

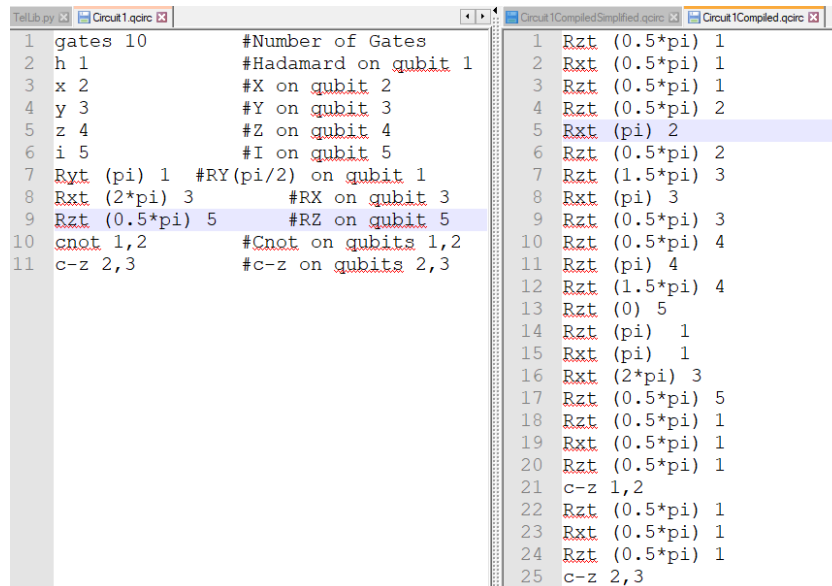
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Task 2:

I define two functions:

- Replacement ("Circuit1.qcirc","Circuit1Compiled.qcirc") #for Compilation

This function get Circuit File name And replace each gate with Rx ,Rz ,Cz library:



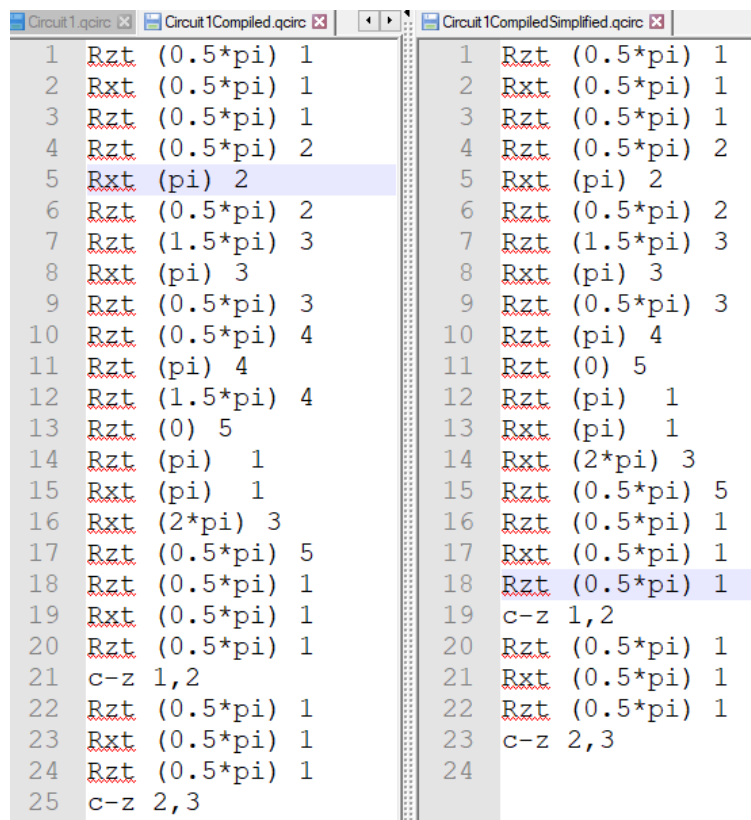
The screenshot shows a code editor with two files open: 'Circuit1.qcirc' and 'Circuit1Compiled.qcirc'. The 'Circuit1.qcirc' file contains the following code:

```
1 gates 10 #Number of Gates
2 h 1 #Hadamard on qubit 1
3 x 2 #X on qubit 2
4 y 3 #Y on qubit 3
5 z 4 #Z on qubit 4
6 i 5 #I on qubit 5
7 Ryt (pi) 1 #RY(pi/2) on qubit 1
8 Rxt (2*pi) 3 #RX on qubit 3
9 Rzt (0.5*pi) 5 #RZ on qubit 5
10 cnot 1,2 #Cnot on qubits 1,2
11 c-z 2,3 #c-z on qubits 2,3
```

The 'Circuit1Compiled.qcirc' file shows the compiled version where gates are replaced with Rxt, Rzt, and c-z:

```
1 Rxt (0.5*pi) 1
2 Rxt (0.5*pi) 1
3 Rzt (0.5*pi) 1
4 Rzt (0.5*pi) 2
5 Rxt (pi) 2
6 Rzt (0.5*pi) 2
7 Rzt (1.5*pi) 3
8 Rxt (pi) 3
9 Rzt (0.5*pi) 3
10 Rzt (0.5*pi) 4
11 Rzt (pi) 4
12 Rzt (1.5*pi) 4
13 Rzt (0) 5
14 Rzt (pi) 1
15 Rxt (pi) 1
16 Rxt (2*pi) 3
17 Rzt (0.5*pi) 5
18 Rzt (0.5*pi) 1
19 Rxt (0.5*pi) 1
20 Rzt (0.5*pi) 1
21 c-z 1,2
22 Rzt (0.5*pi) 1
23 Rxt (0.5*pi) 1
24 Rzt (0.5*pi) 1
25 c-z 2,3
```

- Simplification("Circuit1.qcirc","Circuit1CompiledSimplified.qcirc") #for Simplify



The screenshot shows a code editor with three files open: 'Circuit1.qcirc', 'Circuit1Compiled.qcirc', and 'Circuit1CompiledSimplified.qcirc'. The 'Circuit1CompiledSimplified.qcirc' file shows the simplified version where gates are replaced with Rxt, Rzt, and c-z:

```
1 Rzt (0.5*pi) 1
2 Rxt (0.5*pi) 1
3 Rzt (0.5*pi) 1
4 Rzt (0.5*pi) 2
5 Rxt (pi) 2
6 Rzt (0.5*pi) 2
7 Rzt (1.5*pi) 3
8 Rxt (pi) 3
9 Rzt (0.5*pi) 3
10 Rzt (pi) 4
11 Rzt (0) 5
12 Rzt (pi) 1
13 Rxt (pi) 1
14 Rxt (2*pi) 3
15 Rzt (0.5*pi) 5
16 Rzt (0.5*pi) 1
17 Rxt (0.5*pi) 1
18 Rzt (0.5*pi) 1
19 c-z 1,2
20 Rzt (0.5*pi) 1
21 Rxt (0.5*pi) 1
22 Rzt (0.5*pi) 1
23 c-z 2,3
24
```