Name : Aniket Vishwakarma **Roll No : A-22**

Assignment No 1 : Installation Of Quiskit

Program :-

C:\Users\student> c:1> python—version
C:\Users\student>python –version
Python 3.9.13
C:\Users\student> python3 -m venv c:\path\to\virtual\environment
C:\Users\student>path\to\virtual\environment\Scripts\Activate.ps1
C:\Users\student>Microsoft Windows [Version 10.0.19042.508]
© 2020 Microsoft Corporation. All rights reserved.
C:\Users\student>pip install qiskit
Collecting qiskit

Downloading qiskit-1.1.1-cp38-abi3-win_amd64.whl (4.1 MB)
---------- 4.1/4.1 MB 36.2 kB/s eta 0:00:00
Requirement already satisfied: scipy>=1.5 in c:\users\student\anaconda3\lib\site-packages (from qiskit) (1.9.1)

Requirement already satisfied: numpy<3,>=1.17 in c:\users\student\anaconda3\lib\site-packages (from qiskit) (1.21.5)
Requirement already satisfied: python-dateutil>=2.8.0 in c:\users\student\anaconda3\lib\site-packages (from qiskit) (2.8.2)
Requirement already satisfied: dill>=0.3 in c:\users\student\anaconda3\lib\site-packages (from qiskit) (0.3.4)

Requirement already satisfied: typing-extensions in c:\users\student\anaconda3\lib\site-packages (from qiskit) (4.3.0)

Collecting symengine>=0.11

Downloading symengine-0.11.0-cp39-cp39-win_amd64.whl (16.7 MB)

---------- ---------- 4.4/16.7 MB 25.6 kB/s eta 0:08:01

File “C:\Users\student\anaconda3\lib\site-packages\pip_internal\cli\base_command.py”, line 167, in exc_logging_wrapper

Status = run_func(*args)

File “C:\Users\student\anaconda3\lib\site-packages\pip_internal\cli\req_command.py”, line 247, in wrapper

Return func(self, options, args)

File “C:\Users\student\anaconda3\lib\site-packages\pip_internal\commands\install.py”, line 369, in run

Requirement_set = resolver.resolve(

File “C:\Users\student\anaconda3\lib\site-packages\pip_internal\resolution\resolvelib\resolver.py”, line 92, in resolve

Result = self._result = resolver.resolve(

File “C:\Users\student\anaconda3\lib\site-packages\pip_vendor\resolvelib\resolvers.py”, line 481, in resolve

State = resolution.resolve(requirements, max_rounds=max_rounds)

File “C:\Users\student\anaconda3\lib\site-packages\pip_vendor\resolvelib\resolvers.py”, line 373, in resolve

Failure_causes = self._attempt_to_pin_criterion(name)

File “C:\Users\student\anaconda3\lib\site-packages\pip_vendor\resolvelib\resolvers.py”, line 213, in _attempt_to_pin_criterion

Criteria = self._get_updated_criteria(candidate)

File “C:\Users\student\anaconda3\lib\site-packages\pip_vendor\resolvelib\resolvers.py”, line 204, in _get_updated_criteria

Self._add_to_criteria(criteria, requirement, parent=candidate)

File “C:\Users\student\anaconda3\lib\site-packages\pip_vendor\resolvelib\resolvers.py”, line 172, in _add_to_criteria

If not criterion.candidates:

File “C:\Users\student\anaconda3\lib\site-packages\pip_vendor\resolvelib\structs.py”, line 151, in __bool__

Return bool(self._sequence)

File “C:\Users\student\anaconda3\lib\site-packages\pip_internal\resolution\resolvelib\found_candidates.py”, line 155, in __bool__

Return any(self)

File “C:\Users\student\anaconda3\lib\site-packages\pip_internal\resolution\resolvelib\found_candidates.py”, line 143, in <genexpr>

Return (c for c in iterator if id© not in self._incompatible_ids)

File “C:\Users\student\anaconda3\lib\site-packages\pip_internal\resolution\resolvelib\found_candidates.py”, line 47, in _iter_built

Candidate = func()

File “C:\Users\student\anaconda3\lib\site-packages\pip_internal\resolution\resolvelib\factory.py”, line 206, in _make_candidate_from_link

Self._link_candidate_cache[link] = LinkCandidate(

File “C:\Users\student\anaconda3\lib\site-packages\pip_internal\resolution\resolvelib\candidates.py”, line 297, in __init__

Super().__init__(

File “C:\Users\student\anaconda3\lib\site-packages\pip_internal\resolution\resolvelib\candidates.py”, line 162, in __init__

Self.dist = self._prepare()

File “C:\Users\student\anaconda3\lib\site-packages\pip_internal\resolution\resolvelib\candidates.py”, line 231, in _prepare

Dist = self._prepare_distribution()

File “C:\Users\student\anaconda3\lib\site-packages\pip_internal\resolution\resolvelib\candidates.py”, line 308, in _prepare_distribution

Return preparer.prepare_linked_requirement(self._ireq, parallel_builds=True)

File “C:\Users\student\anaconda3\lib\site-packages\pip_internal\operations\prepare.py”, line 438, in prepare_linked_requirement

Return self._prepare_linked_requirement(req, parallel_builds)

File “C:\Users\student\anaconda3\lib\site-packages\pip_internal\operations\prepare.py”, line 483, in _prepare_linked_requirement

Local_file = unpack_url(

File “C:\Users\student\anaconda3\lib\site-packages\pip_internal\operations\prepare.py”, line 165, in unpack_url

File = get_http_url(

File “C:\Users\student\anaconda3\lib\site-packages\pip_internal\operations\prepare.py”, line 106, in get_http_url

From_path, content_type = download(link, temp_dir.path)

File “C:\Users\student\anaconda3\lib\site-packages\pip_internal\network\download.py”, line 147, in __call__

For chunk in chunks:

File “C:\Users\student\anaconda3\lib\site-packages\pip_internal\cli\progress_bars.py”, line 53, in _rich_progress_bar

For chunk in iterable:

File “C:\Users\student\anaconda3\lib\site-packages\pip_internal\network\utils.py”, line 63, in response_chunks

For chunk in response.raw.stream(

File “C:\Users\student\anaconda3\lib\site-packages\pip_vendor\urllib3\response.py”, line 573, in stream

Data = self.read(amt=amt, decode_content=decode_content)

File “C:\Users\student\anaconda3\lib\site-packages\pip_vendor\urllib3\response.py”, line 538, in read

Raise IncompleteRead(self._fp_bytes_read, self.length_remaining)

File “C:\Users\student\anaconda3\lib\contextlib.py”, line 137, in __exit__

Self.gen.throw(typ, value, traceback)

File “C:\Users\student\anaconda3\lib\site-packages\pip_vendor\urllib3\response.py”, line 440, in _error_catcher

Raise ReadTimeoutError(self._pool, None, “Read timed out.”)

Pip._vendor.urllib3.exceptions.ReadTimeoutError: HTTPSConnectionPool(host=’files.pythonhosted.org’, port=443): Read timed out.

C:\Users\student>pip install qiskit-ibm-runtime

Collecting qiskit-ibm-runtime

Downloading qiskit_ibm_runtime-0.25.0-py3-none-any.whl (2.9 MB)

---------- 2.9/2.9 MB 36.1 kB/s eta 0:00:00

Requirement already satisfied: numpy>=1.13 in c:\users\student\anaconda3\lib\site-packages (from qiskit-ibm-runtime) (1.21.5)

Collecting pydantic>=2.5.0

Downloading pydantic-2.8.2-py3-none-any.whl (423 kB)

---------- 423.9/423.9 kB 41.1 kB/s eta 0:00:00

Collecting websocket-client>=1.5.1

Downloading websocket_client-1.8.0-py3-none-any.whl (58 kB)

---------- 58.8/58.8 kB 47.1 kB/s eta 0:00:00

Collecting qiskit>=1.1.0

Using cached qiskit-1.1.1-cp38-abi3-win_amd64.whl (4.1 MB)

Requirement already satisfied: requests>=2.19 in c:\users\student\anaconda3\lib\site-packages (from qiskit-ibm-runtime) (2.28.1)

Requirement already satisfied: python-dateutil>=2.8.0 in c:\users\student\anaconda3\lib\site-packages (from qiskit-ibm-runtime) (2.8.2)

Collecting ibm-platform-services>=0.22.6

Downloading ibm-platform-services-0.54.2.tar.gz (322 kB)

---------- 322.7/322.7 kB 16.3 kB/s eta 0:00:00

Installing build dependencies … err

C:\Users\student>pip install qiskit[visualization]

Collecting qiskit[visualization]

Using cached qiskit-1.1.1-cp38-abi3-win_amd64.whl (4.1 MB)

Collecting stevedore>=3.0.0

Downloading stevedore-5.2.0-py3-none-any.whl (49 kB)

---------- 49.7/49.7 kB 252.7 kB/s eta 0:00:00

Collecting rustworkx>=0.14.0

Downloading rustworkx-0.15.1-cp38-abi3-win_amd64.whl (1.8 MB)

---------- 1.8/1.8 MB 28.9 kB/s eta 0:00:00

Collecting symengine>=0.11

Downloading symengine-0.11.0-cp39-cp39-win_amd64.whl (16.7 MB)

---------- 16.7/16.7 MB 43.1 kB/s eta 0:00:00

Requirement already satisfied: numpy<3,>=1.17 in c:\users\student\anaconda3\lib\site-packages (from qiskit[visualization]) (1.21.5)

Requirement already satisfied: dill>=0.3 in c:\users\student\anaconda3\lib\site-packages (from qiskit[visualization]) (0.3.4)

Requirement already satisfied: scipy>=1.5 in c:\users\student\anaconda3\lib\site-packages (from qiskit[visualization]) (1.9.1)

Requirement already satisfied: sympy>=1.3 in c:\users\student\anaconda3\lib\site-packages (from qiskit[visualization]) (1.10.1)

Requirement already satisfied: python-dateutil>=2.8.0 in c:\users\student\anaconda3\lib\site-packages (from qiskit[visualization]) (2.8.2)

Requirement already satisfied: typing-extensions in c:\users\student\anaconda3\lib\site-packages (from qiskit[visualization]) (4.3.0)

Requirement already satisfied: Pillow>=4.2.1 in c:\users\student\anaconda3\lib\site-packages (from qiskit[visualization]) (9.2.0)

Requirement already satisfied: matplotlib>=3.3 in c:\users\student\anaconda3\lib\site-packages (from qiskit[visualization]) (3.5.2)

Collecting pylatexenc>=1.4

  Downloading pylatexenc-2.10.tar.gz (162 kB)

     -- 162.6/162.6 kB 69.6 kB/s eta 0:00:00

  Preparing metadata (setup.py) … done

Requirement already satisfied: seaborn>=0.9.0 in c:\users\student\anaconda3\lib\site-packages (from qiskit[visualization]) (0.11.2)

Collecting pydot

  Downloading pydot-2.0.0-py3-none-any.whl (22 kB)

Requirement already satisfied: packaging>=20.0 in c:\users\student\anaconda3\lib\site-packages (from matplotlib>=3.3->qiskit[visualization]) (21.3)

Requirement already satisfied: pyparsing>=2.2.1 in c:\users\student\anaconda3\lib\site-packages (from matplotlib>=3.3->qiskit[visualization]) (3.0.9)
Requirement already satisfied: kiwisolver>=1.0.1 in c:\users\student\anaconda3\lib\site-packages (from matplotlib>=3.3->qiskit[visualization]) (1.4.2)
Requirement already satisfied: fonttools>=4.22.0 in c:\users\student\anaconda3\lib\site-packages (from matplotlib>=3.3->qiskit[visualization]) (4.25.0)
Requirement already satisfied: cycler>=0.10 in c:\users\student\anaconda3\lib\site-packages (from matplotlib>=3.3->qiskit[visualization]) (0.11.0)
Requirement already satisfied: six>=1.5 in c:\users\student\anaconda3\lib\site-packages (from python-dateutil>=2.8.0->qiskit[visualization]) (1.16.0)
Requirement already satisfied: pandas>=0.23 in c:\users\student\anaconda3\lib\site-packages (from seaborn>=0.9.0->qiskit[visualization]) (1.4.4)
Collecting pbr!=2.1.0,>=2.0.0
  Downloading pbr-6.0.0-py2.py3-none-any.whl (107 kB)
     -- 107.5/107.5 kB 49.8 kB/s eta 0:00:00
Requirement already satisfied: mpmath>=0.19 in c:\users\student\anaconda3\lib\site-packages (from sympy>=1.3->qiskit[visualization]) (1.2.1)
Requirement already satisfied: pytz>=2020.1 in c:\users\student\anaconda3\lib\site-packages (from pandas>=0.23->seaborn>=0.9.0->qiskit[visualization]) (2022.1)
Building wheels for collected packages: pylatexenc
Building wheel for pylatexenc (setup.py) … done
Created wheel for pylatexenc: filename=pylatexenc-2.10-py3-none-any.whl size=136820 sha256=58e72c86d59d1dba9df5434b995b919f8841c13366736c7728f871e297402a2c
  Stored in directory: c:\users\student\appdata\local\pip\cache\wheels\a3\68\66\2f15abd0673d83c02f354115feedeb89c3daed2ac319b11090
Successfully built pylatexenc
Installing collected packages: pylatexenc, symengine, rustworkx, pydot, pbr, stevedore, qiskit

