Novel recruitment method

Some time ago Google advertised for employees by using the following message on a roadside billboard: '[first 10-digit prime found in consecutive digits of *e*].com'
That is, potential employees had to locate the first occurrence of a 10-digit prime number in consecutive digits of the mathematical constant *e*. This number gave the web address of a more difficult mathematical question.

How do we find this 10-digit prime number? *Mathematica* has the necessary functions to make this relatively easy.

The function RealDigits[*x, b, len*] gives *len* digits of the number *x* in base *b.* Hence the first 10 digits of *e* in base 10 is obtained from:

```
In[2]:= RealDigits[e, 10, 10]
Out[2]= {{2, 7, 1, 8, 2, 8, 1, 8, 2, 8}, 1}
```

The 10 digits are shown together with the number of digits in the integer part (1). We can then form the 10-digit number by first extracting the list of digits

```
In[3]:= RealDigits[e, 10, 10][[1]]
Out[3]= {2, 7, 1, 8, 2, 8, 1, 8, 2, 8}
```

followed by applying the function FromDigits:

```
In[4]:= FromDigits[RealDigits[e, 10, 10][[1]]]
Out[4]= 2 718 281 828
```

which we can test for primality using PrimeQ:

```
In[5]:= PrimeQ[FromDigits[RealDigits[e, 10, 10][[1]]]]
Out[5]= False
```

Now we need to be able to extract 10 consecutive digits commencing at an arbitrary position.

We do this using RealDigits[*x, b, len, n*] which gives len digits starting with the coefficient of b^n.

We create a function with argument *j* to start the 10 digits at position 10^j:

edigits[j_]:=RealDigits[*e*,10,10,-j]

We can use a For statement to repeat the process until we locate the first 10-digit prime.

The counter *i* is set initially to 0 and incremented by 1 provided the 10-digit number is not prime; the process stops when a prime number is found.

```
In[6]:= For[i = 0, PrimeQ[FromDigits[RealDigits[e, 10, 10, -i][[1]]]] == False, i++];
```

We use this incremented value of *i* to give the 10-digit prime:

```
In[7]:= FromDigits[RealDigits[e, 10, 10, -i][[1]]]
Out[7]= 7 427 466 391
```

Thus 7427466391 is the first 10-digit prime from consecutive digits of *e*.

Here are the first 120 digits of *e* with the 10-digit prime in red:

```
N[e, 120]
```

```
2.71828182845904523536028747135266249775
72470936999595749669676277240766303535 47
59457138217852516642 7427466391 9320030599
```