MOORE's LAW: The number of transistors that can fit on a chip doubles approximatily every two years
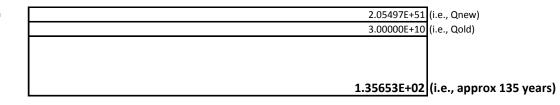
QUESTION: When will Moore's law fail ?

ANSWER : Certianly sometime before it predicts that the number of transitors that can fit on a chip is equal to the number of atoms that are
in the volume of the earth (assuming that sometime in the future transitors could be shrunk to the size of one atom)

USING SOME DEGREE OF PRECISION FOR CALCULATIONS

	Approx Diameter (meters)	Radius (meters)	Volume 4/3 * pi *r^3 (meters)^3
Atom	1.00000E-10	5.00000E-11	5.23598E-31
Earth	1.27136E+07	6.35680E+06	1.07598E+21

Approx number of atoms in Earth = Volume of Earth / Volume of an Atom =   2.05497E+51 (i.e., Qnew)

Assuming that the present day max number of transistor is 30 Billion =   3.00000E+10 (i.e., Qold)

Moore's Law: Qnew = Qold * (2 ^ #of years)

Qnew / Qold = (2 ^ #of years)

Log2 (Qnew / Qold) = #of years =   **1.35653E+02** (i.e., approx 135 years)

ESTIMATING BY GUESSING DIAMETER OF EARTH (and knowing volume of a sphere, and approx conversion between miles and kilometers)

Volume of a sphere = 4/3 * pi *r^3

Conversion between miles and kilometers = approximately 1.6 kilometers per mile

Knowing that California is approximately 3 hours behind our time zone and is approximately 3000 miles away,
we can approximate that at our Latitude, each time zone is approximately 1000 miles wide

And knowing that the earth gets fatter as we move towards the equator, lets add a hundred miles per time zone
so that we guess the circumference of the earth as 24 time zones * 1100 miles = approximately 26000 miles

And since Circumference = Diameter * pi,   Diameter of earth = 26,000 / pi   or approximately 8000 miles
which is approximately 8000miles * (1.6 kilometer per mile) = 8000miles * (1600 meters per mile) = approximately 10 million meters

	Approx Diameter (meters)	Radius (meters)	Volume 4/3 * pi *r^3 (meters)^3
Atom	0.0000000001	0.00000000005	5.E-31
Earth	10,000,000	5,000,000	5.E+20

Approx number of atoms in Earth = Volume of Earth / Volume of an Atom =   1,000,000,000,000,000,000,000,000,000,000,000,000,000,000,000,000 (i.e., Qnew)

Assuming that the present day max number of transistor is 30 Billion =   30,000,000,000 (i.e., Qold)

Moore's Law: Qnew = Qold * (2 ^ #of years)

Qnew / Qold = (2 ^ #of years)

Log2 (Qnew / Qold) = #of years   **135** (i.e., approx 135 years)

Moore's Law 100 years into future