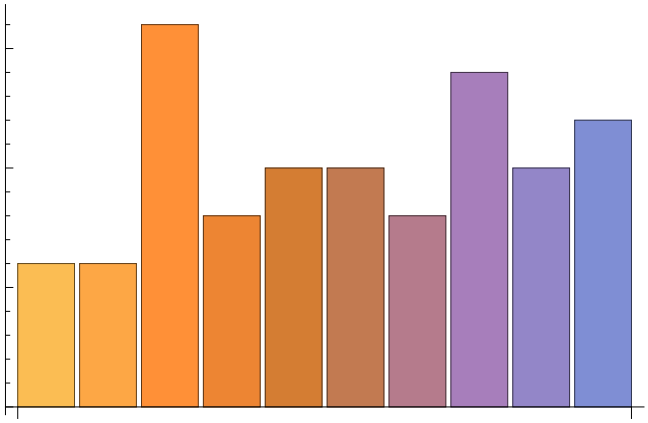
```
(* Simulate equipartition for the number e at levels 1 and 2 *)

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

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

```
{0.06, 0.06, 0.16, 0.08, 0.1, 0.1, 0.08, 0.14, 0.1, 0.12}
```

```
BarChart[{equipartition}]
```

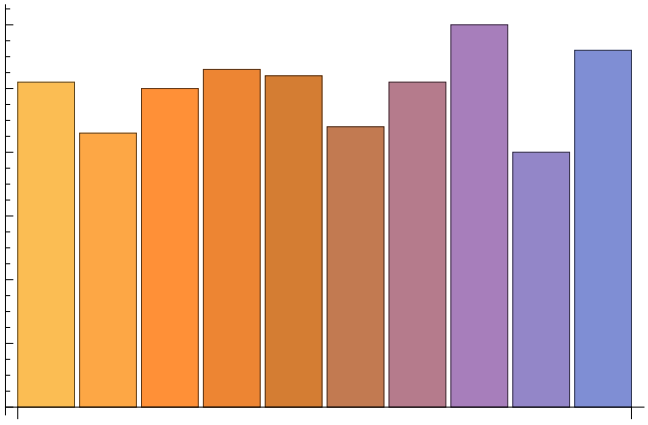


```
(* Decimal expansion of e, medium *)
e = RealDigits[E, 10, 500];
mediumE = e[[1]];
f[n_] := N[ Sum[If[{mediumE[[k]]} == {n}, 1, 0], {k, 1, Length[mediumE]}] / (Length[mediumE])]
equipartionMedium = {}
For[i = 0, i < 10, i++, AppendTo[equipartionMedium, f[i]];];
equipartionMedium
```

```
{}
```

```
{0.102, 0.086, 0.1, 0.106, 0.104, 0.088, 0.102, 0.12, 0.08, 0.112}
```

```
BarChart[{equipartionMedium}]
```



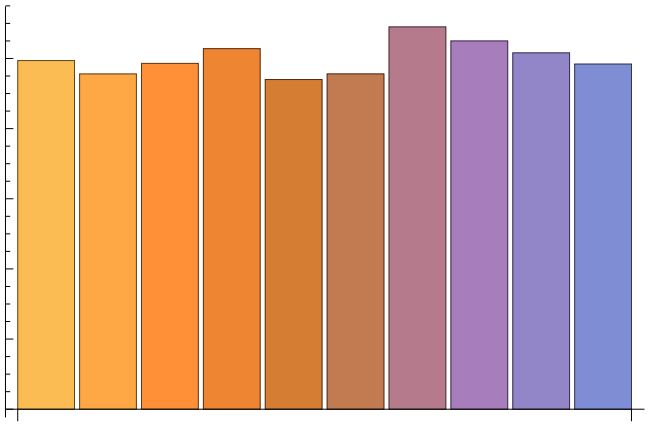
```
(* Decimal expansion of e, large *)
e = RealDigits[E, 10, 5000];
largeE = e[[1]];
f[n_] := N[ Sum_{k=1}^{Length[largeE]} If[{largeE[[k]]} == {n}, 1, 0] / (Length[largeE]) ]

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

```
{}
```

```
{0.0994, 0.0956, 0.0986, 0.1028, 0.094, 0.0956, 0.109, 0.105, 0.1016, 0.0984}
```

