f1

January 13, 2022

1 3.1

1.1 Forrit sem reiknar Collatz-runur

$n_{k+1} = 3n_k + 1$ ef n er oddatala $n_{k+1} = \frac{n_k}{2}$ ef n er slétt tala

Ef nýja talan $n_{k+1} = 1$ þá er hætt að reikna. ***

[ ]:
```
# COLLATZ ÆFING
def næsta(x):
    '''skilar næstu tölu á eftir x í Collatz-runu'''
    if x % 2 == 0:
        f = x//2
    else:
        f = 3*x + 1
    return f

def collatz_runa(n):
    '''finnur og skrifar út Collatz-runu sem byrjar á n'''
    print('runa: ', end='')
    while n > 1:
        print(n, end=', ')
        n = næsta(n)
    print(n)

# Forrit sem prentar út Collatz-runur sem byrja á 2, 3,...,7:
print('Nokkrar Collatz-runur')
for n0 in range(2,8):
    collatz_runa(n0)
```

```
Nokkrar Collatz-runur
runa: 2, 1
runa: 3, 10, 5, 16, 8, 4, 2, 1
runa: 4, 2, 1
runa: 5, 16, 8, 4, 2, 1
runa: 6, 3, 10, 5, 16, 8, 4, 2, 1
runa: 7, 22, 11, 34, 17, 52, 26, 13, 40, 20, 10, 5, 16, 8, 4, 2, 1
```

[ ]:
```
n0 = int(input("Sláið inn tölu til að byrja Collatz runu"))
collatz_runa(n0)
```

```
runa: 27, 82, 41, 124, 62, 31, 94, 47, 142, 71, 214, 107, 322, 161, 484, 242,
121, 364, 182, 91, 274, 137, 412, 206, 103, 310, 155, 466, 233, 700, 350, 175,
526, 263, 790, 395, 1186, 593, 1780, 890, 445, 1336, 668, 334, 167, 502, 251,
754, 377, 1132, 566, 283, 850, 425, 1276, 638, 319, 958, 479, 1438, 719, 2158,
1079, 3238, 1619, 4858, 2429, 7288, 3644, 1822, 911, 2734, 1367, 4102, 2051,
6154, 3077, 9232, 4616, 2308, 1154, 577, 1732, 866, 433, 1300, 650, 325, 976,
488, 244, 122, 61, 184, 92, 46, 23, 70, 35, 106, 53, 160, 80, 40, 20, 10, 5, 16,
8, 4, 2, 1
```

2 4.2

[ ]:
```
print(7/4)
print(7//4)
print(8/4)
print(8//4)
```

```
1.75
1
2.0
2
```

3 4.3

[ ]:
```
x = 5
p = x == 5
q = x == 6
x += 2
y = 10
(x,y) = (y,x)
print(x,y,p,q)
```

```
10 7 True False
```

4 4.4

[ ]:
```
s = input('Sláðu inn tölu: ')
t = float(s)
print(t)
```

```
---------------------------------------------------------------------------
ValueError                                Traceback (most recent call last)
Input In [6], in <module>
      1 s = input('Sláðu inn tölu: ')
```

```
----> 2 t = float(s)
      3 print(t)

ValueError: could not convert string to float: 'hundrað'
```

[ ]:
```
x = 2
s = "AB"
print(x, s)
display(x*2, s*2)
```

```
2 AB
```

```
4
```

```
'ABAB'
```

5 4.5