

Test

July 1, 2022

```
[44]: from qiskit import *
      from qiskit.visualization import plot_bloch_multivector, plot_histogram
      from qiskit.aqua.algorithms import Shor
      from qiskit.aqua import QuantumInstance
      import numpy as np
      from qiskit import IBMQ
      from qiskit.tools.visualization import plot_histogram
      from qiskit.tools.monitor import job_monitor
      IBMQ.
      ↪save_account('35b928a34f3c82fef0cb27f5a76e0b2c660e7ff461551308a1f597918a22843fd99465440401c
      IBMQ.load_account()
      largelist = []
      shortlist = []
```

configrc.store_credentials:WARNING:2022-07-01 02:42:27,652: Credentials already present. Set overwrite=True to overwrite.
ibmqfactory.load_account:WARNING:2022-07-01 02:42:28,304: Credentials are already in use. The existing account in the session will be replaced.

```
[45]: qc = QuantumCircuit(1, 1) #1 quantum, 1 classical
      %matplotlib inline
      qc.draw(output='mpl')
```

[45]:

q —
c ¹/_≠

```
[46]: for i in range(21):
      qc.x(0)
      qc.draw(output='mpl')
```

[46]:



```
[47]: for i in range(30):
      qc.measure(0, 0)
      provider = IBMQ.get_provider('ibm-q')
      backend = provider.get_backend('ibmq_armonk')
      job = execute(qc, backend=backend)
      job_monitor(job)
      result = job.result()
      largelist.append(result.time_taken)
      print(result.time_taken)
      print(largelist)
```

```
Job Status: job has successfully run
21.317058563232422
[21.317058563232422]
Job Status: job has successfully run
21.33203148841858
[21.317058563232422, 21.33203148841858]
Job Status: job has successfully run
21.341662406921387
[21.317058563232422, 21.33203148841858, 21.341662406921387]
Job Status: job has successfully run
21.280064582824707
[21.317058563232422, 21.33203148841858, 21.341662406921387, 21.280064582824707]
Job Status: job has successfully run
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Job Status: job has successfully run
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Job Status: job has successfully run
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Job Status: job has successfully run
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Job Status: job has successfully run
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 Job Status: job has successfully run
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 Job Status: job has successfully run
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21.365771770477295, 21.392760753631592, 21.385360717773438, 21.378321409225464, 21.39856266975403]

Job Status: job has successfully run

21.39267873764038

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Job Status: job has successfully run

21.35705018043518

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Job Status: job has successfully run

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Job Status: job has successfully run

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Job Status: job has successfully run

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Job Status: job has successfully run

21.374614000320435

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Job Status: job has successfully run

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 Job Status: job has successfully run
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Job Status: job has successfully run

21.371685028076172

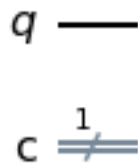
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[]:

[]:

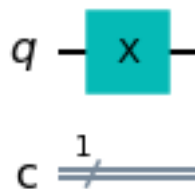
```
[48]: qc = QuantumCircuit(1, 1) #1 quantum, 1 classical
      %matplotlib inline
      qc.draw(output='mpl')
```

[48]:



```
[49]: qc.x(0)
      qc.draw(output='mpl')
```

[49]:



```
[50]: for i in range(30):
        qc.measure(0, 0)
        provider = IBMQ.get_provider('ibm-q')
        backend = provider.get_backend('ibmq_armonk')
        job = execute(qc, backend=backend)
        job_monitor(job)
        result = job.result()
        shortlist.append(result.time_taken)
        print(result.time_taken)
        print(shortlist)
```

```
Job Status: job has successfully run
21.32444715499878
[21.32444715499878]
Job Status: job has successfully run
21.326555490493774
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Job Status: job has successfully run
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Job Status: job has successfully run

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Job Status: job has successfully run

21.322641611099243

[21.32444715499878, 21.326555490493774, 21.390265226364136, 21.41513466835022, 21.27440094947815, 21.344112157821655, 21.291427850723267, 21.364814519882202, 21.285433530807495, 21.416887760162354, 21.392500162124634, 21.268887281417847, 21.40911078453064, 21.380417585372925, 21.3575656414032, 21.352641820907593, 21.278794527053833, 21.34760808944702, 21.381813764572144, 21.322641611099243]

Job Status: job has successfully run

21.410037755966187

[21.32444715499878, 21.326555490493774, 21.390265226364136, 21.41513466835022, 21.27440094947815, 21.344112157821655, 21.291427850723267, 21.364814519882202, 21.285433530807495, 21.416887760162354, 21.392500162124634, 21.268887281417847, 21.40911078453064, 21.380417585372925, 21.3575656414032, 21.352641820907593, 21.278794527053833, 21.34760808944702, 21.381813764572144, 21.322641611099243, 21.410037755966187]

