libbinutils-dev amd64 2.38-4ubuntu2.6 [108 kB]
Get:4 http://in.archive.ubuntu.com/ubuntu jammy-updates/main amd64 libbinutils-f1abi amd64 2.38-4ubuntu2.6 [163 kB]
Get:5 http://in.archive.ubuntu.com/ubuntu jammy-updates/main amd64 libltdl0 amd64 2.38-4ubuntu2.6 [3,108 kB]
Get:6 http://in.archive.ubuntu.com/ubuntu jammy-updates/main amd64 libltdl0.1 amd64 2.38-4ubuntu2.6 [3,236 kB]
Get:7 http://in.archive.ubuntu.com/ubuntu jammy-updates/main amd64 libltdl0.1.1 amd64 2.38-4ubuntu2.6 [3,200 kB]
Get:8 http://in.archive.ubuntu.com/ubuntu jammy-updates/main amd64 libltdl-dev amd64 2.35-3ubuntu3.8 [20.3 kB]
Get:9 http://in.archive.ubuntu.com/ubuntu jammy-updates/main amd64 linux-lts-locdev amd64 5.15.0-116.126 [1,338 kB]
Get:10 http://in.archive.ubuntu.com/ubuntu jammy/main amd64 rpcsvc-proto amd64 1.4.2-0ubuntu6 [68.5 kB]
Get:11 http://in.archive.ubuntu.com/ubuntu jammy-updates/main amd64 libtirpc-dev amd64 1.3.2-2ubuntu0.1 [192 kB]
Get:12 http://in.archive.ubuntu.com/ubuntu jammy/main amd64 libtirpc0 amd64 1.3.2-2ubuntu0.1 [68 kB]
Get:13 http://in.archive.ubuntu.com/ubuntu jammy-updates/main amd64 libtirpc0.1 amd64 1.3.2-0ubuntu1 [2,100 kB]
Get:14 http://in.archive.ubuntu.com/ubuntu jammy-updates/main amd64 libtcmi0 amd64 12.3.0-1ubuntu1-22.04 [49.3 kB]
Get:15 http://in.archive.ubuntu.com/ubuntu jammy-updates/main amd64 libtcmi1 amd64 12.3.0-1ubuntu1-22.04 [30.2 kB]
Get:16 http://in.archive.ubuntu.com/ubuntu jammy-updates/main amd64 libtsan0 amd64 11.4.0-1ubuntu1-22.04 [2,282 kB]
Get:17 http://in.archive.ubuntu.com/ubuntu jammy-updates/main amd64 libtsan0.1 amd64 11.4.0-1ubuntu1-22.04 [1,069 kB]
Get:18 http://in.archive.ubuntu.com/ubuntu jammy-updates/main amd64 libtsan1 amd64 11.4.0-1ubuntu1-22.04 [2,266 kB]
Get:19 http://in.archive.ubuntu.com/ubuntu jammy-updates/main amd64 libubsan1 amd64 12.3.0-1ubuntu1-22.04 [976 kB]
Get:20 http://in.archive.ubuntu.com/ubuntu jammy-updates/main amd64 libquadmath0 amd64 12.3.0-1ubuntu1-22.04 [154 kB]
Get:21 http://in.archive.ubuntu.com/ubuntu jammy-updates/main amd64 libgcc1-11-dep amd64 11.4.0-1ubuntu1-22.04 [2,517 kB]
Get:22 http://in.archive.ubuntu.com/ubuntu jammy-updates/main amd64 libgcc1-11-dep amd64 11.4.0-1ubuntu1-22.04 [20.1 MB]
Get:23 http://in.archive.ubuntu.com/ubuntu jammy/main amd64 gcc_amd64 11.1.0-1ubuntu1 [5,112 kB]
Get:24 http://in.archive.ubuntu.com/ubuntu jammy-updates/main amd64 libstdc++-11-dev amd64 11.1.0-1ubuntu1-22.04 [2,101 kB]
Get:25 http://in.archive.ubuntu.com/ubuntu jammy-updates/main amd64 g++-11 amd64 11.4.0-1ubuntu1-22.04 [11.4 MB]
Get:26 http://in.archive.ubuntu.com/ubuntu jammy/main amd64 g++ amd64 11.1.0-1ubuntu1 [1,412 kB]
Get:27 http://in.archive.ubuntu.com/ubuntu jammy/main amd64 libgcc1-11-dev amd64 11.2.0-1ubuntu1 [180 kB]
Get:28 http://in.archive.ubuntu.com/ubuntu jammy/main amd64 lto-disabled-list all 24 [12.5 kB]
Get:29 http://in.archive.ubuntu.com/ubuntu jammy-updates/main amd64 dpkg-dev all 1.21.0ubuntu2.3 [922 kB]
Get:30 http://in.archive.ubuntu.com/ubuntu jammy/main amd64 build-essential amd64 12.9ubuntu3 [4,744 kB]
Get:31 http://in.archive.ubuntu.com/ubuntu jammy-updates/main amd64 build-essential amd64 12.9ubuntu3 [1,000 kB]
Get:32 http://in.archive.ubuntu.com/ubuntu jammy/main amd64 fakeroot amd64 1.28-1ubuntu1 [60.4 kB]
Get:33 http://in.archive.ubuntu.com/ubuntu jammy/main amd64 javascript-common all 11+multi [5,936 kB]
Get:34 http://in.archive.ubuntu.com/ubuntu jammy/main amd64 liblalgolrithm-diff-perl all 1.201-1 [41.8 kB]
Get:35 http://in.archive.ubuntu.com/ubuntu jammy/main amd64 liblalgolrithm-diff-xs-perl amd64 0.04-5ubuntu3 [11.9 kB]
Get:36 http://in.archive.ubuntu.com/ubuntu jammy/main amd64 liblalgolrithm-merge-perl all 0.08-1 [12.0 kB]
Get:37 http://in.archive.ubuntu.com/ubuntu jammy-updates/main amd64 libc-devtools amd64 2.35-3ubuntu3.8 [28.9 kB]
Get:38 http://in.archive.ubuntu.com/ubuntu jammy-updates/main amd64 libflexpat1-dev amd64 2.4.7-1ubuntu0.3 [147 kB]
Get:39 http://in.archive.ubuntu.com/ubuntu jammy/main amd64 libffile-fcntl-perl amd64 0.22-2ubuntld7 [33.9 kB]
Get:40 http://in.archive.ubuntu.com/ubuntu jammy/main amd64 libjs-jquery all 3.6.0-6dfsg-3-5.13-1 [31.2 kB]
Get:41 http://in.archive.ubuntu.com/ubuntu jammy/main amd64 libjs-underscore all 1.13.2-0fsg-2 [118 kB]
```

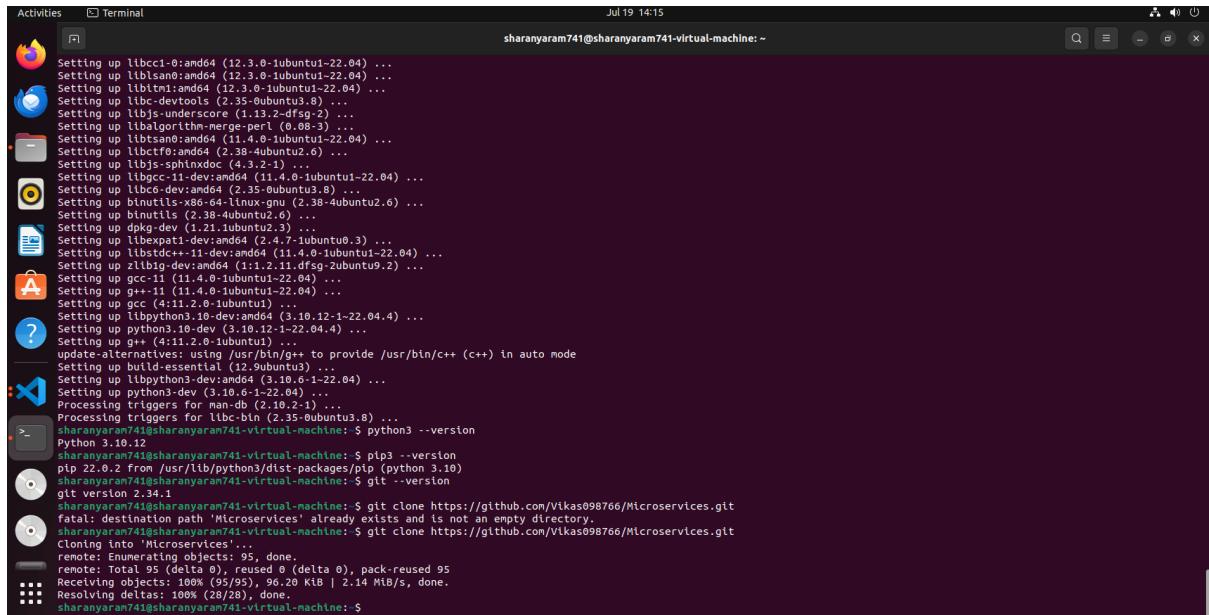
```
Activities Terminal Jul 19 14:08 sharanaram741@sharanaram741-virtual-machine:~  
Get:41 http://in.archive.ubuntu.com/ubuntu jammy/main amd64 libjs-underscore all 1.13.2-dfsg-2 [118 kB]  
Get:42 http://in.archive.ubuntu.com/ubuntu jammy/main amd64 libjs-sphinxdoc all 4.3.2-1 [139 kB]  
Get:43 http://in.archive.ubuntu.com/ubuntu jammy/main amd64 liblouis-dev amd64 1:1.2.11.dfsg-2ubuntu9.2 [164 kB]  
Get:44 http://in.archive.ubuntu.com/ubuntu jammy-updates/main amd64 libpython3.10-dev amd64 3.10.12-1~22.0.4.1 [4,763 kB]  
Get:45 http://in.archive.ubuntu.com/ubuntu jammy-updates/main amd64 libpython3.10-dbg amd64 3.10.12-1~22.0.4.1 [7,166 kB]  
Get:46 http://in.archive.ubuntu.com/ubuntu jammy/main amd64 nanopage-dev all 5.10/ubuntu1 [2,309 kB]  
Get:47 http://in.archive.ubuntu.com/ubuntu jammy-updates/main amd64 python3.10-dev amd64 3.10.12-1~22.0.4.1 [508 kB]  
Get:48 http://in.archive.ubuntu.com/ubuntu jammy-updates/main amd64 python3-dev amd64 3.10.6-1-22.0.4 [26.0 kB]  
Get:49 http://in.archive.ubuntu.com/ubuntu jammy-updates/main amd64 python3-setuptools all 59.6.0-1~2ubuntu0.22.04.1 [339 kB]  
Get:50 http://in.archive.ubuntu.com/ubuntu jammy-updates/universe amd64 python3-wheel all 0.37.1-2ubuntu0.22.04.1 [32.0 kB]  
Get:51 http://in.archive.ubuntu.com/ubuntu jammy-updates/universe amd64 python3-pip all 22.0.2+dfsg-1ubuntu0.4 [1,305 kB]  
Extracting templates from packages: 100%  
(Reading database ... 202001 files and directories currently installed.)  
Preparing to unpack .../liblouis_1.2.11.dfsg-2ubuntu9.2_amd64.deb ...  
Unpacking liblouis:amd64 (1:1.2.11.dfsg-2ubuntu9.2) over (1:1.2.11.dfsg-2ubuntu9.2) ...  
Setting up liblouis:amd64 (1:1.2.11.dfsg-2ubuntu9.2) ...  
Selecting previously unselected package binutils-common:amd64.  
(Reading database ... 202001 files and directories currently installed.)  
Preparing to unpack .../00-binutils-common_2.38-4ubuntu2.6_amd64.deb ...  
Unpacking binutils-common:amd64 (2.38-4ubuntu2.6) ...  
Selecting previously unselected package libbinutils:amd64.  
Preparing to unpack .../01-libbinutils_2.38-4ubuntu2.6_amd64.deb ...  
Unpacking libbinutils:amd64 (2.38-4ubuntu2.6) ...  
Selecting previously unselected package liblbcfg-nobfd:amd64.  
Preparing to unpack .../02-liblbcfg-nobfd_2.38-4ubuntu2.6_amd64.deb ...  
Unpacking liblbcfg-nobfd:amd64 (2.38-4ubuntu2.6) ...  
Selecting previously unselected package liblbcfg:amd64.  
Preparing to unpack .../03-liblbcfg_2.38-4ubuntu2.6_amd64.deb ...  
Unpacking liblbcfg:amd64 (2.38-4ubuntu2.6) ...  
Selecting previously unselected package binutils-x86_64-linux-gnu.  
Preparing to unpack .../04-binutils-x86_64-linux-gnu_2.38-4ubuntu2.6_amd64.deb ...  
Unpacking binutils-x86_64-linux-gnu (2.38-4ubuntu2.6) ...  
Selecting previously unselected package binutils.  
Preparing to unpack .../05-binutils_2.38-4ubuntu2.6_amd64.deb ...  
Unpacking binutils (2.38-4ubuntu2.6) ...  
Selecting previously unselected package libc-dev-bin.  
Preparing to unpack .../06-lc-dev-bin_2.35-0ubuntu3.8_amd64.deb ...  
Unpacking libc-dev-bin (2.35-0ubuntu3.8) ...  
Selecting previously unselected package linux-libc-dev:amd64.  
Preparing to unpack .../07-linux-libc-dev_5.15.0-116.120_amd64.deb ...  
Unpacking linux-libc-dev:amd64 (5.15.0-116.120) ...  
Selecting previously unselected package libcrypt-dev:amd64.  
Preparing to unpack .../08-libcrypt-dev_18344.27-1_amd64.deb ...  
Unpacking libcrypt-dev:amd64 (18344.27-1) ...
```

```
Activities Terminal sharanyaram741@sharanyaram741-virtual-machine: ~ Jul 19 14:09  
Selecting previously unselected package liblc-devtools.  
Preparing to unpack .../37-libc-devtools_2.35-0ubuntu3.8_amd64.deb ...  
Unpacking libc-devtools (2.35-0ubuntu3.8) ...  
Selecting previously unselected package libexpat1-dev:amd64.  
Preparing to unpack .../38-libexpat1-dev_2.4.7-1ubuntu0.3_amd64.deb ...  
Unpacking libexpat1-dev:amd64 (2.4.7-1ubuntu0.3) ...  
Selecting previously unselected package libfile-fcntllock-perl.  
Preparing to unpack .../39-libfile-fcntllock-perl_0.22-3build7_amd64.deb ...  
Unpacking libfile-fcntllock-perl (0.22-3build7) ...  
Selecting previously unselected package libjs-jquery.  
Preparing to unpack .../40-libjs-jquery_3.6.0+dfsg+-3.5.13-1_all.deb ...  
Unpacking libjs-jquery (3.6.0+dfsg+-3.5.13-1) ...  
Selecting previously unselected package libjs-underscore.  
Preparing to unpack .../41-libjs-underscore_1.13.2-2dfsg-2_all.deb ...  
Unpacking libjs-underscore (1.13.2-2dfsg-2) ...  
Selecting previously unselected package libjs-sphinxdoc.  
Preparing to unpack .../42-libjs-sphinxdoc_4.3.2-1_all.deb ...  
Unpacking libjs-sphinxdoc (4.3.2-1) ...  
Selecting previously unselected package zlibig-dev:amd64.  
Preparing to unpack .../43-zlibig-dev_133af_2.11.dfsg-2ubuntu9.2_amd64.deb ...  
Unpacking zlibig-dev:amd64 (1:1.2.11.dfsg-2ubuntu9.2) ...  
Selecting previously unselected package libpython3.10-dev:amd64.  
Preparing to unpack .../44-libpython3.10-dev_3.10.12.1-22.04.4_amd64.deb ...  
Unpacking libpython3.10-dev:amd64 (3.10.12.1-22.04.4) ...  
Selecting previously unselected package libpython3-dev:amd64.  
Preparing to unpack .../45-libpython3-dev_3.10.6.1-22.04_amd64.deb ...  
Unpacking libpython3-dev (3.10.6.1-22.04) ...  
Selecting previously unselected package manpages-dev.  
Preparing to unpack .../46-manpages-dev_5.10-1ubuntu1_all.deb ...  
Unpacking manpages-dev (5.10-1ubuntu1) ...  
Selecting previously unselected package python3.10-dev.  
Preparing to unpack .../47-python3.10-dev_3.10.12.1-22.04.4_amd64.deb ...  
Unpacking python3.10-dev (3.10.12.1-22.04.4) ...  
Selecting previously unselected package python3-dev.  
Preparing to unpack .../48-python3-dev_3.10.6.1-22.04_amd64.deb ...  
Unpacking python3-dev (3.10.6.1-22.04) ...  
Selecting previously unselected package python3-setuptools.  
Setting up python3-setuptools (59.6.0-1~2ubuntu0.22.04.1_all.deb) ...  
Unpacking python3-setuptools (59.6.0-1~2ubuntu0.22.04.1) ...  
Selecting previously unselected package python3-wheel.  
Preparing to unpack .../50-python3-wheel_0.37.1-2ubuntu0.22.04.1_all.deb ...  
Unpacking python3-wheel (0.37.1-2ubuntu0.22.04.1) ...  
Selecting previously unselected package python3-pip.  
Preparing to unpack .../51-python3-pip_22.0.2+dfsg-1ubuntu0.4_all.deb ...  
Unpacking python3-pip (22.0.2+dfsg-1ubuntu0.4) ...
```

