1 Valon Synthesizer operation:

Use root right might help us skip USB port control fussy things. In ipython:

```
In [0]: import serial
In [0]: serial.Serial.isOpen('/dev/ttyUSB0')
In [1]: import valon_synth ()
In [2]: v=valon_synth.Synthesizer('/dev/ttyUSB0')
In [3]: v.get_frequency(valon_synth.SYNTH_A)
out[3]: 2100
In [4]: v.get_frequency(valon_synth.SYNTH_B)
out[4]: 1540
In [5]: v.set_frequency(valon_synth.SYNTH_B,1600)
out[5]: 1600
```

2 Calculate How precise the pulsar observation is.

2.1 PPM

PPM stands for parts per million, and it indicates how much your crystal's frequency may deviate from the nominal value. The MC-306 exists in a 20 ppm and a 50 ppm version. For the 20 ppm version this means that the frequency will be between 32.7673 kHz (32.768 - 20 ppm, or x 0.999980) and 32.7687 kHz (32.768 + 20 ppm, or $\times$ 1.000020). These numbers may give you a comfortable feeling, but remember that a month is 2.6 million seconds, so if you want to use a 20 ppm crystal to build an alarm clock, it may have an error of 1 minute per month.

Crystals are available is different precisions, +/-20 ppm is more or less standard, for 10 ppm you'll pay more. Also, this is basic precision. This frequency may deviate depending on environment factors, mainly temperature.
This parameter could find from Datasheet from Valon.

2.2 Take Pulsar B0329+54 as example

As Valon might have a precision of 2 ppm in frequency. When we observe 8 hours for B0329+54 pulsar, The total time is $8\times3600 = 28800$ (s). As The frequency of B0329+54 is 1.39, The total deviation is $8\times3600\times1.39\times2e^{-6} = 0.08$.

Another calculation method is :in total $8\times3600 = 28800$ (s), the error in seconds is $8 \times 3600 \times 2e^{-6} = 0.05$(s), as period of B0329+54 is 0.714(s). The deviation ratio is $0.05/0.714 = 8\%$.