Cayley-1997-06-popping-ballons

July 25, 2020

1 Cayley Contest, 1997, Question 6

We can represent the set of remaining balloons as a string by listing their letters in clockwise order, staring with `A`. Initially, all balloon remain.

[1]:
```
init_balloons = 'ABCDEFGHIJKL'
```

We are told to pop every third balloon, until only two remain. We skip over the first two balloons using Python string slicing.

[2]:
```
balloons = init_balloons
front = balloons[:2]
print('front = ', front)
```

```
front =  AB
```

We pop the third balloon.

[3]:
```
pop = balloons[2]
print('pop =', pop)
```

```
pop = C
```

We grab the rest of the balloons using string slicing.

[4]:
```
rest = balloons[3:]
print('rest =', rest)
```

```
rest = DEFGHIJKL
```

Since the balloons are arranged in a circle, the front now appears after the rest.

[5]:
```
balloons = rest + front
print('balloons =', balloons)
```

```
balloons = DEFGHIJKLAB
```

Now repeat the above steps until only two balloons remain. Put the above procedure in a function.

[6]:
```
def pop_balloons(balloons):
    while len(balloons) > 2:
```

```
        front = balloons[:2]
        pop = balloons[2]
        print('from ', balloons, ' pop', pop)
        rest = balloons[3:]
        balloons = rest + front

    return balloons
```

Finally run this function on the initial set of balloons.

[7]:
```
remain = pop_balloons(init_balloons)
print('remain =', remain)
```

```
from  ABCDEFGHIJKL  pop C
from  DEFGHIJKLAB  pop F
from  GHIJKLABDE  pop I
from  JKLABDEGH  pop L
from  ABDEGHJK  pop D
from  EGHJKAB  pop H
from  JKABEG  pop A
from  BEGJK  pop G
from  JKBE  pop B
from  EJK  pop K
remain = EJ
```