```
Activities Terminal sharanyaram741@sharanyaram741-virtual-machine: ~ Jul 19 14:12  
Setting up libquadmath0:amd64 (12.3.0-1ubuntu1-22.04) ...  
Setting up python3-pip (22.0.2+dfsg-1ubuntu0.4) ...  
Setting up libdpkg-perl (1.21.1ubuntu2.3) ...  
Setting up libubsan1:amd64 (12.3.0-1ubuntu1-22.04) ...  
Setting up libnls-dev:amd64 (2.38-4ubuntu2.3) ...  
Setting up libnls-dev:i386 (1:2.38-4ubuntu2.3) ...  
Setting up libjs-jquery (3.6.0+dfsg+-3.5.13-1) ...  
Setting up libbinutils:amd64 (2.38-4ubuntu2.6) ...  
Setting up libc-dev-bin (2.35-0ubuntu3.8) ...  
Setting up libalgorithm-diff-xs-perl (0.64-6build3) ...  
Setting up libcc1-0:amd64 (12.3.0-1ubuntu1-22.04) ...  
Setting up liblsan0:amd64 (12.3.0-1ubuntu1-22.04) ...  
Setting up libltsan1:amd64 (12.3.0-1ubuntu1-22.04) ...  
Setting up libc-devtools (2.35-0ubuntu3.8) ...  
Setting up libexpat1-dev:amd64 (2.4.7-1ubuntu0.2) ...  
Setting up libalgorithm-parpare-perl (1.06-1) ...  
Setting up libtsan0:amd64 (11.4.0-1ubuntu1-22.04) ...  
Setting up libctf0:amd64 (2.38-4ubuntu0.6) ...  
Setting up libjs-sphinxdoc (4.3.2-1) ...  
Setting up libgcc-11-dev:amd64 (11.4.0-1ubuntu1-22.04) ...  
Setting up libcc6-dev:amd64 (2.35-0ubuntu3.8) ...  
Setting up binutils-x86_64-linux-gnu (2.38-4ubuntu2.6) ...  
Setting up binutils (2.38-4ubuntu2.6) ...  
Setting up dpkg-dev (1.21.1ubuntu2.3) ...  
Setting up libexpat1-dev:amd64 (2.4.7-1ubuntu0.3) ...  
Setting up libgcc1:amd64 (2.35-0ubuntu3.8) ...  
Setting up zlibc-dev:amd64 (1:1.2.11.dfsg-2ubuntu9.2) ...  
Setting up gcc-11 (11.4.0-1ubuntu1-22.04) ...  
Setting up g++-11 (11.4.0-1ubuntu1-22.04) ...  
Setting up gcc (4:11.2.0-1ubuntu1) ...  
Setting up libpython3.10-dev:amd64 (3.10.12.1-22.04.4) ...  
Setting up python3.10-dev (3.10.12.1-22.04.4) ...  
Setting up g++ (4:11.2.0-1ubuntu1) ...  
update-alternatives: using /usr/bin/g++ to provide /usr/bin/c++ (c++) in auto mode  
Setting up build-essential (12.9ubuntu3) ...  
Setting up libpython3.10-dev:amd64 (3.10.12.1-22.04.4) ...  
Setting up python3-distutils (3.10.6.1-22.04) ...  
Processing triggers for man-db (2.10.2-1) ...  
Processing triggers for liblc-bin (2.35-0ubuntu3.8) ...  
sharanyaram741@sharanyaram741-virtual-machine: $ python3 --version  
Python 3.10.12  
sharanyaram741@sharanyaram741-virtual-machine: $ pip3 --version  
pip 22.0.2 from /usr/lib/python3/dist-packages/pip (python 3.10)  
sharanyaram741@sharanyaram741-virtual-machine: $
```

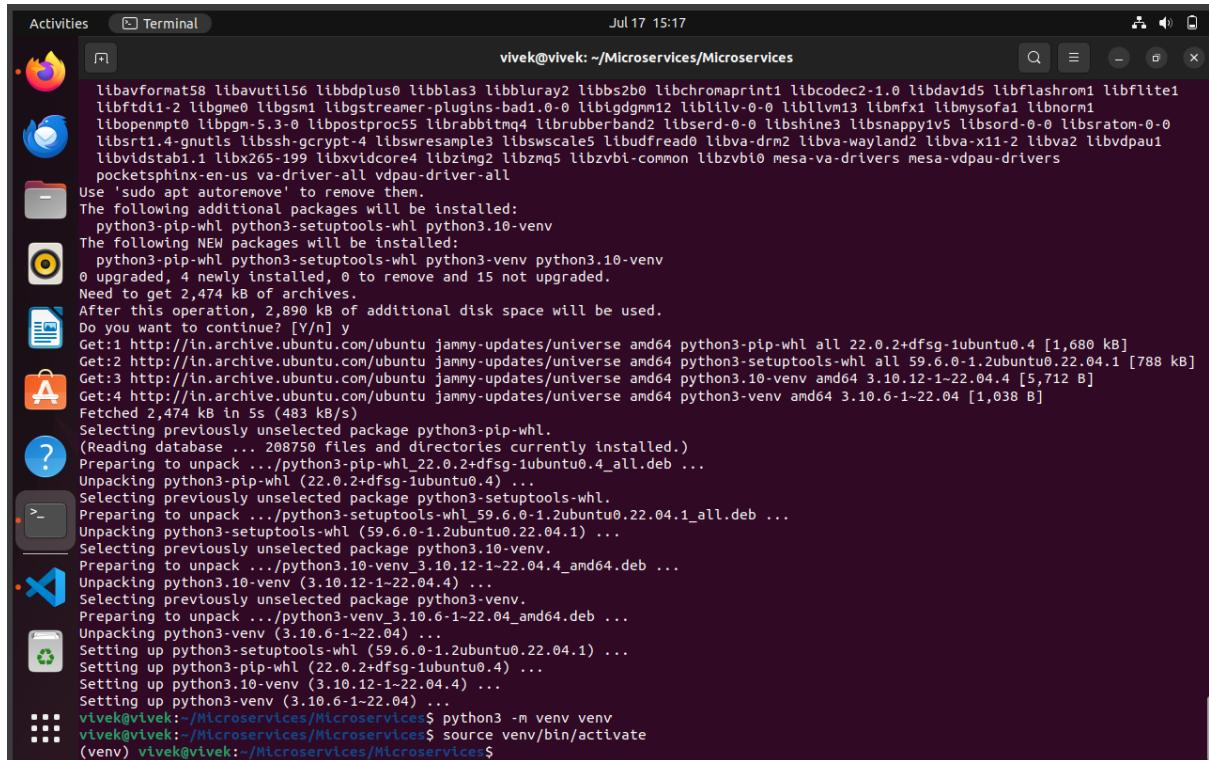
4.Clone this Github repository

<https://github.com/Vikas098766/Microservices.git>



```
Activities Terminal Jul 19 14:15 sharanyaram741@sharanyaram741-virtual-machine: ~
Setting up libgcc-0:amd64 (12.3.0-1ubuntu1-22.04) ...
Setting up libisano:amd64 (12.3.0-1ubuntu1-22.04) ...
Setting up libitm1:amd64 (12.3.0-1ubuntu1-22.04) ...
Setting up liblouis-dev (2.35-0ubuntu3.8) ...
Setting up liblogalgos0 (0.1.0-1) ...
Setting up liblogalgos0:amd64 (0.1.0-1) ...
Setting up liblogalgos0:amd64 (11.4.0-1ubuntu1-22.04) ...
Setting up liblrbff0:amd64 (2.38-4ubuntu2.6) ...
Setting up liblrbjs-sphinxdoc (4.3.2-1) ...
Setting up liblgcc-1-dev:amd64 (11.4.0-1ubuntu1-22.04) ...
Setting up liblc6-dev:amd64 (2.35-0ubuntu3.8) ...
Setting up binutils-x86_64-linux-gnu (2.38-4ubuntu2.6) ...
Setting up binutils (2.38-4ubuntu2.6) ...
Setting up dpkg-dev (1.21.ubuntu2.3) ...
Setting up libexpat1-dev:amd64 (2.4.7-2.4.7-2ubuntu0.3) ...
Setting up liblz4-dev:amd64 (11.1.3.11.dfsg-2ubuntu9.2) ...
Setting up gcc-11 (11.4.0-1ubuntu1-22.04) ...
Setting up g++-11 (11.4.0-1ubuntu1-22.04) ...
Setting up gcc (4:11.2.0-1ubuntu1) ...
Setting up libpython3.10-dev:amd64 (3.10.12.1-22.04.4) ...
Setting up g++ (4:11.2.0-1ubuntu1) ...
update-alternatives: using /usr/bin/g++ to provide /usr/bin/c++ (c++) in auto mode
Setting up build-essential (12.9ubuntu3) ...
Setting up libbz2-dev:amd64 (1.1.10.1-22.04) ...
Setting up python3-dev (3.10.6.1-22.04) ...
Processing triggers for man-db (2.10.2.1) ...
Processing triggers for libc-bin (2.35-0ubuntu3.8) ...
sharanyaram741@sharanyaram741-virtual-machine: $ python3 --version
Python 3.10.12
sharanyaram741@sharanyaram741-virtual-machine: $ pip3 --version
pip 22.0.2 from /usr/lib/python3/dist-packages/pip (python 3.10)
sharanyaram741@sharanyaram741-virtual-machine: $ git -v
git version 2.34.1
sharanyaram741@sharanyaram741-virtual-machine: $ git clone https://github.com/Vikas098766/Microservices.git
fatal: destination path 'Microservices' already exists and is not an empty directory.
sharanyaram741@sharanyaram741-virtual-machine: $ git clone https://github.com/Vikas098766/Microservices.git
Cloning into 'Microservices'...
remote: Enumerating objects: 95, done.
remote: Total 95 (delta 0), reused 0 (delta 0), pack-reused 95
Receiving objects: 100% (95/95), 96.20 KB | 2.14 MB/s, done.
Resolving deltas: 100% (28/28), done.
sharanyaram741@sharanyaram741-virtual-machine: $
```

5.Create a Virtual Environment.



