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Mathematica Einzeiler

In diesem Abschnitt sollen die vielfältigen Möglichkeiten von *Mathematica* mit sogenannten Einzeilern (oder WenigZeilern) dargestellt werden. Oft benötigt die Beschreibung der Aufgabe mehr Zeit als die Implementation des Code.

Expansion of e

Aufgabe

Finde in der Zahl e (transzendente Zahl, dessen erste Ziffern 2.7182818284.... sind) die ersten 10 aufeinanderfolgenden Ziffern, die eine Primzahl ergeben.

Lösung

```
Select[ Map[ FromDigits, Partition[ First[ RealDigits[ E, 10, 1000]], 10, 1]], PrimeQ, 1]
```

```
{7427466391}
```

Schritt für Schritt Erklärung

Beachte: % entspricht in *Mathematica* dem Output der vorhergehenden Berechnung.

RealDigits[E, 10, 1000] liefert die ersten 1000 Digits der Euler Zahl e zur Basis 10 zusammen mit der Anzahl der Digits, die links vom Dezimalpunkt stehen ...

```
RealDigits[E, 10, 1000]
```

... mit First[#] werden nur die Digits verwendet ...

```
First[%]
```

... mit Partition[#, 10, 1] werden aus dieser Liste 10-er Listen mit jeweils einem Offset von 1 erzeugt ...

```
Partition[%, 10, 1]
```

... mit Map[FromDigits, #] wird auf jedes Element der Liste FromDigits (d.h. produziert aus einer Liste von Integer Ziffern eine Integer Zahl) angewendet ...

```
Map[FromDigits, %]
```

... mit Select[#, PrimeQ, 1] wird die erste Primzahl dieser Liste herausgepickt ...

```
Select[%, PrimeQ, 1]
```

```
{7427466391}
```

Beispiel box-and-whisker plot (package Statistics`StatisticsPlot`)

Aufgabe

Stelle mit folgenden Daten einen Box-and-Whisker Plot dar.

```
datm = Table[Random[], {50}, {5}]
```

```
{{0.818889, 0.333893, 0.307781, 0.168006, 0.664626},
 {0.728246, 0.59918, 0.108263, 0.566337, 0.856539},
 {0.763646, 0.0897583, 0.481441, 0.930606, 0.613962},
 {0.642718, 0.17375, 0.971534, 0.255871, 0.0409865},
 {0.647141, 0.741966, 0.756105, 0.500062, 0.828252},
 {0.408073, 0.448324, 0.332056, 0.163626, 0.679827},
 {0.849144, 0.223793, 0.59729, 0.823288, 0.0854979},
 {0.134035, 0.115849, 0.892682, 0.471536, 0.491317},
 {0.942099, 0.921148, 0.215665, 0.450331, 0.294958},
 {0.179182, 0.45956, 0.950268, 0.466706, 0.771109},
 {0.0112362, 0.618212, 0.30308, 0.0912816, 0.162093},
 {0.394419, 0.70579, 0.267994, 0.0765947, 0.260384},
 {0.589941, 0.375312, 0.605059, 0.769067, 0.647843},
 {0.454164, 0.389394, 0.318736, 0.352885, 0.274982},
 {0.929834, 0.368468, 0.886179, 0.503874, 0.918598},
 {0.750255, 0.583099, 0.412592, 0.756505, 0.355836},
 {0.87731, 0.144598, 0.679911, 0.095452, 0.287368},
 {0.769286, 0.074852, 0.326385, 0.639525, 0.315122},
 {0.685458, 0.00764892, 0.286641, 0.0401398, 0.755624},
 {0.639181, 0.400462, 0.536266, 0.837026, 0.888926},
 {0.817362, 0.123674, 0.0805203, 0.53309, 0.940053},
 {0.979076, 0.40061, 0.437638, 0.652684, 0.209789},
 {0.325758, 0.111253, 0.013159, 0.894667, 0.6403},
 {0.103604, 0.726518, 0.854528, 0.884676, 0.464423},
 {0.326057, 0.318262, 0.0476501, 0.575497, 0.508694},
 {0.194588, 0.96713, 0.0424069, 0.568642, 0.215512},
 {0.56652, 0.604769, 0.915957, 0.00572271, 0.240762},
 {0.493516, 0.902798, 0.111055, 0.600463, 0.389913},
 {0.17628, 0.256528, 0.715787, 0.92549, 0.850223},
 {0.938266, 0.668137, 0.349993, 0.341529, 0.743678},
 {0.701007, 0.307586, 0.772887, 0.528166, 0.134487},
 {0.702817, 0.85693, 0.522444, 0.893725, 0.209301},
 {0.954131, 0.411388, 0.293262, 0.819388, 0.777851},
 {0.15486, 0.577475, 0.893899, 0.927628, 0.216594},
 {0.909338, 0.543905, 0.586099, 0.472916, 0.208331},
 {0.236319, 0.813212, 0.94475, 0.0738433, 0.533501},
 {0.956282, 0.422306, 0.180119, 0.3242, 0.00215059},
 {0.0109181, 0.886857, 0.504812, 0.224299, 0.856058},
 {0.309382, 0.610913, 0.296672, 0.639463, 0.400044},
 {0.0670081, 0.710573, 0.166547, 0.191714, 0.830689},
 {0.897361, 0.221797, 0.11787, 0.297188, 0.941079},
 {0.799491, 0.937752, 0.972988, 0.938929, 0.788573},
 {0.0508948, 0.468176, 0.714629, 0.932515, 0.741513},
```

```
{0.857262, 0.417958, 0.293052, 0.341469, 0.790254},
{0.707385, 0.126505, 0.149755, 0.959565, 0.810024},
{0.904707, 0.0318852, 0.662377, 0.868945, 0.105216},
{0.0941336, 0.689389, 0.930016, 0.316643, 0.0432388},
{0.221214, 0.215387, 0.384128, 0.301726, 0.363951},
{0.79743, 0.0910759, 0.960257, 0.573697, 0.0900446},
{0.964571, 0.810502, 0.614132, 0.280021, 0.0598636}}
```

The box-and-whisker plot is invaluable for gaining a quick overview of the extent of a numeric data set. It takes the form of a box that spans the distance between two quantiles surrounding the median, typically the 25% quantile to the 75% quantile. Commonly, “whiskers,” lines that extend to span either the full data set or the data set excluding outliers, are added. Outliers are defined as points beyond 3/2 the interquantile range from the edge of the box; far outliers are points beyond three times the interquantile range.

Lösung

```
Needs["Statistics`StatisticsPlots`"];
BoxWhiskerPlot[datm, Background -> RGBColor[1, 1, 1]];
```