Lab DA-5, Winter 2020-21, L15+L16

WEB MINING

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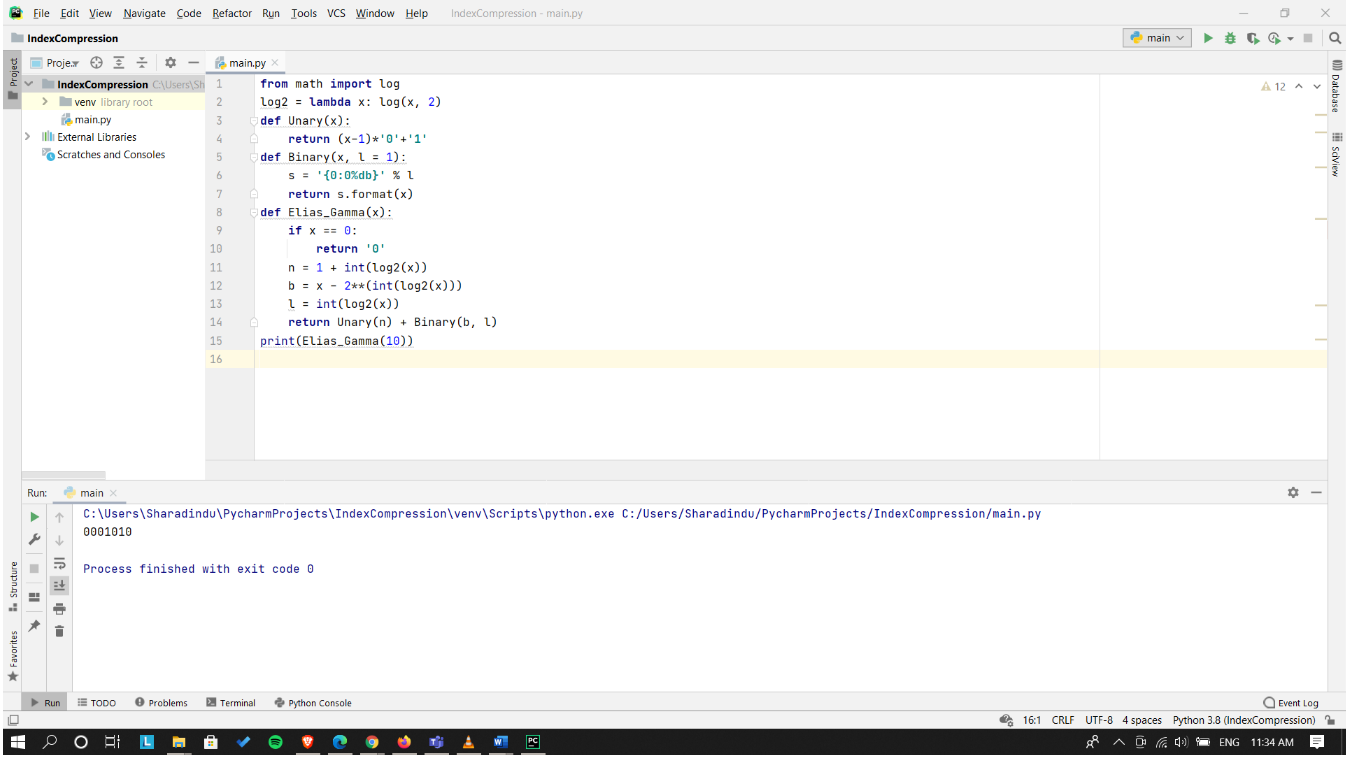
IMPLEMENTATION OF INDEX COMPRESSION TECHNIQUES: Elias gamma and Golomb encoding and decoding.