```
Activities Terminal Jul 17 15:17 vivek@vivek: ~/Microservices/Microservices
libavformat58 libavutil56 libbdplus0 libblas3 libbluray2 libbs20 libchromaprint1 libcodecs2-1.0 libdavids5 libflashrom1 libflite1 libftfd1-2 libgme0 libgsml1 libgstreamer-plugins-bad1.0-0 liblgdgm12 libllvv13 libmfx1 libmysofa1 libnorm1 libopenmp10 libpgm-5.3-0 libpostproc55 librabbitmq4 librubberband2 libserd-0-0 libshine3 libsnappy1v5 libssord-0-0 libsratom-0-0 libsrts1-4-gnutls libssh-openssl-4 libswresample3 libswscale5 libudfread0 libva-drm2 libva-wayland2 libva-x11-2 libva2 libvdpau1 libvidstab1.1 libz265-199 libxvidcore4 libzimg2 libzmq5 libzvbi-common libzvbi0 mesa-va-drivers mesa-vdpau-drivers pocketsphinx-en-us va-driver-all vdpau-driver-all
Use 'sudo apt autoremove' to remove them.
The following additional packages will be installed:
  python3-pip-whl python3-setuptools-whl python3.10-venv
The following NEW packages will be installed:
  python3-pip-whl python3-setuptools-whl python3-venv python3.10-venv
  0 upgraded, 4 newly installed, 0 to remove and 15 not upgraded.
Need to get 2,474 kB of archives.
After this operation, 2,890 kB of additional disk space will be used.
Do you want to continue? [Y/n] y
Get:1 http://in.archive.ubuntu.com/ubuntu jammy-updates/universe amd64 python3-pip-whl all 22.0.2+dfsg-1ubuntu0.4 [1,680 kB]
Get:2 http://in.archive.ubuntu.com/ubuntu jammy-updates/universe amd64 python3-setuptools-whl all 59.6.0-1.2ubuntu0.22.04.1 [788 kB]
Get:3 http://in.archive.ubuntu.com/ubuntu jammy-updates/universe amd64 python3.10-venv amd64 3.10.12-1-22.04.4 [5,712 B]
Get:4 http://in.archive.ubuntu.com/ubuntu jammy-updates/universe amd64 python3-venv amd64 3.10.6-1-22.04 [1,038 B]
Fetched 2,474 kB in 5s (483 kB/s)
Selecting previously unselected package python3-pip-whl.
(Reading database ... 208750 files and directories currently installed.)
Preparing to unpack .../python3-pip-whl_22.0.2+dfsg-1ubuntu0.4_all.deb ...
Unpacking python3-pip-whl (22.0.2+dfsg-1ubuntu0.4) ...
Selecting previously unselected package python3-setuptools-whl.
Preparing to unpack .../python3-setuptools-whl_59.6.0-1.2ubuntu0.22.04.1_all.deb ...
Unpacking python3-setuptools-whl (59.6.0-1.2ubuntu0.22.04.1) ...
Selecting previously unselected package python3.10-venv.
Preparing to unpack .../python3.10-venv_3.10.12-1-22.04.4_amd64.deb ...
Unpacking python3.10-venv (3.10.12-1-22.04.4) ...
Selecting previously unselected package python3-venv.
Preparing to unpack .../python3-venv_3.10.6-1-22.04_amd64.deb ...
Unpacking python3-venv (3.10.6-1-22.04) ...
Setting up python3-setuptools-whl (59.6.0-1.2ubuntu0.22.04.1) ...
Setting up python3-pip-whl (22.0.2+dfsg-1ubuntu0.4) ...
Setting up python3.10-venv (3.10.12-1-22.04.4) ...
Setting up python3-venv (3.10.6-1-22.04) ...
vivek@vivek:~/Microservices/Microservices$ python3 -m venv venv
vivek@vivek:~/Microservices/Microservices$ source venv/bin/activate
(venv) vivek@vivek:~/Microservices/Microservices$
```

source venv/bin/activate

6.Install the dependencies from requirements.txt file.

```

Activities Terminal Jul 19 14:36
sharanyaram741@sharanyaram741-virtual-machine: ~/Microservices$ pip install -r requirements.txt
Collecting click==8.0.3
  Downloading click-8.0.3-py3-none-any.whl (97 kB)
Collecting cyclers==0.11.0
  Downloading cyclers-0.11.0-py3-none-any.whl (0.4 kB)
Collecting Flask==2.0.2
  Downloading Flask-2.0.2-py3-none-any.whl (95 kB)
Collecting fonttools==4.28.5
  Downloading fonttools-4.28.5-py3-none-any.whl (890 kB)
Collecting gunicorn==20.1.0
  Downloading gunicorn-20.1.0-py3-none-any.whl (79 kB)
Collecting itsdangerous==2.0.1
  Downloading itsdangerous-2.0.1-py3-none-any.whl (18 kB)
Collecting Jinja2==3.0.3
  Downloading Jinja2-3.0.3-py3-none-any.whl (133 kB)
Collecting joblib==1.1.0
  Downloading joblib-1.1.0-py3-none-any.whl (306 kB)
Collecting kiwisolver==1.3.2
  Downloading kiwisolver-1.3.2-cp310-cp310-manylinux_2_12_x86_64_manylinux2010_x86_64.whl (1.6 MB)
Collecting MarkupSafe==2.0.1
  Downloading MarkupSafe-2.0.1-cp310-cp310-manylinux_2_5_x86_64_manylinux1_x86_64_manylinux2010_x86_64.whl (30 kB)
Collecting matplotlib==3.5.1
  Downloading matplotlib-3.5.1-cp310-cp310-manylinux_2_17_x86_64_manylinux2014_x86_64.whl (11.9 MB)
Collecting numpy==1.22.0
  Downloading numpy-1.22.0-cp310-cp310-manylinux_2_17_x86_64_manylinux2014_x86_64.whl (16.8 MB)
Collecting packaging==21.3
  Downloading packaging-21.3-py3-none-any.whl (40 kB)
Collecting pandas==1.3.5
  Downloading pandas-1.3.5-cp310-cp310-manylinux_2_17_x86_64_manylinux2014_x86_64.whl (11.5 MB)
Collecting Pillow==9.0.0
  Downloading Pillow-9.0.0-cp310-cp310-manylinux_2_17_x86_64_manylinux2014_x86_64.whl (4.3 MB)
Collecting pyarsing==3.0.6
  Downloading pyParsing-3.0.6-py3-none-any.whl (97 kB)
Collecting python-dateutil==2.8.2
  Downloading python_dateutil-2.8.2-py3-none-any.whl (247 kB)
Collecting pytz==2021.3
  Downloading pytz-2021.3-py2.py3-none-any.whl (508 kB)
Collecting scikit-learn==1.0.2
  Downloading scikit_learn-1.0.2-cp310-cp310-manylinux_2_17_x86_64_manylinux2014_x86_64.whl (26.5 MB)
Collecting scipy==1.7.3
  Downloading scipy-1.7.3-cp310-cp310-manylinux_2_17_x86_64_manylinux2014_x86_64.whl (39.9 MB)
Collecting six==1.16.0
  Using cached six-1.16.0-py2.py3-none-any.whl (11 kB)
Collecting sklearn==0.0
  Downloading sklearn-0.0.tar.gz (1.1 kB)
  Preparing metadata (setup.py) ... done
Collecting threadpoolctl==3.0.0
  Downloading threadpoolctl-3.0.0-py3-none-any.whl (14 kB)
Collecting Werkzeug==2.0.2
  Downloading Werkzeug-2.0.2-py3-none-any.whl (288 kB)
Requirement already satisfied: setuptools>=3.0 in /home/sharanyaram741/venv/lbt/python3.10/site-packages (from gunicorn==20.1.0->-r requirements.txt (line 5)) (59.6.0)
Using legacy 'setup.py install' for sklearn, since package 'wheel' is not installed.
Installing collected packages: pytz, Werkzeug, threadpoolctl, six, pyarsing, Pillow, numpy, MarkupSafe, kiwisolver, joblib, itsdangerous, gunicorn, fonttools, cycler, click, scipy, python-dateutil, packaging, Jinja2, scikit-learn, pandas, matplotlib, Flask, sklearn
  Running setup.py install for sklearn ... done
Successfully installed Flask-2.0.2 Jinja2-3.0.3 MarkupSafe-2.0.1 Pillow-9.0.0 Werkzeug-2.0.2 click-8.0.3 cycler-0.11.0 fonttools-4.28.5 gunicorn-20.1.0 itsdangerous-2.0.1 joblib-1.1.0 kiwisolver-1.3.2 matplotlib-3.5.1 numpy-1.22.0 packaging-21.3 pandas-1.3.5 pyParsing-3.0.6 python-dateutil-2.8.2 pytz-2021.3 scikit-learn-1.0.2 scipy-1.7.3 six-1.16.0 sklearn-0.0
(venv) sharanyaram741@sharanyaram741-virtual-machine: ~/Microservices$ 
```

7. Train and save the model.

