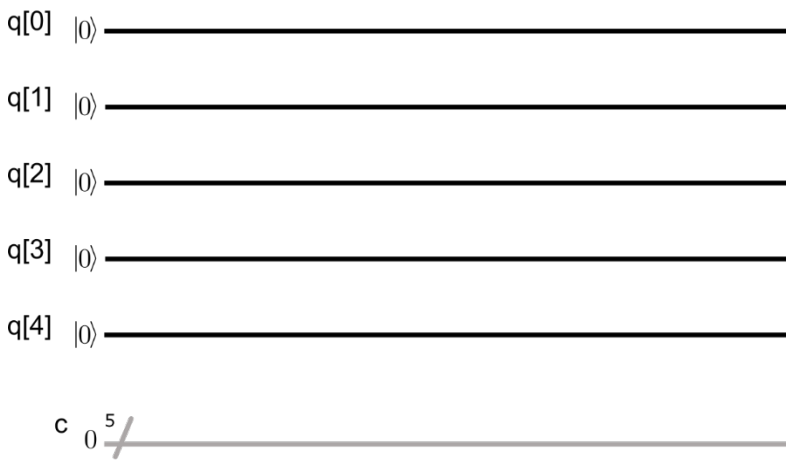
Syntax

In the figure below, each horizontal line represents the evolution of a qubit with time proceeding from left to right. The five qubits are labeled in order as: q[0], q[1], q[2], q[3] and q[4]. The qubits are always initialized in the quantum state:



Classical bits -- used to store measurement results -- are indicated by the letter "c" and the number "5" indicates that there are five classical bits in the register being represented with the grey line.

The figure below shows a graphical representation of adding a measurement block to the first qubit. The vertical grey line indicates that the measurement result will be stored in the classical bit register. The number below the grey arrowhead indicates into which classical bit the result will be stored. In this case, the result is stored in bit c[0].

The following QASM code implements the quantum circuit above:

```
1 include "qelib1.inc";
2 qreg q[5];
3 creg c[5];
4
5 // This is a comment
6 measure q[0] -> c[0];
```

Let's take a look at what each line of the previous code does.

- Line 1: Includes all gates in the quantum gate library. By adding this, you can then use the X-gate, Y-gate, Z-gate, CNOT gate, etc. Notice that **each line has to end in a semicolon ";" (without quotes)**.

- Line 2: Defines a quantum register of five qubits. In this example, you are using five qubits but you can elect to use any number of qubits from one to five. Note that even if you define a two-qubit register, the quantum circuits depicted here and at the IBM quantum experience site will always graphically illustrate all five qubits by default. This is because the physical quantum computer being used has 5 qubits. Nonetheless, you can choose to work with only a subset of those five qubits.

- Line 3: Defines a classical register of five bits. This register is used to store the quantum measurement results. As with the quantum register, even if you define a two-bit classical register, the quantum circuits will still indicate all five bits by the gray line. Nonetheless, you can choose to work with only a subset of those five bits.

- Line 4: You can insert blank lines to help you organize your sections.

- Line 5: You can also insert comments using the "//" (two back-slashes, without quotes) . This helps other readers understand your intention in each line. **Text that appears after the "//" (without quotes) is not evaluated.**

- Line 6: Measures the first qubit q[0] and stores the measurement result in bit c[0]. You could alternatively store the information on c[1], but, for organizational purposes, we recommend a direct numerical mapping q[0] to c[0].