



CSE 3024

Web Mining

LAB ASSESSMENT - 3

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1. Create a Python programme that performs Elias Gamma Encoding and Decoding for even numbers ranging from 1 to 20.

Ans 1.

HANDWRITTEN CODE:

```
Q1) VIBHU KUNAR SINGH 19BCE0215

from math import log
import math

log2 = lambda x: log(x, 2)

def Unary(n):
    return (n-1)*'0'+'1'

def Binary(x, l=1):
    s = '{0:0%db}' % l
    return s.format(x)

def Elias-Gamma(x):
    if (x == 0):
        return '0'

    n = 1 + int(log2(x))
    b = x - 2**(int(log2(x)))

    l = int(log2(n))
    return Unary(n) + Binary(b, l)

def Elias-Gamma-Decoding(x):
    x = list(x)
    k = 0
    while True:
        if not x[k] == '0':
            break
        k = k + 1
    x = x[k : 2*k + 1]
```

```

n = 0
x.reverse()
for i in range(len(n)):
    if n[i] == '1':
        n = n + math.pow(2, i)
return int(n)

print("Elias - Gamma Encoding and Decoding : \n")
heading = '{<20} {<12} {<8}'.format("n (ranging [1-20])",
    "Encoding", "Decoding")

print("\033[4m" + heading + "\033[0m")

for k in range(2, 21, 2):
    string = str(Elias_Gamma(n))
    line_new = '{<20} {<12} {>8}'.format(
        "For n = " + str(n), string,
        Elias_Gamma_Decoding(string))

    print(line_new)

```

CODE:

```

from math import log
import math

log2 = lambda x: log(x, 2)

def Unary(x):
    return (x-1)*'0'+'1'

def Binary(x, l = 1):
    s = '{0:0%db}' % l
    return s.format(x)

def Elias_Gamma(x):
    if(x == 0):
        return '0'

    n = 1 + int(log2(x))
    b = x - 2**(int(log2(x)))

    l = int(log2(x))

    return Unary(n) + Binary(b, l)

def Elias_Gamma_Decoding(x):
    x = list(x)
    K = 0
    while True:
        if not x[K] == '0':
            break
        K = K + 1
    x = x[K:2*K+1]
    n = 0
    x.reverse()

```

```

        for i in range(len(x)):
            if x[i] == '1':
                n = n+math.pow(2, i)
        return int(n)

print("Elias - Gamma Encoding and Decoding:\n")
heading = '{:<20}  {:<12}  {:<8}'.format("x(ranging[1-20])", "Encoding", "Decoding")
print("\033[4m"+heading+"\033[0m")
for x in range(2,21,2):
    string = str(Elias_Gamma(x))
    line_new = '{:<20}  {:<12}  {:>8}'.format("For x = " + str(x), string,
Elias_Gamma_Decoding(string))
    print(line_new)

```

CODE SCREENSHOT:

```

C:\Users\Vibhu\OneDrive - vit.ac.in\Desktop\Winter Semester 21-22\Web Mining\ELA\LAB-3\EliasGamma.py
EliasGamma.py
1  from math import log
2  import math
3
4  log2 = lambda x: log(x, 2)
5
6  def Unary(x):
7      return (x-1)*'0'+'1'
8
9  def Binary(x, l = 1):
10     s = '{0:0%db}' % l
11     return s.format(x)
12
13  def Elias_Gamma(x):
14     if(x == 0):
15         return '0'
16     n = 1 + int(log2(x))
17     b = x - 2**(int(log2(x)))
18     l = int(log2(b))
19     return Unary(n) + Binary(b, l)
20
21  def Elias_Gamma_Decoding(x):
22     x = list(x)
23     K = 0
24     while True:
25         if not x[K] == '0':
26             break
27         K = K + 1
28     x = x[K:2*K+1]
29     n = 0
30     x.reverse()
31     for i in range(len(x)):
32         if x[i] == '1':
33             n = n+math.pow(2, i)
34     return int(n)
35
36  print("Elias - Gamma Encoding and Decoding:\n")
37  heading = '{:<20}  {:<12}  {:<8}'.format("x(ranging[1-20])", "Encoding", "Decoding")
38  print("\033[4m"+heading+"\033[0m")
39  for x in range(2,21,2):
40     string = str(Elias_Gamma(x))
41     line_new = '{:<20}  {:<12}  {:>8}'.format("For x = " + str(x), string, Elias_Gamma_Decoding(string))
42     print(line_new)

```

(P.T.O)

OUTPUT:

Elias - Gamma Encoding and Decoding:

| <u>x(ranging[1-20])</u> | <u>Encoding</u> | <u>Decoding</u> |
|-------------------------|-----------------|-----------------|
| For x = 2 | 010 | 2 |
| For x = 4 | 00100 | 4 |
| For x = 6 | 00110 | 6 |
| For x = 8 | 0001000 | 8 |
| For x = 10 | 0001010 | 10 |
| For x = 12 | 0001100 | 12 |
| For x = 14 | 0001110 | 14 |
| For x = 16 | 000010000 | 16 |
| For x = 18 | 000010010 | 18 |
| For x = 20 | 000010100 | 20 |

OUTPUT SCREENSHOT:

```
In [1]: runfile('C:/Users/Vibhu/OneDrive - vit.ac.in/Desktop/Winter Semester 21-22/
Web Mining/ELA/LAB-3/EliasGamma.py', wdir='C:/Users/Vibhu/OneDrive - vit.ac.in/
Desktop/Winter Semester 21-22/Web Mining/ELA/LAB-3')
Elias - Gamma Encoding and Decoding:

x(ranging[1-20])    Encoding    Decoding
For x = 2           010         2
For x = 4           00100       4
For x = 6           00110       6
For x = 8           0001000     8
For x = 10          0001010    10
For x = 12          0001100    12
For x = 14          0001110    14
For x = 16          000010000   16
For x = 18          000010010   18
For x = 20          000010100   20
```