```

Activities Terminal Jul 19 14:40
sharanyaram741@sharanyaram741-virtual-machine: ~/Microservices
Collecting Pillow==9.0.0
  Downloading Pillow-9.0.0-cp310-cp310-manylinux_2_17_x86_64.manylinux2014_x86_64.whl (4.3 MB)
Collecting pyparsing==3.0.6
  Downloading pyparsing-3.0.6-py3-none-any.whl (97 kB)
Collecting python-dateutil==2.8.2
  Downloading python_dateutil-2.8.2-py2.py3-none-any.whl (247 kB)
Collecting pytz==2021.3
  Downloading pytz-2021.3-py2.py3-none-any.whl (503 kB)
Collecting scikit-learn==1.0.2
  Downloading scikit_learn-1.0.2-cp310-cp310-manylinux_2_17_x86_64.manylinux2014_x86_64.whl (26.5 MB)
Collecting scipy==1.7.3
  Downloading scipy-1.7.3-cp310-cp310-manylinux_2_17_x86_64.manylinux2014_x86_64.whl (39.9 MB)
Collecting six==1.16.0
  Using cached stx-1.16.0-py2.py3-none-any.whl (11 kB)
Collecting sklearn==0.0
  Downloading sklearn-0.0.tar.gz (1.1 kB)
    Preparing metadata (setup.py) ... done
Collecting threadpoolctl==0.0
  Downloading threadpoolctl-0.0-py3-none-any.whl (14 kB)
Collecting Werkzeug==2.0.2
  Downloading Werkzeug-2.0.2-py3-none-any.whl (288 kB)
Requirement already satisfied: setuptools>=3.0 in /home/sharanyaram741/venv/lib/python3.10/site-packages (from gunicorn==20.1.0->-r requirements.txt (line 5)) (59.6.0)
Using legacy 'setup.py install' for sklearn, since package 'wheel' is not installed.
Installing collected packages: pytz, Werkzeug, threadpoolctl, six, pyparsing, Pillow, numpy, MarkupSafe, kiwisolver, joblib, itsdangerous, gunicorn, fonttools, cycler, click, scipy, python-dateutil, packaging, Jinja2, scikit-learn, pandas, matplotlib, Flask, sklearn
  Running setup.py install for sklearn ... done
Successfully installed Flask-2.0.2 Jinja2-3.0.3 MarkupSafe-2.0.1 Pillow-9.0.0 Werkzeug-2.0.2 click-8.0.3 cycler-0.11.0 fonttools-4.28.5 gunicorn-20.1.0 itsdangerous-2.0.1 joblib-1.1.0 kiwisolver-1.3.2 matplotlib-3.15.1 numpy-1.22.0 packaging-21.3 pandas-1.3.5 pyparsing-3.0.6 python-dateutil-2.8.2 pytz-2021.3 scikit-learn-1.0.2 scipy-1.7.3 stx-1.16.0 sklearn-0.0
</venv> sharanyaram741@sharanyaram741-virtual-machine:~/Microservices$ python code_model_training/train.py
/home/sharanyaram741/Microservices/code_model_training/train.py:54: UserWarning: Matplotlib is currently using agg, which is a non-GUI backend, so cannot show the figure.
  plt.show()
</venv> sharanyaram741@sharanyaram741-virtual-machine:~/Microservices$
```

8. Test the Flask web application.

```

Activities Terminal Jul 19 16:45
sharanyaram741@sharanyaram741-virtual-machine: ~/Microservices
sharanyaram741@sharanyaram741-virtual-machine: ~/Microservices
Collecting Werkzeug==2.0.2-py3-none-any.whl (288 kB)
  Downloading Werkzeug-2.0.2-py3-none-any.whl (288 kB)
Requirement already satisfied: setuptools>=3.0 in /home/sharanyaram741/venv/lib/python3.10/site-packages (from gunicorn==20.1.0->-r requirements.txt (line 5)) (59.6.0)
Using legacy 'setup.py install' for sklearn, since package 'wheel' is not installed.
Installing collected packages: pytz, Werkzeug, threadpoolctl, six, pyparsing, Pillow, numpy, MarkupSafe, kiwisolver, joblib, itsdangerous, gunicorn, fonttools, cycler, click, scipy, python-dateutil, packaging, Jinja2, scikit-learn, pandas, matplotlib, Flask, sklearn
  Running setup.py install for sklearn ... done
Successfully installed Flask-2.0.2 Jinja2-3.0.3 MarkupSafe-2.0.1 Pillow-9.0.0 Werkzeug-2.0.2 click-8.0.3 cycler-0.11.0 fonttools-4.28.5 gunicorn-20.1.0 itsdangerous-2.0.1 joblib-1.1.0 kiwisolver-1.3.2 matplotlib-3.15.1 numpy-1.22.0 packaging-21.3 pandas-1.3.5 pyparsing-3.0.6 python-dateutil-2.8.2 pytz-2021.3 scikit-learn-1.0.2 scipy-1.7.3 stx-1.16.0 sklearn-0.0
</venv> sharanyaram741@sharanyaram741-virtual-machine:~/Microservices$ python code_model_training/train.py
Matplotlib is building the font cache; this may take a moment.
Accuracy: 0.9736842105263158
</venv> sharanyaram741@sharanyaram741-virtual-machine:~/Microservices$ flask run -p 5000
</venv> sharanyaram741@sharanyaram741-virtual-machine:~/Microservices$ flask run -p 5000
* Environment: production
  WARNING: This is a development server. Do not use it in a production deployment.
* Use a production WSGI server instead.
* Debug mode: off
* Running on http://127.0.0.1:5000/ (Press CTRL+C to quit)
curl -X GET http://localhost:5000/info
curl -d '[{"radius_mean": 17.99, "texture_mean": 10.38, "perimeter_mean": 122.8, "area_mean": 1001.0, "smoothness_mean": 0.1184, "compactness_mean": 0.2776, "concavity_mean": 0.3001, "concave points_mean": 0.1471, "symmetry_mean": 0.2419, "fractal_dimension_mean": 0.07871, "radius_se": 1.095, "texture_se": 0.9053, "perimeter_se": 8.589, "area_se": 153.4, "smoothness_se": 0.006399, "compactness_se": 0.04094, "concavity_se": 0.05373, "concave points_se": 0.01587, "symmetry_se": 0.03003, "fractal dimension_se": 0.000193, "radius_worst": 25.38, "texture_worst": 17.33, "perimeter_worst": 184.6, "area_worst": 2019.0, "smoothness_worst": 0.1622, "compactness_worst": 0.6656, "concavity_worst": 0.7119, "concave points_worst": 0.2654, "symmetry_worst": 0.4601, "fractal_dimension_worst": 0.1189}]' \
-X POST http://0.0.0.0:5000/predict
</venv> sharanyaram741@sharanyaram741-virtual-machine:~/Microservices$ flask run
</venv> sharanyaram741@sharanyaram741-virtual-machine:~/Microservices$ flask run
* Environment: production
  WARNING: This is a development server. Do not use it in a production deployment.
* Use a production WSGI server instead.
* Debug mode: off
* Running on http://127.0.0.1:5000/ (Press CTRL+C to quit)
127.0.0.1 - [19/Jul/2024 16:39:40] "GET /info HTTP/1.1" 200 -
127.0.0.1 - [19/Jul/2024 16:42:41] "POST /predict HTTP/1.1" 500 -
127.0.0.1 - [19/Jul/2024 16:43:55] "POST /predict HTTP/1.1" 200 -
```

9. Test the application and make prediction service and test it locally by passing some example cells available in the folder /tests. (5 marks)

```
Activities Terminal sharanyaram741@sharanyaram741-virtual-machine: ~/Microservices Jul 19 16:44
sharanyaram741@sharanyaram741-virtual-machine: ~/Microservices sharanyaram741@sharanyaram741-virtual-machine: ~/Microservices

sharanyaram741@sharanyaram741-virtual-machine: ~/Microservices $ sudo apt install curl
[sudo] password for sharanyaram741:
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following packages were automatically installed and are no longer required:
  chromium-codecs-free-extra gstreamer1.0-vaapi libgstreamer1.0-0 libgstreamer1.0-va-driver intel-media-va-driver libva-ac3 libva-bass libva-codec58 libva-format58 libva-util56 libvddplus8 libvblas3 libluby2 libluby2b libchromaprint liblcodec2-1.0 liblfdavids5 liblfelite1 libpgm0 libpgm5 libgststreamer-plugins-bad1.0-0 liblgbmpm12 liblilly-0.0 liblilyvms1 liblfx1 libwsysfa1 libnorm1 libbompente libpgm-5.3-0 libpostproc55 librabitmq4 librubberband2 libvba2 libvbd6-0-0 libvhsine3 libsnappy1v5 libssord-0-0 libsrat0-0-0 libsrst1.4-gnutls libssh-gcrypt-4 libswresample3 libwscales libvdpau-freaddo libvba-drm2 libvba-wayland2 libvba-x11-2 libvba2 libvbidpaul libvbidstab1.1 libvbx265-199 libvbxvidcore4 libzimg2 libzmq5 libzbvbi-common libzbvbi-0 mesa-va-drivers mesa-vdpau-drivers pocketphinx-en-us va-driver-all vdpau-driver-all
Use 'sudo apt autoremove' to remove them.
The following NEW package will be installed:
  curl
0 upgraded, 1 newly installed, 0 to remove and 197 not upgraded.
Need to get 136 kB of additional disk space will be used.
After this operation, 454 kB of additional disk space will be used.
Get: http://in.archive.ubuntu.com/ubuntu jammy-updates/main amd64 curl amd64 7.81.0-1ubuntu1.16 [194 kB]
Fetched 194 kB in 0s (136 kB/s)
Selecting previously unselected package curl.
(Reading database ... 210202 files and directories currently installed.)
Preparing to unpack .../curl_7.81.0-1ubuntu1.16_amd64.deb ...
Unpacking curl (7.81.0-1ubuntu1.16) ...
Setting up curl (7.81.0-1ubuntu1.16) ...
Processing triggers for man-db (2.10.2-1) ...
sharanyaram741@sharanyaram741-virtual-machine: ~/Microservices $ curl -X GET http://127.0.0.1:5000/info
[{"name": "ComputerVision", "version": "v1.0.0"}
sharanyaram741@sharanyaram741-virtual-machine: ~/Microservice $ curl -d '{'
  "radius_mean": 17.99,
  "texture_mean": 10.38,
  "perimeter_mean": 122.8,
  "area_mean": 1001.0,
  "smoothness_mean": 0.1184,
  "compactness_mean": 0.2776,
  "concavity_mean": 0.0001,
  "concave_points_mean": 0.1471,
  "symmetry_mean": 0.2419,
  "fractal_dimension_mean": 0.07871,
  "radius_se": 1.095,
  "texture_se": 0.9053,
  "perimeter_se": 8.589,
  "area_se": 153.4,
```

```
Activities Terminal Jul 19 16:45
sharanyaram741@sharanyaram741-virtual-machine: ~/Microservices
sharanyaram741@sharanyaram741-virtual-machine: ~/Microservices $ curl -d '[{"name": "Breast Cancer Wisconsin (Diagnostic)", "version": "v1.0.0"}]' http://127.0.0.1:5000/predict
sharanyaram741@sharanyaram741-virtual-machine: ~/Microservices $ curl -d '{"radius_mean": 17.99, "texture_mean": 10.38, "perimeter_mean": 122.8, "area_mean": 1001.0, "smoothness_mean": 0.1184, "compactness_mean": 0.0776, "concavity_mean": 0.0301, "concave_points_mean": 0.1471, "symmetry_mean": 0.2419, "fractal_dimension_mean": 0.07871, "radius_se": 1.095, "texture_se": 0.9053, "perimeter_se": 8.589, "area_se": 153.4, "smoothness_se": 0.006399, "compactness_se": 0.04904, "concavity_se": 0.05373, "concave_points_se": 0.01587, "symmetry_se": 0.03003, "fractal_dimension_se": 0.006193, "radius_worst": 25.38, "texture_worst": 17.33, "perimeter_worst": 184.6, "area_worst": 2019.0, "smoothness_worst": 0.1622, "compactness_worst": 0.6656, "concavity_worst": 0.7119, "concave_points_worst": 0.2654, "symmetry_worst": 0.4601, "fractal_dimension_worst": 0.1189}' -H "Content-type: application/json" -X POST http://127.0.0.1:5000/predict
sharanyaram741@sharanyaram741-virtual-machine: ~/Microservices $ curl -d '{"radius_mean": 17.99, "texture_mean": 10.38, "perimeter_mean": 122.8, "area_mean": 1001.0, "smoothness_mean": 0.1184, "compactness_mean": 0.0776, "concavity_mean": 0.0301, "concave_points_mean": 0.1471, "symmetry_mean": 0.2419, "fractal_dimension_mean": 0.07871, "radius_se": 1.095, "texture_se": 0.9053, "perimeter_se": 8.589, "area_se": 153.4, "smoothness_se": 0.006399, "compactness_se": 0.04904, "concavity_se": 0.05373, "concave_points_se": 0.01587, "symmetry_se": 0.03003, "fractal_dimension_se": 0.006193, "radius_worst": 25.38, "texture_worst": 17.33, "perimeter_worst": 184.6, "area_worst": 2019.0, "smoothness_worst": 0.1622, "compactness_worst": 0.6656, "concavity_worst": 0.7119, "concave_points_worst": 0.2654, "symmetry_worst": 0.4601, "fractal_dimension_worst": 0.1189}' -H "Content-type: application/json" -X POST http://127.0.0.1:5000/predict
sharanyaram741@sharanyaram741-virtual-machine: ~/Microservices $ curl -d '{"label": "M", "prediction": "B"}' -H "Content-type: application/json" -X POST http://127.0.0.1:5000/predict
```

10.Create a docker image containing everything needed to run the application.(10 marks)

```
Activities Terminal Jul 19 23:17
sharanyaram741@sharanyaram741-virtual-machine: ~/Microservices
sharanyaram741@sharanyaram741-virtual-machine: $ ls
Desktop Documents Downloads Microservices Microservices-past Microservices.zip microsoft.asc Music Pictures Public snap Templates venv Videos
sharanyaram741@sharanyaram741-virtual-machine: $ cd Microservices
sharanyaram741@sharanyaram741-virtual-machine: ~/Microservices
sharanyaram741@sharanyaram741-virtual-machine: $ app.py <code_model_training> data Dockerfile model.msl output.txt __pycache__ README.md requirements.txt tests
sharanyaram741@sharanyaram741-virtual-machine: ~/Microservices$ docker build -t flask-ml-app .
DEPRECATED: The legacy builder is deprecated and will be removed in a future release.
  Install the buildx component to build images with BuildKit:
    https://docs.docker.com/go/buildx/
Sending build context to Docker daemon 333.8kB
Step 1/8 : FROM python:3.9-slim
3.9-slim: Pulling from library/python
f1c1cadaa26e: Pull complete
c1f67e58a3d2: Pull complete
937003d1185: Pull complete
174cb52e37e5: Pull complete
f259657f3656: Pull complete
Digest: sha256:a5c12ec09ff13df9d4bb84edd8878c1b212d89885be14b6c72b633bee2a520f4
Status: Downloaded newer image for python:3.9-slim
--> b97320a8c1ca
Step 2/8 : WORKDIR /app
--> Running in 833efda5027c
Removing intermediate container 833efda5027c
--> d7e299bb8523
Step 3/8 : COPY requirements.txt /app/
--> eaad22c08899
Step 4/8 : RUN pip install --no-cache-dir -r requirements.txt
--> Running in f7cc5d8aa015
Collecting click==8.0.3
  Downloading click-8.0.3-py3-none-any.whl (97 kB)
Collecting cyclers==0.11.0
  Downloading cyclers-0.11.0-py3-none-any.whl (6.4 kB)
Collecting Flask==2.0.2
  Downloading Flask-2.0.2-py3-none-any.whl (95 kB)
--> 95.2/95.2 kB 9.8 MB/s eta 0:00:00
Collecting FontTools==4.28.5
  Downloading FontTools-4.28.5-py3-none-any.whl (890 kB)
--> 890.4/890.4 kB 9.1 MB/s eta 0:00:00
Collecting gunicorn==20.1.0
  Downloading gunicorn-20.1.0-py3-none-any.whl (70 kB)
```

```

sharanyaram741@sharanyaram741-virtual-machine: ~/Microservices
Collecting gunicorn==20.1.0
  Downloading gunicorn-20.1.0-py3-none-any.whl (79 kB)
    79.5/79.5 kB 107.1 MB/s eta 0:00:00
Collecting itsdangerous==2.0.1
  Downloading itsdangerous-2.0.1-py3-none-any.whl (18 kB)
Collecting Jinja2==3.0.3
  Downloading Jinja2-3.0.3-py3-none-any.whl (133 kB)
    133.6/133.6 kB 100.3 MB/s eta 0:00:00
Collecting joblib==1.1.0
  Downloading joblib-1.1.0-py2.py3-none-any.whl (306 kB)
    307.0/307.0 kB 11.2 MB/s eta 0:00:00
Collecting kiwisolver==1.3.2
  Downloading kiwisolver-1.3.2-cp39-cp39-manylinux_2_12_x86_64.manylinux2010_x86_64.whl (1.6 MB)
    1.6/1.6 kB 10.5 MB/s eta 0:0:00
Collecting MarkupSafe==2.0.1
  Downloading MarkupSafe-2.0.1-cp39-cp39-manylinux_2_5_x86_64.manylinux1_x86_64.manylinux_2_12_x86_64.manylinux2010_x86_64.whl (30 kB)
Collecting matplotlib==3.5.1
  Downloading matplotlib-3.5.1-cp39-cp39-manylinux_2_5_x86_64.manylinux1_x86_64.whl (11.2 MB)
    11.2/11.2 kB 10.7 MB/s eta 0:0:00
Collecting numpy==1.22.0
  Downloading numpy-1.22.0-cp39-cp39-manylinux_2_17_x86_64.manylinux2014_x86_64.whl (16.8 MB)
    16.8/16.8 kB 9.6 MB/s eta 0:0:00
Collecting packaging==21.3
  Downloading packaging-21.3-py3-none-any.whl (40 kB)
    40.8/40.8 kB 138.3 MB/s eta 0:0:00
Collecting pandas==1.3.5
  Downloading pandas-1.3.5-cp39-cp39-manylinux_2_17_x86_64.manylinux2014_x86_64.whl (11.5 MB)
    11.5/11.5 kB 10.0 MB/s eta 0:0:00
Collecting Pillow==9.0.0
  Downloading Pillow-9.0.0-cp39-cp39-manylinux_2_17_x86_64.manylinux2014_x86_64.whl (4.3 MB)
    4.3/4.3 kB 6.8 MB/s eta 0:0:00
Collecting pyarrow==3.0.6
  Downloading pyarrow-3.0.6-py3-none-any.whl (97 kB)
    97.0/97.6 kB 18.4 MB/s eta 0:0:00
Collecting python-dateutil==2.8.2
  Downloading python_dateutil-2.8.2-py2.py3-none-any.whl (247 kB)
    247.7/247.7 kB 14.1 MB/s eta 0:0:00
Collecting pytz==2021.3
  Downloading pytz-2021.3-py3-none-any.whl (503 kB)
    503.5/503.5 kB 11.1 MB/s eta 0:0:00
Collecting scikit-learn==1.0.2
  Downloading scikit_learn-1.0.2-cp39-cp39-manylinux_2_17_x86_64.manylinux2014_x86_64.whl (26.4 MB)

sharanyaram741@sharanyaram741-virtual-machine: ~/Microservices
Preparing metadata (setup.py): finished with status 'done'
Collecting threadpoolctl==3.0.0
  Downloading threadpoolctl-3.0.0-py3-none-any.whl (14 kB)
Collecting Werkzeug==2.0.2
  Downloading Werkzeug-2.0.2-py3-none-any.whl (288 kB)
    288.9/288.9 kB 10.7 MB/s eta 0:0:00
Requirement already satisfied: setuptools>=3.0.0 in /usr/local/lib/python3.9/site-packages (from gunicorn==20.1.0->-r requirements.txt (line 5)) (58.1.0)
Building wheels for collected packages: sklearn
  Building wheel for sklearn (setup.py): started
  Building wheel for sklearn (setup.py): finished with status 'done'
  Created wheel for sklearn: filename=sklearn-0.0-py2.py3-none-any.whl size=1309 sha256=28b8c718cc4dad45e1ff29b7aa4db03fe82bf778a1c0d35139df7c20470dic9
  Stored in directory: /tmp/pip-ephem-wheel-cache-qzwr7rvg7/wheels/e4/7b/98/b6466d71b8d738ad5470809eb9bf8676d1ff6ca4a622af1c
Successfully built Flask-2.0.2 Jinja2-3.0.3 MarkupSafe-2.0.1 Pillow-9.0.0 Werkzeug-2.0.2 click-8.0.3 cyclere-0.11.0 fonttools-4.28.5 gunicorn-20.1.0 itsdangerous-2.0.1 joblib-1.1 .0 kiwisolver-1.3.2 matplotlib-3.5.1 numpy-1.22.0 packaging-21.3 pandas-1.3.5 pyarrow-3.0.6 python-dateutil-2.8.2 pytz-2021.3 scikit-learn-1.0.2 scipy-1.7.3 six-1.16.0 sklearn-0.0 threadpoolctl-3.0.0
WARNING: Running pip as the 'root' user can result in broken permissions and conflicting behaviour with the system package manager. It is recommended to use a virtual environment instead: https://pip.pypa.io/warnings/venv

[notice] A new release of pip is available: 23.0.1 -> 24.1.2
[notice] To update, run: pip install --upgrade pip
Removing intermediate container ffc3daa6155
--> 261f02499051
Step 5/8 : COPY ./app
--> 5bcd80411207
Step 6/8 : EXPOSE 5000
--> Running in 7b5f57166ce4
Removing intermediate container 7b5f57166ce4
--> 38ce0be2c57e
Step 7/8 : ENV FLASK_APP=app.py
--> Running in af892fbfedf
Removing intermediate container 6fa892fbfedf
--> bcf54f7a02fc
Step 8/8 : CMD ["flask", "run", "-host=0.0.0.0"]
--> Running in 7cdb2f80e511
Removing intermediate container 7cdb2f80e511
--> 32a989836d20c
Successfully built 32a989836d20c
Successfully tagged flask-ml-app:latest
sharanyaram741@sharanyaram741-virtual-machine:~/Microservices$ docker run -p 5000:5000 flask-ml-app

```

11.Run the containerized application as a prediction service and test it locally by passing some example calls and get the prediction. (10 marks)

Activities Terminal Jul 19 23:20

```
sharanyaram741@sharanyaram741-virtual-machine: ~/Microservices
curl: command not found
sharanyaram741@sharanyaram741-virtual-machine: ~/Microservices$ -curl -X GET http://localhost:5000/info
Command '-curl' not found, did you mean:
  command 'curl' from snap curl (8.1.2)
  command 'curl' from deb curl (7.81.0-1ubuntu1.16)
See 'snap info <snapname>' for additional versions.
sharanyaram741@sharanyaram741-virtual-machine: ~/Microservices$ curl -X GET http://localhost:5000/info
"Breast Cancer Wisconsin (Diagnostic)", "version": "v1.0.0"
sharanyaram741@sharanyaram741-virtual-machine: ~/Microservices$ curl -d '[{"radius_mean": 17.99, "texture_mean": 10.38, "perimeter_mean": 122.8, "area_mean": 1001.0, "smoothness_mean": 0.1184, "compactness_mean": 0.2776, "concavity_mean": 0.3081, "symmetry_mean": 0.2419, "fractal_dimension_mean": 0.07871, "radius_se": 1.095, "texture_se": 0.9053, "perimeter_se": 0.589, "area_se": 153.4, "smoothness_se": 0.006399, "compactness_se": 0.04904, "concavity_se": 0.05373, "concave points_se": 0.01587, "symmetry_se": 0.03083, "fractal_dimension_se": 0.006193, "radius_worst": 25.38, "texture_worst": 17.33, "perimeter_worst": 184.6, "area_worst": 2019.0, "smoothness_worst": 0.1622, "compactness_worst": 0.6656, "concavity_worst": 0.7119, "concave points_worst": 0.2654, "symmetry_worst": 0.4601, "fractal_dimension_worst": 0.1189}]' -X POST http://localhost:5000/predict
{"label": "M", "prediction": 1, "status": 200}
sharanyaram741@sharanyaram741-virtual-machine: ~/Microservices$ script terminal_output.txt
Script started, output log file is 'terminal_output.txt'.
sharanyaram741@sharanyaram741-virtual-machine: ~/Microservices$
```

Activities Terminal Jul 19 23:20

```
sharanyaram741@sharanyaram741-virtual-machine: ~/Microservices
sharanyaram741@sharanyaram741-virtual-machine: ~/Microservices$ pip install flask Werkzeug threadpoolctl six pyParsing Pillow numpy MarkupSafe kvlib solver joblib itsdangerous gunicorn fonttools cycler click scypy python-dateutil packaging Jinja2 scikit-learn pandas matplotlib Flask sklearn
  Successfully built sklean
  Installing collected packages: pytz, Werkzeug, threadpoolctl, six, pyParsing, Pillow, numpy, MarkupSafe, kvlib, solver, joblib, itsdangerous, gunicorn, fonttools, cycler, click, scypy, python-dateutil, packaging, Jinja2, scikit-learn, pandas, matplotlib, Flask, sklearn
    Successfully installed Flask-2.0.2 Jinja2-3.0.3 MarkupSafe-2.0.1 Pillow-9.0.0 Werkzeug-2.0.2 click-8.0.3 cycler-0.11.0 fonttools-4.28.5 gunicorn-20.1.0 itsdangerous-2.0.1 joblib-1.1.0 kvlib-0.1.2.2 matplotlib-3.5.1 numpy-1.22.0 packaging-21.3 pandas-1.3.5 pyParsing-3.0.6 python-dateutil-2.8.2 pytz-2021.3 scikit-learn-1.0.2 scypy-1.7.3 six-1.16.0 sklearn-0.0.1
WARNING: Running pip as the 'root' user can result in broken permissions and conflicting behaviour with the system package manager. It is recommended to use a virtual environment instead: https://pip.pypa.io/warnings/venv
[notice] A new release of pip is available: 23.0.1 => 24.1.2
[notice] To update, run: pip install --upgrade pip
Removing intermediate container ffcc3daa6155
--> 261f02496581
Step 5/8 : COPY . /app
--> 5bcd804112d1
Step 6/8 : RUN pip install -r requirements.txt
--> 7bsf57166ce4
  Removing intermediate container 7bsf57166ce4
--> 38ce0be2c57e
Step 7/8 : ENV FLASK_APP=app.py
--> Running in 6fa892fbfedf
  Removing intermediate container 6fa892fbfedf
--> bcf5af7a02fc
Step 8/8 : CMD ["flask", "run", "--host=0.0.0.0"]
--> Running in 7cdb2f80e511
  Removing intermediate container 7cdb2f80e511
--> 32ab0986d20c
Successfully built 32ab0986d20c
Successfully tagged flask-ml-app:latest
sharanyaram741@sharanyaram741-virtual-machine: ~/Microservices$ docker run -p 5000:5000 flask-ml-app
* Serving Flask app 'app.py' (lazy loading)
* Environment: production
  WARNING: This is a development server. Do not use it in a production deployment.
  Use a production WSGI server instead.
* Debug mode: off
* Running on all addresses.
  WARNING: This is a development server. Do not use it in a production deployment.
* Listening on http://172.17.0.2:5000/ (Press CTRL+C to quit)
172.17.0.1 - [19/Jul/2024 17:36:19] "GET /info HTTP/1.1" 200 -
172.17.0.1 - [19/Jul/2024 17:36:40] "POST /predict HTTP/1.1" 200 -
```

Pushing

Activities Terminal