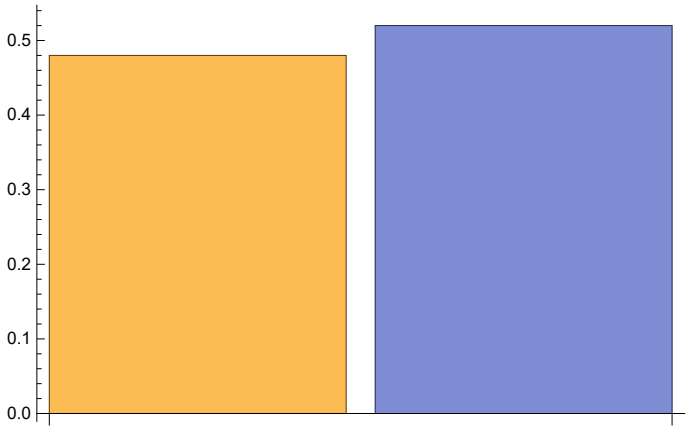
```
BarChart[{equipartitionLarge}]
```



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

```
{0.48, 0.52}
```

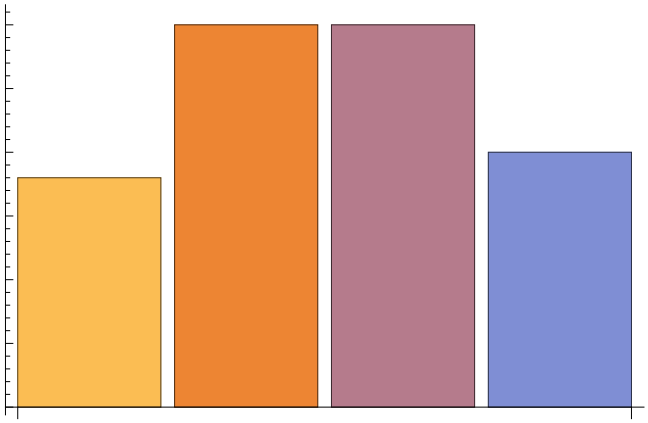
```
BarChart[{equipartitionSmall}]
```




```
(* Binary expansion of the number e, small, level 2 *)
e = RealDigits[E, 2, 50]
smallE = e[[1]];
equipartitionSmall = {};
f[n_, m_] :=
  N[ ∑_{k=1}^{Length[smallE]-1} If[{smallE[[k]], smallE[[k + 1]]} == {n, m}, 1, 0] / (Length[smallE] - 1)];
AppendTo[equipartitionSmall, f[0, 0]];
AppendTo[equipartitionSmall, f[0, 1]];
AppendTo[equipartitionSmall, f[1, 0]];
AppendTo[equipartitionSmall, f[1, 1]];
equipartitionSmall
```

```
{0.18, 0.3, 0.3, 0.2}
```

```
BarChart[{equipartitionSmall}]
```

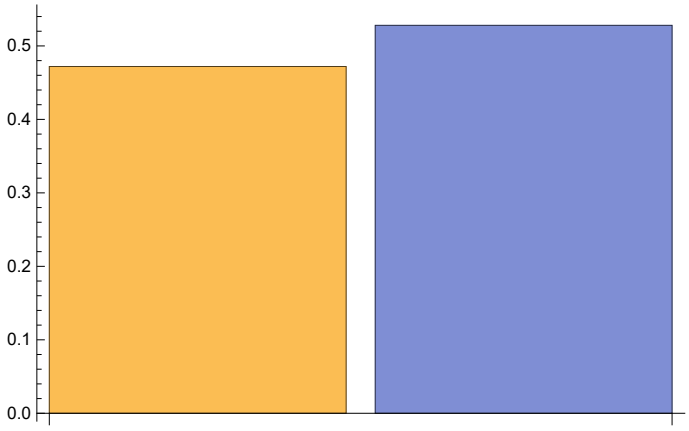


```
(* Binary expansion of the number e, medium, level 1 *)
e = RealDigits[E, 2, 500];
smallE = e[[1]]; (* should have been named mediumE *)
equipartitionSmall = {}
f[n_] := N[ Sum[If[{smallE[[k]]} == {n}, 1, 0], {k, 1, Length[smallE]}] / (Length[smallE])]
For[i = 0, i < 2, i++, AppendTo[equipartitionSmall,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

```
{}
```

```
{0.472, 0.528}
```

```
BarChart[{equipartitionSmall}]
```




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

