

```
// Advanced Quantum Circuit in QASM
```

```
OPENQASM 2.0;
```

```
include "qelib1.inc";
```

```
// Define a quantum register with 3 qubits
```

```
qreg q[3];
```

```
// Define a classical register with 3 bits
```

```
creg c[3];
```

```
// Apply Hadamard gates to all qubits to create superposition states
```

```
h q[0];
```

```
h q[1];
```

```
h q[2];
```

```
// Entangle qubits using CNOT gates
```

```
cx q[0], q[1];
```

```
cx q[1], q[2];
```

```
// Apply a phase shift to qubit 2
```

```
t q[2];
```

```
// Apply additional Hadamard gate to demonstrate interference
```

```
h q[1];
```

```
// Measure all qubits
```

```
measure q[0] -> c[0];
```

```
measure q[1] -> c[1];
```

```
measure q[2] -> c[2];
```