```
sharanyaram741@sharanyaram741-virtual-machine: ~/Microservices
sharanyaram741@sharanyaram741-virtual-machine:~/Microservices$ sudo apt update
[sudo] password for sharanyaram741:
Hit:1 https://packages.microsoft.com/repos/code stable InRelease
Hit:2 http://in.archive.ubuntu.com/ubuntu jammy InRelease
Get:3 http://security.ubuntu.com/ubuntu jammy-security InRelease [129 kB]
Get:4 http://in.archive.ubuntu.com/ubuntu jammy-updates InRelease [128 kB]
Hit:5 http://in.archive.ubuntu.com/ubuntu jammy-backports InRelease
Get:6 http://in.archive.ubuntu.com/ubuntu jammy-updates/universe amd64 Packages [1,107 kB]
Get:7 http://in.archive.ubuntu.com/ubuntu jammy-updates/universe i386 Packages [722 kB]
Fetched 2,087 kB in 3s (703 kB/s)
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
197 packages can be upgraded. Run 'apt list --upgradable' to see them.
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
Building dependency tree... Done
Reading state information... Done
git is already the newest version (1:2.34.1-1ubuntu1.11).
The following packages were automatically installed and are no longer required:
chromium-codecs-ffmpeg-extra gstreamer1.0-vaapi intel-media-va-driver libaacso libao3 libass5 libavcodec58 libavformat58 libavutil56 libbdplus0 libblas3
libbluray2 libbs2bb libchromaprint libcodecs2.1.0 libdavids libflite1 libgsm1 libgstreamer-plugins-bad1.0-0 liblomm12 libllyv15 libmfx1 libmsofai libnorm1
libopenmp10 libpq5.3.0 libpostproc55 librabitmq4 librubberband2 libserd-0.0 libsnappy1v5 libssord-0.0 libsratom-0.0 libssrt1.4-gnutls libssh-gcrypt-4 libswresample3
libswscale5 libvdpau-drivers pocketsphinx-en-us va-driver-all vdpau-driver-all
mesa-vdpau-drivers pocketsphinx-en-us va-driver-all vdpau-driver-all
Use 'sudo apt autoremove' to remove them.
0 upgraded, 0 newly installed, 0 to remove and 197 not upgraded.
sharanyaram741@sharanyaram741-virtual-machine:~/Microservices$ git config --global user.name "SharanyaRamSR"
sharanyaram741@sharanyaram741-virtual-machine:~/Microservices$ git config --global user.email "SharanyaRam108@gmail.com"
sharanyaram741@sharanyaram741-virtual-machine:~/Microservices$ git init
Reinitialized existing git repository in /home/sharanyaram741/Microservices/.git/
sharanyaram741@sharanyaram741-virtual-machine:~/Microservices$ git add .
sharanyaram741@sharanyaram741-virtual-machine:~/Microservices$ git commit -m "Initial commit of W11 Graded Assignment"
[main f3e4d05] Initial commit of W11 Graded Assignment
 8 files changed, 50 insertions(+)
  create mode 100644 .terminal_output.txt.swp
  create mode 100644 Dockerfile
  create mode 100644 .app.cpython-310.pyc
  rewrite mode /model_binary.dat.gz (99%)
  create mode 100644 ms/_pycache_/_init_.cpython-310.pyc
  create mode 100644 ms/_pycache_/_functions.cpython-310.pyc
  create mode 100644 output.txt
  create mode 100644 terminal_output.txt
sharanyaram741@sharanyaram741-virtual-machine:~/Microservices$ git remote add origin https://github.com/SharanyaRamSR/SharanyaRamSR-SharanyaRamSR_W11_W12_Graded_Assignment.git
git branch -M main
git push -u origin main
error: remote origin already exists.
Username for 'https://github.com':
Password for 'https://github.com':
remote: Deny-NonInteractive
fatal: Authentication failed for 'https://github.com/Vikas098766/Microservices.git'
sharanyaram741@sharanyaram741-virtual-machine:~/Microservices$ git remote remove origin
sharanyaram741@sharanyaram741-virtual-machine:~/Microservices$ git remote add origin https://github.com/SharanyaRamSR/SharanyaRamSR-SharanyaRamSR_W11_W12_Graded_Assignment.git
origin https://github.com/SharanyaRamSR/SharanyaRamSR-SharanyaRamSR_W11_W12_Graded_Assignment.git (fetch)
origin https://github.com/SharanyaRamSR/SharanyaRamSR-SharanyaRamSR_W11_W12_Graded_Assignment.git (push)
sharanyaram741@sharanyaram741-virtual-machine:~/Microservices$ git push -u origin main
Username for 'https://github.com': sharanyaram108@gmail.com
Password for 'https://sharanyaram108@gmail.com@github.com':
remote: Support for password authentication was removed on August 13, 2021.
remote: Please see https://docs.github.com/get-started/getting-started-with-git/about-remote-repositories#cloning-with-https-urls for information on currently recommended modes of a
authentication.
fatal: Authentication failed for 'https://github.com/SharanyaRamSR/SharanyaRamSR-SharanyaRamSR_W11_W12_Graded_Assignment.git'
sharanyaram741@sharanyaram741-virtual-machine:~/Microservices$ git push -u origin main
Username for 'https://github.com': sharanyaram108@gmail.com
Password for 'https://sharanyaram108@gmail.com@github.com':
remote: Permission to SharanyaRamSR/sharanyaRamSR-SharanyaRamSR_W11_W12_Graded_Assignment.git denied to SharanyaRamSR.
```

Activities Terminal

```
sharanyaram741@sharanyaram741-virtual-machine: ~/Microservices
sharanyaram741@sharanyaram741-virtual-machine:~/Microservices$ git commit -m "Initial commit of W11 Graded Assignment"
[main f3e4d05] Initial commit of W11 Graded Assignment
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git push -u origin main
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origin https://github.com/SharanyaRamSR/SharanyaRamSR-SharanyaRamSR_W11_W12_Graded_Assignment.git (fetch)
origin https://github.com/SharanyaRamSR/SharanyaRamSR-SharanyaRamSR_W11_W12_Graded_Assignment.git (push)
sharanyaram741@sharanyaram741-virtual-machine:~/Microservices$ git push -u origin main
Username for 'https://github.com': sharanyaram108@gmail.com
Password for 'https://sharanyaram108@gmail.com@github.com':
remote: Support for password authentication was removed on August 13, 2021.
remote: Please see https://docs.github.com/get-started/getting-started-with-git/about-remote-repositories#cloning-with-https-urls for information on currently recommended modes of a
authentication.
fatal: Authentication failed for 'https://github.com/SharanyaRamSR/SharanyaRamSR-SharanyaRamSR_W11_W12_Graded_Assignment.git'
sharanyaram741@sharanyaram741-virtual-machine:~/Microservices$ git push -u origin main
Username for 'https://github.com': sharanyaram108@gmail.com
Password for 'https://sharanyaram108@gmail.com@github.com':
remote: Permission to SharanyaRamSR/sharanyaRamSR-SharanyaRamSR_W11_W12_Graded_Assignment.git denied to SharanyaRamSR.
```

```
Activities Terminal Jul 20 00:15
sharanyaram741@sharanyaram741-virtual-machine:~/Microservices sharanyaram741@sharanyaram741-virtual-machine:~/Microservices
Generating public/private ed25519 key pair.
Enter file in which to save the key (/home/sharanyaram741/.ssh/id_ed25519):
Enter passphrase (empty for no passphrase):
Enter same passphrase again:
The key fingerprint has been saved in /home/sharanyaram741/.ssh/id_ed25519
Your public key has been saved in /home/sharanyaram741/.ssh/id_ed25519.pub
The key fingerprint is:
SHA256:WvgakTudqlLev8HFrDX3vaxteGZqp4QsBdMNwO/6aro your_email@example.com
The key's randomart image is:
+--[ED25519 256]--+
| ..o. . .
| .. o.o .o.
| o =+=.. o |
| + o o. . .
| ..o.s . o |
| ..o o . . |
| .o o . o+ |
| .+ . o+* |
| .. = .o.* |
| +oo+. +o.o.o |
+---[SHA256]---+
sharanyaram741@sharanyaram741-virtual-machine:~/Microservices$ cat ~/.ssh/id_ed25519.pub
ssh-ed25519 AAAAC3NzaC1lZDI1NTE5AAAAIEA3Pn0EfAxhc9fy0Y4QxQ6HXB271xV/AiM3aikvST your_email@example.com
sharanyaram741@sharanyaram741-virtual-machine:~/Microservices$ ssh -T git@github.com
The authenticity of host "github.com (20.207.73.82)" can't be established.
ED25519 key fingerprint is SHA256:WvgakTudqlLev8HFrDX3vaxteGZqp4QsBdMNwO/6aro
This key is not known by any other names.
Are you sure you want to continue connecting (yes/no/[fingerprint])? y
Please type 'yes' 'no' or the fingerprint: yes
Warning: Permanent added 'github.com' (ED25519) to the list of known hosts.
Hi SharanyaRamSR! You've successfully authenticated, but GitHub does not provide shell access.
sharanyaram741@sharanyaram741-virtual-machine:~/Microservices$ git remote set-url origin git@github.com:SharanyaRamSR/SharanyaRamSR-SharanyaRamSR_W11_W12_Graded_Assignment.git
sharanyaram741@sharanyaram741-virtual-machine:~/Microservices$ git push -u origin main
Enumerating objects: 109, done.
Counting objects: 100% (109/109), done.
Delta compression using up to 4 threads.
Compressing objects: 100% (65/65), done.
Writing objects: 100% (109/109), 125.47 KiB | 1.31 MiB/s, done.
Total 109 (delta 29), reused 94 (delta 28), pack-reused 0
remote: Resolving deltas: 100% (29/29), done.
To github.com:SharanyaRamSR/SharanyaRamSR-SharanyaRamSR_W11_W12_Graded_Assignment.git
 * [new branch]      main -> main
```