Part 3: Demonstration of Laplace Expansion

In [ ]:
```
import numpy as np
import pandas as pd
```

In [ ]:
```
A = [[2, 1, 2, 6],
     [6, 4, 3, 5],
     [8, 1, 4, 9],
     [9, 8, 7, 8]]

A = np.array(A)
A
```

Out[ ]:
```
array([[2, 1, 2, 6],
       [6, 4, 3, 5],
       [8, 1, 4, 9],
       [9, 8, 7, 8]])
```

In [ ]:
```
def minor(A, row, col):
    new_A = A
    new_A = np.delete(A, row, axis=0)
    new_A = np.delete(new_A, col, axis =1)
    return new_A
```

In [ ]:
```
minor(A, 1,1)
```

Out[ ]:
```
array([[2, 2, 6],
       [8, 4, 9],
       [9, 7, 8]])
```

In [ ]:
```
def laplace(A, row):
    sums = 0

    coeff = A[row]

    for i in range(len(coeff)):
        sums+= (-1)**(row+i) * coeff[i] * np.linalg.det(minor(A, row, i))
```

```
    return sums
```

In [ ]:
```
laplace(A, 0)
```

Out[ ]: 229.00000000000023

In [ ]:
```
np.linalg.det(A)
```

Out[ ]: 229.00000000000028