

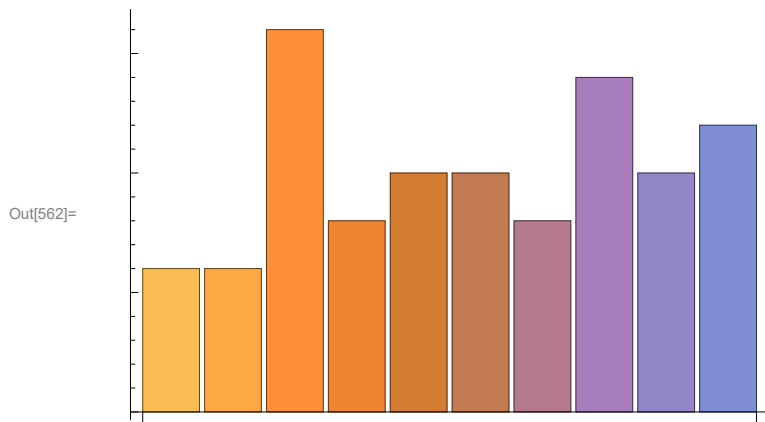
(* Simulate equipartition for the number e at levels 1 and 2 *)

```
In[556]:= (* Decimal expansion of e, small *)
e = RealDigits[E, 10, 50]; (* number, base, length of digits *)
smallE = e[[1]];
f[n_] := N[ $\sum_{k=1}^{\text{Length}[\text{smallE}]} \text{If}[\{\text{smallE}[[k]]\} == \{n\}, 1, 0] / (\text{Length}[\text{smallE}])]$ 
equipartition = {};

In[560]:= For[i = 0, i < 10, i++, AppendTo[equipartition, f[i]]];
equipartition
```

Out[561]= {0.06, 0.06, 0.16, 0.08, 0.1, 0.1, 0.08, 0.14, 0.1, 0.12}

```
In[562]:= BarChart[equipartition]
```

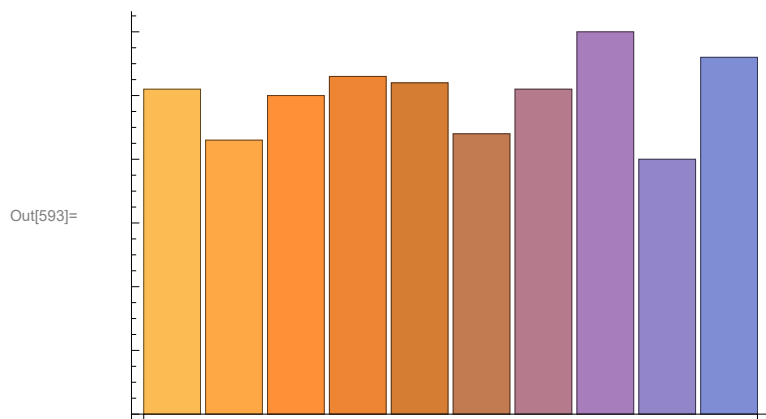


```
In[587]:= (* Decimal expansion of e, medium *)
e = RealDigits[E, 10, 500];
mediumE = e[[1]];
f[n_] := N[ $\sum_{k=1}^{\text{Length}[\text{mediumE}]} \text{If}[\{\text{mediumE}[[k]]\} == \{n\}, 1, 0] / (\text{Length}[\text{mediumE}])]$ 
equipartitionMedium = {}
For[i = 0, i < 10, i++, AppendTo[equipartitionMedium, f[i]]];
equipartitionMedium
```

Out[590]= {}

Out[592]= {0.102, 0.086, 0.1, 0.106, 0.104, 0.088, 0.102, 0.12, 0.08, 0.112}

In[593]:= **BarChart**[{equipartitionMedium}]



In[595]:= (* Decimal expansion of e, large *)
 e = RealDigits[E, 10, 5000];
 largeE = e[[1]];

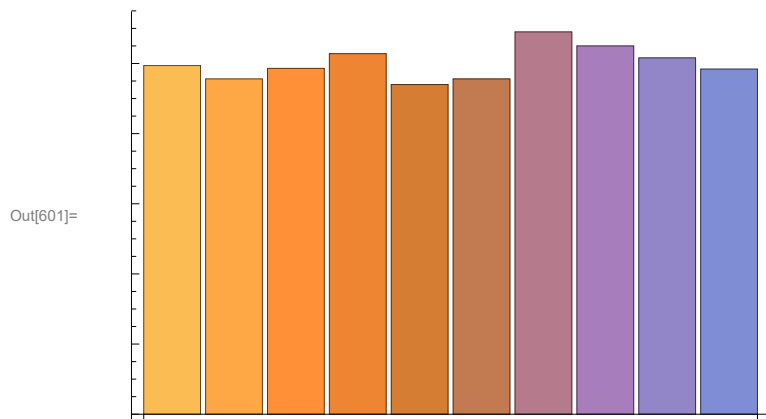
$$f[n_] := N\left[\sum_{k=1}^{\text{Length}[\text{largeE}]} \text{If}[\{\text{largeE}[[k]]\} = \{n\}, 1, 0] / (\text{Length}[\text{largeE}])\right]$$

In[598]:= equipartitionLarge = {}
 For[i = 0, i < 10, i++, AppendTo[equipartitionLarge, f[i]]];
 equipartitionLarge

Out[598]= {}

Out[600]= {0.0994, 0.0956, 0.0986, 0.1028, 0.094, 0.0956, 0.109, 0.105, 0.1016, 0.0984}

In[601]:= **BarChart**[{equipartitionLarge}]

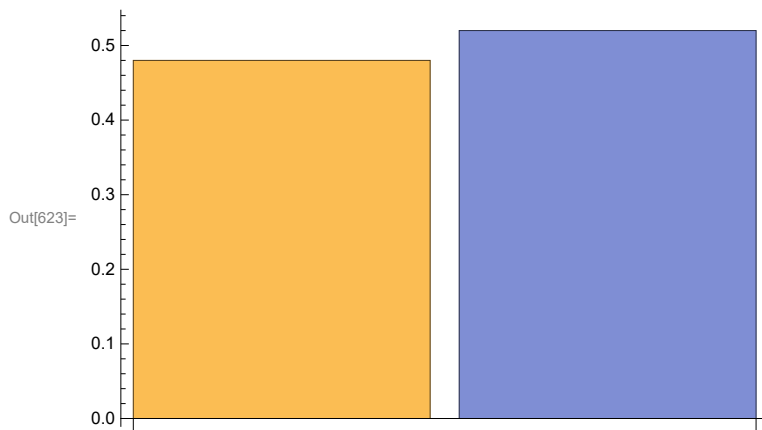


```
In[617]:= (* Binary expansion of the number e, small, level 1 *)
e = RealDigits[E, 2, 50];
smallE = e[[1]];
equipartitionSmall = {}
f[n_] := N[ $\sum_{k=1}^{\text{Length}[\text{smallE}]} \text{If}[\{\text{smallE}[[k]]\} == \{n\}, 1, 0] / (\text{Length}[\text{smallE}])]$ 
For[i = 0, i < 2, i++, AppendTo[equipartitionSmall, f[i]]];
```

```
In[622]:= equipartitionSmall
```

```
Out[622]= {0.48, 0.52}
```

```
In[623]:= BarChart[{equipartitionSmall}]
```



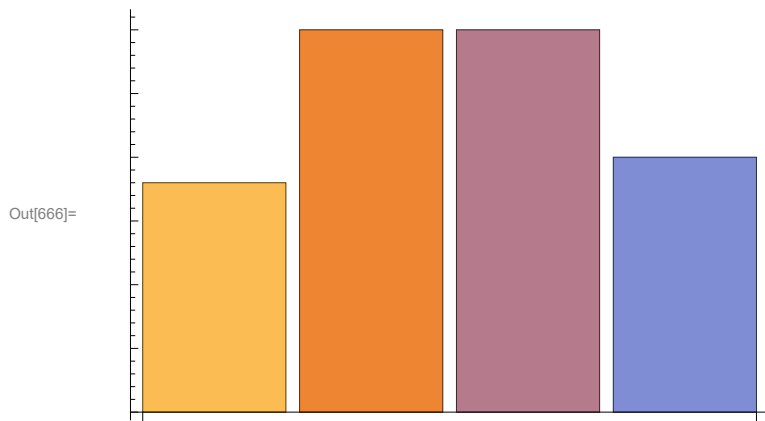
```
(* Binary expansion of the number e, small, level 2 *)
```

```
e = RealDigits[E, 2, 50]
```

```
In[658]:= smallE = e[[1]];
equipartitionSmall = {};
f[n_, m_] :=
N[ $\sum_{k=1}^{\text{Length}[\text{smallE}]-1} \text{If}[\{\text{smallE}[[k]], \text{smallE}[[k+1]]\} == \{n, m\}, 1, 0] / (\text{Length}[\text{smallE}])]$ 
AppendTo[equipartitionSmall, f[0, 0]];
AppendTo[equipartitionSmall, f[0, 1]];
AppendTo[equipartitionSmall, f[1, 0]];
AppendTo[equipartitionSmall, f[1, 1]];
equipartitionSmall
```

```
Out[665]= {0.18, 0.3, 0.3, 0.2}
```

In[666]:= BarChart[{equipartitionSmall}]

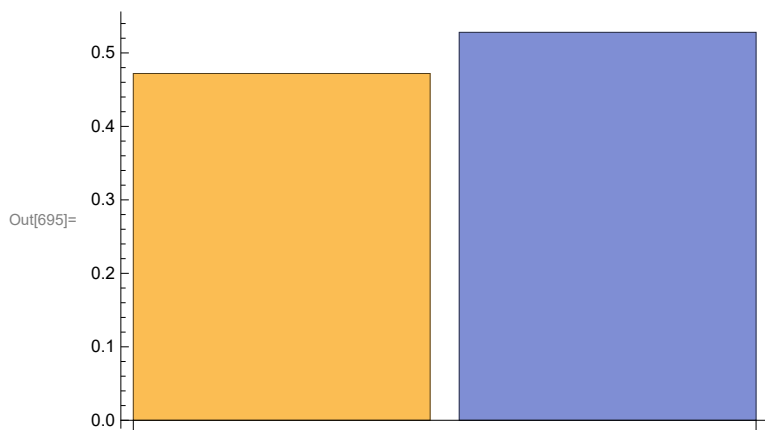


```
(* Binary expansion of the number e, medium, level 1 *)
e = RealDigits[E, 2, 500];
smallE = e[[1]]; (* should have been named mediumE *)
equipartitionSmall = {}
f[n_] := N[ $\sum_{k=1}^{\text{Length}[smallE]} \text{If}[\{smallE[[k]]\} == \{n\}, 1, 0] / (\text{Length}[smallE])]$ ]
For[i = 0, i < 2, i++, AppendTo[equipartitionSmall, f[i]]];
equipartitionSmall
```

Out[691]= {}

Out[694]= {0.472, 0.528}

In[695]:= BarChart[{equipartitionSmall}]



```
(* Binary expansion of the number e, medium, level 2 *)
e = RealDigits[E, 2, 500];
mediumE = e[[1]];
equipartitionMedium = {}
```

Out[719]= {}

```
In[720]:= f[n_, m_] :=
  N[
$$\sum_{k=1}^{\text{Length}[\text{mediumE}]-1} \text{If}[\{\text{mediumE}[[k]], \text{mediumE}[[k+1]]\} == \{n, m\}, 1, 0] / (\text{Length}[\text{mediumE}])];$$

```

```
In[722]:= equipartitionMedium = {}
```

```
Out[722]= {}
```

```
In[723]:= AppendTo[equipartitionMedium, f[0, 0]];
AppendTo[equipartitionMedium, f[0, 1]];
AppendTo[equipartitionMedium, f[1, 0]];
AppendTo[equipartitionMedium, f[1, 1]];
equipartitionMedium
```

```
Out[727]= {0.218, 0.252, 0.254, 0.274}
```

```
In[731]:= equipartitionMedium
```

```
Out[731]= {0.218, 0.252, 0.254, 0.274}
```

```
In[734]:= BarChart[{equipartitionMedium}]
```

```
Out[734]=
```