Successfully installed pbr-6.0.0 pydot-2.0.0 pylatexenc-2.10 qiskit-1.1.1 rustworkx-0.15.1 stevedore-5.2.0 symengine-0.11.0
C:\Users\student>pip install jupyter
Requirement already satisfied: jupyter in c:\users\student\anaconda3\lib\site-packages (1.0.0)
Requirement already satisfied: notebook in c:\users\student\anaconda3\lib\site-packages (from jupyter) (6.4.12)
Requirement already satisfied: nbconvert in c:\users\student\anaconda3\lib\site-packages (from jupyter) (6.4.4)
Requirement already satisfied: ipykernel in c:\users\student\anaconda3\lib\site-packages (from jupyter) (6.15.2)
Requirement already satisfied: qtconsole in c:\users\student\anaconda3\lib\site-packages (from jupyter) (5.2.2)
Requirement already satisfied: jupyter-console in c:\users\student\anaconda3\lib\site-packages (from jupyter) (6.4.3)
Requirement already satisfied: ipywidgets in c:\users\student\anaconda3\lib\site-packages (from jupyter) (7.6.5)
Requirement already satisfied: matplotlib-inline>=0.1 in c:\users\student\anaconda3\lib\site-packages (from ipykernel->jupyter) (0.1.6)
Requirement already satisfied: ipython>=7.23.1 in c:\users\student\anaconda3\lib\site-packages (from ipykernel->jupyter) (7.31.1)
Requirement already satisfied: jupyter-client>=6.1.12 in c:\users\student\anaconda3\lib\site-packages (from ipykernel->jupyter) (7.3.4)
Requirement already satisfied: debugpy>=1.0 in c:\users\student\anaconda3\lib\site-packages (from ipykernel->jupyter) (1.5.1)
Requirement already satisfied: psutil in c:\users\student\anaconda3\lib\site-packages (from ipykernel->jupyter) (5.9.0)
Requirement already satisfied: pyzmq>=17 in c:\users\student\anaconda3\lib\site-packages (from ipykernel->jupyter) (23.2.0)
Requirement already satisfied: nest-asyncio in c:\users\student\anaconda3\lib\site-packages (from ipykernel->jupyter) (1.5.5)
Requirement already satisfied: traitlets>=5.1.0 in c:\users\student\anaconda3\lib\site-packages (from ipykernel->jupyter) (5.1.1)
Requirement already satisfied: packaging in c:\users\student\anaconda3\lib\site-packages (from ipykernel->jupyter) (21.3)
Requirement already satisfied: tornado>=6.1 in c:\users\student\anaconda3\lib\site-packages (from ipykernel->jupyter) (6.1)
Requirement already satisfied: nbformat>=4.2.0 in c:\users\student\anaconda3\lib\site-packages (from ipywidgets->jupyter) (5.5.0)
Requirement already satisfied: jupyterlab-widgets>=1.0.0 in c:\users\student\anaconda3\lib\site-packages (from ipywidgets->jupyter) (1.0.0)
Requirement already satisfied: widgetsnbextension~=3.5.0 in c:\users\student\anaconda3\lib\site-packages (from ipywidgets->jupyter) (3.5.2)
Requirement already satisfied: ipython-genutils~=0.2.0 in c:\users\student\anaconda3\lib\site-packages (from ipywidgets->jupyter) (0.2.0)
Requirement already satisfied: prompt-toolkit!=3.0.0,!=3.0.1,<3.1.0,>=2.0.0 in c:\users\student\anaconda3\lib\site-packages (from jupyter-console->jupyter) (3.0.20)
Requirement already satisfied: pygments in c:\users\student\anaconda3\lib\site-packages (from jupyter-console->jupyter) (2.11.2)
Requirement already satisfied: entrypoints>=0.2.2 in c:\users\student\anaconda3\lib\site-packages (from nbconvert->jupyter) (0.4)
Requirement already satisfied: nbclient<0.6.0,>=0.5.0 in c:\users\student\anaconda3\lib\site-packages (from nbconvert->jupyter) (0.5.13)
Requirement already satisfied: bleach in c:\users\student\anaconda3\lib\site-packages (from nbconvert->jupyter) (4.1.0)

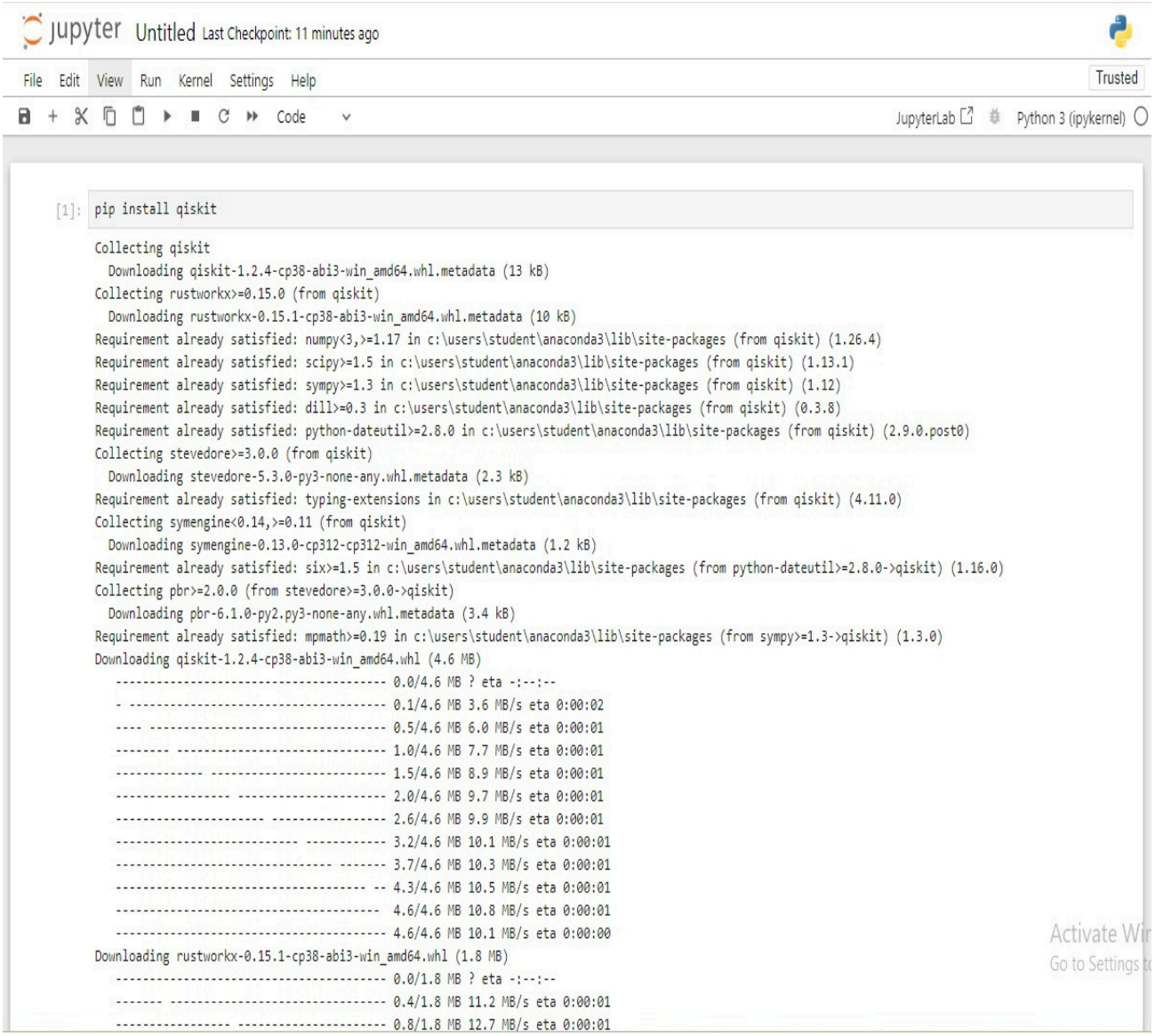
Requirement already satisfied: jinja2>=2.4 in c:\users\student\anaconda3\lib\site-packages (from nbconvert->jupyter) (2.11.3)
Requirement already satisfied: pandocfilters>=1.4.1 in c:\users\student\anaconda3\lib\site-packages (from nbconvert->jupyter) (1.5.0)
Requirement already satisfied: mistune<2,>=0.8.1 in c:\users\student\anaconda3\lib\site-packages (from nbconvert->jupyter) (0.8.4)
Requirement already satisfied: testpath in c:\users\student\anaconda3\lib\site-packages (from nbconvert->jupyter) (0.6.0)
Requirement already satisfied: jupyterlab-pygments in c:\users\student\anaconda3\lib\site-packages (from nbconvert->jupyter) (0.1.2)
Requirement already satisfied: beautifulsoup4 in c:\users\student\anaconda3\lib\site-packages (from nbconvert->jupyter) (4.11.1
Requirement already satisfied: defusedxml in c:\users\student\anaconda3\lib\site-packages (from nbconvert->jupyter) (0.7.1)
Requirement already satisfied: jupyter-core in c:\users\student\anaconda3\lib\site-packages (from nbconvert->jupyter) (4.11.1)
Requirement already satisfied: argon2-cffi in c:\users\student\anaconda3\lib\site-packages (from notebook->jupyter) (21.3.0)
Requirement already satisfied: Send2Trash>=1.8.0 in c:\users\student\anaconda3\lib\site-packages (from notebook->jupyter) (1.8.0)
Requirement already satisfied: prometheus-client in c:\users\student\anaconda3\lib\site-packages (from notebook->jupyter) (0.14.1)
Requirement already satisfied: terminado>=0.8.3 in c:\users\student\anaconda3\lib\site-packages (from notebook->jupyter) (0.13.1)
Requirement already satisfied: qtpy in c:\users\student\anaconda3\lib\site-packages (from qtconsole->jupyter) (2.2.0)
Requirement already satisfied: setuptools>=18.5 in c:\users\student\anaconda3\lib\site-packages (from ipython>=7.23.1->ipykernel->jupyter) (63.4.1)
Requirement already satisfied: colorama in c:\users\student\anaconda3\lib\site-packages (from ipython>=7.23.1->ipykernel->jupyter) (0.4.5)
Requirement already satisfied: pickleshare in c:\users\student\anaconda3\lib\site-packages (from ipython>=7.23.1->ipykernel->jupyter) (0.7.5)
Requirement already satisfied: backcall in c:\users\student\anaconda3\lib\site-packages (from ipython>=7.23.1->ipykernel->jupyter) (0.2.0)
Requirement already satisfied: decorator in c:\users\student\anaconda3\lib\site-packages (from ipython>=7.23.1->ipykernel->jupyter) (5.1.1)
Requirement already satisfied: jedi>=0.16 in c:\users\student\anaconda3\lib\site-packages (from ipython>=7.23.1->ipykernel->jupyter) (0.18.1)
Requirement already satisfied: MarkupSafe>=0.23 in c:\users\student\anaconda3\lib\site-packages (from jinja2>=2.4->nbconvert->jupyter) (2.0.1)
Requirement already satisfied: python-dateutil>=2.8.2 in c:\users\student\anaconda3\lib\site-packages (from jupyter-client>=6.1.12->ipykernel->jupyter) (2.8.2)
Requirement already satisfied: pywin32>=1.0 in c:\users\student\anaconda3\lib\site-packages (from jupyter-core->nbconvert->jupyter) (302)
Requirement already satisfied: fastjsonschema in c:\users\student\anaconda3\lib\site-packages (from nbformat>=4.2.0->ipywidgets->jupyter) (2.16.2)
Requirement already satisfied: jsonschema>=2.6 in c:\users\student\anaconda3\lib\site-packages (from nbformat>=4.2.0->ipywidgets->jupyter) (4.16.0)
Requirement already satisfied: wcwidth in c:\users\student\anaconda3\lib\site-packages (from prompt-toolkit!=3.0.0,!=3.0.1,<3.1.0,>=2.0.0->jupyter-console->jupyter) (0.2.5)
Requirement already satisfied: pywinpty>=1.1.0 in c:\users\student\anaconda3\lib\site-packages (from terminado>=0.8.3->notebook->jupyter) (2.0.2)
Requirement already satisfied: argon2-cffi-bindings in c:\users\student\anaconda3\lib\site-packages (from argon2-cffi->notebook->jupyter) (21.2.0)

Requirement already satisfied: soupsieve>1.2 in c:\users\student\anaconda3\lib\site-packages (from beautifulsoup4->nbconvert->jupyter) (2.3.1)
Requirement already satisfied: webencodings in c:\users\student\anaconda3\lib\site-packages (from bleach->nbconvert->jupyter) (0.5.1)
Requirement already satisfied: six>=1.9.0 in c:\users\student\anaconda3\lib\site-packages (from bleach->nbconvert->jupyter) (1.16.0)
Requirement already satisfied: pyparsing!=3.0.5,>=2.0.2 in c:\users\student\anaconda3\lib\site-packages (from packaging->ipykernel->jupyter) (3.0.9)
Requirement already satisfied: parso<0.9.0,>=0.8.0 in c:\users\student\anaconda3\lib\site-packages (from jedi>=0.16->ipython>=7.23.1->ipykernel->jupyter) (0.8.3)
Requirement already satisfied: pyrsistent!=0.17.0,!=0.17.1,!=0.17.2,>=0.14.0 in c:\users\student\anaconda3\lib\site-packages (from jsonschema>=2.6->nbformat>=4.2.0->ipywidgets->jupyter) (0.18.0)
Requirement already satisfied: attrs>=17.4.0 in c:\users\student\anaconda3\lib\site-packages (from jsonschema>=2.6->nbformat>=4.2.0->ipywidgets->jupyter) (21.4.0)
Requirement already satisfied: cffi>=1.0.1 in c:\users\student\anaconda3\lib\site-packages (from argon2-cffi-bindings->argon2-cffi->notebook->jupyter) (1.15.1)
Requirement already satisfied: pycparser in c:\users\student\anaconda3\lib\site-packages (from cffi>=1.0.1->argon2-cffi-bindings->argon2-cffi->notebook->jupyter) (2.21)
C:\Users\student>jupyter notebook path/to/notebook.ipynb
[C 15:30:26.772 NotebookApp] No such file or directory: C:\Users\student\path\to\notebook.ipynb
C:\Users\student>jupyter notebook C:\Users\student\.jupyter
[W 2024-07-10 15:31:55.960 LabApp] 'notebook_dir' has moved from NotebookApp to ServerApp. This config will be passed to ServerApp. Be sure to update your config before our next release.
[W 2024-07-10 15:31:55.961 LabApp] 'notebook_dir' has moved from NotebookApp to ServerApp. This config will be passed to ServerApp. Be sure to update your config before our next release.
[I 2024-07-10 15:31:55.968 LabApp] JupyterLab extension loaded from C:\Users\student\anaconda3\lib\site-packages\jupyterlab
[I 2024-07-10 15:31:55.968 LabApp] JupyterLab application directory is C:\Users\student\anaconda3\share\jupyter\lab
[I 15:31:55.974 NotebookApp] Serving notebooks from local directory: C:\Users\student\.jupyter
[I 15:31:55.975 NotebookApp] Jupyter Notebook 6.4.12 is running at:
[I 15:31:55.975 NotebookApp]
http://localhost:8888/?token=b3e72e9e1e44b2d94bf8c5203a2740fca0e676e0e312bea0
[I 15:31:55.975 NotebookApp] or
http://127.0.0.1:8888/?token=b3e72e9e1e44b2d94bf8c5203a2740fca0e676e0e312bea0
[I 15:31:55.975 NotebookApp] Use Control-C to stop this server and shut down all kernels (twice to skip confirmation)
[C 15:31:56.015 NotebookApp]