Elias Gamma Encoding

```
from math import log
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)
print(Elias_Gamma(10))
```



```
from math import log
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:
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    n = 1 + int(log2(x))
    b = x - 2**(int(log2(x)))
    l = int(log2(x))
    return Unary(n) + Binary(b, l)
print(Elias_Gamma(10))
```
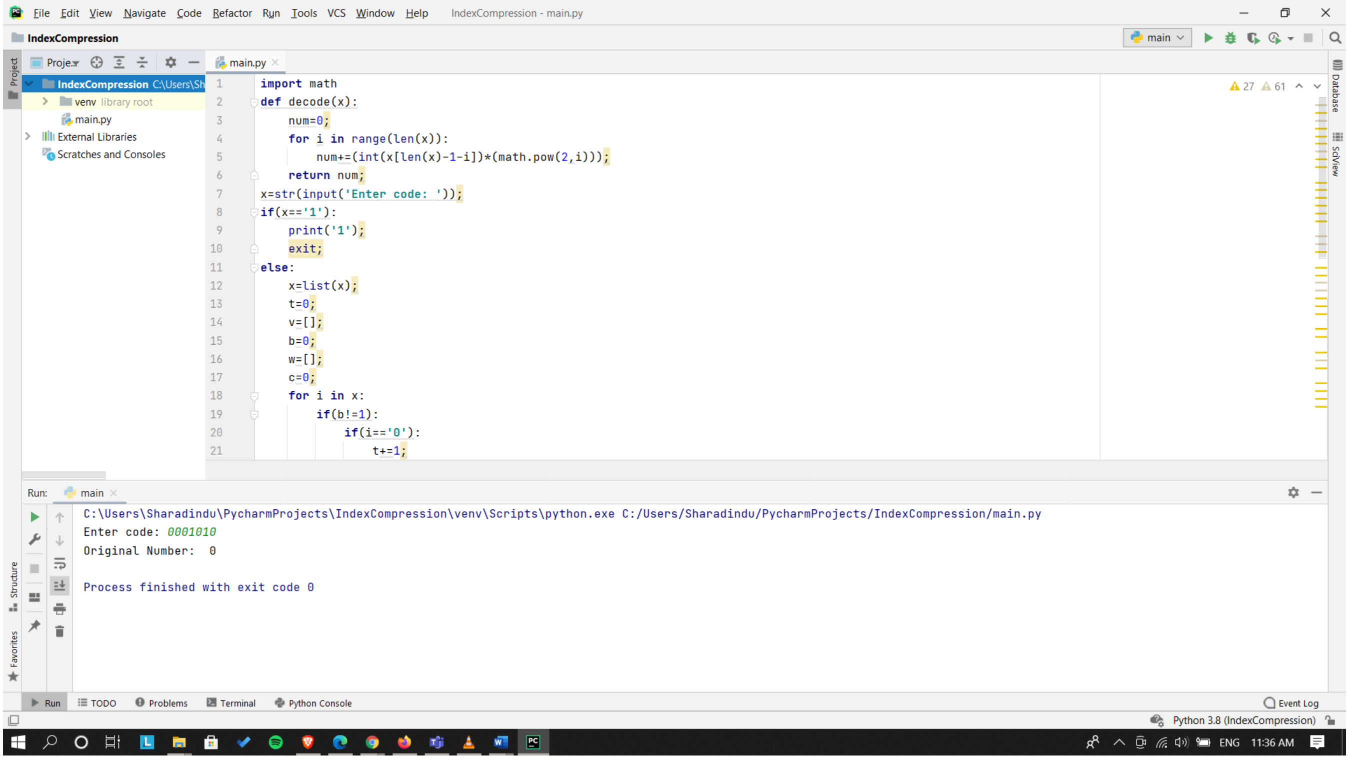

```
C:\Users\Sharadindu\PycharmProjects\IndexCompression\venv\Scripts\python.exe C:/Users/Sharadindu/PycharmProjects/IndexCompression/main.py
0001010

Process finished with exit code 0
```

Elias Gamma Decoding

```
import math
def decode(x):
    num=0;
    for i in range(len(x)):
        num+=(int(x[len(x)-1-i])*(math.pow(2,i)));
    return num;
x=str(input('Enter code: '));
if(x=='1'):
    print('1');
    exit;
else:
    x=list(x);
    t=0;
    v=[];
    b=0;
    w=[];
    c=0;
    for i in x:
        if(b!=1):
            if(i=='0'):
                t+=1;
            else:
                v.append(i);
                b=1;
        elif(c!=1):
            if(t==0):
                c=1;
                w.append('1');
                w.append(i);
            else:
                v.append(i);
                t-=1;
        else:
            num=decode(v);
            if(num==0):
                break;
            else:
                w.append(i);
                num-=1;
    ans=decode(w);
    print('Original Number: ',int(ans));
```

