

Improve performance and usability of BasicAer

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Working on Quantum Thermodynamics

Summary of the project



Improve BasicAer the numpy-based Qiskit backend

Solving some basic issues

- BasicAer fails when shots requested exceeds a threshold [Qiskit/qiskit-terra#7634](#)
- Add date attribute to BasicAer job result [Qiskit/qiskit-terra#7781](#)

Improve the user experience of BasicAer

- Leverage `quantum_info` in BasicAer.
- Removing duplication of code adding some functions from `quantum_info` in BasicAer
- Leverage `quantum_info` in StatevectorSimulatorPy [Qiskit/qiskit-terra#7670](#)

What I have done!

14th – First Meeting with my mentor

13-22: Get familiar to BasicAer

22nd – Pull Request for max_shots problem

4th – Pull Request for date problem

March

April

Fixissue7634 #7801

alejomonbar wants to merge 6 commits into `qiskit:main` from `alejomonbar:fixissue7634`

Summary

Executing the following code gives an error because `max_iter` for BasicAer has a limit of 65536 shots.

```
from qiskit import BasicAer, QuantumCircuit

backend = BasicAer.get_backend("qasm_simulator")
circuit = QuantumCircuit(1,1)
circuit.x(0)
circuit.measure(0,0)
job = backend.run(circuit, shots=int(1e6))
```

Details and comments

The idea is that BasicAer does not have a limit in terms of the number of shots. Instead, the default value equals zero which works as no restriction on the number of shots.

Issue7781 #7877

alejomonbar wants to merge 3 commits into `qiskit:main` from `alejomonbar:Issue7781`

Summary

Executing the following code gives an error because BasicAer backend job has no attribute date.

```
import numpy as np
import math
from qiskit import BasicAer, QuantumCircuit, Aer

backend = BasicAer.get_backend("statevector_simulator")
mit = @three.Mitigation(backend)
mit.call_from_system(range(2))

circuit = QuantumCircuit(2)
circuit.r(np.pi / 4, 0)
circuit.r(np.pi / 2, 1)
circuit.measure_all()
```

Details and comments

This error can be solved by putting the attribute `job.result().date = None` as a default parameter.

qiskit

Future work

- Improve the previous pull requests and make the test for them.
- Leverage `quantum_info` in `BasicAer`.