```
{}
```

```
f[n_, m_] := N[
    Sum[If[{mediumE[[k]], mediumE[[k + 1]]} == {n, m}, 1, 0], {k, 1, Length[mediumE] - 1}] / (Length[mediumE] - 1)];

equipartionMedium = {}
```

{}

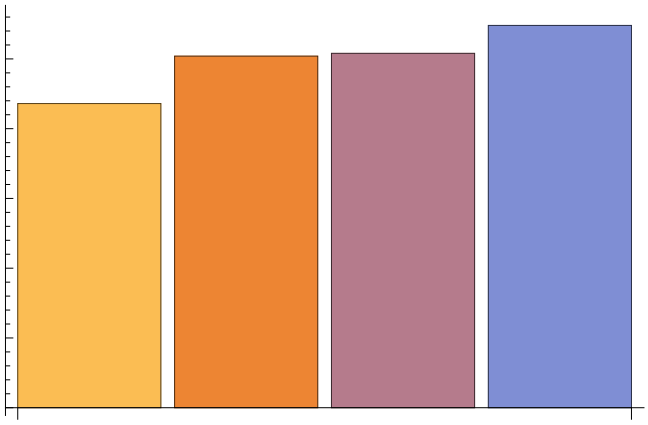
```
AppendTo[equipartitionMedium, f[0, 0]];
AppendTo[equipartitionMedium, f[0, 1]];
AppendTo[equipartitionMedium, f[1, 0]];
AppendTo[equipartitionMedium, f[1, 1]];
equipartitionMedium
```

{0.218, 0.252, 0.254, 0.274}

```
equipartitionMedium
```

{0.218, 0.252, 0.254, 0.274}

```
BarChart[{equipartitionMedium}]
```



In[43]:=
```
(* Binary expansion of the number e, large, level 1 *)
equipartitionLarge = {}
```

Out[43]= {}

In[37]:=
```
largeEDigits = RealDigits[E, 2, 5000];
```

In[38]:=
```
largeE = largeEDigits[[1]];
```

In[40]:=
```
f[n_] := N[Sum[If[{largeE[[k]]} == {n}, 1, 0], {k, 1, Length[largeE]}] / (Length[largeE])];
```

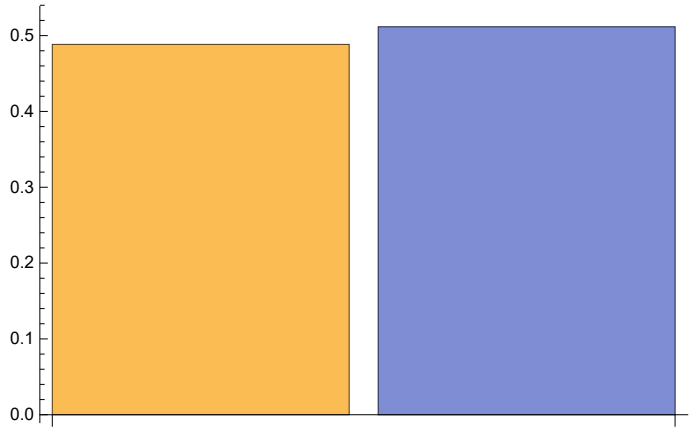
In[44]:=
```
For[i = 0, i < 2, i++, AppendTo[equipartitionLarge, f[i]];];
```

In[45]:=
```
equipartitionLarge
```

Out[45]= {0.4884, 0.5116}

In[46]:=
```
BarChart[{equipartitionLarge}]
```

Out[46]=



In[47]:=
```
(* Binary expansion for the number E, large, level 2 *)
equipartitionLarge = {}
```

Out[47]= { }

In[48]:=
```
largeE = RealDigits[E, 2, 5000];
```

In[49]:=
```
e = largeE[[1]];
```

In[60]:=
```
f[n_, m_] := N[ Sum[If[{e[[k]], e[[k + 1]]} == {n, m}, 1, 0], {k, 1, Length[e] - 1}] / (Length[e] - 1)];
AppendTo[equipartitionLarge, f[0, 0]];
```

In[62]:=
```
AppendTo[equipartitionLarge, f[0, 1]];
```

In[63]:=
```
AppendTo[equipartitionLarge, f[1, 0]];
AppendTo[equipartitionLarge, f[1, 1]];
```

In[65]:=
```
equipartitionLarge
```

Out[65]= {0.243249, 0.245049, 0.245249, 0.266453}

In[66]:=
```
BarChart[{equipartitionLarge}]
```

Out[66]=