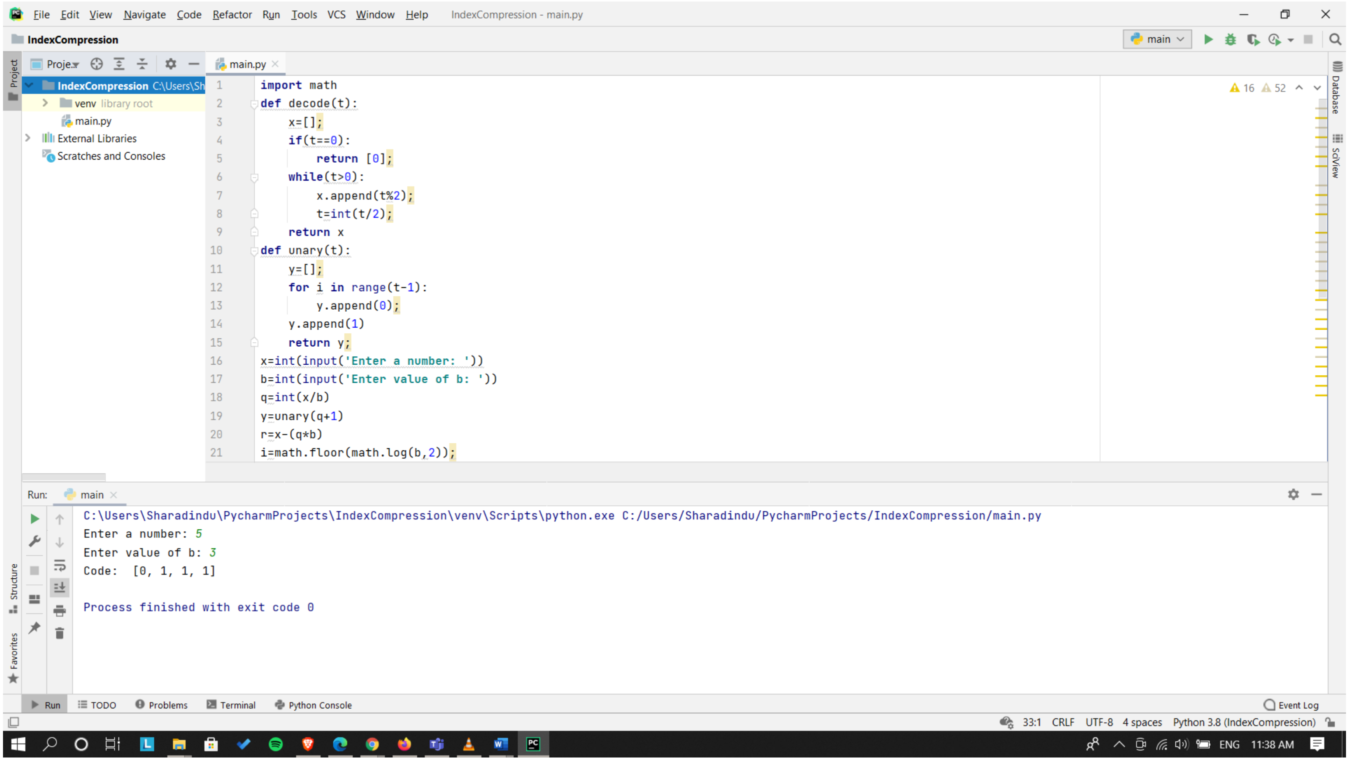


```
import math
def decode(x):
    num=0;
    for i in range(len(x)):
        num+=(int(x[len(x)-1-i])*(math.pow(2,i)));
    return num;
x=str(input('Enter code: '));
if(x=='1'):
    print('1');
    exit;
else:
    x=list(x);
    t=0;
    v=[];
    b=0;
    w=[];
    c=0;
    for i in x:
        if(b!=1):
            if(i=='0'):
                t+=1;
```

```
C:\Users\Sharadindu\PycharmProjects\IndexCompression\venv\Scripts\python.exe C:/Users/Sharadindu/PycharmProjects/IndexCompression/main.py
Enter code: 0001010
Original Number:  0

Process finished with exit code 0
```

