Untitled

May 13, 2018

In [44]:
```
import numpy as np
```

In [54]:
```
x = np.zeros(4)
lables=np.array([0, 1])
uPotentials=np.zeros([4,2])
pPotential=np.zeros([2,2])

#Unary potentials:
uPotentials[0]=[11, 3]
uPotentials[1]=[6, 3]
uPotentials[2]=[1, 10]
uPotentials[3]=[5, 7]
#Pairwise potentials:
pPotential=[[3, -10],[-10, 3]]
```

In [57]:
```
# just pick a large number where we can be certain that there will be smaller energie
min_energy = 10000000
for x1 in range(2):
    for x2 in range(2):
        for x3 in range(2):
            for x4 in range(2):
                energy = (uPotentials[0][x1]
                + uPotentials[1][x2]
                + uPotentials[2][x3]
                + uPotentials[3][x4]
                + pPotential[x1][x2]
                + pPotential[x1][x3]
                + pPotential[x1][x4])

                if(energy <= min_energy):
                    min_energy = energy
                    x[0]=x1
                    x[1]=x2
                    x[2]=x3
                    x[3]=x4

print("The global minima for the energy function is:")
print("E( x1="+str(x[0])
```

```
            + ", x2=" + str(x[1])
            + ", x3=" + str(x[2])
            + ", x4=" + str(x[3])
            + ") = " + str(min_energy))
        # The solution of this program for the x-vector also confirms the solution that was c
```

```
The global minima for the energy function is:
E( x1=1.0, x2=0.0, x3=0.0, x4=0.0) = -15.0
```