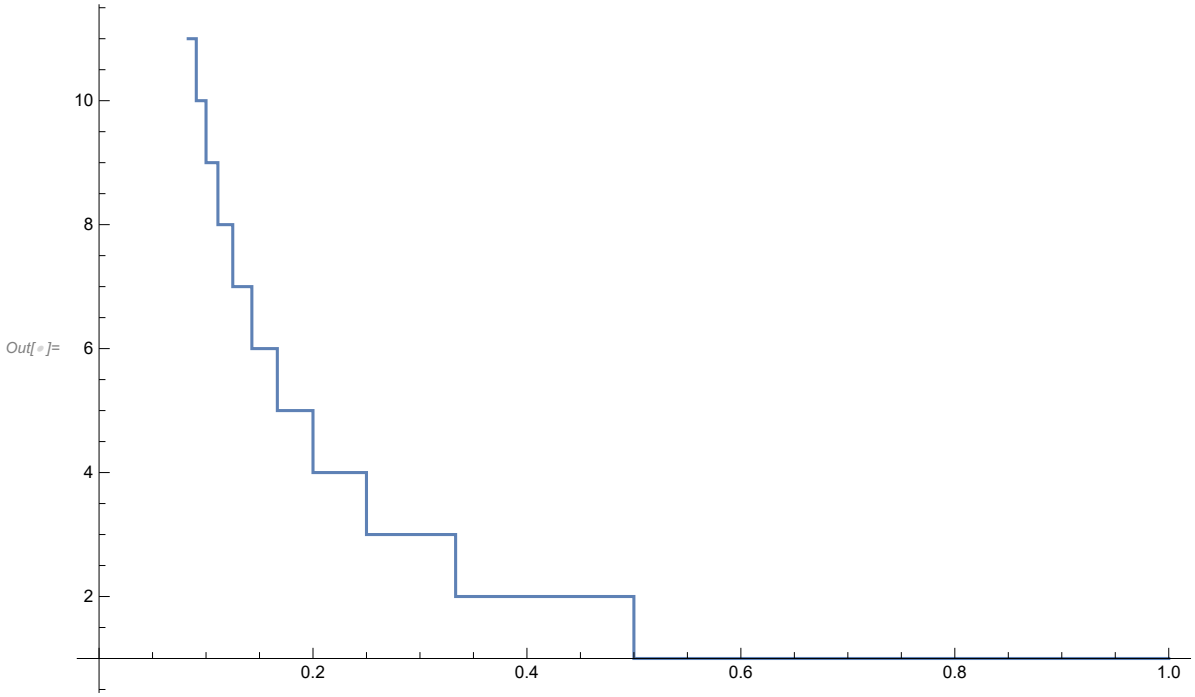
Pensieve header: How wasteful are continued fractions information-theoretically, as means to store integers?

```
In[•]:= r = RandomReal[WorkingPrecision → 40]
Out[•]= 0.80162214512592827089367660796958223628 11

In[•]:= RealDigits[r][[1]] // Length
Out[•]= 40

In[•]:= cf = ContinuedFraction[r]
Out[•]= {0, 1, 4, 24, 2, 5, 1, 1, 4, 8, 1, 2, 3, 1, 2, 1, 1,
  1, 1, 9, 1, 8, 1, 199, 2, 1, 37, 2, 1, 1, 3, 1, 2, 26, 1, 1, 1, 12}

In[•]:= Length /@ IntegerDigits /@ cf
Out[•]= {1, 1, 1, 2, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1,
  1, 1, 1, 1, 1, 1, 3, 1, 1, 2, 1, 1, 1, 1, 1, 1, 2, 1, 1, 1, 2}

In[•]:= N[FromContinuedFraction[cf], 50]
Out[•]= 0.994890262166020631377412494136775425755424020441 25

In[•]:= Total[Length /@ IntegerDigits /@ cf]
Out[•]= 47

In[•]:= N@Mean[Table[
     r = RandomReal[WorkingPrecision → 100000];
     cf = ContinuedFraction[r];
     Total[Length /@ Rest[IntegerDigits /@ cf]],
     {1000}
    ] / 100000]
Out[•]= 1.11909
```

In[•]:=
```
Plot[ContinuedFraction[x][[2]], {x, 0, 1}, PlotPoints → 1000]
```

Out[•]=



In[•]:=
```
N@Sum[ (10^(1-n) - 10^-n) (n - Log[10, 10^(1-n) - 10^-n]), {n, 1, 200}]
```

In[•]:=
```
N@Sum[ (10^(1-n) - 10^-n) n, {n, 1, 200}]
```

Out[•]= 1.11111

In[•]:=
```
ContinuedFraction[0.010000001]
```

Out[•]= {0, 99, 1, 99 999}