Golomb Encoding

```
import math
def decode(t):
    x=[];
    if(t==0):
        return [0];
    while(t>0):
        x.append(t%2);
        t=int(t/2);
    return x
def unary(t):
    y=[];
    for i in range(t-1):
        y.append(0);
    y.append(1)
    return y;
x=int(input('Enter a number: '))
b=int(input('Enter value of b: '))
q=int(x/b)
y=unary(q+1)
r=x-(q*b)
i=math.floor(math.log(b,2));
d=math.pow(2,i+1)-b;
if(r>=d):
    r+=int(d);
r2=decode(r);
if(len(r2)<=i and r>=d):
    r2.append(0);
if(len(r2)<i and r<d):
    r2.append(0);
r2=r2[::-1];
y=y+r2;
print('Code: ',y);
```


File Edit View Navigate Code Refactor Run Tools VCS Window Help
IndexCompression - main.py
IndexCompression
main
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venv library root
main.py
External Libraries
Scratches and Consoles
main.py
Run: main
Run
TODO
Problems
Terminal
Python Console
Event Log
33:1 CRLF UTF-8 4 spaces Python 3.8 (IndexCompression)
ENG 11:38 AM

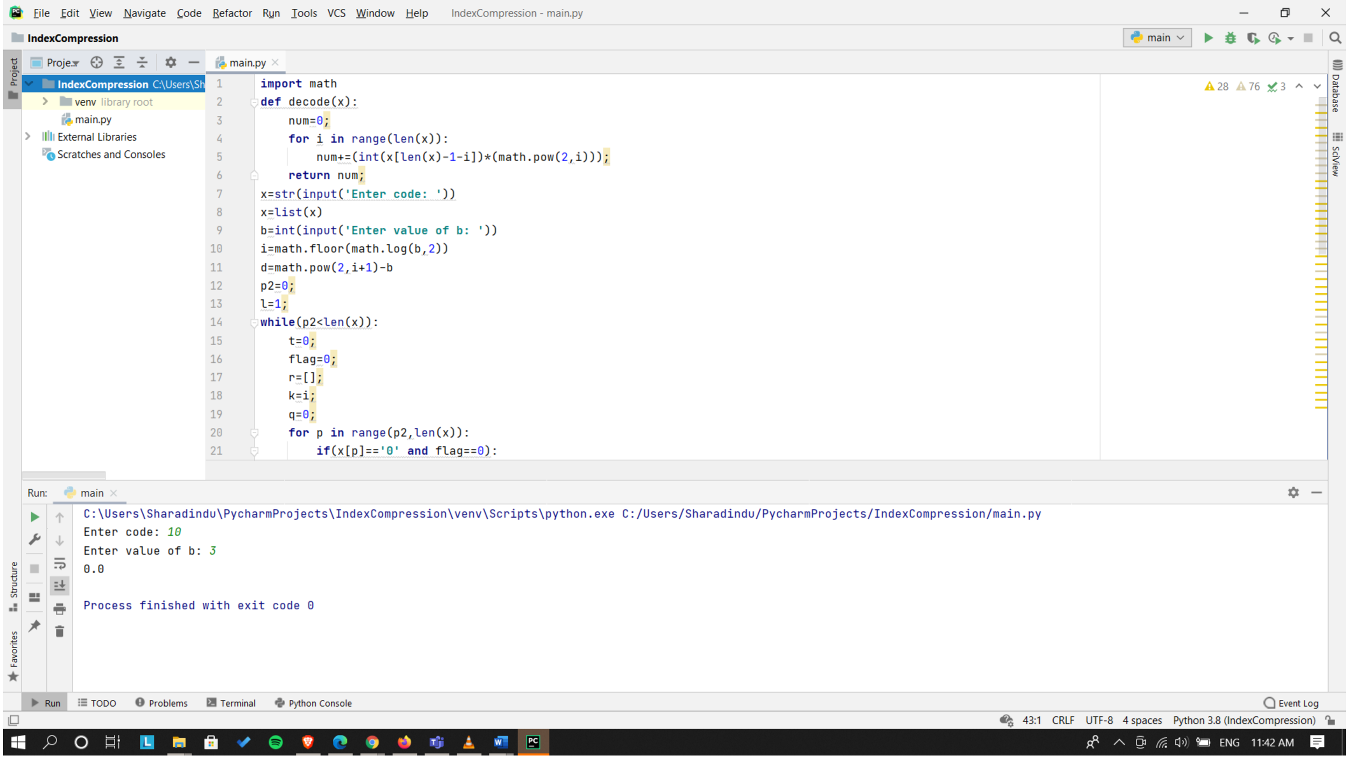
```
import math
def decode(t):
    x=[];
    if(t==0):
        return [0];
    while(t>0):
        x.append(t%2);
        t=int(t/2);
    return x
def unary(t):
    y=[];
    for i in range(t-1):
        y.append(0);
    y.append(1)
    return y;
x=int(input('Enter a number: '))
b=int(input('Enter value of b: '))
q=int(x/b)
y=unary(q+1)
r=x-(q*b)
i=math.floor(math.log(b,2));
```

```
C:\Users\Sharadindu\PycharmProjects\IndexCompression\venv\Scripts\python.exe C:/Users/Sharadindu/PycharmProjects/IndexCompression/main.py
Enter a number: 5
Enter value of b: 3
Code:  [0, 1, 1, 1]

Process finished with exit code 0
```

