Python Project 7: Richter

- **Create a Python program. Save As: Richter.py**
- **Include the necessary Program Header and use descriptive comments.**

1. This programming project will display information about the energy released by **Earthquakes**.

   The Richter scale is a way to quantify the magnitude of an earthquake using a base-10 logarithmic scale. The magnitude is defined as the logarithm of the ratio of the amplitude of waves measured by a seismograph to an arbitrarily small amplitude. An earthquake that measures 5.0 on the Richter scale has a shaking amplitude 10 times larger than one that measures 4.0, and corresponds to a 31.6 times larger release of energy.

2. Your program will prompt the user for a floating point **richter** scale number. **(Your prompt should be descriptive).**

3. **Calculate**: For each of the following Richter scale measurements (see page 2), your program will perform the appropriate calculations and output the equivalent amount of energy in joules and in tons of exploded TNT:

   - The energy in **joules** released for a particular Richter scale measurement is given by:

   $$Energy = 10^{(1.5*richter)+4.8}$$

   - where *Energy* is measured in joules and *richter* is the Richter scale measurement (typically on a scale from 1-10 as a floating point number).
   - **1 ton of exploded TNT = 4.184x10^9 joules.** *(You can relate the energy released in joules to tons of exploded TNT).*

4. **Output**. Use the sample data in the graphic below to test your program and output as described.

  - 1.0
  - 5.0
  - 9.1 (Indonesia earthquake, 2004)
  - 9.2 (Alaska earthquake, 1964)
  - 9.5 (Chile earthquake, 1960; largest ever measured)
  - Richter scale value:
  - Equivalence in joules:
  - Equivalence in tons of TNT:

5. Run the Program and Handle Errors
  - If entering a negative number at the prompt?
  - If a letter is entered instead of a number for Richter scale value at the prompt?

```
>>> ============================== RESTART ===============================
>>>
Richter         Joules                        TNT
1           1995262.3149688789               0.00047687913837688307
5           1995262314968.8828             476.87913837688404
9.1         2.818382931264449e+18    673609687.2046962
9.2         3.981071705534953e+18    951498973.5982201
9.5         1.1220184543019653e+19 2681688466.3048882

Please enter a Richter scale value: 3.4
Richter scale value: 3.4
Equivalence in joules: 7943282347.242789
Equivalence in tons of TNT: 1.8984900447521007
>>>
```