Google Collab Notebook

SUMMARY

15Q Quantum Circuit

CIRQ: 3.67s, 3.36s

QISKIT: 1.06s, 1.07s

PENNYLANE (default.qubit): 3.23s, 2.78s

PENNYLANE (lightning.qubit): 1.12s, 0.89s

PQ: 7.79s, 9.72s

17Q Quantum Circuit

CIRQ: 17.60s, 16.39s

QISKIT: 1.98s, 16.39s

PENNYLANE (default.qubit): 13.75s, 12.51s

PENNYLANE (lightning.qubit): 2.78s, 5.31s

PQ: 25.35s, 30.79s

19Q Quantum Circuit

CIRQ: 114.77s, 114.32s

QISKIT: 39.46s, 52.12s

PENNYLANE (default.qubit): 136.79s, 133.32s

PENNYLANE (lightning.qubit): 33.63s, 39.17s

PQ: 126.83s, 125.56s

CIRQ Quantum circuit OP

For 15Q dataset:

```
Number of Qbits: 15
Number of iteration: 142
Enter the target departure date: Jan 10
Enter the target arrival date: Jan 10
Enter the target price: 394
Enter the target airline (or any): any
Enter the target halt status (0 or 1): 1
```
Execution time: **3.3885 seconds, 4.4748 seconds, 3.4871 seconds, 3.3422 seconds (of quantum circuit)**
```
Matching flight found at index: 0
Flight details: ('F1', 'Jan 10', 'Jan 10', 394, 'Qatar Airways', 1)
```
Result: {**'000000000000000': 1020**}
```
Measured index: 0
```

```
Number of Qbits: 15
Number of iteration: 142
Enter the target departure date: Aug 6
Enter the target arrival date: Aug 6
Enter the target price: 250
Enter the target airline (or any): any
Enter the target halt status (0 or 1): 1
```
Execution time: **3.1685 seconds, 4.0935 seconds, 3.0127 seconds, 3.1570 seconds (of quantum circuit)**
```
Matching flight found at index: 32767
Flight details: ('F32768', 'Aug 6', 'Aug 6', 250, 'Delta Airlines', 1)
```
Result: {**'111111111111111': 1020**}
```
Measured index: 32767
```

For 17Q dataset:

```
Number of Qbits: 17
Number of iteration: 284
Enter the target departure date: Jan 1
Enter the target arrival date: Jan 1
Enter the target price: 232
Enter the target airline (or any): any
Enter the target halt status (0 or 1): 0
```
Execution time: **17.5877 seconds, 18.3479 seconds, 17.1247 seconds, 17.3467 seconds (of quantum circuit)**
```
Matching flight found at index: 0
Flight details: ('F1', 'Jan 1', 'Jan 1', 232, 'Qatar Airways', 0)
```
Result: {**'00000000000000000': 1020**}
```
Measured index: 0
```

```
Number of Qbits: 17
Number of iteration: 284
Enter the target departure date: Aug 28
Enter the target arrival date: Aug 28
Enter the target price: 244
```

```
Enter the target airline (or any): any
Enter the target halt status (0 or 1): 0
Execution time:16.2577 seconds, 16.6504 seconds, 16.4325 seconds, 16.2266
seconds (of quantum circuit)
Matching flight found at index: 131071
Flight details: ('F131072', 'Aug 28', 'Aug 28', 244, 'Emirates', 0)
Result: {'11111111111111111': 1020}
Measured index: 131071
```

For 19Q dataset:

```
Number of Qbits: 19
Number of iteration: 568
Enter the target departure date: Jan 5
Enter the target arrival date: Jan 5
Enter the target price: 381
Enter the target airline (or any): any
Enter the target halt status (0 or 1): 0
Execution time: 119.9612 seconds, 117.9356 seconds, 111.5617 seconds,
109.6321 seconds (of quantum circuit)
Matching flight found at index: 0
Flight details: ('F1', 'Jan 5', 'Jan 5', 381, 'Air India', 0)
Result: {'0000000000000000000': 1020}
Measured index: 0

Number of Qbits: 19
Number of iteration: 568
Enter the target departure date: Aug 29
Enter the target arrival date: Aug 29
Enter the target price: 333
Enter the target airline (or any): Delta Airlines
Enter the target halt status (0 or 1): 1
Execution time: 109.4723 seconds, 111.9906 seconds, 116.4389 seconds,
119.3677 seconds (of quantum circuit)
Matching flight found at index: 524287
Flight details: ('F524288', 'Aug 29', 'Aug 29', 333, 'Delta Airlines', 1)
Result: {'1111111111111111111': 1020}
Measured index: 524287
```

QISKIT Quantum circuit OP

For 15Q dataset:

Number of Qbits: 15
Number of iteration: 142
Enter the target departure date: Jan 10
Enter the target arrival date: Jan 10
Enter the target price: 394
Enter the target airline (or any): Qatar Airways
Enter the target halt status (0 or 1): 1
Execution time:**1.5799 seconds, 0.7442 seconds, 0.9524 seconds, 0.9662 seconds (of quantum circuit)**
Matching flight found at index: 0
Flight details: ('F1', 'Jan 10', 'Jan 10', 394, 'Qatar Airways', 1)
Result: {**'000000000000000': 1020**}
Measured index: 0