Job Status: job has successfully run

21.338077306747437

[21.32444715499878, 21.326555490493774, 21.390265226364136, 21.41513466835022, 21.27440094947815, 21.344112157821655, 21.291427850723267, 21.364814519882202, 21.285433530807495, 21.416887760162354, 21.392500162124634, 21.268887281417847, 21.40911078453064, 21.380417585372925, 21.3575656414032, 21.352641820907593, 21.278794527053833, 21.34760808944702, 21.381813764572144, 21.322641611099243, 21.410037755966187, 21.338077306747437]

Job Status: job has successfully run

21.2770779132843

[21.32444715499878, 21.326555490493774, 21.390265226364136, 21.41513466835022, 21.27440094947815, 21.344112157821655, 21.291427850723267, 21.364814519882202, 21.285433530807495, 21.416887760162354, 21.392500162124634, 21.268887281417847, 21.40911078453064, 21.380417585372925, 21.3575656414032, 21.352641820907593, 21.278794527053833, 21.34760808944702, 21.381813764572144, 21.322641611099243, 21.410037755966187, 21.338077306747437, 21.2770779132843]

Job Status: job has successfully run

21.293599367141724

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 Job Status: job has successfully run
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 Job Status: job has successfully run
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 Job Status: job has successfully run
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 Job Status: job has successfully run
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Job Status: job has successfully run

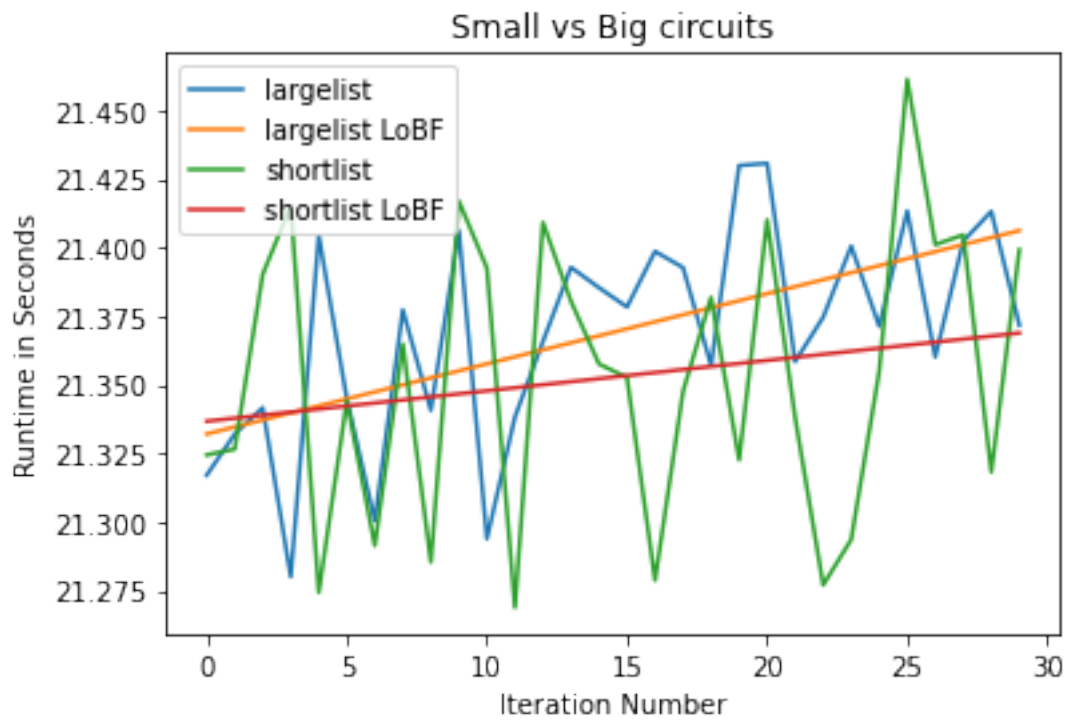
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```
[73]: #big = [map(int, x) for x in largelist]
      ylargelist= []
      yshortlist= []
      for i in range(len(largelist)):
          ylargelist.append(i)

      for i in range(len(shortlist)):
          yshortlist.append(i)

      import matplotlib.pyplot as plt
      plt.xlabel("Iteration Number")
      plt.ylabel("Runtime in Seconds")
      plt.title("Small vs Big circuits")
      plt.plot(ylargelist, largelist, label = 'largelist')
      #line of best fit
      plt.plot(ylargelist, np.poly1d(np.polyfit(ylargelist, largelist, 1))(ylargelist), label = 'largelist LoBF')
      plt.plot(yshortlist, shortlist, label = 'shortlist')
      #line of best fit
      plt.plot(yshortlist, np.poly1d(np.polyfit(yshortlist, shortlist, 1))(yshortlist), label = 'shortlist LoBF')
      plt.legend()
      plt.show()
```



[]: