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## **Congruencia Lineal.**

In [5]:



```
#Importamos las librerias
from tabulate import tabulate
from prettytable import PrettyTable
import pandas as pd
import numpy as np
import random
import math
```



In [10]:

```

xn=[]
un=[]
def congruencia(semilla,iteraciones,a,c,m,x):
    table = PrettyTable()
    table.field_names= ["Numero iteraccion","Xn","x","Un"]
    for i in range(1, iteraciones):
        xn = (a*x + c) % m; #FORMULA
        rn = xn/m
        x = xn
        table.add_row([i,xn,x,rn])
    #print(table)
    print(tabulate(table,tablefmt="fancy_grid"))

v=congruencia(15678,12,4343243,11,43,34321)

```

| Numero iteraccion | Xn | x  | Un                |
|-------------------|----|----|-------------------|
| 1                 | 35 | 35 | 0.813953488372093 |

| Numero iteraccion | Xn | x | Un                   |
|-------------------|----|---|----------------------|
| 2                 | 2  | 2 | 0.046511627906976744 |

| Numero iteraccion | Xn | x  | Un                 |
|-------------------|----|----|--------------------|
| 3                 | 24 | 24 | 0.5581395348837209 |

| Numero iteraccion | Xn | x  | Un                 |
|-------------------|----|----|--------------------|
| 4                 | 38 | 38 | 0.8837209302325582 |

| Numero iteraccion | Xn | x | Un  |
|-------------------|----|---|-----|
| 5                 | 0  | 0 | 0.0 |

| Numero iteraccion | Xn | x  | Un                 |
|-------------------|----|----|--------------------|
| 6                 | 11 | 11 | 0.2558139534883721 |

| Numero iteraccion | Xn | x  | Un                 |
|-------------------|----|----|--------------------|
| 7                 | 18 | 18 | 0.4186046511627907 |

|                   |    |    |                    |
|-------------------|----|----|--------------------|
| Numero iteraccion | Xn | x  | Un                 |
| 8                 | 42 | 42 | 0.9767441860465116 |

|                   |    |    |                    |
|-------------------|----|----|--------------------|
| Numero iteraccion | Xn | x  | Un                 |
| 9                 | 26 | 26 | 0.6046511627906976 |

|                   |    |   |                     |
|-------------------|----|---|---------------------|
| Numero iteraccion | Xn | x | Un                  |
| 10                | 8  | 8 | 0.18604651162790697 |

|                   |    |    |                     |
|-------------------|----|----|---------------------|
| Numero iteraccion | Xn | x  | Un                  |
| 11                | 20 | 20 | 0.46511627906976744 |

In [11]:



```
def congruencia(semilla,iteraciones,a,c,m,x):
    table = PrettyTable()
    table.field_names= ["Numero iteraccion","Xn","x0","Un"]
    for i in range(1, iteraciones):
        xn = (a*x + c) % m; #FORMULA
        rn = xn/m
        x = xn
        table.add_row([i,xn,x,rn])
    #print(table)
    print(tabulate(table,tablefmt="fancy_grid"))

v=congruencia(3432234,8,5,3,9,1)
```

| Numero iteraccion | Xn | x0 | Un                 |
|-------------------|----|----|--------------------|
| 1                 | 8  | 8  | 0.8888888888888888 |
| 2                 | 7  | 7  | 0.7777777777777778 |
| 3                 | 2  | 2  | 0.2222222222222222 |
| 4                 | 4  | 4  | 0.4444444444444444 |
| 5                 | 5  | 5  | 0.5555555555555556 |
| 6                 | 1  | 1  | 0.1111111111111111 |
| 7                 | 8  | 8  | 0.8888888888888888 |



In [12]:

```

iteraciones = int(input("Ingrese numero iteraciones: "))
print("Iter :", iteraciones)
seed = int(input("Ingrese semilla: "))
print("Xo:", seed)
a=int(input("Ingrese valor de a: "))
print("a:",a)
c=int(input("Ingrese valor de c: "))
print("c:",c)
m=int(input("Ingrese valor de m: "))
print("m:", m)
xn=[]
un=[]
def formula_conLineal(xo, A, C, M):
    form=((xo*A)+C)%M
    xn.append(form)
    return form

def dividido(n):
    d=n/m
    un.append(d)
    return d

xn.append(seed)
un.append(' ')
for i in range(iteraciones):
    valor=seed
    semilla=formula_conLineal(valor, a, c, m)
    dividido(seed)
    #table.add_row([xn,un])
#print(tabulate(table,tablefmt="fancy_grid"))
df=pd.DataFrame({"Xn":xn, "Un":un})
pd.set_option('display.max_columns', None)
pd.set_option('display.max_rows', None)
print(df)

```

Ingrese numero iteraciones: 50

Iter : 50

Ingrese semilla: 25

Xo: 25

Ingrese valor de a: 24

a: 24

Ingrese valor de c: 15

c: 15

Ingrese valor de m: 20

m: 20

|    | Xn | Un   |
|----|----|------|
| 0  | 25 |      |
| 1  | 15 | 1.25 |
| 2  | 15 | 1.25 |
| 3  | 15 | 1.25 |
| 4  | 15 | 1.25 |
| 5  | 15 | 1.25 |
| 6  | 15 | 1.25 |
| 7  | 15 | 1.25 |
| 8  | 15 | 1.25 |
| 9  | 15 | 1.25 |
| 10 | 15 | 1.25 |

|    |    |      |
|----|----|------|
| 11 | 15 | 1.25 |
| 12 | 15 | 1.25 |
| 13 | 15 | 1.25 |
| 14 | 15 | 1.25 |
| 15 | 15 | 1.25 |
| 16 | 15 | 1.25 |
| 17 | 15 | 1.25 |
| 18 | 15 | 1.25 |
| 19 | 15 | 1.25 |
| 20 | 15 | 1.25 |
| 21 | 15 | 1.25 |
| 22 | 15 | 1.25 |
| 23 | 15 | 1.25 |
| 24 | 15 | 1.25 |
| 25 | 15 | 1.25 |
| 26 | 15 | 1.25 |
| 27 | 15 | 1.25 |
| 28 | 15 | 1.25 |
| 29 | 15 | 1.25 |
| 30 | 15 | 1.25 |
| 31 | 15 | 1.25 |
| 32 | 15 | 1.25 |
| 33 | 15 | 1.25 |
| 34 | 15 | 1.25 |
| 35 | 15 | 1.25 |
| 36 | 15 | 1.25 |
| 37 | 15 | 1.25 |
| 38 | 15 | 1.25 |
| 39 | 15 | 1.25 |
| 40 | 15 | 1.25 |
| 41 | 15 | 1.25 |
| 42 | 15 | 1.25 |
| 43 | 15 | 1.25 |
| 44 | 15 | 1.25 |
| 45 | 15 | 1.25 |
| 46 | 15 | 1.25 |
| 47 | 15 | 1.25 |
| 48 | 15 | 1.25 |
| 49 | 15 | 1.25 |
| 50 | 15 | 1.25 |