To access the notebook, open this file in a browser:
File:///C:/Users/student/AppData/Roaming/jupyter/runtime/nbserver-13684-open.html
Or copy and paste one of these URLs:
http://localhost:8888/?token=b3e72e9e1e44b2d94bf8c5203a2740fca0e676e0e312bea0
or **http://127.0.0.1:8888/?token=b3e72e9e1e44b2d94bf8c5203a2740fca0e676e0e312bea0**

Name : Aniket Vishwakarma **Roll No : A-22**

Output :



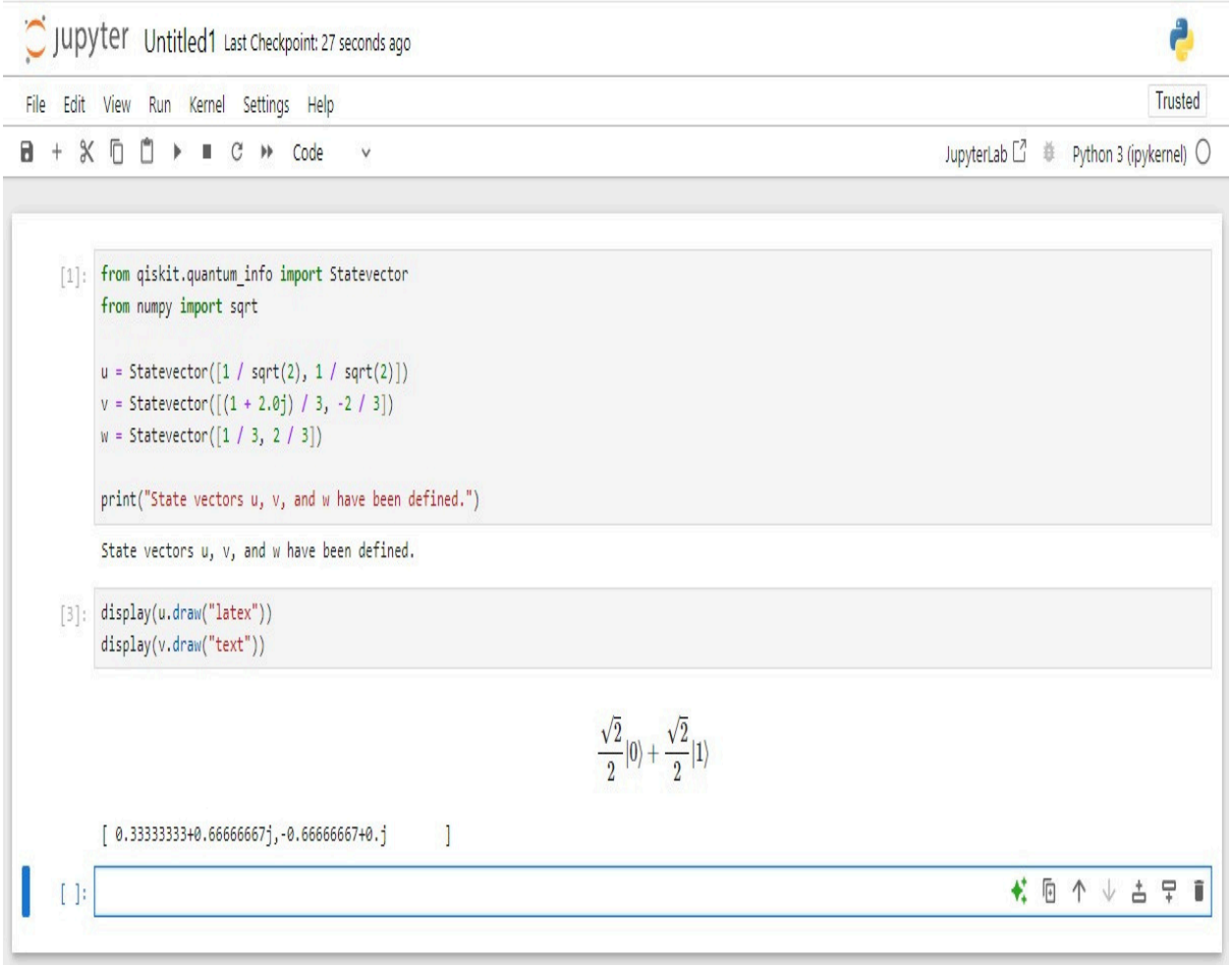
Name : Aniket Vishwakarma **Roll No : A-22**

Assignment No 2 : Implementation of linear algebra on Qiskit

Program:- **A) Creation Of State Vector**

```
from qiskit.quantum_info import Statevector
from numpy import sqrt

u = Statevector([1 / sqrt(2), 1 / sqrt(2)])
v = Statevector([(1 + 2.0j) / 3, -2 / 3])
w = Statevector([1 / 3, 2 / 3])

print("State vectors u, v, and w have been defined.")

display(u.draw("latex"))
display(v.draw("text"))
```

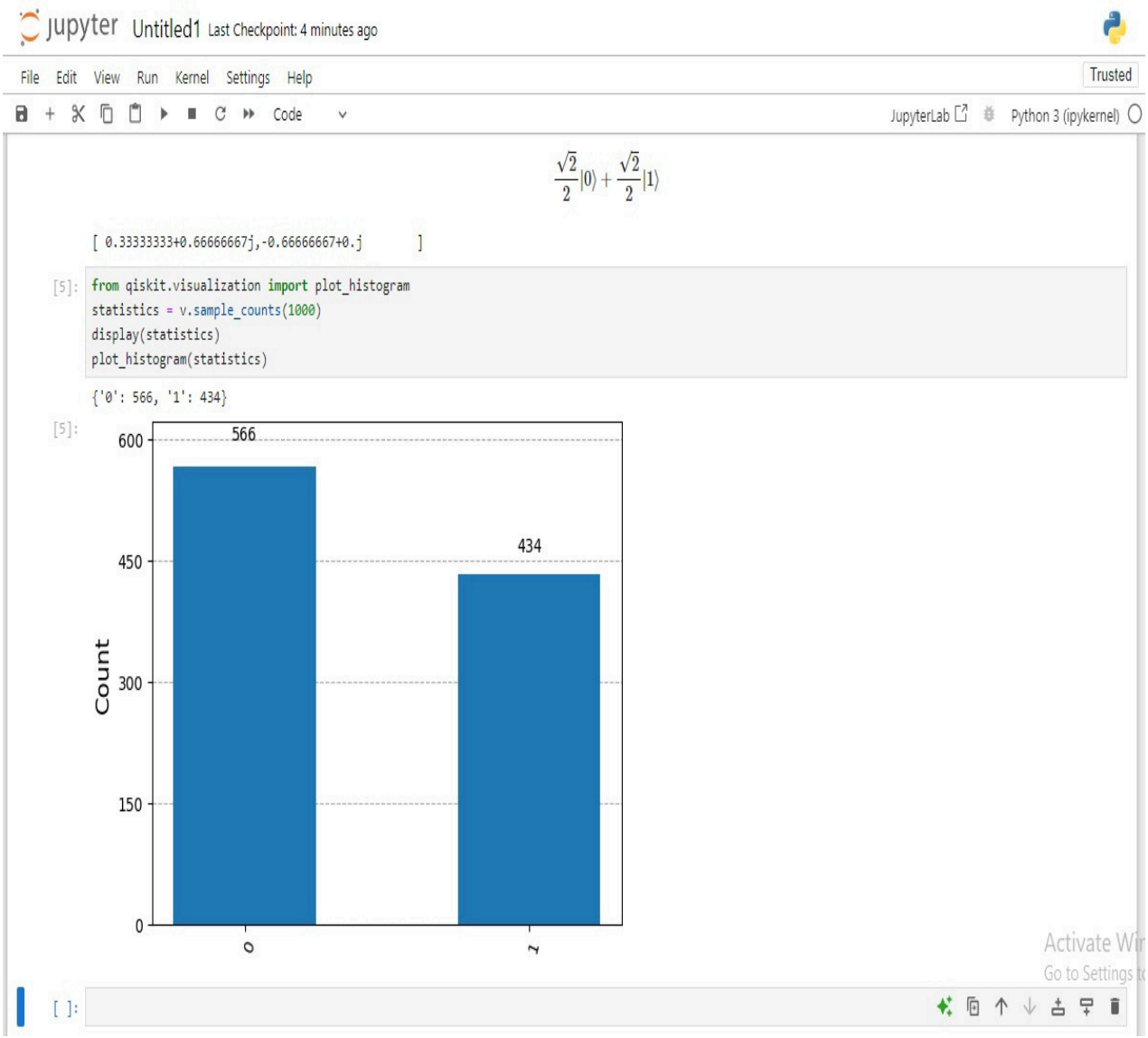
Output:



Program :- B) Display the Vectors Using Histogram

```
from qiskit.visualization import plot_histogram
statistics = v.sample_counts(1000)
display(statistics)
plot_histogram(statistics)
```

Output:



Name : Danish Shaikh

Roll No : A-45

Assignment 2 : Linear algebra: Vector operations, Vector multiplication, Tensor products.

Inner Product/ dot product of two vectors :

from qiskit.quantum_info import Statevector import numpy as np # State vector for |0〉 state_vector_0 = Statevector.from_label('0') # State vector for |1〉 state_vector_1 = Statevector.from_label('1') # Convert state vectors to numpy arrays vec_0 = state_vector_0.data vec_1 = state_vector_1.data # Compute the dot product (inner product) dot_product = np.vdot(vec_0, vec_1) print("Dot product:", dot_product)

Output :

Dot product: 0j

Tensor Product of two vectors :

```
tensor_product = state_vector_0.tensor(state_vector_1)
print(&amp;quot;Tensor product:&amp;quot;, tensor_product)
from qiskit.quantum_info import Statevector
import numpy as np

# Step 1: Create quantum state vectors
state_vector_0 = Statevector.from_label(&amp;#39;0&amp;#39;)
state_vector_1 = Statevector.from_label(&amp;#39;1&amp;#39;)

# Step 2: Compute the dot product (inner product)
vec_0 = state_vector_0.data
vec_1 = state_vector_1.data
dot_product = np.vdot(vec_0, vec_1)
print(&amp;quot;Dot product:&amp;quot;, dot_product)
# Step 3: Compute the tensor product
tensor_product = state_vector_0.tensor(state_vector_1)
print(&amp;quot;Tensor product:&amp;quot;, tensor_product)
```

Output :

**Tensor product: Statevector([0.+0.j, 1.+0.j, 0.+0.j, 0.+0.j],
dims=(2, 2))**

Create Quantum State Vector :

```
from qiskit.quantum_info import Statevector
import numpy as np

# Step 1: Create quantum state vectors

state_vector_0 = Statevector.from_label(&#39;0&#39;)
state_vector_1 = Statevector.from_label(&#39;1&#39;)
# Step 2: Compute the dot product (inner product)
vec_0 = state_vector_0.data
vec_1 = state_vector_1.data
dot_product = np.vdot(vec_0, vec_1)
print(&quot;Dot product:&quot;, dot_product)
# Step 3: Compute the tensor product
tensor_product = state_vector_0.tensor(state_vector_1)
print(&quot;Tensor product:&quot;, tensor_product)
```

Output :

Dot product: 0j
**Tensor product: Statevector([0.+0.j, 1.+0.j, 0.+0.j, 0.+0.j],
dims=(2, 2))**

Name : Aniket Vishwakarma **Roll No : A-22**

Assignment No 3: Implementation of Identity Matrix:1 Qubit, 2 Qubits, 3 Qubits

Program:

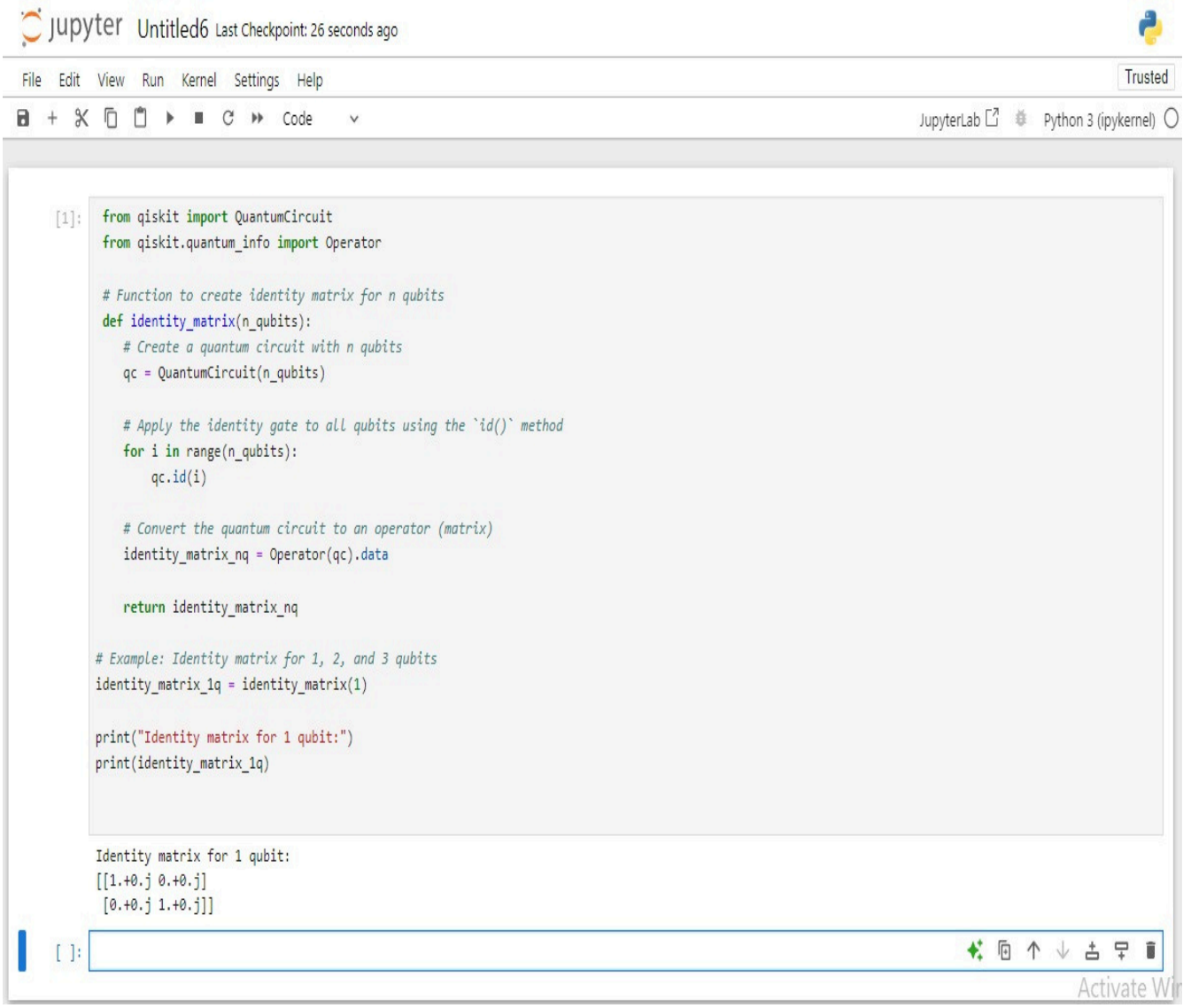
```
from qiskit import QuantumCircuit
from qiskit.quantum_info import Operator

# Function to create identity matrix for n qubits
def identity_matrix(n_qubits):
    # Create a quantum circuit with n qubits
    qc = QuantumCircuit(n_qubits)

    # Apply the identity gate to all qubits using the `id()` method
    for i in range(n_qubits):
        qc.id(i)

    # Convert the quantum circuit to an operator (matrix)
    identity_matrix_nq = Operator(qc).data

    return identity_matrix_nq

# Example: Identity matrix for 1, 2, and 3 qubits
identity_matrix_1q = identity_matrix(1)
identity_matrix_2q = identity_matrix(2)
identity_matrix_3q = identity_matrix(3)

print("Identity matrix for 1 qubit:")
print(identity_matrix_1q)

print("\nIdentity matrix for 2 qubits:")
print(identity_matrix_2q)

print("\nIdentity matrix for 3 qubits:")
print(identity_matrix_3q)
```

Quantum Computing

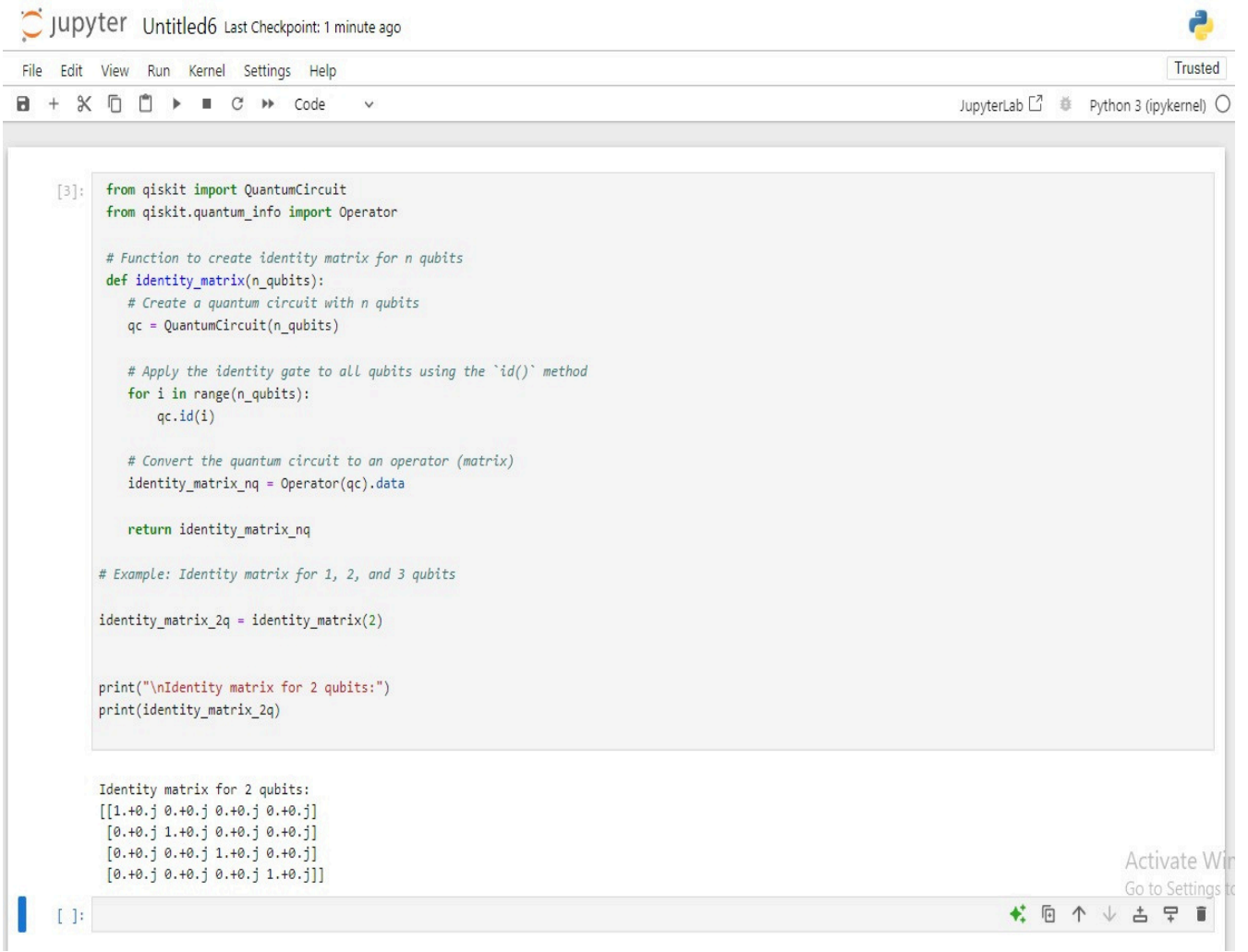
Name : Aniket Vishwakarma **Roll No : A-22**

Output :

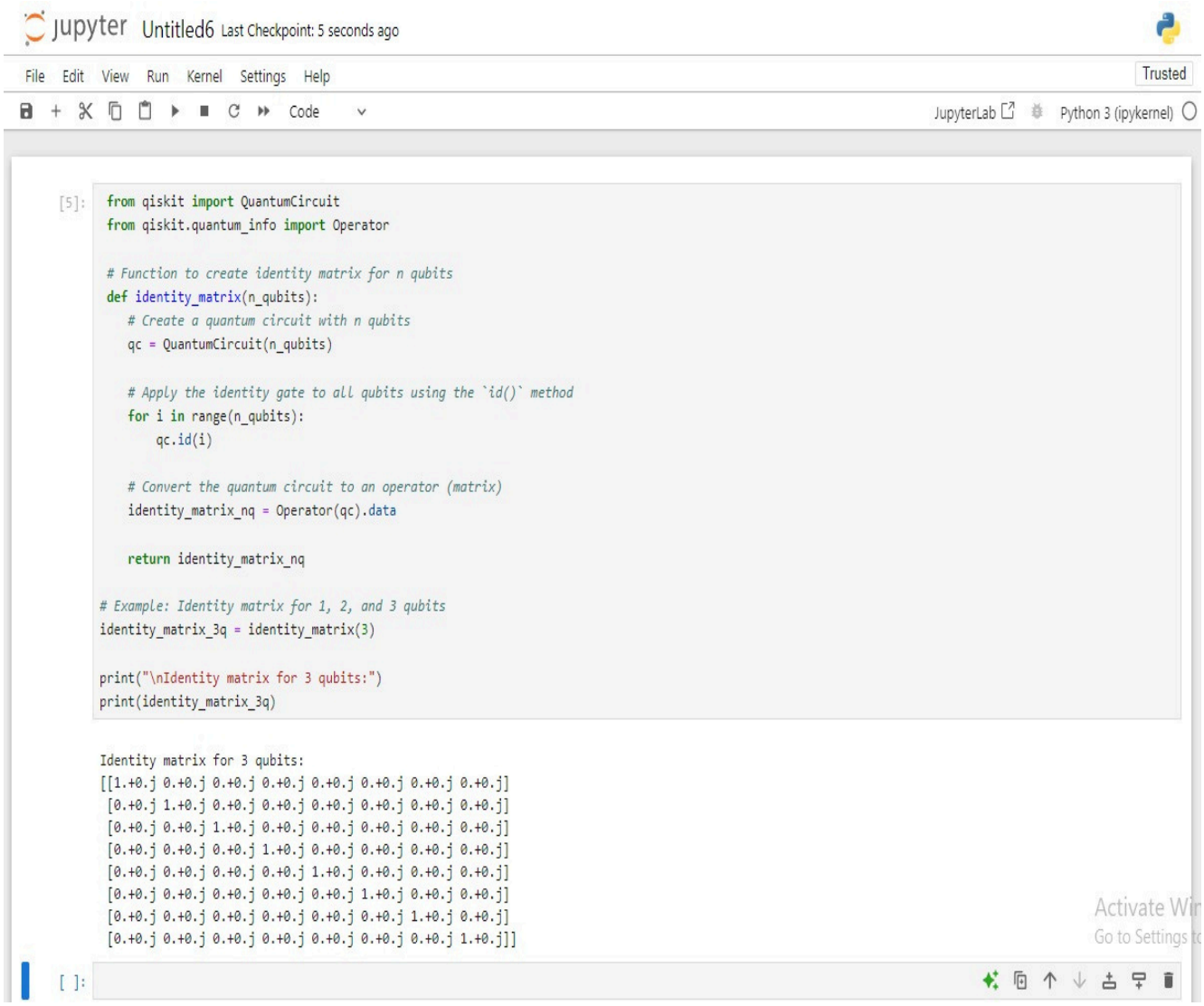
1)



2)


jupyter Untitled6 Last Checkpoint: 1 minute ago
File Edit View Run Kernel Settings Help
Trusted
Code
JupyterLab
Python 3 (ipykernel)
[3]:
from qiskit import QuantumCircuit
from qiskit.quantum_info import Operator
# Function to create identity matrix for n qubits
def identity_matrix(n_qubits):
# Create a quantum circuit with n qubits
qc = QuantumCircuit(n_qubits)
# Apply the identity gate to all qubits using the `id()` method
for i in range(n_qubits):
qc.id(i)
# Convert the quantum circuit to an operator (matrix)
identity_matrix_nq = Operator(qc).data
return identity_matrix_nq
# Example: Identity matrix for 1, 2, and 3 qubits
identity_matrix_2q = identity_matrix(2)
print("\nIdentity matrix for 2 qubits:")
print(identity_matrix_2q)
Identity matrix for 2 qubits:
[[1.+0.j 0.+0.j 0.+0.j 0.+0.j]
[0.+0.j 1.+0.j 0.+0.j 0.+0.j]
[0.+0.j 0.+0.j 1.+0.j 0.+0.j]
[0.+0.j 0.+0.j 0.+0.j 1.+0.j]]
[ ]:

3)


jupyter Untitled6 Last Checkpoint: 5 seconds ago
File Edit View Run Kernel Settings Help
Trusted
Code
JupyterLab
Python 3 (ipykernel)
[5]:
from qiskit import QuantumCircuit
from qiskit.quantum_info import Operator
# Function to create identity matrix for n qubits
def identity_matrix(n_qubits):
# Create a quantum circuit with n qubits
qc = QuantumCircuit(n_qubits)
# Apply the identity gate to all qubits using the `id()` method
for i in range(n_qubits):
qc.id(i)
# Convert the quantum circuit to an operator (matrix)
identity_matrix_nq = Operator(qc).data
return identity_matrix_nq
# Example: Identity matrix for 1, 2, and 3 qubits
identity_matrix_3q = identity_matrix(3)
print("\nIdentity matrix for 3 qubits:")
print(identity_matrix_3q)
Identity matrix for 3 qubits:
[[1.+0.j 0.+0.j 0.+0.j 0.+0.j 0.+0.j 0.+0.j 0.+0.j 0.+0.j]
[0.+0.j 1.+0.j 0.+0.j 0.+0.j 0.+0.j 0.+0.j 0.+0.j 0.+0.j]
[0.+0.j 0.+0.j 1.+0.j 0.+0.j 0.+0.j 0.+0.j 0.+0.j 0.+0.j]
[0.+0.j 0.+0.j 0.+0.j 1.+0.j 0.+0.j 0.+0.j 0.+0.j 0.+0.j]
[0.+0.j 0.+0.j 0.+0.j 0.+0.j 1.+0.j 0.+0.j 0.+0.j 0.+0.j]
[0.+0.j 0.+0.j 0.+0.j 0.+0.j 0.+0.j 1.+0.j 0.+0.j 0.+0.j]
[0.+0.j 0.+0.j 0.+0.j 0.+0.j 0.+0.j 0.+0.j 1.+0.j 0.+0.j]
[0.+0.j 0.+0.j 0.+0.j 0.+0.j 0.+0.j 0.+0.j 0.+0.j 1.+0.j]]
[ ]:

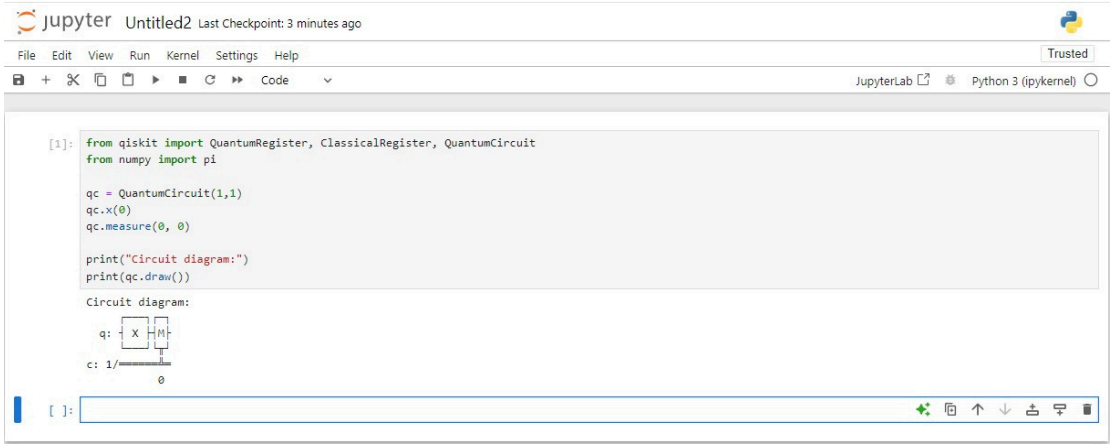
Name : Aniket Vishwakarma **Roll No : A-22**

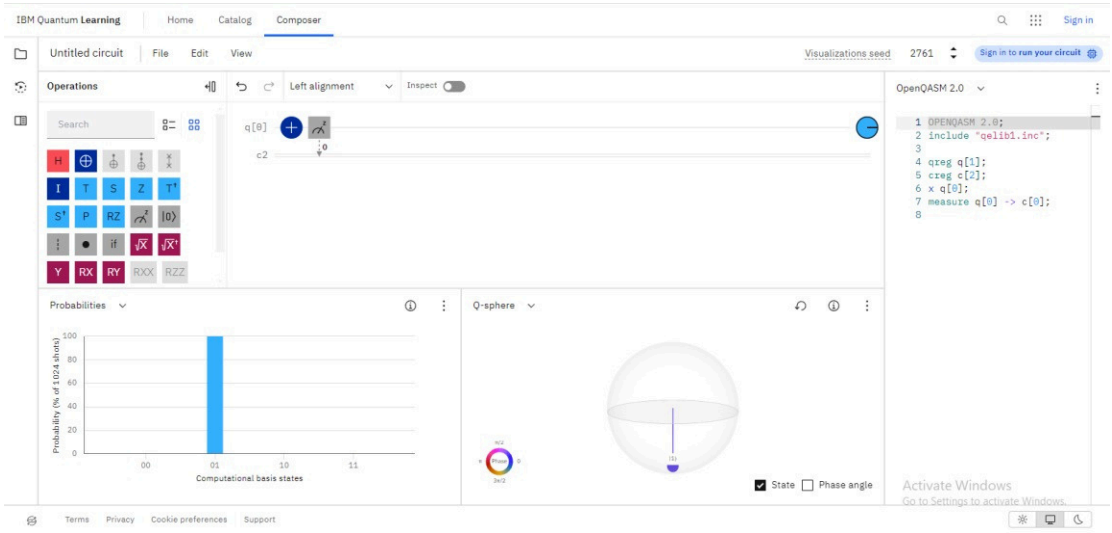
Assignment No 4 : Implementation of 1- Qubit Gate

1. Pauli-X Gate:

```
from qiskit import QuantumRegister, ClassicalRegister, QuantumCircuit
from numpy import pi

qc = QuantumCircuit(1,1)
qc.x(0)
qc.measure(0, 0)

print("Circuit diagram:")
print(qc.draw())
```

Output:



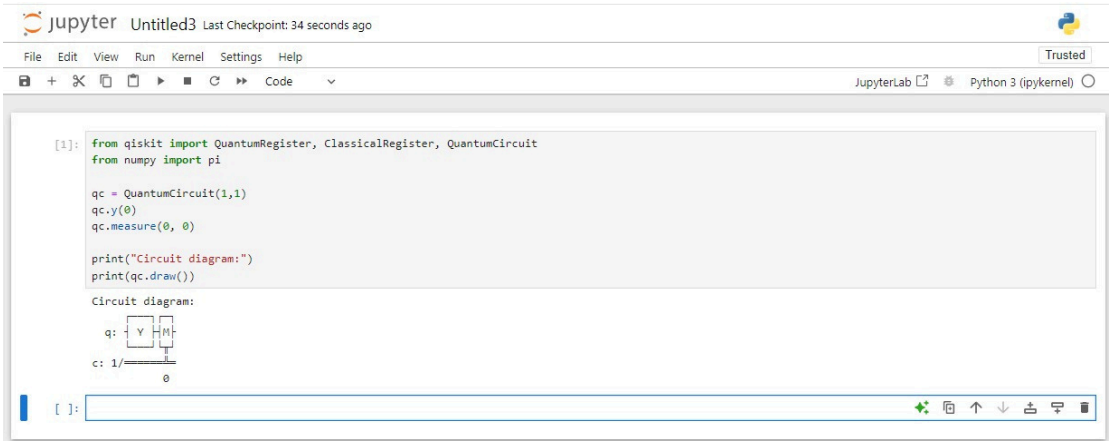


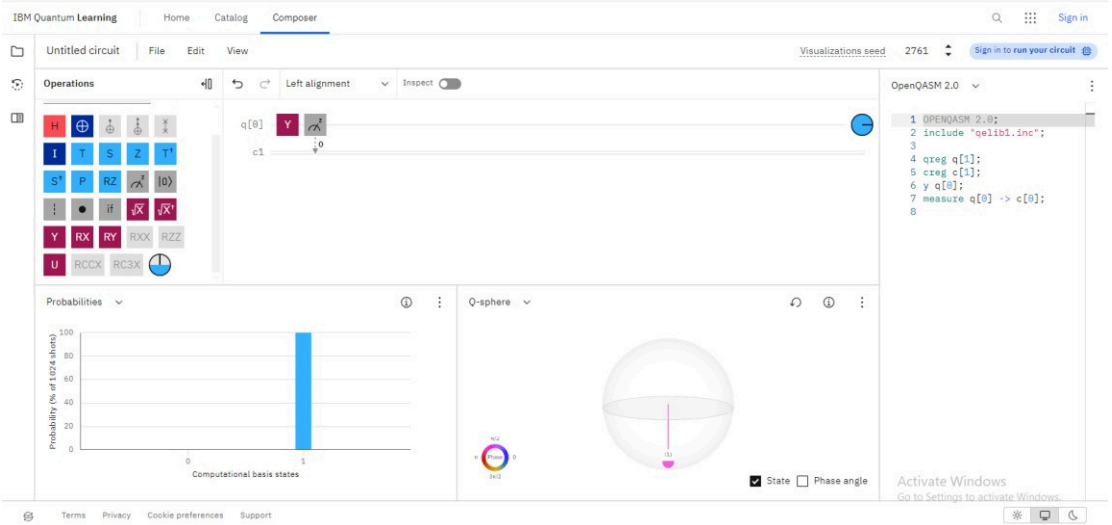
2. **Pauli-Y Gate:**

from qiskit import QuantumRegister, ClassicalRegister, QuantumCircuit
from numpy import pi

```
qc = QuantumCircuit(1,1)
qc.y(0)
qc.measure(0, 0)

print("Circuit diagram:")
print(qc.draw())
```

Output:

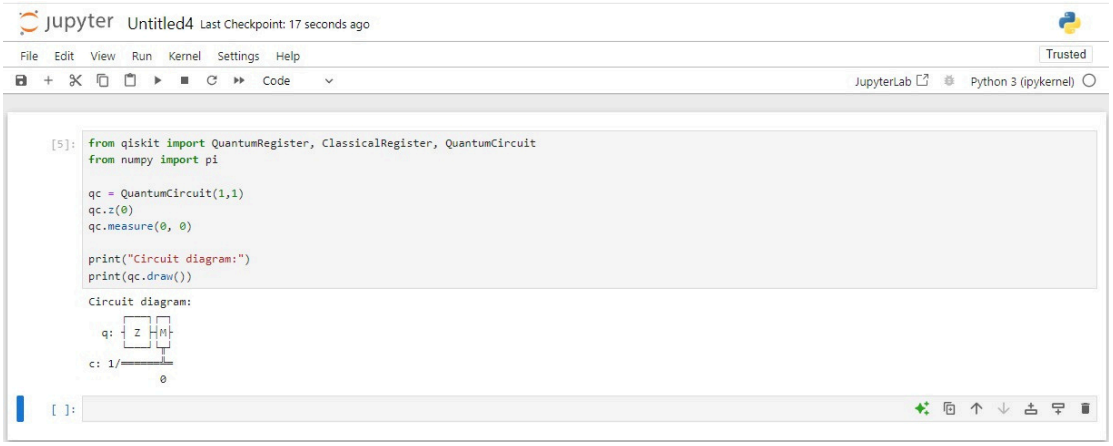


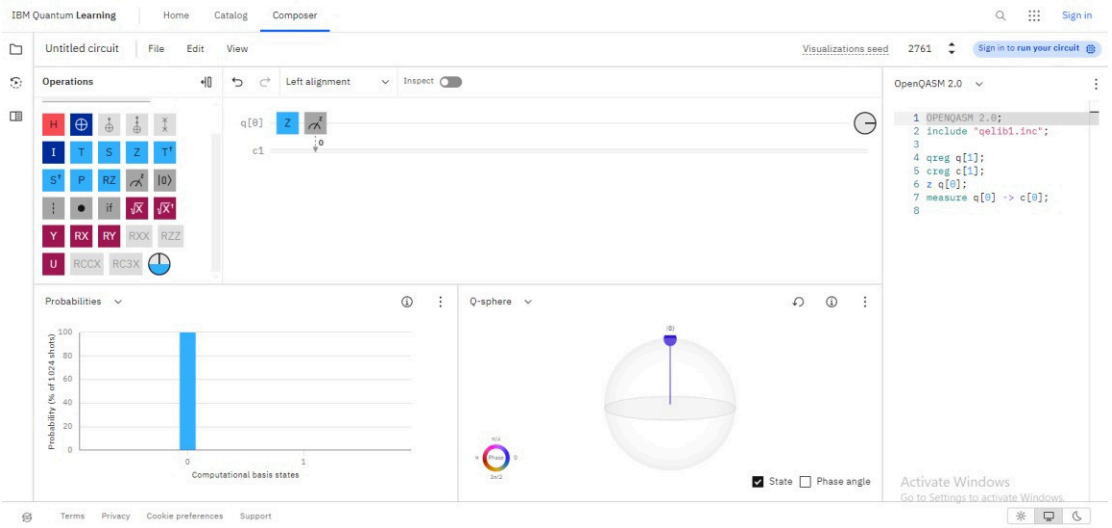


3)**Pauli-Z Gate:**

```
from qiskit import QuantumRegister, ClassicalRegister, QuantumCircuit
from numpy import pi

qc = QuantumCircuit(1,1)
qc.y(0)
qc.measure(0, 0)

print("Circuit diagram:")
print(qc.draw())
```

Output:





Name : Aniket Vishwakarma **Roll No : A-22**

Assignment No 5 : Implementation of 1- Qubit Gate

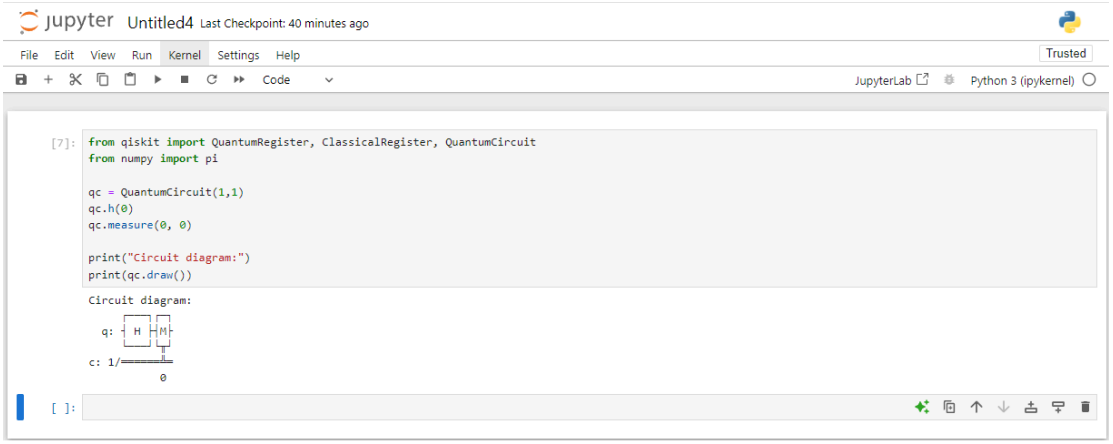
1) Hadamard Gates

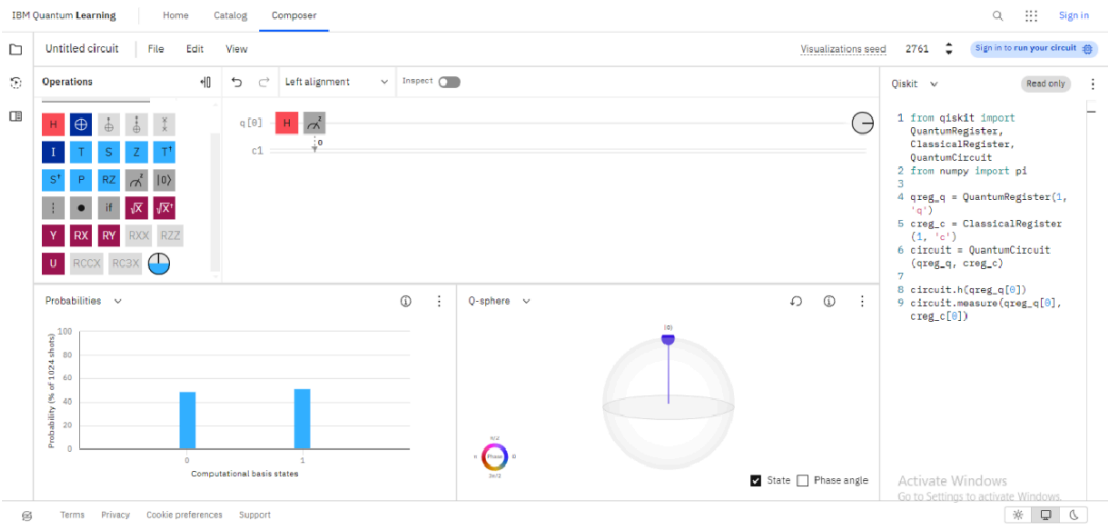
Program:

1. **Hadamard Gate (H):**

```
from qiskit import QuantumRegister, ClassicalRegister, QuantumCircuit
from numpy import pi

qc = QuantumCircuit(1,1)
qc.h(0)
qc.measure(0, 0)

print("Circuit diagram:")
print(qc.draw())
```

Output:





Name : Aniket Vishwakarma **Roll No : A-22**

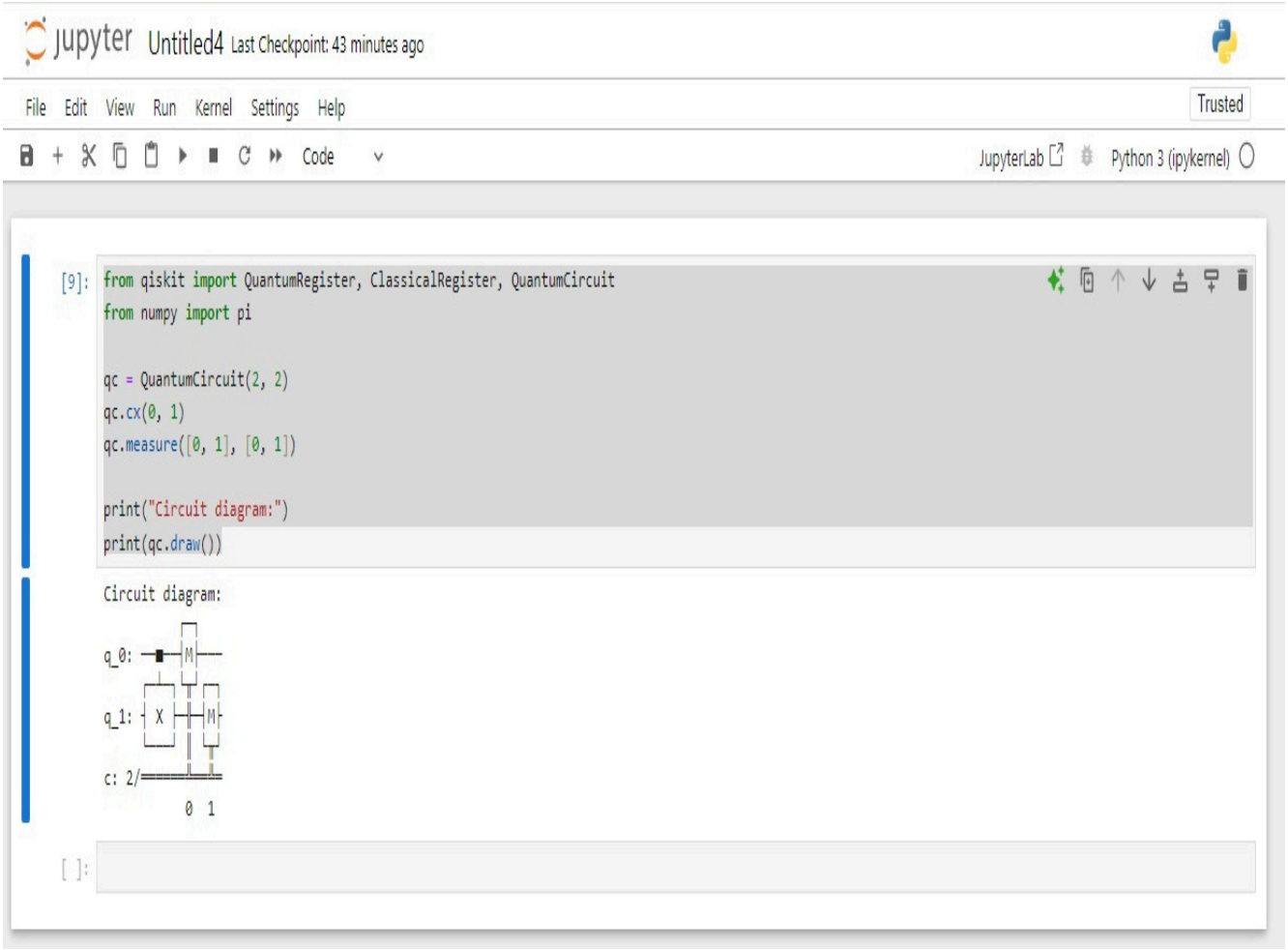
Experiment No 6 : Implementation of 2 Qubit Gates

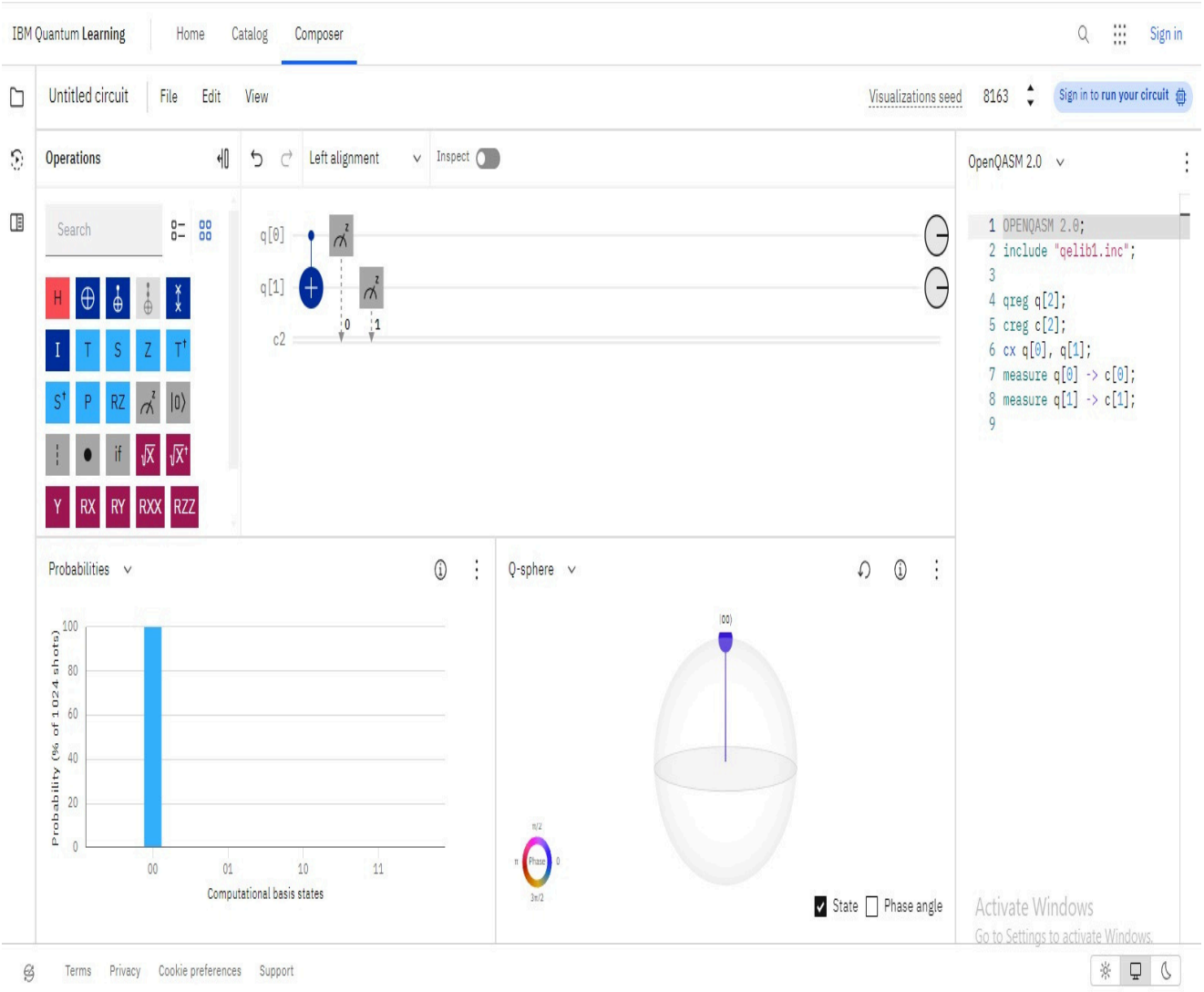
Program:

1. **CNOT Gate (CX):**

```
from qiskit import QuantumRegister, ClassicalRegister, QuantumCircuit
from numpy import pi

qc = QuantumCircuit(2, 2)
qc.cx(0, 1)
qc.measure([0, 1], [0, 1])

print("Circuit diagram:")
print(qc.draw())
```

Output:



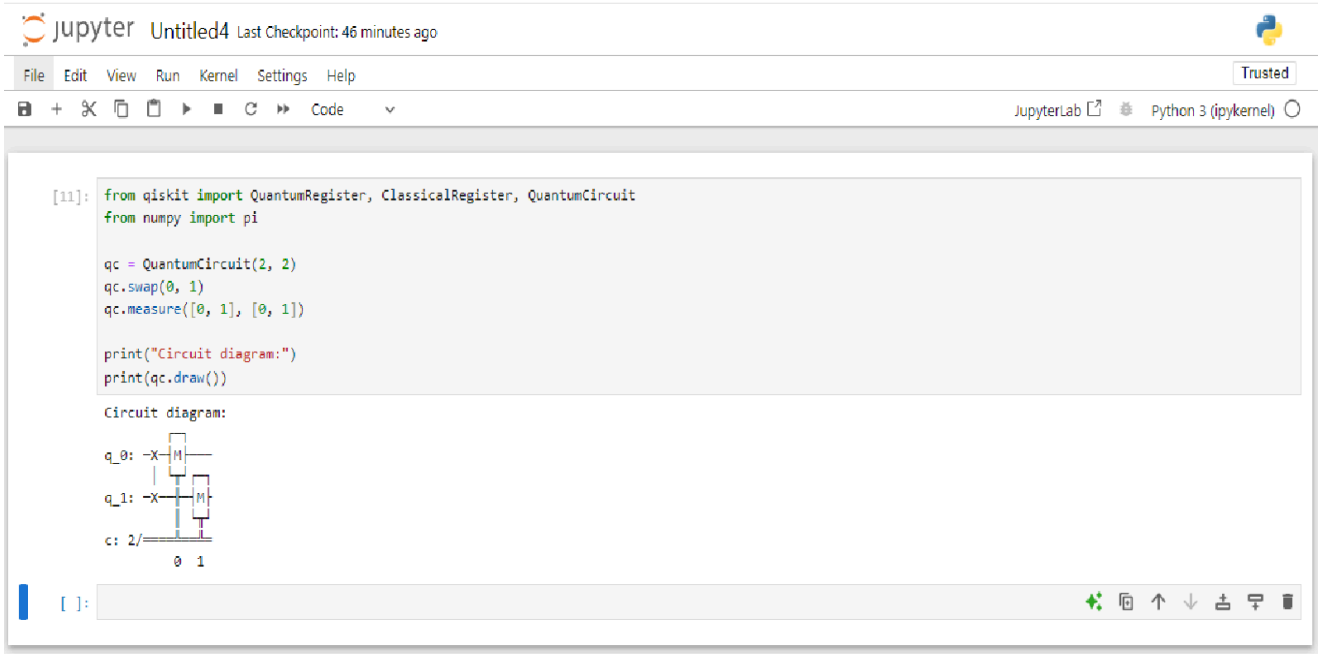


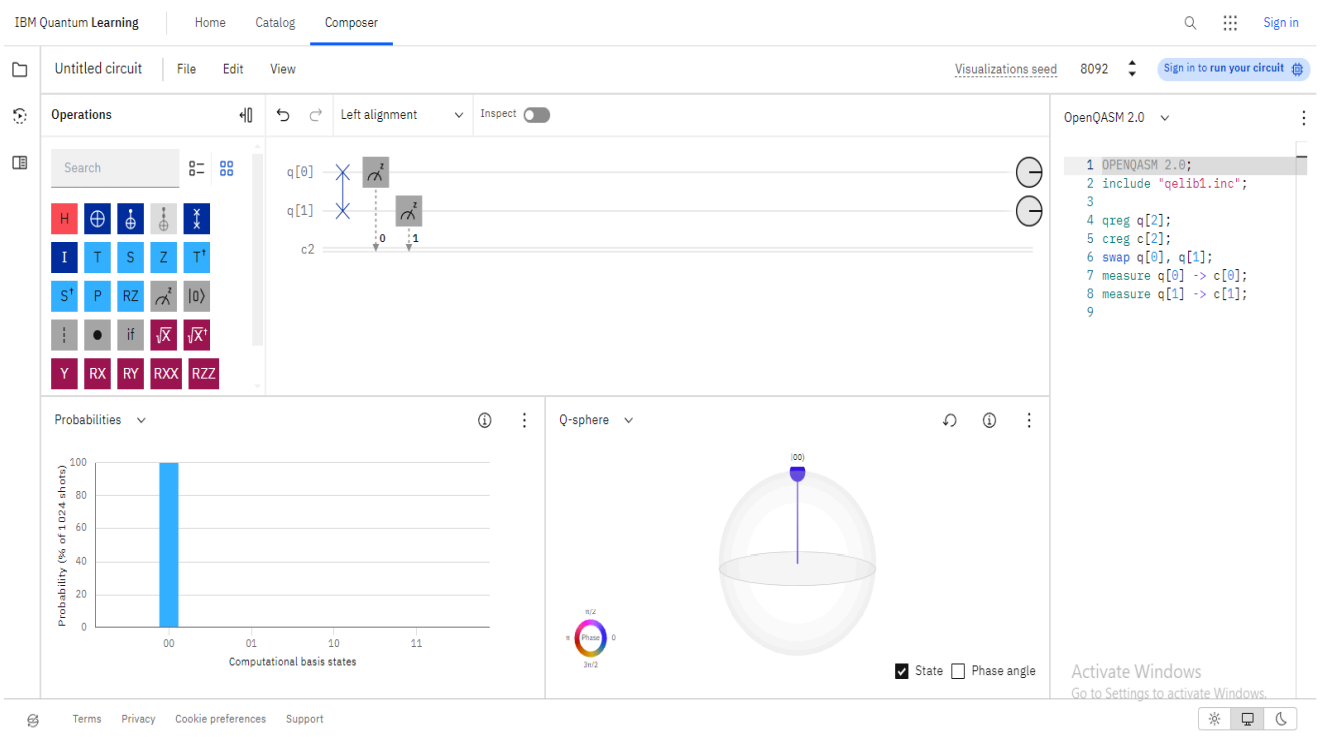
Program:

2) SWAP Gate (SWAP):

```
from qiskit import QuantumRegister, ClassicalRegister, QuantumCircuit
from numpy import pi

qc = QuantumCircuit(2, 2)
qc.swap(0, 1)
qc.measure([0, 1], [0, 1])

print("Circuit diagram:")
```

Output:


jupyter Untitled4 Last Checkpoint: 46 minutes ago
File Edit View Run Kernel Settings Help
Trusted
Code
JupyterLab
Python 3 (ipykernel)
[11]:
from qiskit import QuantumRegister, ClassicalRegister, QuantumCircuit
from numpy import pi
qc = QuantumCircuit(2, 2)
qc.swap(0, 1)
qc.measure([0, 1], [0, 1])
print("Circuit diagram:")
print(qc.draw())
Circuit diagram:
q_0: -X-|M|--
q_1: -X-|-|M|-
c: 2/=====
0 1
[ ]:


IBM Quantum Learning
Home
Catalog
Composer
Sign in
Untitled circuit
File
Edit
View
Visualizations seed
8092
Sign in to run your circuit
Operations
Search
Left alignment
Inspect
q[0]
q[1]
c2
OpenQASM 2.0
1 OPENQASM 2.0;
2 include "qelib1.inc";
3
4 qreg q[2];
5 creg c[2];
6 swap q[0], q[1];
7 measure q[0] -> c[0];
8 measure q[1] -> c[1];
9
Probabilities
Probability (% of 1024 shots)
Computational basis states
Q-sphere
State
Phase angle
Activate Windows
Terms
Privacy
Cookie preferences
Support

Name : Aniket Vishwakarma **Roll No : A-22**

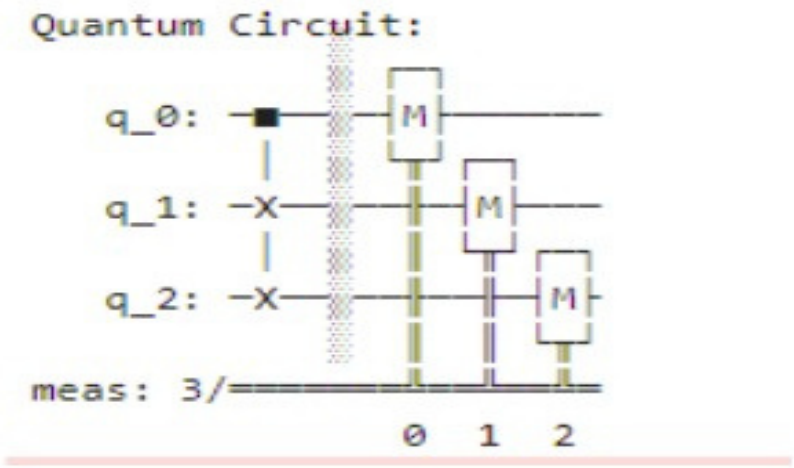
Assignment No 7 : Implementation of 3 Qubit Gates

1. Implementation of three Qubits FREDKIN Gate :

Program:

```
from qiskit import QuantumCircuit, transpile, assemble
from qiskit.visualization import plot_histogram
from qiskit_aer import Aer
from qiskit.primitives import Sampler
# Create a Quantum Circuit with 3 qubits
qc = QuantumCircuit(3)
# Apply the Fredkin gate (control qubit 0, target qubits 1 and 2)
qc.cswap(0, 1, 2)
# Add measurement to all qubits
qc.measure_all()
# Print the circuit diagram

print(&amp;quot;Quantum Circuit:&amp;quot;)
print(qc.draw())
# Simulate the circuit
backend = Aer.get_backend(&amp;#39;aer_simulator&amp;#39;)
compiled_circuit = transpile(qc, backend)
qobj = assemble(compiled_circuit)
sampler = Sampler(backend)
result = sampler.run(qc, shots=1024).result()
# Get the results
counts = result.get_counts()
print(&amp;quot;Measurement Results:&amp;quot;, counts)
# Plot the results
plot_histogram(counts)
```

Output:



Name : Aniket Vishwakarma **Roll No : A-22**

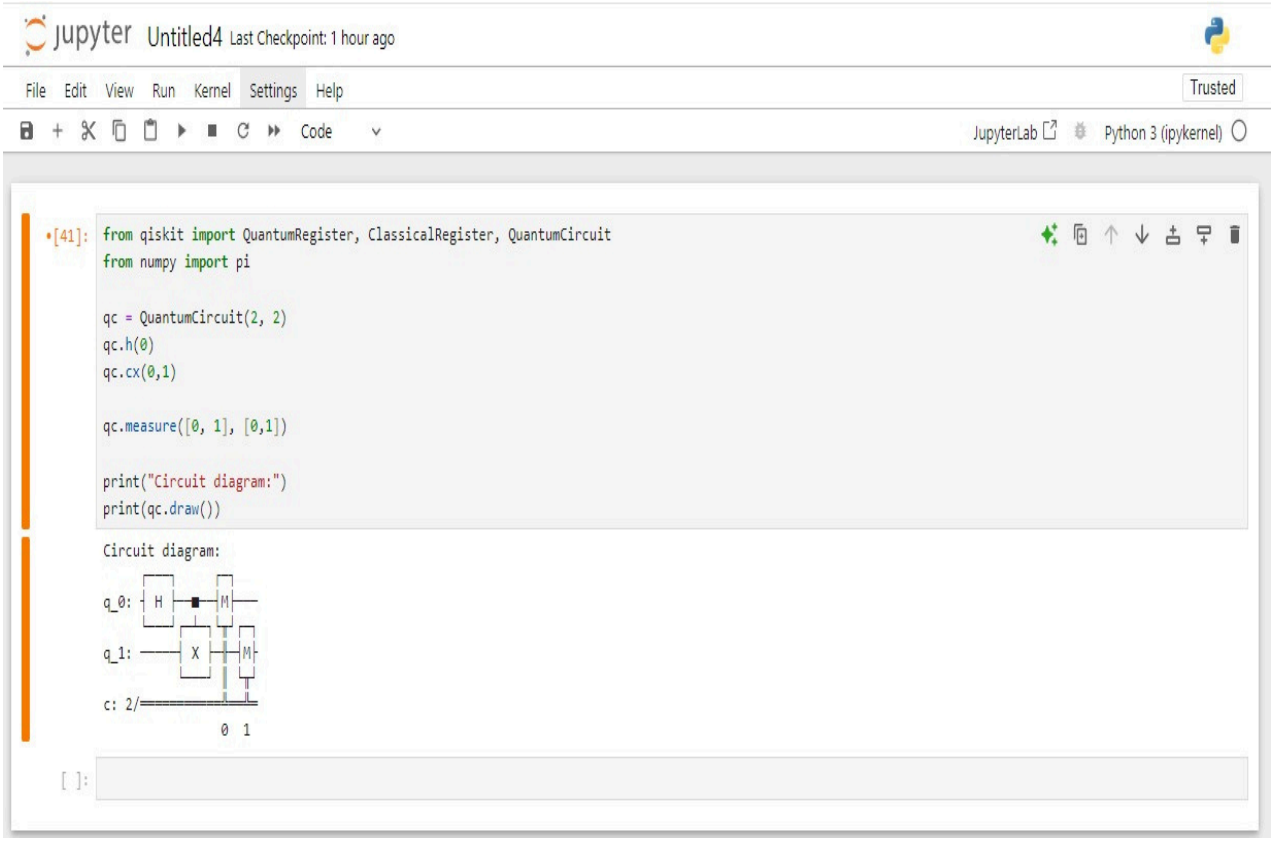
Experiment No 8 : Implementation of Circuit Formation-1

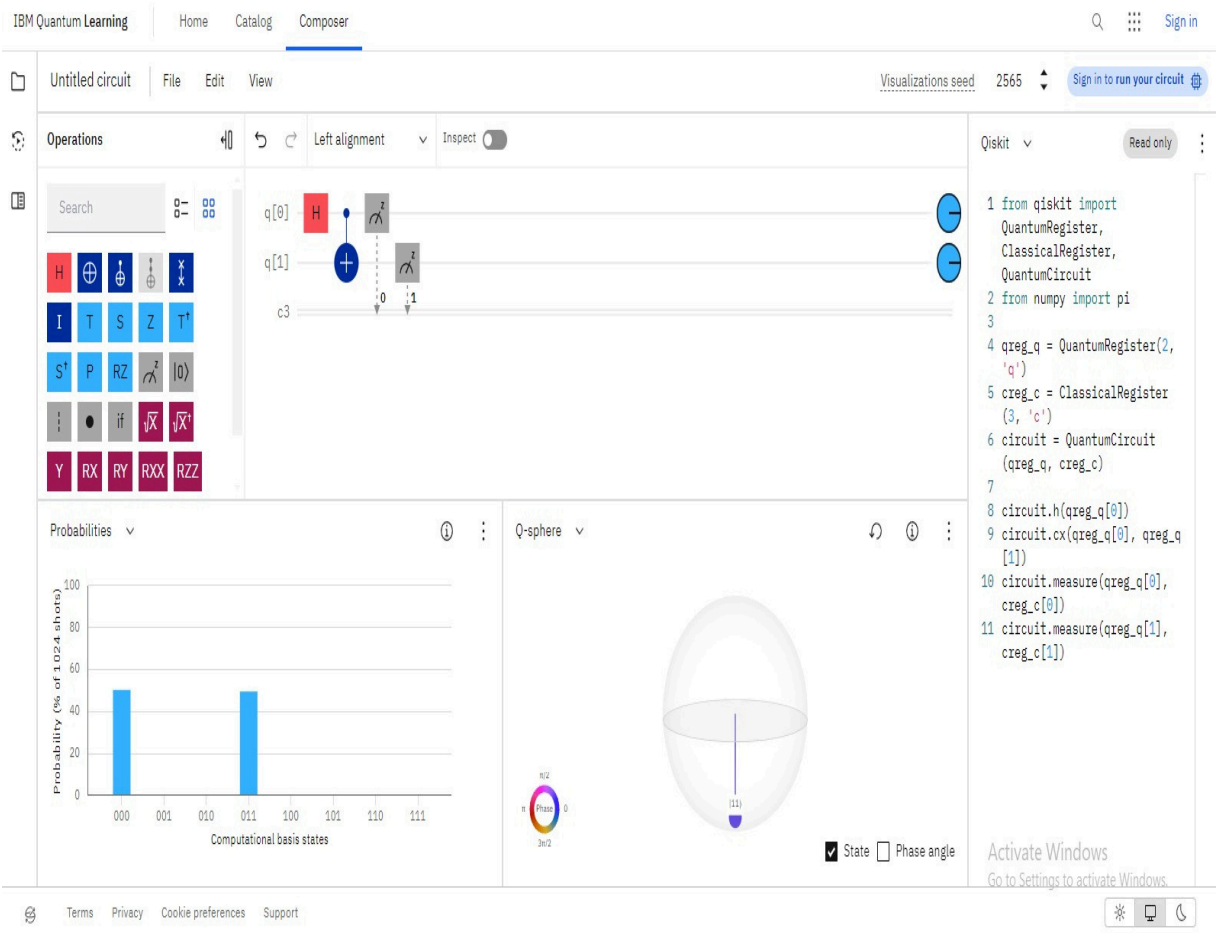
Program:

1. Hadamard Gate on CNOT Gate (CX):

```
from qiskit import QuantumRegister, ClassicalRegister, QuantumCircuit
from numpy import pi


qc = QuantumCircuit(2, 2)
qc.h(0)
qc.cx(0,1)

qc.measure([0, 1], [0,1])

print("Circuit diagram:")
print(qc.draw())
```

Output:

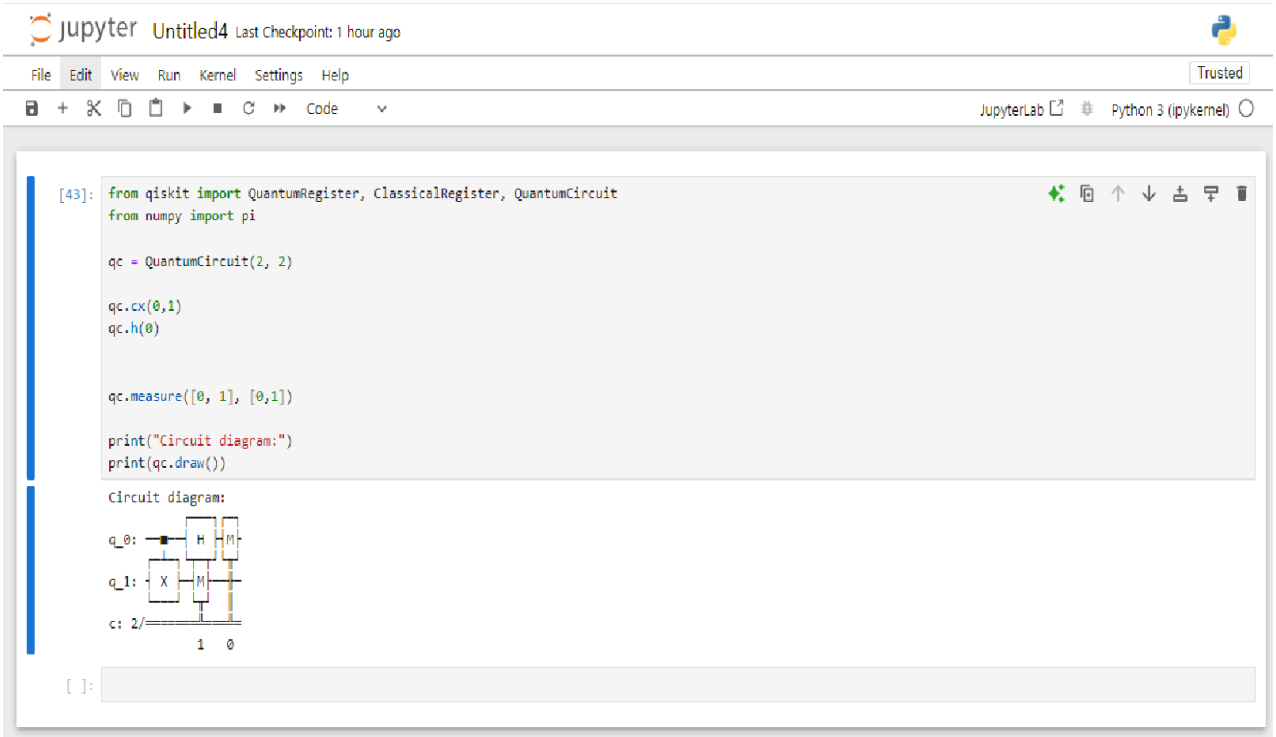


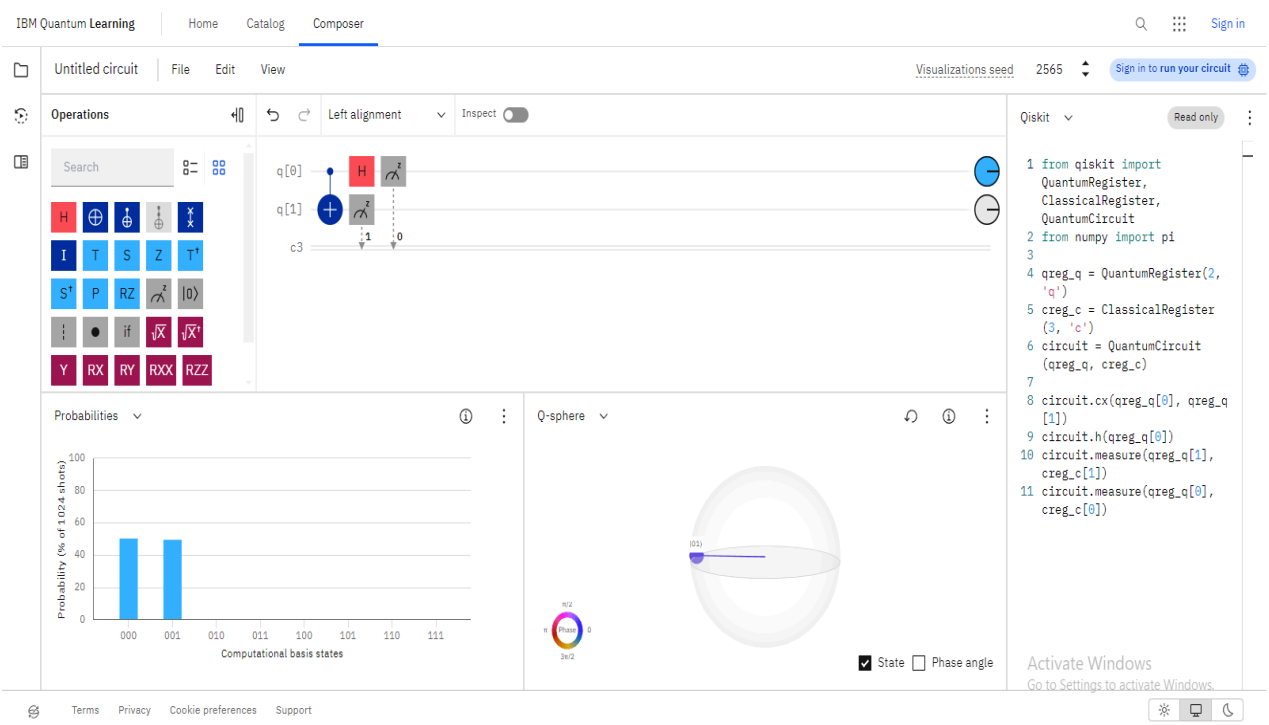


2. **CNOT Gate on Hadamard Gate (CX):**

```
from qiskit import QuantumRegister, ClassicalRegister, QuantumCircuit
from numpy import pi

qc = QuantumCircuit(2, 2)

qc.cx(0,1)
qc.h(0)

qc.measure([0, 1], [0,1])

print("Circuit diagram:")
print(qc.draw())
```

Output:


jupyter Untitled4 Last Checkpoint: 1 hour ago
File Edit View Run Kernel Settings Help
Trusted
Code
JupyterLab
Python 3 (ipykernel)
[43]:
from qiskit import QuantumRegister, ClassicalRegister, QuantumCircuit
from numpy import pi
qc = QuantumCircuit(2, 2)
qc.cx(0,1)
qc.h(0)
qc.measure([0, 1], [0,1])
print("Circuit diagram:")
print(qc.draw())
Circuit diagram:
q_0:
q_1:
c: 2/
H
M
X
M
1 0
[ ]:


IBM Quantum Learning
Home
Catalog
Composer
Sign in
Untitled circuit
File
Edit
View
Visualizations seed
2565
Sign in to run your circuit
Operations
Left alignment
Inspect
Qiskit
Read only
Search
q[0]
q[1]
c3
1 from qiskit import QuantumRegister, ClassicalRegister, QuantumCircuit
2 from numpy import pi
3
4 qreg_q = QuantumRegister(2, 'q')
5 creg_c = ClassicalRegister(3, 'c')
6 circuit = QuantumCircuit(qreg_q, creg_c)
7
8 circuit.cx(qreg_q[0], qreg_q[1])
9 circuit.h(qreg_q[0])
10 circuit.measure(qreg_q[1], creg_c[1])
11 circuit.measure(qreg_q[0], creg_c[0])
Probabilities
Probability (% of 1024 shots)
Computational basis states
Q-sphere
State
Phase angle
Activate Windows
Go to Settings to activate Windows.
Terms
Privacy
Cookie preferences
Support

Name : Aniket Vishwakarma

Roll No : A-22

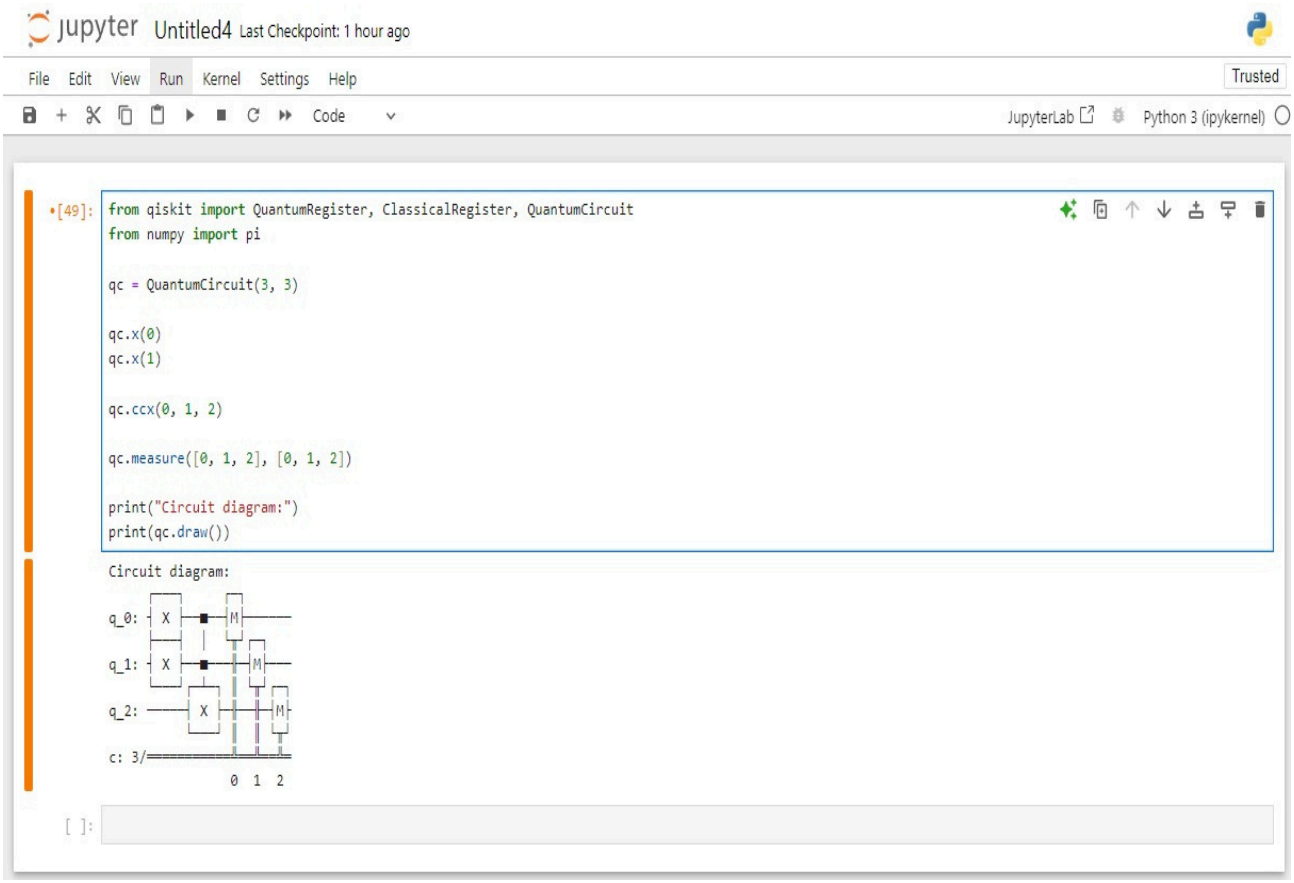
Experiment No 9: Implementation of Circuit Formation-2

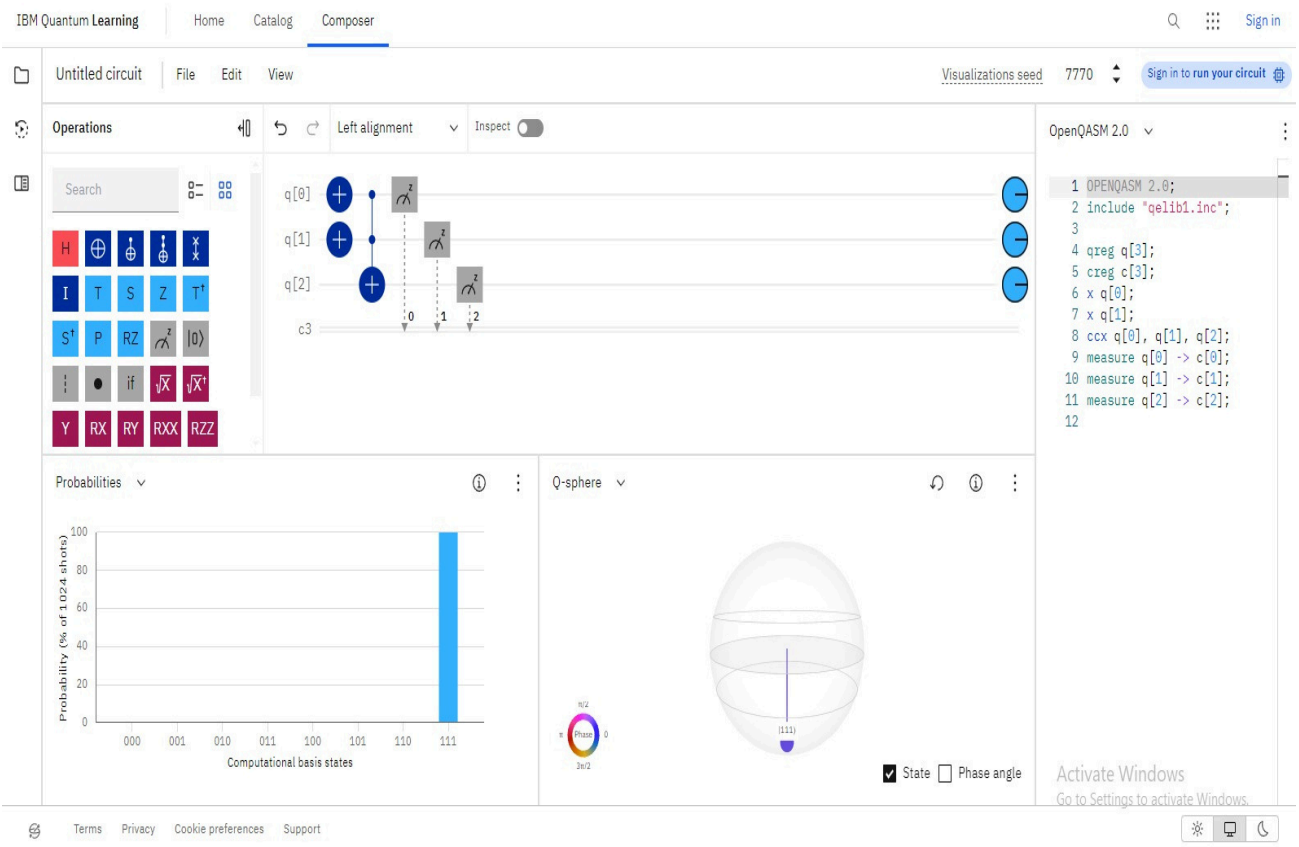
Program:

1. **2 Pauli-X gates on CCX Gate :**

```
from qiskit import QuantumRegister, ClassicalRegister, QuantumCircuit
from numpy import pi

qc = QuantumCircuit(3, 3)

qc.x(0)
qc.x(1)
qc.ccx(0, 1, 2)

qc.measure([0, 1, 2], [0, 1, 2])

print("Circuit diagram:")
print(qc.draw())
```

Output:




IBM Quantum Learning
Home
Catalog
Composer
Sign in
Untitled circuit
File
Edit
View
Visualizations seed
7770
Sign in to run your circuit
Operations
Search
Left alignment
Inspect
OpenQASM 2.0
1 OPENQASM 2.0;
2 include "qelib1.inc";
3
4 qreg q[3];
5 creg c[3];
6 x q[0];
7 x q[1];
8 ccx q[0], q[1], q[2];
9 measure q[0] -> c[0];
10 measure q[1] -> c[1];
11 measure q[2] -> c[2];
12
q[0]
q[1]
q[2]
c3
Probabilities
Probability (% of 1024 shots)
Computational basis states
000
001
010
011
100
101
110
111
Q-sphere
State
Phase angle
Activate Windows
Go to Settings to activate Windows.
Terms
Privacy
Cookie preferences
Support