Golomb Decoding

```python
import math
def decode(x):
    num=0;
    for i in range(len(x)):
        num+=(int(x[len(x)-1-i])*(math.pow(2,i)));
    return num;
x=str(input('Enter code: '))
x=list(x)
b=int(input('Enter value of b: '))
i=math.floor(math.log(b,2))
d=math.pow(2,i+1)-b
p2=0;
l=1;
while(p2<len(x)):
    t=0;
    flag=0;
    r=[];
    k=i;
    q=0;
    for p in range(p2,len(x)):
        if(x[p]=='0' and flag==0):
            t+=1;
            continue;
        if(x[p]=='1' and flag==0):
            q=t;
            flag=1;
            continue;
        r.append(x[p]);
        k-=1;
        if(k==0):
            rnum=decode(r);
            if(rnum<d):
                p2=p+1;
                break;
        if(k==-1):
            rnum=decode(r);
            rnum=rnum-d;
            p2=p+1;
            break;
    ans=q*b+rnum;
    print(ans);
    l=0;
```


File Edit View Navigate Code Refactor Run Tools VCS Window Help
IndexCompression - main.py
IndexCompression
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venv library root
main.py
External Libraries
Scratches and Consoles
Run: main
Run
TODO
Problems
Terminal
Python Console
Event Log
43:1 CRLF UTF-8 4 spaces Python 3.8 (IndexCompression)
ENG 11:42 AM

```python
import math
def decode(x):
    num=0;
    for i in range(len(x)):
        num+=(int(x[len(x)-1-i])*(math.pow(2,i)));
    return num;
x=str(input('Enter code: '))
x=list(x)
b=int(input('Enter value of b: '))
i=math.floor(math.log(b,2))
d=math.pow(2,i+1)-b
p2=0;
l=1;
while(p2<len(x)):
    t=0;
    flag=0;
    r=[];
    k=i;
    q=0;
    for p in range(p2,len(x)):
        if(x[p]=='0' and flag==0):
```

```
C:\Users\Sharadindu\PycharmProjects\IndexCompression\venv\Scripts\python.exe C:/Users/Sharadindu/PycharmProjects/IndexCompression/main.py
Enter code: 10
Enter value of b: 3
0.0

Process finished with exit code 0
```