Number of Qbits: 15
Number of iteration: 142
Enter the target departure date: Aug 6
Enter the target arrival date: Aug 6
Enter the target price: 250
Enter the target airline (or any): any
Enter the target halt status (0 or 1): 1
Execution time: **0.8334 seconds, 1.6021 seconds, 0.8298 seconds, 1.0276 seconds (of quantum circuit)**
Matching flight found at index: 32767
Flight details: ('F32768', 'Aug 6', 'Aug 6', 250, 'Delta Airlines', 1)
Result: {**'111111111111111': 1020**}
Measured index: 32767

For 17Q dataset:

Number of Qbits: 17
Number of iteration: 284
Enter the target departure date: Jan 1
Enter the target arrival date: Jan 1
Enter the target price: 232
Enter the target airline (or any): any
Enter the target halt status (0 or 1): 0
Execution time: **2.0819 seconds, 1.8687 seconds, 1.8560 seconds, 2.0968 seconds (of quantum circuit)**
Matching flight found at index: 0
Flight details: ('F1', 'Jan 1', 'Jan 1', 232, 'Qatar Airways', 0)
Result: {**'00000000000000000': 1020**}
Measured index: 0

Number of Qbits: 17
Number of iteration: 284
Enter the target departure date: Aug 28
Enter the target arrival date: Aug 28
Enter the target price: 244
Enter the target airline (or any): any

Enter the target halt status (0 or 1): 0
Execution time: **4.1033 seconds, 4.3085 seconds, 4.4627 seconds, 4.1653 seconds (of quantum circuit)**
Matching flight found at index: 131071
Flight details: ('F131072', 'Aug 28', 'Aug 28', 244, 'Emirates', 0)
Result: {**'11111111111111111': 1020**}
Measured index: 131071

For 19Q dataset:

Number of Qbits: 19
Number of iteration: 568
Enter the target departure date: Jan 5
Enter the target arrival date: Jan 5
Enter the target price: 381
Enter the target airline (or any): any
Enter the target halt status (0 or 1): 0
Execution time: **39.3341 seconds, 39.5711 seconds, 39.8037 seconds, 39.1195 seconds**
Matching flight found at index: 0
Flight details: ('F1', 'Jan 5', 'Jan 5', 381, 'Air India', 0)
Result: {**'0000000000000000000': 1020**}
Measured index: 0

Number of Qbits: 19
Number of iteration: 568
Enter the target departure date: Aug 29
Enter the target arrival date: Aug 29
Enter the target price: 333
Enter the target airline (or any): Delta Airlines
Enter the target halt status (0 or 1): 1
Execution time: **51.6090 seconds, 51.9905 seconds, 51.6334 seconds, 53.2444 seconds, 52.0628 seconds**
Matching flight found at index: 524287
Flight details: ('F524288', 'Aug 29', 'Aug 29', 333, 'Delta Airlines', 1)
Result: {**'1111111111111111111': 1020**}
Measured index: 524287

PENNYLANE Quantum circuit OP

For 15Q dataset:

```
Number of Qbits: 15
Number of iteration: 142
Enter the target departure date: Jan 10
Enter the target arrival date: Jan 10
Enter the target price: 394
Enter the target airline (or any): Qatar Airways
Enter the target halt status (0 or 1): 1
```
Execution time (default.qubit): 3.8148 seconds, 2.5800 seconds, 2.7422 seconds, 2.7860 seconds
Execution time (lightning.qubit): 1.3615 seconds, 0.9783 seconds, 1.1149 seconds, 1.0099 seconds
```
Matching flight found at index: 0
Flight details: ('F1', 'Jan 10', 'Jan 10', 394, 'Qatar Airways', 1)
```
Result: {**'000000000000000': 1020**}
```
Measured index: 0
```

```
Number of Qbits: 15
Number of iteration: 142
Enter the target departure date: Aug 6
Enter the target arrival date: Aug 6
Enter the target price: 250
Enter the target airline (or any): any
Enter the target halt status (0 or 1): 1
```
Execution time (default.qubit): 3.6174 seconds, 2.8102 seconds, 2.3538 seconds, 2.3469 seconds
Execution time **(lightning.qubit): 0.8742 seconds, 0.8315 seconds, 1.0098 seconds, 0.8589 seconds**
```
Matching flight found at index: 32767
Flight details: ('F32768', 'Aug 6', 'Aug 6', 250, 'Delta Airlines', 1)
```
Result: {**'111111111111111': 1020**}
```
Measured index: 32767
```

For 17Q dataset:

```
Number of Qbits: 17
Number of iteration: 284
Enter the target departure date: Jan 1
Enter the target arrival date: Jan 1
Enter the target price: 232
Enter the target airline (or any): any
Enter the target halt status (0 or 1): 0
```
Execution time (**default.qubit**): **13.6338 seconds, 13.3647 seconds, 14.4006 seconds,13.5949 seconds**
Execution time **(lightning.qubit): 5.6592 seconds, 4.6780 seconds, 5.4663 seconds, 4.7963 seconds**
```
Matching flight found at index: 0
Flight details: ('F1', 'Jan 1', 'Jan 1', 232, 'Qatar Airways', 0)
```
Result: {**'00000000000000000': 1020**}
```
Measured index: 0
```

```
Number of Qbits: 17
Number of iteration: 284
Enter the target departure date: Aug 28
Enter the target arrival date: Aug 28
Enter the target price: 244
Enter the target airline (or any): any
Enter the target halt status (0 or 1): 0
```
Execution time (**default.qubit**): **12.6935 seconds, 12.7325 seconds, 12.8387 seconds, 12.7753 seconds**
Execution time (**lightning.qubit**): **4.9326 seconds, 5.9069 seconds, 4.9336 seconds, 5.4490 seconds**
```
Matching flight found at index: 131071
Flight details: ('F131072', 'Aug 28', 'Aug 28', 244, 'Emirates', 0)
```
Result: {**'11111111111111111': 1020**}
```
Measured index: 131071
```

For 19Q dataset:

```
Number of Qbits: 19
Number of iteration: 568
Enter the target departure date: Jan 5
Enter the target arrival date: Jan 5
Enter the target price: 381
Enter the target airline (or any): any
Enter the target halt status (0 or 1): 0
```
Execution time (**default.qubit**): **135.9749 seconds, 136.7211 seconds, 138.3915 seconds, 136.0887 seconds**
Execution time (**lightning.qubit**): **33.9769 seconds, 33.4681 seconds, 33.9121 seconds, 33.1565 seconds**
```
Matching flight found at index: 0
Flight details: ('F1', 'Jan 5', 'Jan 5', 381, 'Air India', 0)
```
Result: {**'0000000000000000000': 1020**}
```
Measured index: 0
```

```
Number of Qbits: 19
Number of iteration: 568
Enter the target departure date: Aug 29
Enter the target arrival date: Aug 29
Enter the target price: 333
Enter the target airline (or any): Delta Airlines
Enter the target halt status (0 or 1): 1
```
Execution time(**default.qubit**) : **135.5865 seconds, 130.9607 seconds, 132.2664 seconds, 133.9343 seconds, 133.8355 seconds**
Execution time (**lightning.qubit**): **38.7017 seconds, 39.8919 seconds, 38.9727 seconds, 39.0988 seconds**
```
Matching flight found at index: 524287
Flight details: ('F524288', 'Aug 29', 'Aug 29', 333, 'Delta Airlines', 1)
```
Result: {**'1111111111111111111': 1020**}
```
Measured index: 524287
```

ProjectQ Quantum circuit OP

For 15Q dataset:

Number of Qubits: 15
Number of iterations: 142
Execution time: **8.7473 seconds, 7.7163 seconds, 6.9018 seconds, 8.8039 seconds(of quantum circuit)**
Matching flight found at index: 0
Flight details: ('F1', 'Jan 10', 'Jan 10', 394, 'Qatar Airways', 1)
Measurement results: [0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0]
Measured index: 0

Number of Qubits: 15
Number of iterations: 142
Execution time: **9.1484 seconds, 9.5599 seconds, 9.6095 seconds, 9.5492 seconds (of quantum circuit)**
Matching flight found at index: 32767
Flight details: ('F32768', 'Aug 6', 'Aug 6', 250, 'Delta Airlines', 1)
Measurement results: [1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1]
Measured index: 32767

For 17Q dataset:

Number of Qubits: 17
Number of iterations: 284
Execution time: **25.0420 seconds, 25.1125 seconds, 25.9116 seconds, 25.3477 seconds (of quantum circuit)**
Matching flight found at index: 0
Flight details: ('F1', 'Jan 1', 'Jan 1', 232, 'Qatar Airways', 0)
Measurement results: [0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0]
Measured index: 0

Number of Qubits: 17
Number of iterations: 284
Execution time: **28.9703 seconds, 29.5738 seconds, 35.3708 seconds, 29.2367 seconds (of quantum circuit)**
Matching flight found at index: 131071
Flight details: ('F131072', 'Aug 28', 'Aug 28', 244, 'Emirates', 0)
Measurement results: [1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1]
Measured index: 131071

For 19Q dataset:

Number of Qubits: 19
Number of iterations: 568
Execution time: **128.8702 seconds, 126.7327 seconds,126.5952 seconds, 125.1331 seconds (of quantum circuit)**
Matching flight found at index: 0
Flight details: ('F1', 'Jan 5', 'Jan 5', 381, 'Air India', 0)
Measurement results: [0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0]
Measured index: 0

Number of Qubits: 19
Number of iterations: 568
Execution time: **124.7361 seconds, 124.0298 seconds, 128.7585 seconds, 125.7103 seconds (of quantum circuit)**
Matching flight found at index: 0
Flight details: ('F524288', 'Aug 29', 'Aug 29', 333, 'Delta Airlines', 1)
Measurement results: [0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0]
Measured index: 0